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HERITAGE AT RISK

Special Edition

Cultural Heritage and Natural Disasters

Risk Preparedness and the Limits of Prevention

Kulturerbe und Naturkatastrophen

Möglichkeiten und Grenzen der Prävention

TUDpress

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МЕЖДУНАРОДНЫЙ СОВЕТ ПО ВОПРОСАМ ПАМЯТНИКОВ И ДОСТОПРИМЕЧАТЕЛЬНЫХ МЕСТ

Cultural Heritage and Natural Disasters

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HERITAGE AT RISK ***Special Edition 2007***

Edited by Hans-Rudolf Meier, Michael Petzet and Thomas Will

TUD*press*

HERITAGE AT RISK ***Special Edition***
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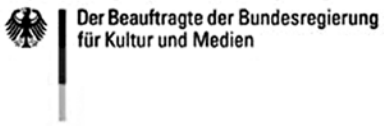

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Front cover: »Earthquake in Lisbon,« colored copperplate engraving by Martin Engelbrecht depicting a paper theater, Augsburg, c. 1760 (photo credit: Sammlung Werner Nekes, Mülheim/Ruhr)
Inside front cover: aerial view of the Lower Ninth Ward after the flood waters receded, 2005 (photo: Ozzy Marcenaro, Malteser International)
Inside back cover: Versailles, Etoile Royale with storm damage (photo credit: Christiane Schmuckle-Mollard, Paris)
Back cover: Assisi, San Francesco, the upper basilica during the earthquake on 27 September 1997 (still from the daily TV news, September 1997)

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Foreword

The ICOMOS Heritage at Risk series, which began publication in 2000 and is now also available over the internet, makes evident that many monuments and sites all over the world are endangered by natural disasters, wars and ethnic conflicts, barbaric acts of destruction, pillage, uncontrolled urban development and general environmental pollution, as well as by neglect, inappropriate restoration and many other factors. This special volume of Heritage at Risk deals exclusively with natural disasters, a subject of particular relevance in view of the threat to our cultural heritage by global climate change.

This publication is the outcome of the conference *Cultural Heritage and Natural Disasters—Risk Preparedness and the Limits of Prevention*, organized by ICOMOS Germany within the framework of the Leipzig Messe's European Conservation Fair *denkmal 2006*, in cooperation with ICCROM (International Center for the Study of Preservation and Restoration of Cultural Property) and the Konferenz Nationaler Kultureinrichtungen (KNK, Conference of National Cultural Institutions). The conference speakers' reports on earthquake, storm and flood disasters—the earthquake in Bam and the consequences of the tsunami in Sri Lanka received special emphasis—are supplemented here with new articles by additional experts in the field and an appendix. The proceedings of the parallel KNK conference, which met jointly with the ICOMOS conference for part of the time, have already been published: Konferenz Nationaler Kultureinrichtungen (ed.), Sicherheit und Katastrophenschutz, Museen, Archive, Bibliotheken, Dresden 2007 (und www.konferenzkultur.de).

The conference, which was kindly supported by the Leipziger Messe (Leipzig Fair), was simultaneously an attempt to give new stimulus to international collaboration within the context of the Blue Shield program and to the efforts of the ICOMOS International Committee on Risk Preparedness (ICORP). I am especially grateful to the authors for their contributions and in particular to my two colleagues in Dresden, Prof. Dr. Hans-Rudolf Meier and Prof. Thomas Will, who not only developed the conference concept but also supervised this publication. Additional thanks go to Dr. Birgit Finger for editorial work, Margaret Thomas Will for translation of the German contributions into English, and Dr. John Ziesemer for proofreading of the English manuscripts. Finally, the

Vorwort

Die seit dem Jahr 2000 erscheinende, auch über das Internet verbreitete ICOMOS-Serie Heritage at Risk zeigt, dass weltweit viele Denkmäler und historische Stätten durch Naturkatastrophen, durch Kriege und ethnische Konflikte, barbarische Akte der Zerstörung, Raubgrabungen, unkontrollierte städtische Entwicklung sowie die allgemeine Umweltverschmutzung bedroht sind, nicht zu vergessen Vernachlässigung des historischen Baubestands, auch verfehlte Restaurierungen und viele weitere Faktoren. Die hier vorgelegte Heritage at Risk Special Edition befasst sich ausschließlich mit Naturkatastrophen, ein Thema, das angesichts der auch unser Kulturerbe bedrohenden weltweiten Klimaveränderung höchst aktuell ist.

Die Publikation ist das Ergebnis der Konferenz Kulturerbe und Naturkatastrophen – Möglichkeiten und Grenzen der Prävention*, eine Konferenz, die von ICOMOS Deutschland im Rahmen der von der Leipziger Messe veranstalteten europäischen Denkmalmesse denkmal 2006 in Kooperation mit ICCROM (International Centre for the Study of Preservation and Restoration of Cultural Property) und der KNK, der Konferenz Nationaler Kultureinrichtungen, veranstaltet wurde. Die Berichte unserer Kollegen über Erdbeben-, Sturm- und Flutkatastrophen – als besondere Schwerpunkte die Berichte über das Erdbeben in Bam und die Folgen des Tsunami in Sri Lanka – sind in der vorliegenden Publikation durch zusätzliche Beiträge und einen Anhang ergänzt worden. Die Ergebnisse der KNK-Konferenz, die in Leipzig zum Teil gemeinsam mit uns tagte, sind bereits veröffentlicht: Konferenz Nationaler Kultureinrichtungen (Hg.), Sicherheit und Katastrophenschutz, Museen, Archive, Bibliotheken, Dresden 2007 (und www.konferenzkultur.de).*

Die dankenswerterweise von der Leipziger Messe unterstützte Konferenz war auch ein Versuch, neue Impulse für die internationale Zusammenarbeit im Rahmen des Blue Shield und für die Tätigkeit des Internationalen ICOMOS-Komitees für Risk Preparedness (ICORP) zu geben. Mein Dank gilt den Autoren für Ihre Beiträge und insbesondere den beiden Dresdner Kollegen Prof. Dr. Hans-Rudolf Meier und Prof. Thomas Will, die nicht nur das Konzept entwickelt, sondern auch die vorliegende Publikation betreut haben. Für die redaktionelle Bearbeitung ist außerdem Frau Dr. Birgit Finger zu danken, für die Übersetzung der deutschen Beiträge ins Englische Frau Margaret Thomas Will und für die Korrektur englischer Manuskripte Herrn Dr. John Ziesemer. Der Dank des Deutschen Nationalkomitees von ICOMOS gilt

German National Committee of ICOMOS extends its appreciation to the German Federal Government Commissioner for Cultural Affairs and the Media for special support of both the conference and this publication.

Michael Petzet
President of ICOMOS

schließlich dem Beauftragten der Bundesregierung für Kultur und Medien, durch den die Konferenz und die vorliegende Publikation besondere Förderung erfahren haben.

Michael Petzet
Präsident von ICOMOS

Thomas Will, Hans-Rudolf Meier

Cultural Heritage and Natural Disasters: Risk Preparedness and the Limits of Prevention

Kulturerbe und Naturkatastrophen. Möglichkeiten und Grenzen der Prävention

Mankind's cultural works have always been threatened not only by the ravages of time and by our own interventions, but also by natural disasters. Certain natural catastrophes have left a lasting mark on cultural history and historic consciousness; the destruction of Pompeii by the eruption of Vesuvius in 79 A. D. comes to mind in this context, as do the earthquakes in Shaanxi (1556), Lisbon (1755), Tokyo (1649 and 1703) and San Francisco (1906), the floods of the Huang He (1887) and the Chang Jiang (1911 and 1931) or the inundation of Florence in 1966.

The number and intensity of natural disasters are expected to rise in the course of the climatic changes now being observed on the earth. Up until recent times, »classic« natural disasters had been perceived as isolated, sudden local or regional events, even if the broader context of their seismic or atmospheric causes was known. But climatic changes have now introduced a new dimension: slow but worldwide transformations, the effects of which can be experienced as a single, global catastrophe that takes many forms and evolves over an extended period of time. Reacting in a timely manner to this diagnosis is the main geopolitical challenge for us and for coming generations.

The ability and the readiness to react to disasters with preventive measures depend not only on the objective natural events themselves, which we are increasingly able to explain, but also on public perception of the disaster as something that is not necessarily far away—as a historic event or an exotic twist of fate—but as something that could occur tomorrow on one's own doorstep. It is clear that the destructive force of natural disasters is now being impressed upon our consciousness in an entirely new way through the almost instantaneous, worldwide depiction of such events by the media. This intensified and accelerated flow of information is also changing our readiness to undertake preventive measures, a readiness that depends not only on technological possibilities but also on our collective ability to remember and learn.

As the signs that natural disasters will be increasingly frequent worldwide continue to accumulate, the question of preventive measures arises more and more often in the field of cultural heritage; immovable cultural property

Seit jeher sind die Kulturschöpfungen der Menschheit nicht nur durch den »Zahn der Zeit« und durch menschliche Eingriffe oder Zerstörungen, sondern auch durch Naturgewalten gefährdet. Einzelne Katastrophenfälle haben die Kulturgeschichte und das historische Bewusstsein nachhaltig beeinflusst, etwa die Zerstörung Pompejis durch den Vesuvausbruch 79 n. Chr., die Erdbeben von Shaanxi 1556, Lissabon 1755, Tokio 1649/1703 und San Francisco 1906, die Überschwemmungen des Huáng Hé 1887 und des Jangtse-Kiang 1911/1931 und das Hochwasser des Arno in Florenz 1966.

Im Zuge der gegenwärtig beobachteten klimatischen Veränderungen auf der Erde wird erwartet, dass Anzahl und Intensität von Naturereignissen, die sich für den Menschen als Katastrophen auswirken, weiter ansteigen. »Klassische« Naturkatastrophen waren bislang als plötzlich hereinbrechende, lokale oder regionale Einzelereignisse wahrnehmbar, auch wenn der größere Zusammenhang ihrer seismischen beziehungsweise atmosphärischen Ursachen bekannt war. Inzwischen fügt der diagnostizierte Klimawandel eine neue, weltumspannende Dimension hinzu: langsame, aber die ganze Erde umfassende Veränderungen, deren Auswirkungen als eine einzige, in vielerlei Formen und über längere Zeit auftretende globale Katastrophe erfahrbar werden könnten. Auf diese Diagnose noch rechtzeitig zu reagieren, stellt die zentrale weltpolitische Herausforderung unserer und kommender Generationen dar.

Die Möglichkeit und Bereitschaft, auf Katastrophen vorbeugend zu reagieren, hängt dabei nicht nur von den objektiven, zunehmend besser erklärbaren Naturereignissen selbst ab, sondern ebenso von der öffentlichen Wahrnehmung der Katastrophe als etwas, das nicht nur in der Ferne, als historischer oder exotischer Schicksalsschlag, sondern bereits morgen vor der eigenen Haustür auftreten kann. Hier ist deutlich geworden, dass die zerstörerische Gewalt von Naturkatastrophen sich heute durch ihre nahezu simultane weltweite Darstellung in den Medien auf ganz neue Weise in das Bewusstsein der Menschen einprägt. Auch die Bereitschaft zur Prävention, die nicht nur von den technischen Möglichkeiten, sondern auch von der kollektiven Erinnerungs- und Lernfähigkeit abhängt, wird sich durch den beschleunigten und verdichteten Informationsfluss wandeln.

(historic buildings, historic cities and open spaces, cultural landscapes) is by nature particularly endangered by disasters. Experiences in this field are still relatively scattered, and there is a great need for clarification of fundamental issues. These include risk assessment; the possibilities and limitations of technical adaptation and retrofitting of historic buildings to withstand disasters and, in this context, the paradox of endangerment through prevention; and ethical aspects of potential conflicts between the urgent protection of people and the protection of cultural property.

In response to the obviously increasing damage caused by disasters in recent years[1] and the dramatic losses of cultural heritage that often accompany these events, numerous organizations, meetings and research projects have turned their attention lately to specific aspects of this topic. A few of these are described briefly below.

– The European Commission has been supporting several international research projects on the triggering mechanisms and behavior of natural and man-made disasters, their effects and possible preventive and remedial measures. Most of the projects study basic phenomena and mechanisms related to natural hazards, without explicitly focusing on the protection of cultural heritage from disasters. However, the results of several of these projects are applicable to effective strategies in the cultural heritage field and provide tools for mapping, monitoring and predicting disasters and their territorial impact. More recently, the 5th and 6th »Framework Programmes« of the European Commission also include several joint research projects specifically dedicated to the cultural heritage:
  The vulnerability of the cultural heritage to natural disasters and similar threats was discussed in workshops by ARCCHIP (the Advanced Research Centre for Cultural Heritage Interdisciplinary Projects).[2]
  FLOODsite, the largest ongoing integrated project, comprising 37 partner organizations from 13 different countries, takes cultural heritage into account in some sections in relation to socio-economic evaluations of flood damage.[3] NOAH'S ARK, supported by a European consortium in seven countries, investigates the influence of climate change on historic buildings and cultural landscapes and formulates strategies for action by conservation managers and policy and

1 According to the World Bank, the number of disaster events grew by 400% between 1975 and 2005. (World Bank Independent Evaluation Group: Hazards of Nature, Risk to Development: An IEG Evaluation of World Bank Assistance for Natural Disasters, Washington D. C. 2006, http://www.worldbank.org/ieg/naturaldisasters/)

2 ARCCHIP Proceedings, 2004/2006, http://www.arcchip.cz

3 Integrated Flood Risk Analysis and Management Methodologies, http://www.floodsite.net/

Mit den sich häufenden Anzeichen, dass Naturkatastrophen weltweit zunehmen werden, stellt sich die Frage nach vorbeugenden Schutzmaßnahmen immer öfter auch im Bereich des Kulturerbes, vor allem für die besonders gefährdeten unbeweglichen Kulturgüter: Baudenkmale, historische Städte und Freiräume, Kulturlandschaften. Hierzu gibt es noch relativ wenige Erfahrungen und einen großen Klärungsbedarf. Dieser reicht von der Risikoeinschätzung über Fragen nach den Möglichkeiten und Grenzen der technischen Anpassung und Aufrüstung historischer Baustrukturen und, damit zusammenhängend, der möglichen Gefährdung durch Prävention, bis zu ethischen Aspekten bei möglichen Konflikten zwischen dem vordringlichen Schutz der Bevölkerung und dem Kulturgüterschutz.

In der Folge der in den letzten Jahren unübersehbar gestiegenen Schadensbilanzen[1] und der damit oftmals einhergehenden dramatischen Verluste im Bereich des kulturellen Erbes haben sich in jüngster Zeit mehrfach Organisationen, Veranstaltungen und Forschungsprojekte einzelnen Aspekten dieses Themas gewidmet. Im Folgenden werden einige wenige beispielhaft erwähnt.

– *Die Europäische Kommission unterstützte mehrere internationale Forschungsprojekte, die sich mit den Ursachen und Abläufen von natürlichen und vom Menschen verursachten Katastrophen, ihren Auswirkungen und möglichen Vorbeuge- und Hilfsmaßnahmen beschäftigen. Die meisten dieser Projekte untersuchen grundlegende Phänomene und Mechanismen von natürlichen Risiken, ohne im Besonderen den Schutz des Kulturerbes vor Katastrophen zu behandeln. Dennoch können die Ergebnisse einiger dieser Projekte effektive Strategien für die jeweiligen Regionen unterstützen. Sie stellen Methoden und Instrumente zur Kartierung, Beobachtung und Vorhersage von Katastrophen sowie ihrer territorialen Wirkungen bereit. Inzwischen wurden und werden im 5. und 6. Rahmenprogramm der Europäischen Kommission mehrere Verbundforschungsprojekte bearbeitet, die spezifisch dem Kulturerbe gewidmet sind:*
  Die Verletzbarkeit des Kulturerbes bei Naturkatastrophen und ähnlichen Bedrohungen wurde im Rahmen der ARCCHIP Projekt-Workshops (Advanced Research Centre for Cultural Heritage Interdisciplinary Projects) diskutiert.[2]
  FLOODsite, das größte der derzeit laufenden integrierten Projekte, das 37 Partnerorganisationen aus 13 verschiedenen Ländern umfasst, berücksichtigt das Kulturerbe in einigen Bereichen in Verbindung mit sozioökonomi-

1 Nach Angaben der Weltbank stieg die Zahl der registrierten Naturkatastrophen zwischen 1975 und 2005 um 400%. (World Bank Independent Evaluation Group: Hazards of Nature, Risk to Development: An IEG Evaluation of World Bank Assistance for Natural Disasters, Washington D. C. 2006 und http://www.worldbank.org/ieg/naturaldisasters/)

2 ARCCHIP Proceedings, 2004/2006, http://www.arcchip.cz

decision makers.[4] This pioneering EC project involves interdisciplinary research in the fields of climate modeling, atmospheric chemistry, atmospheric physics, materials science, conservation, structural engineering, planning, and social and economic impact.
A new international research project, CHEF (Cultural Heritage Protection against Flooding), investigates and documents protective possibilities for movable and immovable cultural heritage in case of floods.

- The European Parliament Report »Protecting the cultural heritage from natural disasters« provides a survey of regulations, tools, programs and practical examples as well as recommendations for the protection of the cultural heritage during natural disasters in the European Union.[5]
- Unlike Europe, where there is no central coordination of programs for disaster emergency measures, in the United States a Federal Emergency Management Agency (FEMA) was established in 1979. In 1995 FEMA and the non-profit national advocacy organization Heritage Preservation founded the Heritage Emergency National Task Force, a partnership of 36 national organizations and federal agencies, to help promote preparedness and mitigation measures and provide expert information on response and salvage. The task force's best known resource, the Emergency Response and Salvage Wheel, is used by cultural institutions worldwide.[6]
- ICCROM has issued a »Management Manual on Risk Preparedness for World Cultural Heritage.«[7]
- In 1994 several cultural organizations, including UNESCO, ICCROM, ICOMOS, ICOM, ICA and IFLA, initiated the International Inter-Agency Task Force (IATF) for Risk Preparedness for Cultural Heritage, which created the International Committee of the Blue Shield (ICBS) in 1996.[8]

With knowledge of these diverse efforts, but as a more concrete response to the most recent major natural disasters, the German National Committee of ICOMOS organized an international conference in October 2006 on »Cultural Heritage and Natural Disasters—Risk Preparedness and the Limits of Prevention.« In order to extend the discus-

4 NOAH'S ARK, Global Climate Change Impact on Built Heritage and Cultural Landscapes, FP 6 European Research Project, consortium partners: C. Sabbioni, M. Cassar, P. Brimblecombe, J. Tidblad, R. Kozlowski, M. Drdácký, C. Saiz-Jimenez, T. Grøntoft, I. Wainwright and X. Ariño. First reports are published on http://noahsark.isac.cnr.it

5 Miloš Drdácký/Luigia Binda/Ivo Herle/Luca Giovanni Lanza/Ingval Maxwell/Stanislav Pospíšil: Protecting the cultural heritage from natural disasters. European Parliament Study IP/B/CULT/IC/2006_163, Brussels 2007 and www.europarl.europa.eu/activities/expert/eStudies.do

6 Drdácký (note 5), p. 13.

7 Herb Stovel: Risk Preparedness: a Management Manual for World Cultural Heritage, Rome, ICCROM 1998.

8 http://www.icbs.com

schen Bewertungen von Flutschäden.[3] NOAH'S ARC, getragen von einem Europäischen Konsortium in sieben Ländern, untersucht den Einfluss des Klimawandels auf Baudenkmale und Kulturlandschaften und formuliert Handlungsstrategien.[4]
Ein neues internationales Verbundforschungsprojekt, CHEF (Cultural Heritage Protection Against Flooding), erforscht und dokumentiert auf breiter Basis Schutzmöglichkeiten für bauliche und bewegliche Kulturgüter bei Hochwasserereignissen.

- *Eine Bestandsaufnahme von Regelungen, Instrumenten, Programmen, praktischen Beispielen sowie Empfehlungen für die Europäische Union liefert die Studie des Europäischen Parlaments: Schutz des kulturellen Erbes vor Naturkatastrophen.[5]*
- *Anders als in Europa, wo keine zentrale Koordinierung der Notfallmaßnahmen bei Katastrophen existiert, arbeitet in den Vereinigten Staaten seit 1979 die Federal Emergency Agency (FEMA). Im Jahr 1995 bildete sie zusammen mit Heritage Preservation die Heritage Emergency National Task Force, eine Vereinigung von 36 nationalen Organisationen und bundesstaatlichen Agenturen, um Maßnahmen zur Vorsorge und Schadensminderung zu unterstützen und Expertenwissen zur Rettung zu vermitteln. Ihr am besten bekanntes Arbeitsinstrument, die »Drehscheibe für Notfallmaßnahmen und Bergung«, wird von Kulturinstitutionen weltweit genutzt.[6]*
- *ICCROM veröffentlichte einen Managementplan zur Risikovorsorge für das Weltkulturerbe.[7]*
- *Im Jahr 1994 initiierten verschiedene Kulturorganisationen, darunter die UNESCO, ICCROM, ICIOMOS, ICOM, ICA und IFLA, die International Inter-Agency Task (IATF) für Risikovorsorge für Kulturerbe, die 1996 The International Committee of the Blue Shield (ICBS) gründete.[8]*

Vor diesem Horizont, aber konkret angeregt von den jüngsten Großereignissen, die auch Kulturdenkmale betreffen, veranstaltete das Deutsche Nationalkomitee von ICOMOS im Oktober 2006 eine internationale Tagung zu »Kulturerbe und Naturkatastrophen – Möglichkeiten und Grenzen der Prävention«. Um die genannten Themen nicht nur fach-

3 Integrated Flood Risk Analysis and Management Methodologies, http://www.floodsite.net/

4 NOAH'S ARC, Global Climate Change Impact on Built Heritage and Cultural Landscapes, FP 6 European Research Project, Consortium partners: C. Sabbioni, M. Cassar, P. Brimblecombe, J. Tidblad, R. Kozlowski, M. Drdácký, C. Saiz-Jimenez, T. Grøntoft, I. Wainwright and X. Ariño. Erste Ergebnisse sind publiziert in: http://noahsark.isac.cnr.it

5 Miloš Drdácký/Luigia Binda/Ivo Herle/Luca Giovanni Lanza/Ingval Maxwell/Stanislav Pospíšil: Schutz des kulturellen Erbes vor Naturkatastrophen, hg. vom Europäischen Parlament, Ausschuss für Kultur und Bildung, Studie IP/B/CULT/IC/2006_163, Brüssel 2007.

6 Ebd., S. 16.

7 Herb Stovel: Risk Preparedness: a Management Manual for World Cultural Heritage, Rome, ICCROM 1998.

8 http://www.icbs.com

sion beyond highly specialized or regional aspects and ensure an interdisciplinary and international perspective, ICOMOS arranged cooperation with the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM, Rome) and the Konferenz Nationaler Kultureinrichtungen (KNK, Conference of National Cultural Institutions) in Germany.[9] Up-to-date reports, based in part on recent disasters in various parts of the world, served to define conceptual, technical and organizational aspects of the theme. Issues of paramount importance that the speakers were asked to address included:

What are the long-term consequences of recent disasters in terms of cultural heritage protection?

Within the framework of post-disaster reconstruction, what lessons can be learned regarding precautionary measures?

Where are the limits of safety and feasibility, and to what degree should vulnerability be accepted?

How should the possible benefits of technical protective measures be weighed against their adverse side effects on cultural property?

How can high-tech solutions be evaluated in comparison to traditional methods (retrofitting vs. authenticity)?

It is becoming increasingly clear that the questions we dealt with in Leipzig need further research and discussion. While there are numerous useful reports concerning stabilization and repair of cultural sites in the aftermath of disasters, there is still rather limited knowledge regarding active prevention or, significantly, the social, economic and technical limitations of preventive measures. This publication of the Leipzig conference proceedings, supplemented by contributions from guest authors with particular experience in the field, is intended to fill a gap by picking up at the critical point where accounts of natural disasters often end. Such reports tend on the one hand to document the disaster itself—often reflecting the dramatic impression such an event makes—or on the other hand to focus on often admirable reconstruction work. In contrast, the social, economic, cultural and ecological considerations of long-term preventive measures are less spectacular, but are all the more important in the long run. The following articles are meant to contribute individual, if not

9 The proceedings of the KNK conference organized parallel to the ICOMOS meeting have been published: Konferenz nationaler Kultureinrichtungen (ed.): Sicherheit und Katastrophenschutz für Museen, Archive und Bibiliotheken, Dresden 2007 and www.konferenz.kultur.de

oder regionalspezifisch, sondern in einer interdisziplinären und internationalen Perspektive zu erörtern, wurde eine Kooperation mit dem International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM, Rom) und der Konferenz Nationaler Kultureinrichtungen (KNK) in Deutschland vereinbart.[9] Ausgehend von jüngsten Schadensereignissen in aller Welt dienten aktuelle Berichte dazu, die konzeptionellen, technischen und organisatorischen Aspekte des Themas zu umreißen. Übergeordnete Fragestellungen, die sich an alle Referenten richteten, waren:

Welche weiterführenden Konsequenzen haben jüngere Katastrophenereignisse für den Schutz des kulturellen Erbes?

Welche Lehren lassen sich im Rahmen des Wiederaufbaues für Vorsorgemaßnahmen ziehen?

Wo liegen die Grenzen der Sicherheit und der Machbarkeit, wo sind sie gegebenenfalls zu ziehen?

Wie geschieht die Abwägung zwischen technischen Schutzmaßnahmen und ihren schädlichen Nebenwirkungen?

Wie sind High-Tech-Lösungen im Vergleich zu traditionellen Methoden zu bewerten?

In jüngster Zeit hat sich erneut gezeigt, wie sehr diese in Leipzig behandelten Fragen der weiteren Forschung und Verständigung bedürfen. Den zahlreichen fundierten Erfahrungsberichten, die zur Sicherung und Instandsetzung von Kulturdenkmalen nach Katastrophenfällen vorliegen, stehen nach wie vor relativ wenige Erkenntnisse gegenüber, wie weit eine aktive Prävention in diesem Bereich überhaupt möglich ist, beziehungsweise wo eine solche auch ihre sozialen, ökonomischen oder technischen Grenzen finden muss. Die vorliegende Publikation der Tagungsreferate, ergänzt durch Beiträge profilierter Gastautoren, möchte fachübergreifend an jener Konfliktstelle ansetzen, wo die Berichte über Katastrophenfälle oft enden, weil sie einerseits unter dem dramatischen Eindruck des Unglücks die Katastrophe selbst dokumentieren, andererseits die oft bewundernswerten Wiederaufbauleistungen in den Blickpunkt rücken. Die sozialen, ökonomischen, kulturellen und ökologischen Abwägungen bei langfristigen Präventionsmaßnahmen sind demgegenüber weniger spektakulär, aber langfristig umso bedeutender. Sie verdienen deshalb eine vertiefte Diskussion, zu der die nachfolgenden Beiträge einzelne, freilich noch nicht systematisch aufeinander bezogene Erkenntnisse beisteuern möchten.

9 *Die Ergebnisse der kooperativ von der KNK veranstalteten Tagung sind bereits veröffentlicht: Konferenz nationaler Kultureinrichtungen (Hg.): Sicherheit und Katastrophenschutz für Museen, Archive und Bibliotheken, Dresden 2007 und www.konferenz-kultur.de*

yet systematically interrelated, findings on these issues to the in-depth discussion which they deserve.

This volume is divided into four sections. The first, »Disasters and Society: The Task of Prevention,« is devoted to the historic, philosophic and socio-economic foundations of the topic. The following two sections offer thematic contributions and case studies of precautionary strategies for earthquake, storm and flood disasters. In the final section several authors discuss the long-term perspectives for preventive protection of our built cultural heritage in a time of increasing natural disasters. The appendix includes the texts of selected international resolutions on the theme, as well as bibliographic references and a list of the authors.

At the Leipzig conference several crucial, interdisciplinary aspects of our theme were treated primarily in discussions and the concluding statements. These points are touched upon below as an introduction to the more specialized contributions that follow.

Der Band ist in vier Abschnitte gegliedert. Ein erstes Kapitel »Katastrophe und Gesellschaft. Prävention als Aufgabe« widmet sich den historischen, philosophischen und sozioökonomischen Grundlagen des Themas. Die folgenden beiden Kapitel versammeln thematische Beiträge und Fallstudien zu vorbeugenden Strategien bei Erbeben, Sturm- und Flutkatastrophen. Abschließend zeigen einige Autoren Langzeitperspektiven auf, wie sie für einen präventiven Schutz des baulichen Kulturerbes im Hinblick auf zunehmende Katastrophenereignisse geboten erscheinen. Im Anhang folgen ausgewählte Texte internationaler Resolutionen zum Thema, sowie Hinweise zur Literatur und den Autoren.

Einzelne zentrale und übergreifende Aspekte unseres Themas wurden während der Tagung vor allem in den Diskussionen und den Schlussresümees behandelt. Sie sollen hier einführend vor den nachfolgenden Fachbeiträgen angesprochen werden.

Disaster and daily life

How useful is it to consider the goals and methods of heritage conservation from the perspective of the special case »natural disaster«?[10] For one thing, the danger posed by disasters represents only the critical peak—an extreme concentration and acceleration—of the normal dangers that cultural monuments are exposed to everyday by physiochemical or mechanical influences: erosion, decrepitude, wear and tear, and mechanical damage.

Heritage conservation is an outcome of our own reflections on the ubiquitous endangerment of the cultural properties that have been passed down to us over the generations. In this respect the danger posed by disasters merely represents a special case, a heightening of the day-to-day problems of heritage conservation. Nonetheless, the size of natural disasters and their general unpredictability make mitigation a special priority task in the field of heritage conservation. This task should not be considered separately, however, because in crisis situations the everyday problems also can be seen with heightened clarity. Solutions, too, are carried to an extreme. Either they prove successful—or they fail spectacularly. The study of vulnerability in times of crisis therefore offers lessons for everyday practice as well.

10 The reverse question, looking at natural disasters from the special case of the cultural heritage, would be just as relevant but cannot be pursued here. With increasingly certain knowledge that we will not be able to hinder, but at best only reduce the cataclysmic effects of climatic change for the next decades, we will have to put priority on adaptation strategies as well as on the currently discussed avoidance strategies (alterations in emissions, etc.); these strategies will have to be developed by the social and cultural sciences.

Katastrophe und Alltag

Wie sinnvoll ist es, Ziele und Methoden der Denkmalpflege vom Sonderfall der Naturkatastrophe her zu betrachten?[10] Zunächst einmal stellt die Gefährdung durch Katastrophen nur die Zuspitzung, die extreme Verdichtung und Beschleunigung der normalen Gefährdungen dar, denen Kulturdenkmale auch im Alltag durch physikalisch-chemische oder mechanische Einwirkungen ausgesetzt sind: Erosion, Altersschwäche, Abnutzung und Beschädigung.

Denkmalpflege ist ein Ergebnis der Reflexion über die beständig vorhandene Gefährdung der überlieferten Werke. Die Gefahr durch Katastrophen bedeutet insofern nur einen Sonderfall, eine Steigerung der Alltagsprobleme der Denkmalpflege. Die Größe der Schadensereignisse und ihre weitgehende Unvorhersehbarkeit machen jedoch den präventiven Schutz gegen Naturkatastrophen zu einer spezifischen und vorrangigen Aufgabe auch in der Denkmalpflege. Diese Aufgabe sollte aber nicht isoliert betrachtet werden, denn in Krisensituationen erscheinen die alltäglichen Fragestellungen mit verschärfter Klarheit. Lösungsmöglichkeiten werden auf die Spitze getrieben. Sie bewähren sich dann – oder versagen spektakulär. Das Studium der Verwundbarkeit im Krisenfall hält deshalb auch Lehren für den Alltag bereit.

10 Ebenso aktuell, aber an anderer Stelle zu verfolgen wäre die umgekehrte Fragestellung, nämlich Naturkatastrophen vom Sonderfall des Kulturerbes her zu betrachten. In der zunehmend sicheren Erkenntnis, dass sich kataklysmische Auswirkungen des Klimawandels für die nächsten Dekaden nicht mehr verhindern, sondern allenfalls noch dämpfen werden lassen, werden neben den derzeit vorrangig diskutierten Vermeidungsstrategien (verändertes Emissionsverhalten) für die nächsten Dekaden vorrangig Anpassungsstrategien erforderlich sein, die aus dem Bereich der Sozial- und Kulturwissenschaften zu entwickeln sind.

By the same token, historical knowledge developed from everyday experience regarding exposure to dangers and susceptibility to damage is also valuable »prevention capital« from which lessons can be drawn for the more seldom and much less predictable case of a disaster. The built cultural heritage is in itself a storehouse of knowledge about risk reduction that reflects reliable long-term experiences.

Modern analytical engineering methods that are based on universal standards and norms tend to disregard this traditional depository of experience because such knowledge is often tied to special local and regional contexts that may have changed over time or even as a result of a disaster. Just as it makes little sense to specify individual historic building forms or uses as inalterable models for future measures, little success can be expected from concepts based from the outset on the belief that local traditional knowledge systems can be dispensed with.[11]

The related idea that the cultural monument can be seen, as it were, as a needy »patient,« unable to speak for itself, easily overlooks the fact that this heritage, which has often already survived a disaster or two tolerably well, holds tested and often still valid experiences in store for us, from which we can draw lessons that are still useful today. Thus, as we develop mitigation and retrofitting measures, should we not only ask, »What is to be done for the cultural monument in particular?« but also the reverse, »What can be learned from the adaptation techniques and protective precautions that have been passed down through history in the local building stock?« How can this empirical knowledge be applied to contemporary mitigation measures?[12]

Of course this observation should not lead to an idealization of the past, i. e., to the idea, biased by cultural criticism, that because of their empirical development and long history older traditional cultural techniques are as a matter of principle better oriented to the conditions and dangers of nature than modern technology. Here, too, heritage conservation can make differentiations on the basis of its own historic perspective. Thus it is indisputable that the majority of the buildings that are now counted as significant components of our cultural heritage were constructed at a time when no consideration was given, or even could have been given, to building dynamics for earthquake-safe construction. In general these older historic buildings could be expected to have a higher potential for destruction than modern

Umgekehrt bedeutet auch das historische Wissen, wie es aus der Erfahrung mit den alltäglichen Gefährdungen und Schadensanfälligkeiten aufgebaut wurde, ein wertvolles »Präventionskapital«, aus dem es gilt, Lehren zu ziehen für die selteneren, doch umso weniger berechenbaren Katastrophenfälle. Das gebaute Kulturerbe stellt selbst einen Wissensspeicher dar, der auch erprobte Langzeiterfahrungen zur Risikovorsorge beinhaltet.

Moderne ingenieurwissenschaftliche Planungsmethoden, die auf universelle Standards (Normen) gestützt sind, lassen diese traditionellen Erfahrungsspeicher bei ihrer Problemanalyse leicht außer Acht, sind diese doch oftmals an besondere lokale und regionale Zusammenhänge gebunden, die sich mittlerweile oder auch durch die Katastrophe selbst verändert haben. So wenig sinnvoll es deshalb ist, einzelne historische Bau- und Nutzungsformen als unabänderliche Muster für zukünftige Maßnahmen vorzusehen, so wenig erfolgreich werden andererseits Konzepte sein, die auf das ortsgebundene historische Erfahrungswissen von vornherein glauben verzichten zu können.[11]

Die damit zusammenhängende Vorstellung, die das Kulturdenkmal gewissermaßen als hilfsbedürftigen (und unmündigen) »Patienten« betrachtet, übersieht leicht, dass dieses Erbe, das oft schon manche Katastrophe leidlich überstanden hat, selbst erprobte und oftmals weiterhin gültige Erfahrungen bereithält, aus denen auch für heute brauchbare Lehren zu ziehen sind. Bei präventiven Schutz- und Ertüchtigungsmaßnahmen sollte die Frage also nicht nur heißen: Was ist im Besonderen für die Kulturdenkmale zu tun? Sondern auch umgekehrt: Was ist aus den Anpassungstechniken und Schutzvorkehrungen, die im lokalen Baubestand aus der Geschichte überliefert sind, zu lernen? Wie kann dieses Erfahrungswissen gegebenenfalls in zeitgenössische Schutzmaßnahmen übertragen werden?[12]

Diese Beobachtung darf freilich nicht zu einer Verklärung der Vergangenheit führen, zu der kulturkritisch gefärbten Vorstellung, ältere, traditionelle Kulturtechniken seien aufgrund ihrer empirischen Entwicklung und ihres langen Erfahrungswissens prinzipiell besser auf die Bedingungen und Gefahren der Natur ausgerichtet als die moderne Technik. Auch hier kann die Denkmalpflege aufgrund ihres eigenen historischen Horizontes differenzieren. So ist unbestreitbar, dass die Bauwerke, die zum bedeutenden kulturellen Erbe gezählt werden, überwiegend zu einer Zeit erstellt wurden, in der baudynamische Aspekte für eine erdbebensichere Konstruktion noch keine Beachtung fanden und auch nicht finden konnten. Diese älteren historischen Baustrukturen weisen deshalb in der Regel ein höheres Zerstörungspotential

11 See the article by Joseph King and Gamini Wijesurya in this volume.

12 See for example the substantial research being carried out at the Centro Universitario Europeo per i Beni Culturali in Ravello, recently presented in: Ferruccio Ferrigni et al.: Ancient Buildings and Earthquakes. The Local Seismic Culture approach: principles, methods, potentialities (Rischio sismico e patrimonio culturale 1), Bari 2005.

11 Siehe hierzu den Beitrag von Joseph King und Gamini Wijesurya in diesem Band.

12 Grundlegend hierzu etwa die Forschungsarbeiten am Centro Universitario Europeo per i Beni Culturali in Ravello, zuletzt dargelegt in: Ferruccio Ferrigni et al.: Ancient Buildings and Earthquakes. The Local Seismic Culture approach: principles, methods, potentialities (Rischio sismico e patrimonio culturale 1), Bari 2005.

buildings. In practice, however, they often perform better.[13] Nonetheless we are justified in our attempts to develop compatible retrofitting methods that protect this particularly endangered building stock from seismic destruction as well as from damage that can arise from the well-meaning but insensitive application of modern safety standards. So far experience gathered in this field has not been given much consideration in legal and technical guidelines.[14]

Disaster and history

The disaster is an event whose traces can themselves attain monument value. Destruction by a disaster is not a banal accident, the effects of which are cleared away without leaving a trace. Traces of disasters and also the way in which the destruction they cause has been dealt with regularly become a part of the monument landscape. They are recorded as a meaningful layer in the cultural heritage, and they can even take on preventive character themselves, at least in the sense of a warning or admonition.[15]

Conflicts of goals

As with everyday tasks in heritage conservation, disaster mitigation is a question of choice and optimization: what are the most suitable protection and retrofitting procedures in a particular situation? What sounds like a technical question is much more, namely, a task that is governed by different goals or categories of values, as options for action are weighed against their effects on the property to be protected. The fundamental alternative to the adaptation or retrofitting of a historic building—a form of modernization—is always the preservation of its existing state of integrity and vulnerability.

In the field of heritage conservation it is often also necessary to weigh the concerns of monument protection with those of the protection of people or of goods in general, for instance in the context of building regulations for fire protection or safe usage. In case of a disaster, however, these questions arise in quite a different dimension. There are numerous issues in common with the fields of general disaster mitigation and risk management. Ultimately it is a question of risk preparedness or, as a

13 See especially the article by Randolph Langenbach in this volume.

14 The only existing European structural standard (EuroCode-8) on resistance of structures to earthquake loads does not reflect the specific needs of cultural heritage objects. Drdácký (note 5), p. 49.

15 See the article by Hans-Rudolf Meier in this volume.

auf als moderne Gebäude. In der Praxis schneiden sie allerdings oftmals besser ab.[13] Auf jeden Fall ist es berechtigt, denkmalgerechte Ertüchtigungsmethoden zu entwickeln, die diesen besonders gefährdeten Bestand sowohl vor seismischen Zerstörungen wie auch vor den Schäden schützen, die durch die wohlmeinende, aber unsensible Anwendung moderner Sicherheitsstandards entstehen können. In diesem Bereich gemachte Erfahrungen sind bislang noch wenig in rechtliche und technische Regelwerke eingegangen.[14]

Katastrophe und Geschichte

Die Katastrophe ist das Ereignis schlechthin, dessen Spuren als Zeugnis Denkmalwert erlangen können. Die Zerstörung durch eine Katastrophe ist eben kein banaler Unfall, dessen Folgen man möglichst spurlos beseitigt. Spuren von Katastrophen und auch der Umgang mit den Zerstörungen werden deshalb regelmäßig selbst Teil der Denkmallandschaft. Sie schreiben sich als bedeutungsvolle Schicht in das kulturelle Erbe ein und können, zumindest als Warnung oder Mahnung, sogar selbst präventiven Charakter annehmen.[15]

Zielkonflikte

Wie bei den Denkmalaufgaben des Alltags geht es auch beim vorbeugenden Katastrophenschutz um Auswahl und Optimierung: Welches sind die geeignetsten Schutz- und Ertüchtigungsverfahren in der jeweiligen Situation? Was wie eine technische Fragestellung klingt, ist weit mehr, nämlich eine Aufgabe der Abwägung zwischen Handlungsoptionen oder Schutzgütern, die von unterschiedlichen Wertkategorien oder Zielen geleitet wird. Der Anpassung oder Ertüchtigung eines historischen Bauwerks – einer Form der Modernisierung – steht als Möglichkeit grundsätzlich die Bewahrung seines überlieferten Zustandes der Integrität und damit auch seiner Verwundbarkeit gegenüber.

Auch eine Abwägung zwischen den Belangen des Denkmalschutzes, des allgemeinen Sachschutzes und des Personenschutzes ist in der Denkmalpflege häufig erforderlich, etwa bei baugesetzlichen Auflagen des Brandschutzes oder der Verkehrssicherheit. Im Katastrophenfall stellen sich diese Fragen allerdings in einer ganz anderen Dimension. Es ergeben sich zahlreiche Berührungspunkte mit dem Bereich der allgemeinen Katastrophenvorsorge und des Risikomanagements. Letztlich geht es um die Risikobereitschaft oder, als

13 Siehe hierzu den Beitrag von Randolph Langenbach in diesem Band.

14 Die einzige Europäische Norm zur Bemessung von Bauten gegen Erdbebenschäden (EuroCode 8) geht nicht auf die besonderen Anforderungen ein, wie sie bei Baudenkmalen vorliegen. Drdácký (wie Anm. 5), S. 54.

15 Siehe den Beitrag von Hans-Rudolf Meier in diesem Band.

pendant, of a society's need for security. Even though life safety must be given first priority, heritage conservation concerns are not to be handled separately, but rather must be integrated into existing disaster management policies and mechanisms.[16]

Technical flood protection provides a vivid example of the conflicting goals that can occur in this situation. There is a long history of success in flood protection, but the limits of appropriate use of technology have also been revealed. Measures that indisputably serve the safety of the population and its tangible property can cause grave damage to the cultural and natural heritage. Particularly regarding the old cities and cultural landscapes of Europe, it has become apparent that cultural-historical values, as so-called »soft« factors, are the very factors that constitute the identity and thus the attractiveness of a place. This has been made especially clear recently by the increased competition between cities in a dynamic economy that no longer follows the traditional criteria for location. In such situations, with the development of cities and regions depending more than ever on their cultural identity, protective measures that adversely affect the built heritage can trigger negative feedback. Through their unwanted side effects they end up putting themselves in jeopardy.

This conflict between ends and means can be expressed in a generalized way: technical protection measures may increase the safety of a location objectively and subjectively, but they also cause disruptions in the natural or cultural structure upon which the value and integrity of what is being protected or the attractiveness of the place depend (in addition of course to other factors such as access, security, etc.). If technical protection is increased, the resulting effects will usually outweigh the disruptions up to a certain point. However, if this point is exceeded, protective measures will have a negative impact on the intended improvement: the more rigorously they are carried out, the greater their negative impact will be.

The common goal of all those involved must be to avoid a situation in which protective measures, which are often extremely costly, produce negative overall effects. However, this calls for very difficult, interdisciplinary processes of weighing and integrating goals and actions. It is above all necessary to consider the role of cultural monuments as socially and economically effective factors in development planning for a region or community and to integrate cultural heritage concerns into existing disaster mitigation plans and programs.

16 Compare the results of the workshops »Integrating Cultural Heritage into National Disaster Planning, Mitigation and Relief,« Skopje 1997, in: Revival 1998, issue 9.

Pendant, um das Sicherheitsbedürfnis einer Gesellschaft. Auch wenn dem Personenschutz dabei erste Priorität zukommen muss, sollten die Anliegen des Denkmalschutzes nicht separat behandelt, sondern in bestehende Katastrophenschutzpläne und -programme integriert werden.[16]

Ein anschauliches Beispiel für dabei auftretende Zielkonflikte liefert der technische Hochwasserschutz. Er kann auf eine sehr lange Geschichte der Erfolge, aber auch der Grenzen des sinnvollen Technikeinsatzes zurückblicken. Maßnahmen, die unbestreitbar der Sicherheit der Bevölkerung und ihrer Sachwerte dienen, können hier gravierende Schädigungen des kulturellen und natürlichen Erbes verursachen. Nun hat sich, besonders für die alten Städte und Kulturlandschaften Europas, gezeigt, dass gerade die kulturhistorischen Werte, als so genannte »weiche« Standortfaktoren, die Identität und damit auch die Attraktivität eines Ortes ausmachen. Der neue Wettbewerb der Städte in einer dynamischen Wirtschaft, die nicht mehr den herkömmlichen Standortkriterien folgt, hat dies in letzter Zeit besonders deutlich werden lassen. In dieser Situation, wo die Entwicklung vieler Städte und Regionen mehr als bisher von ihrer kulturellen Identität abhängig sein wird, können Schutzmaßnahmen, die das bauliche Erbe beeinträchtigen, eine Art von negativer Rückkopplung auslösen. Sie stellen sich dann mit ihren unerwünschten Nebenwirkungen selbst in Frage.

Man kann diesen Konflikt verallgemeinert so ausdrücken: Die technische Schutzmaßnahme erhöht zwar objektiv und subjektiv die Sicherheit des Standorts. Sie verursacht jedoch Störungen für das natürliche oder kulturelle Gefüge, von dem wiederum der Wert und die Integrität des Schutzobjekts beziehungsweise die Attraktivität des Standorts abhängen (natürlich neben anderen Faktoren wie Erschließung, Sicherheit etc.). Erhöht man die technischen Schutzvorkehrungen, so werden die Schutzeffekte bis zu einem gewissen Punkt die Störungen zunächst meist übertreffen können. Ist dieser jedoch überschritten, wird die Schutzmaßnahme die angestrebte Wertsteigerung des Objektes beziehungsweise des Standortes umso negativer beeinflussen, je rigoroser sie ausgeführt wird.

Solche negativen Gesamteffekte bei den zum Teil sehr kostspieligen Schutzmaßnahmen zu vermeiden, muss gemeinsames Ziel aller Beteiligten sein. Es erfordert jedoch sehr schwierige, ressortübergreifende Abwägungs- und Integrationsprozesse. Dafür ist es vor allem notwendig, bei der Entwicklungsplanung einer Region oder einer Gemeinde die Rolle der Kulturdenkmale auch als sozial und ökonomisch wirksame Faktoren zu berücksichtigen und die Anliegen des Denkmalschutzes in bestehende Katastrophenschutzpläne und Programme einzuarbeiten.

16 Vgl. hierzu Ergebnisse des Workshops »Integrating Cultural Heritage into National Disaster Planning, Mitigation and Relief«, Skopje 1997, in: Revival 1998, Issue 9.

Monument and transience

The built cultural heritage is vulnerable to the forces of nature in many different ways. Monumentally conceived buildings and cities of long-term stability have survived not only time but also numerous disasters in an astonishing manner. Visible traces of a disaster—from patina to partial destruction to ruins—come to represent age value, a value that we experience emotionally, whereas the use value of such monuments has often long since disappeared. Up till the beginning of the Modern Movement the great traditions of architecture were mostly characterized by materials and forms meant to last as long as possible. In western architecture Vitruvian *firmitas* already stood for this: the enduring and the constant as protection against ravaging time. But it is not man's body that calls for this—*utilitas* is enough for the body, and a short-lived structure can also offer that—or man's soul, yearning for beauty, but rather »the rest of the world … [and] nature's actions that are constantly trying to break up, ruin or overturn what man creates.«[17]

This »monumental« cultural heritage, created to endure, is counterbalanced by a multitude of more transitory and also more ephemerally conceived works. They are often still in use, but at the same time are particularly vulnerable. It is difficult to react to these great differences with universally valid principles for preservation. Should one plan more limited protective measures for buildings whose vulnerability is evident (or indeed is even part of their original conception) than for those whose builders quite obviously had in mind for them to withstand great dangers? Or should one take the opposite course and award special protection precisely to these vulnerable works, which as practical buildings were planned for limited duration and resistance, if they have in the meantime attained special meaning for posterity as part of our historic or cultural heritage?

Modern conservation philosophy, with its emphasis on cultural heritage as historical documents, suggests the latter, whereas cultural traditions themselves seem more to follow the first path. Architects and users knew very well how to differentiate between the unique, often tremendous effort needed to create something that endures and the smaller, periodic requirements for repairing shorter-lived buildings again and again or renewing them altogether. We also find this »planned transience« in traditional buildings in the context of disasters. Stone bridges often had wooden middle sections intended as the »point of breakage;« these could be carried off during major floods and then replaced. Mills and other utilitarian buildings located near the water were not always particularly resistant, but rather were often constructed

17 Paul Valery: Eupalinos or the Architect [1921], transl. from the German edition: Eupalinos oder der Architekt, Frankfurt/M. 1973, p. 141.

Monument und Vergänglichkeit

Das bauliche Kulturerbe ist gegenüber den Naturgewalten in sehr unterschiedlicher Weise anfällig. Langfristig stabile, monumental konzipierte Architekturen und Stadtanlagen haben nicht nur die Zeiten, sondern auch zahlreiche Katastrophen in erstaunlicher Weise überdauert. Die sichtbaren Spuren – von der Patina bis zur Teilzerstörung bei der Ruine – verdichten sich dort zu einem für uns emotional erfahrbaren Alterswert, während der Gebrauchswert meist längst gewichen ist. Die großen Traditionen der Baukunst sind bis zum Beginn der Moderne überwiegend durch das möglichst Dauerhafte, im Material und in der Form, gekennzeichnet. Dafür steht in der abendländischen Baukunst schon die vitruvianische firmitas: das Beständige und Beharrende als Schutzwehr gegen die reißende Zeit. Aber nicht der Körper des Menschen erfordert dies – ihm genügt die utilitas, die auch ein kurzlebiges Werk zu bieten vermag –, oder die Seele, die nach Schönheit verlangt, sondern »der Rest der Welt … [und die] Bewegung in der Natur, die immerfort bemüht sind aufzulösen, zu verderben und umzustürzen, was er hervorbringt.«[17]

Diesem auf Dauer angelegten »monumentalen« Kulturerbe steht nun aber eine Vielzahl von vergänglicheren und auch ephemer konzipierten Werken gegenüber. Sie befinden sich oft noch in Gebrauch, sind aber zugleich besonders verwundbar. Es ist schwierig, auf diese großen Unterschiede mit allgemein gültigen Prinzipien für die Denkmalpflege zu reagieren. Sollte man für Werke, deren Verwundbarkeit evident, ja Teil ihrer ureigenen Konzeption ist, geringere Schutzmaßnahmen vorsehen als für solche, deren Erbauer ganz offensichtlich im Sinne hatten, dass sie schweren Gefährdungen standhalten mögen? Oder müsste man umgekehrt vorgehen und gerade den verwundbaren Schöpfungen, die als praktische Werke auf beschränkte Dauer und Widerstandsfähigkeit angelegt waren, besonderen Schutz zusprechen, sofern sie inzwischen als Bestandteil des historischen oder künstlerischen Erbes besondere Bedeutung für die Nachwelt erlangt haben?

Eine moderne, wissenschaftlich-konservatorische Sicht legt den letzteren Schluss nahe, während die kulturellen Traditionen selbst eher dem ersteren Vorgehen zu folgen scheinen. Baumeister und Nutzer wussten sehr wohl zu unterscheiden zwischen der einmaligen, oft gewaltigen Anstrengung, Dauerhaftes zu schaffen, und den kleineren regelmäßigen Erfordernissen, kurzlebigere Werke immer wieder zu reparieren oder auch ganz zu erneuern. Wir finden diese »geplante Vergänglichkeit« bei traditionellen Bauwerken auch im Hinblick auf Katastrophenfälle. Steinbrücken besaßen oft hölzerne Mittelteile als »Sollbruchstellen«, die bei großem Hochwasser abgingen und ersetzt werden konnten. Auch Mühlengebäude oder andere am Wasser gelegene Zweckbauten wurden nicht immer besonders widerstandsfähig, sondern im Gegenteil häufig als »Opferbauten« ausgeführt, um nach den seltenen, aber absehbaren Schadensfällen

17 Paul Valery: Eupalinos oder der Architekt, Frankfurt/M. 1973, S. 141.

as »casualty buildings« that could be readily replaced after the seldom but foreseeable event of damage. Similar precautions involving lightweight construction, used not to withstand disasters (particularly earthquakes) but to evade them by allowing easy, low-grade damage, are found in many parts of Asia.

Conclusions from the final discussion

1. Conservation is a modern phenomenon born out of the need to compensate for the loss of tradition. In an overall perspective, the conservation of historic heritage can be seen as part of the concept of sustainability, which is in turn a rationalized version of earlier patterns of careful treatment of the resources at hand. Plans for sustainability, including precautions against natural disasters, can draw from two different sources today: on the one hand from traditional empirical knowledge (where it still exists), and on the other hand from knowledge of modern analytical sciences. At the intersection of these two approaches, post- or neo-traditionalist strategies are trying to reconstruct the knowledge of traditional methods where these have been buried or lost from practice altogether and to reactivate them in conjunction with the use of modern measures. Numerous cases of disasters in the last decades have made it clear that we must continue to heed and to use the old traditional methods of exercising precaution rather than replacing them with purely scientific procedures that are meant to be universal and therefore tend to give inadequate consideration to social, economic and cultural contexts. But because the empirical knowledge of traditional ways of building is often already forgotten or is threatened by loss at the present time—as the example of Bam shows—it is necessary to verify and to reflect scientifically upon such procedures, which have been proven over the ages, as well as to adapt them to current possibilities.
   These two basic modes of action (empirical-traditional versus analytic-scientific) are more or less analogous to two kinds of reactions following disasters. Both also have a secure place in the history of preservation: whereas in traditional contexts we usually find the desire to restore everything to how it was before (»dov'era e com'era!«[18]), if a break in tradition has already occurred or is sealed by a disaster, there is a desire for new solutions that would prevent any repetition of the damage (»never again!«). Major

18 The motto for the reconstruction of the Campanile in Venice after it had collapsed in 1902.

Folgerungen aus der Schlussdiskussion

1. *Denkmalpflege ist ein Phänomen der Aufklärung und der Moderne, hervorgegangen aus der Notwendigkeit, den Verlust von Traditionen zu kompensieren. In einer Gesamtperspektive ist Denkmalpflege dem Prinzip der Nachhaltigkeit zuzuordnen, einer rational vorausschauenden Handlungsmaxime, die ihrerseits auf ältere Formen des umsichtigen Umgangs mit den verfügbaren Ressourcen zurückgeht. Nachhaltigkeitskonzepte, zu denen die Vorsorge gegen Naturkatastrophen gehört, können heute aus zweierlei Quellen schöpfen: einerseits aus einem traditionellen Erfahrungswissen, wo es noch existiert, andererseits aus den Erkenntnissen der modernen, analytischen Wissenschaften. In der Verknüpfung beider Ansätze suchen post- oder neotraditionalistische Konzepte die Erfahrungen traditioneller Methoden, wo sie verschüttet oder in der Praxis verloren sind, zu rekonstruieren und unter Einbeziehung zeitgenössischer Möglichkeiten zu restituieren.Nach zahlreichen Katastrophenfällen in den letzten Jahrzehnten wurde deutlich, dass es nötig ist, die alten, überlieferten Methoden der Vorsorge weiterhin zu beachten und anzuwenden, anstatt sie gegen rein wissenschaftliche Verfahren zu ersetzen, die strukturell universalistisch angelegt sind und deshalb tendenziell die sozialen, ökonomischen und kulturellen Kontexte nicht ausreichend berücksichtigen. Weil das Erfahrungswissen der traditionellen Bauweisen aber bereits vielfach vergessen ist oder gegenwärtig verloren zu gehen droht – wie am Beispiel von Bam gezeigt wird –, ist es nötig, diese seit Alters erprobten Verfahren heute sowohl wissenschaftlich zu reflektieren und zu verifizieren als auch den heutigen Möglichkeiten anzupassen.*
   Diesen beiden grundsätzlichen Verhaltensweisen (empirisch-traditionell versus analytisch-wissenschaftlich) entsprechen in etwa zwei Arten von Reaktionen nach Katastrophenfällen, die auch in der Geschichte der Denkmalpflege ihren festen Platz haben: Während wir in traditionellen Kontexten meist den Wunsch finden, alles wieder herzustellen so wie es war (»dov'era e com'era!«[18]), gibt es dort, wo ein Traditionsbruch bereits erfolgt ist oder durch die Katastrophe besiegelt wurde, den Wunsch nach neuen Lösungen, die jede Wiederholung des Schadensfalles

18 Motto für den Wiederaufbau des 1902 eingestürzten Campaniles in Venedig.

changes in the structure and the appearance of cities go back to such bursts of innovation in the aftermath of urban fires, floods and earthquake disasters. This was the origin of building regulations introducing fireproof roof coverings, firewalls and eave alignments, set spaces between buildings, protection zones and numerous other changes in building construction. The collective learning process, from which preventive measures arise, will continue to lead to changes in cities and cultural landscapes. Heritage conservation has to adapt to this. Preservationists must participate constructively with their special knowledge when the preservation of surviving, often particularly vulnerable buildings is weighed against modern protective measures that are often combined with problematic interventions in the historic fabric.

2. One way in which historic preservation can specifically contribute to risk awareness and to mitigation of the impact of natural disasters lies in the surviving monuments themselves: in the activation of their mnemonic potential. Monuments that have survived major disasters with more or less damage to their historic fabric need not be robbed of this historic evidence. If we allow such traces to remain during the repair process, then these buildings can, perhaps in combination with written information, vividly promote precautionary behavior.
3. On the level of planning policies and strategies there are very different concepts that are closely related to particular cultural and economic situations. On the one hand we find a tradition of civil disaster protection (cultural property protection, civil defense) that confers special status to cultural property within the hierarchy of objects to be protected, independently of its current market value or use value (for instance, in Switzerland and Canada). On the other hand, disaster prevention is influenced by theoretical models used in the insurance industry. Here cases of damage are considered according to the cost of their reconstruction or their insurance value, which is oriented on their replacement costs. Cultural property does not yet seem to have its own definable status in these models. In contrast, because of the difficulty of putting a value on the non-market nature of many cultural heritage objects or the absence of a replacement price for them, the most important historic buildings, characterized by their uniqueness and often by the vulnerability of their materials, are ranked in terms of their insurance damage assessment beneath mere material property such as industrial complexes or consumer goods (e. g., automobiles). This often results in reluctance by decision makers to invest in mitigation measures for cultural monuments. Without appropriate value assessment we are not able to decide whether a certain »primitive« precautionary measure is, in fact,

ausschließen sollen (»never again!«). Große Veränderungen in der Struktur und im Erscheinungsbild der Städte gehen auf solche Innovationsschübe nach Stadtbränden, Flut- und Erdbebenkatastrophen zurück. So entstanden die Baureglements zur Einführung der feuersicheren Dachdekkungen, der Brandwände und damit der Traufstellung der Dächer, die geregelten Abstandsflächen und Schutzzonen und zahlreiche weitere Veränderungen an den Baukonstruktionen. Der kollektive Lernprozess, aus dem präventive Schutzmaßnahmen entstehen, wird auch weiterhin zu Veränderungen der Städte und Kulturlandschaften führen. Die Denkmalpflege muss sich darauf einstellen. Bei der Abwägung zwischen der Bewahrung des Überlieferten, die oft besondere Verwundbarkeit bedeutet, und neuartigen Schutzvorkehrungen, die oft mit problematischen Eingriffen in den Bestand verbunden sind, sollte sie mit ihrem Fachwissen konstruktiv mitwirken.

2. *Ein spezifischer Beitrag der Denkmalpflege zur Katastrophenvorsorge liegt in den Kulturdenkmalen selbst, in der Aktivierung ihres Erinnerungspotentials. Wenn man Denkmale, die große Schadensereignisse mehr oder weniger beschädigt überstanden haben, ihrer historischen Zeugenschaft nicht völlig beraubt, sondern bei der nötigen Reparaturarbeit einzelne aussagefähige Spuren an den Bauwerken belässt, dann können sie, eventuell ergänzt durch schriftliche Informationen, anschaulich für ein vorsorgliches Verhalten werben.*
3. *Auf der Ebene der Planung und des strategischen Verhaltens gibt es sehr unterschiedliche Konzepte, die eng mit der jeweiligen kulturellen und volkswirtschaftlichen Situation verbunden sind. Auf der einen Seite finden wir eine Tradition des zivilen Katastrophenschutzes (Kulturgüterschutz, Civil Defense), die innerhalb einer Hierarchie der Schutzobjekte den Kulturgütern einen besonderen Status einräumt, unabhängig von ihrem aktuellen Markt- oder Nutzwert (z. B. Schweiz, Kanada). Auf der anderen Seite ist die Katastrophenvorsorge von den Denkmodellen der Versicherungswirtschaft geprägt. Hier werden Schadensfälle nach ihrem an der Wiederherstellung beziehungsweise am Neuanschaffungspreis orientierten Versicherungswert betrachtet. Dabei scheinen Kulturgüter bislang kaum einen definierbaren eigenen Status zu besitzen. Im Gegenteil, aufgrund ihres schwer bezifferbaren Marktwertes oder ihres fehlenden Wiederanschaffungspreises rangieren die wertvollsten von ihnen, die durch Einzigartigkeit, aber oft auch durch materielle Verwundbarkeit gekennzeichnet sind, in der versicherungswirtschaftlichen Schadensbewertung noch unterhalb reiner Sachwerte wie Industrieanlagen und Konsumgüter (z. B. Fahrzeuge). Das führt zu einer gewissen Zurückhaltung der Entscheidungsträger bei Investitionen in präventive Schutzmaßnahmen für Kulturdenkmale. Ohne geeignete Bewertungsverfahren ist es andererseits in diesem Bereich gar nicht möglich zu entscheiden, ob nicht gewisse »primitive« Schutzvorkeh-*

more cost effective in some situations than ambitious retrofitting techniques.[19]

4. Heritage conservation and protection can also contribute to mastering the epochal task of avoiding a global environmental disaster. Admittedly, the field is not able to contribute much to research into the causes and avoidance of natural disasters and has to concentrate on alleviating their destructive symptoms through sensibly administered measures for adaptation, mitigation and retrofitting. With its long tradition of sustainable, multi-generational action, however, heritage conservation can indeed provide impulses that lead beyond its own field. As a discipline that sees its main concern as passing down cultural values, heritage conservation is always conscious of the limitations of its actions and the transience of the works of mankind. With this historical and practical orientation, heritage conservation appears superior to some technical-scientific approaches whose starting point is the universal validity and feasibility of their solutions. This places particular responsibility on the discipline of heritage conservation.

rungen in manchen Situationen kosteneffizienter sind als ambitionierte Ertüchtigungstechniken.[19]

4. *Zur Bewältigung der epochalen Aufgabe, eine globale Umweltkatastrophe zu vermeiden, können auch Denkmalschutz und Denkmalpflege beitragen. Im Bereich der Naturkatastrophen und ihrer Vermeidung steuern sie allerdings nur wenig zur Ursachenforschung bei und müssen sich weitgehend darauf beschränken, die Symptome in ihren zerstörerischen Auswirkungen durch sinnvoll dosierte vorbeugende Anpassungs-, Schutz- und Ertüchtigungsmaßnahmen zu mildern. Mit ihrer langen Tradition des nachhaltigen, generationenübergreifenden Handelns kann die Denkmalpflege gleichwohl Anstöße geben, die über ihr eigenes Arbeitsfeld hinausweisen. Als eine Disziplin, die ihr Hauptanliegen in der Überlieferung kultureller Werte sieht und sich doch stets der Begrenztheit ihres Einsatzes und der Vergänglichkeit der Werke bewusst ist, erscheint sie mancher technisch-wissenschaftlichen Position, die von der universellen Gültigkeit und Machbarkeit ihrer Lösungsvorschläge ausgeht, in ihrem Geschichts- und Realitätsbezug überlegen. Damit kommt ihr eine besondere Verantwortung zu.*

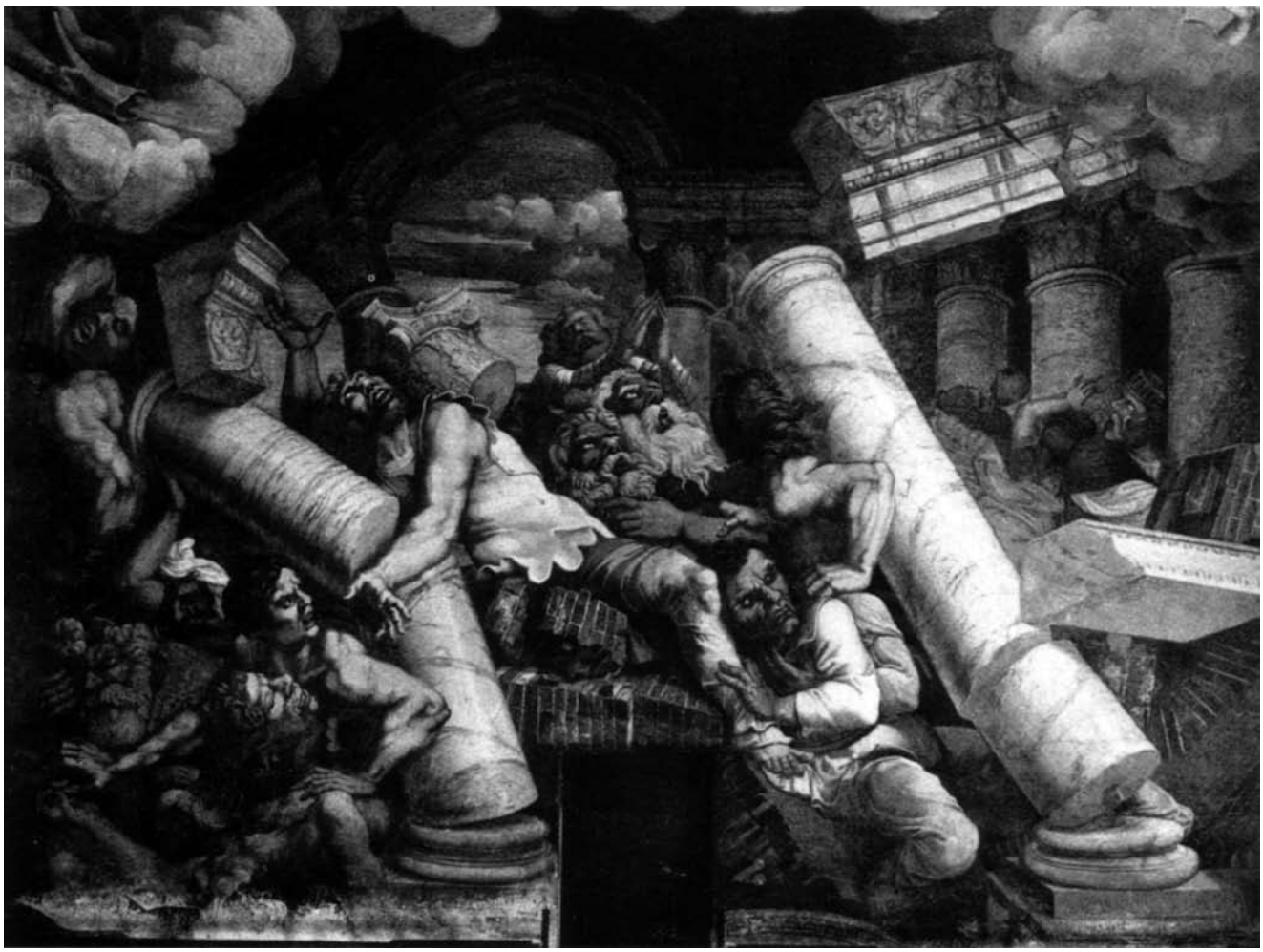
19 Cost effectiveness is understood here as invested money versus loss prevented. Drdácký (note 5), pp. 26, 47.

19 Kosteneffizienz wird hier verstanden als das Verhältnis der zur Prävention eingesetzten Mittel zum damit verhinderten Schaden. Drdácký (wie Anm. 5), S. 31 u. 52.

I.

Disasters and Society: The Task of Prevention

Katastrophe und Gesellschaft: Prävention als Aufgabe



Mantua, Giulio Romano, Palazzo del Te, Sala dei Giganti (Alinari)

Hans-Rudolf Meier

The Cultural Heritage of the Natural Disaster: Learning Processes and Projections from the Deluge to the »Live« Disaster on TV

Das Kulturerbe der Naturkatastrophe: Lernprozesse und Projektionen von der Sintflut zur TV-Live-Katastrophe

»Only man experiences disasters, to the extent that he survives them. Disasters are unknown in nature,« writes Max Frisch in his story »Man in the Holocene.«[1] In fact, there are sudden and radical changes occurring constantly throughout the universe, but such events are noted in history for their effects on mankind rather than as disasters per se. This view, which accords with a generally accepted idea of nature today, is also reflected in the most recent attempts to define disasters, particularly from a historical perspective in that field's recent intensive involvement in historic disaster research.[2] An anthropocentric approach, for example, is evident in the work of Gerhard Waldherr, who sees the disaster as »a blunder of systems upheld by mankind, and therefore a failure of both the built and the social infrastructure.«[3] Mischa Meier includes sociological considerations in his proposed definition that natural disasters are »events that suddenly (rapidly) and profoundly (radically) affect, or are felt to affect, man's daily life and that have grave effects on the social action of the people concerned,« and »longer-term developments that increasingly elude human control but ultimately have similar consequences for social behavior as do the local events.«[4] The aspect of social and cultural experience is already resonate in the

1 Max Frisch: Der Mensch erscheint im Holozän. Eine Erzählung, Frankfurt am Main 1979, p. 103.

2 On the historiography of German historical disaster research see: Dieter Groh/Michael Kempe/Franz Mauelshagen (ed.): Naturkatastrophen. Beiträge zu ihrer Deutung, Wahrnehmung und Darstellung in Text und Bild von der Antike bis ins 20. Jahrhundert. Literatur und Anthropologie 13, Tübingen 2003, p. 14, note 8 ff.; Andreas Ranft/Stephan Selzer (ed.): Städte aus Trümmern. Katastrophenbewältigung zwischen Antike und Moderne, Göttingen 2004, p. 10, note 4; on pre-scientific and early chronicles of earthquakes and disasters see Gerhard Fouquet: Für eine Kulturgeschichte der Naturkatastrophen. Erdbeben in Basel 1356 und Großfeuer in Frankenberg 1476, in: Ranft/Selzer, pp. 101–131, here pp. 101 f.

3 Gerhard Waldherr: Altertumswissenschaften und moderne Katastrophenforschung, in: Eckart Olshausen/H. Sonnabend (ed.): Naturkatastrophen in der antiken Welt. Stuttgarter Kolloquium zur Historischen Geographie des Altertums 6, Geographica Historica 10, Stuttgart 1998, pp. 51–64, here pp. 59 f.

4 Mischa Meier: Das andere Zeitalter Justinians. Kontingenzerfahrung und Kontingenzbewältigung im 6. Jahrhundert n. Chr., Hypomnemata

»Katastrophen kennt allein der Mensch, sofern er sie überlebt. Die Natur kennt keine Katastrophen«, so Max Frisch in seiner Erzählung »Der Mensch erscheint im Holozän«.[1] *Tatsächlich gibt es zwar im ganzen Universum ständig plötzliche und radikale Veränderungen, als Katastrophen werden solche Ereignisse aber in der Geschichte nicht per se registriert, sondern in Funktion ihrer Auswirkungen auf die Menschen. Diese einem heute weitgehend konsensfähigen Naturbild entsprechende Sicht spiegelt sich auch in den jüngsten Definitionsversuchen von Katastrophen insbesondere aus der Perspektive der Geschichtswissenschaften, die sich in den letzten Jahren intensiv mit historischer Katastrophenforschung beschäftigt hat.*[2] *Der anthropozentrische Ansatz wird beispielsweise deutlich bei Gerhard Waldherr, der Katastrophe als »eine Fehlleistung der von Menschen getragenen Systeme, also ein Versagen sowohl der gebauten als auch der sozialen Infrastruktur« sieht.*[3] *Mischa Meier schlägt unter Einbezug soziologischer Überlegungen die Definition vor, Naturkatastrophen seien »Ereignisse, die plötzlich (rapide) und tiefgreifend (radikal) auf den Alltag der Menschen einwirken oder in dieser Weise empfunden werden und die sich gravierend auf das soziale Handeln der Betroffenen auswirken, sowie längerfristige Entwicklungen, die sich menschlicher Kontrolle zunehmend entziehen, aber letztlich ähnliche Konsequenzen für das soziale Verhalten haben wie die punktuellen Ereignisse«.*[4] *Bereits in der ursprünglicher*

1 Max Frisch: Der Mensch erscheint im Holozän. Eine Erzählung, Frankfurt am Main 1979, S. 103.

2 Zur Forschungsgeschichte der deutschen historischen Katastrophenforschung: Dieter Groh/Michael Kempe/Franz Mauelshagen (Hg.): Naturkatastrophen. Beiträge zu ihrer Deutung, Wahrnehmung und Darstellung in Text und Bild von der Antike bis ins 20. Jahrhundert. Literatur und Anthropologie 13, Tübingen 2003, S. 14, Anm. 8 ff.; Andreas Ranft/Stephan Selzer (Hg.): Städte aus Trümmern. Katastrophenbewältigung zwischen Antike und Moderne, Göttingen 2004, S. 10, Anm. 4; zur vor- und frühwissenschaftlichen Erdbeben- und Katastrophenchronistik Gerhard Fouquet: Für eine Kulturgeschichte der Naturkatastrophen. Erdbeben in Basel 1356 und Großfeuer in Frankenberg 1476, in: ebd., S. 101–131, hier S. 101 f.

3 Gerhard Waldherr: Altertumswissenschaften und moderne Katastrophenforschung, in: Eckart Olshausen/H. Sonnabend (Hg.): Naturkatastrophen in der antiken Welt. Stuttgarter Kolloquium zur Historischen Geographie des Altertums 6, Geographica Historica 10, Stuttgart 1998, S. 51–64, hier S. 59 f.

4 Mischa Meier: Das andere Zeitalter Justinians. Kontingenzerfahrung und Kontingenzbewältigung im 6. Jahrhundert n. Chr., Hypomnemata

original meaning of the word catastrophe: in classical literature καταστροφη, starting with the basic meaning »turning,« denotes various forms of turning around or over that are not yet fixated on negative events, and refers more to the course of turning than to the concrete event, more to the process than the result.[5] This meaning seems to have predominated into the 19th century, and recent approaches based on systems theory come close to it again, for instance when Piero Pierotti sees earthquakes as »unexpectedly accelerated change.«[6]

Wortbedeutung von Katastrophe schwingt der Aspekt einer sozialen und kulturellen Erfahrung mit, werden doch mit καταστροφη, ausgehend von der Grundbedeutung »Umwendung«, in der antiken Literatur verschiedene noch nicht auf negative Ereignisse fixierte Formen des Umdrehens bezeichnet, und zwar eher deren Verlauf als das konkrete Ereignis, den Prozess als das Resultat.[5] Diese Bedeutung scheint bis ins 19. Jahrhundert vorherrschend gewesen zu sein und jüngste systemtheoretische Betrachtungsweisen kommen dem wieder nahe, wenn etwa Piero Pierotti Erdbeben als »unexpectedly accelerated change« versteht.[6]

Perception[7]

Natural disasters are key events in the history of mankind that give structure to our history and shape our collective memory up to this day. We can see this, for instance, in the attention paid by the Swiss media in 2006 to the 200th anniversary of the rockslide in Goldau and to the 650th anniversary of the Basel earthquake. Some disasters are part of the »memory of the world,« as it were; we need only recall the deluges in the great creation narratives (Genesis, the Gilgamesh epics), the end of the mythical cities of Atlantis and Rungholt, the eruption of Vesuvius in the year 79 that destroyed Herculaneum and Pompeii (after which these previously insignificant provincial Roman cities were made famous by Plinius and ultimately, 1900 years later, became World Heritage sites), the volcanic eruption at Krakatau, the earthquakes in Lisbon and San Francisco, and so on (fig. 1). Outstanding works of architecture, including world wonders from antiquity, have been spectacularly destroyed by natural disasters: the Colossus of Rhodes, the giant statue of Helios erected in memory of the successful resistance of Rhodes against the siege by Demetrios Poliorketes in 305 B. C., collapsed during an earthquake in 227 B. C. This example in particular is worth pursuing beyond the actual event itself, since it turns out to be a multi-faceted case of disaster management. We will come back to that

Wahrnehmung[7]

Naturkatastrophen sind Schlüsselereignisse der Menschheitsgeschichte; sie strukturieren diese und prägen bis heute unser kollektives Gedächtnis. Das zeigt sich nicht zuletzt am Aufsehen, das im Tagungsjahr (2006) der 200. Jahrestag des Bergsturzes von Goldau oder das 650-jährige Jubiläum des Basler Erdbebens in den Schweizer Medien erfuhren. Manche Katastrophen gehören gewissermaßen zum »memory of the world«, man denke nur an die Sintfluten der großen Schöpfungserzählungen – der Genesis oder dem Gilgamesch-Epos –, an den Untergang der mythischen Traumorte Atlantis und Rungholt, den Vesuvausbruch des Jahres 79, der unter anderem Herculaneum und Pompeji vernichtete – wodurch diese an sich unbedeutenden römischen Provinzstädte bereits durch Plinius berühmt und nach 1900 Jahren schließlich zu Welterbestätten wurden –, man denke an den Vulkanausbruch am Krakatau oder an die Erdbeben von Lissabon, San Francisco und so weiter (Abb. 1). Herausragende Bauwerke bis hin zu Weltwundern der Antike sind durch Naturkatastrophen spektakulär zu Grunde gegangen: Der Koloss von Rhodos, die Kolossalstatue des Helios, die zur Erinnerung an den erfolgreichen Widerstand der Rhodier gegen die Belagerung durch Demetrios Poliorketes 305 v. Chr. errichtet worden war, ist 227 v. Chr. bei einem Erdbeben eingestürzt. Gerade dieses Beispiel lohnt es auch, über das Ereignis hinaus zu verfolgen, erweist es sich doch als vielfältiges Exempel

147, Göttingen²2004, p. 33. On terms and definitions see also Groh/Kempe/Mauelshagen 2003 (note 2), pp. 15 f.

5 Groh/Kempe/Mauelshagen 2003 (note 2), pp. 16 ff.; Meier 2004 (note 4), p. 31.

6 Piero Pierotti: History and praxis, in: Ferruccio Ferrigni et al.: Ancient Buildings and Earthquakes. The Local Seismic Culture approach: principles, methods, potentialities (Centro Universitario Europeo per in Beni Culturali Ravello, Rischio sismico e patrimonio culturale 1), Bari 2005, pp. 29–50, esp. pp. 34 ff.

7 On the triad »perception—interpretation—management« of natural disasters see Christian Rohr: Mensch und Naturkatastrophe. Tendenzen und Probleme einer mentalitätsbezogenen Umweltgeschichte des Mittelalters, in: Sylvia Hahn/Reinhold Reith (ed.): Umwelt-Geschichte: Arbeitsfelder, Forschungsansätze, Perspektiven, Querschnitte 8, Vienna 2001, pp. 13–31, esp. pp. 17 f.

147, Göttingen²2004, S. 33. Zu Begriff und Definitionen auch Groh/Kempe/Mauelshagen 2003 (wie Anm. 2), S. 15 f.

5 Groh/Kempe/Mauelshagen 2003 (wie Anm. 2), S. 16 ff.; Meier 2004 (wie Anm. 4), S. 31.

6 Piero Pierotti: History and praxis, in: Ferruccio Ferrigni et al.: Ancient Buildings and Earthquakes. The Local Seismic Culture approach: principles, methods, potentialities (Centro Universitario Europeo per in Beni Culturali Ravello, Rischio sismico e patrimonio culturale 1), Bari 2005, S. 29–50, bes. S. 34 ff.

7 Zur Trias »Wahrnehmung – Deutung – Bewältigung« von Naturkatastrophen vgl. Christian Rohr: Mensch und Naturkatastrophe. Tendenzen und Probleme einer mentalitätsbezogenen Umweltgeschichte des Mittelalters, in: Sylvia Hahn/Reinhold Reith (Hg.): Umwelt-Geschichte: Arbeitsfelder, Forschungsansätze, Perspektiven, Querschnitte 8, Wien 2001, S. 13–31, bes. S. 17 f.

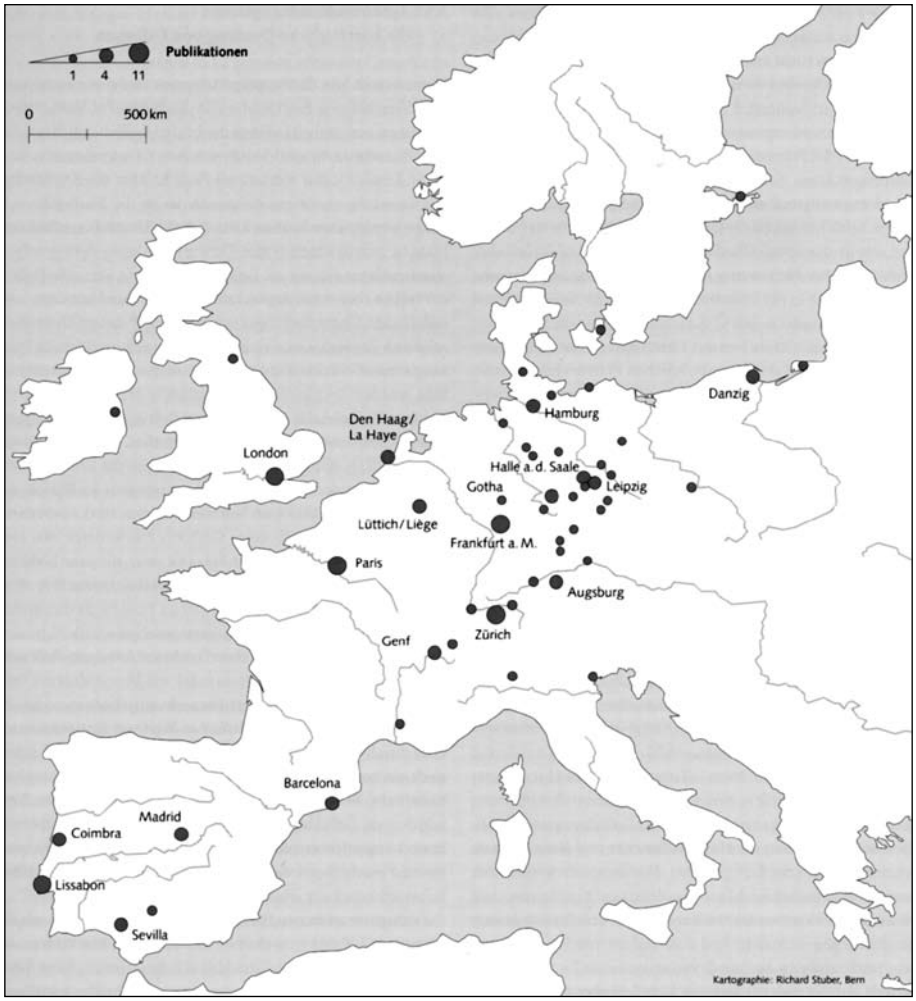


Fig. 1 The earthquake in Lisbon as a European disaster: cities where publications about the earthquake were produced between 1755 and 1757

Abb. 1 Das Erdbeben von Lissabon als europäische Katastrophe: Orte, in denen zwischen 1755 und 1757 Publikationen dazu ediert wurden

later; at this point mention need only be made of the misuse of financial aid, also not uncommon in such a context: the Rhodians let Ptolemaios pay them for the costs of reconstruction, but then did not carry out the work. They knew how to combine material profit with a symbolic gain; the ruins of the colossus were turned into a symbol of their resolute neutrality, which was later used for lucrative ends.[8]

Thus it is not surprising that the main interest of historic disaster research is directed not to the event as such but rather to mastery of the catastrophe as a contingent experience, to the effects of a disaster on society and to how society functions in an extreme situation. This interest in the »day after« corresponds with historic sources, since up until recent times the reports of survivors—as mentioned in the opening quote from Max Frisch—with their experience of having escaped were the most direct source of information on a disaster. Communication technologies have only recently brought about critical changes here, bringing us to the point of a real-time global »chronicle«—for instance the eye witness

der Katastrophenbewältigung. Es wird darauf zurückzukommen sein; erwähnt sei an dieser Stelle vorerst nur der wohl in solchem Kontext auch nicht ganz seltene Missbrauch von Hilfsgeldern, in dem die Rhodier sich von Ptolemaios die Kosten für die Wiederherstellung bezahlen ließen, diese aber nicht ausführten. Den materiellen Gewinn verstanden sie mit einem symbolischen zu verbinden, machten sie doch die Trümmer des Kolosses zum Symbol ihrer konsequenten Neutralität, die sie in der Folge Gewinn bringend einzusetzen verstanden.[8]

Es wundert daher nicht, dass das Hauptinteresse der historischen Katastrophenforschung weniger dem Ereignis als solchem als der Bewältigung der Katastrophe als Kontingenzerfahrung gilt, den Auswirkungen einer Katastrophe auf die Gesellschaft, deren Funktionsweise in einer Extremsituation. Dieses Interesse »am Tag danach« korrespondiert mit der Quellenlage, waren doch bis vor kurzem die Berichte von Überlebenden mit ihrer – auch im Eingangszitat von Max Frisch angesprochenen – Erfahrung, davon gekommen zu sein, die unmittelbarsten Quellen für Katastrophen. Erst jüngste Kommunikationstechnologien haben hier einschneidende

8 Burkhard Meißner: Kriege – Krisen – Katastrophen. Stadtzerstörung und Stadterneuerung in der griechischen Antike, in: Ranft/Selzer 2004 (note 2), pp. 26–53, esp. p. 41.

8 Burkhard Meißner: Kriege – Krisen – Katastrophen. Stadtzerstörung und Stadterneuerung in der griechischen Antike, in: Ranft/Selzer 2004 (wie Anm. 2), S. 26–53, bes. S. 41.

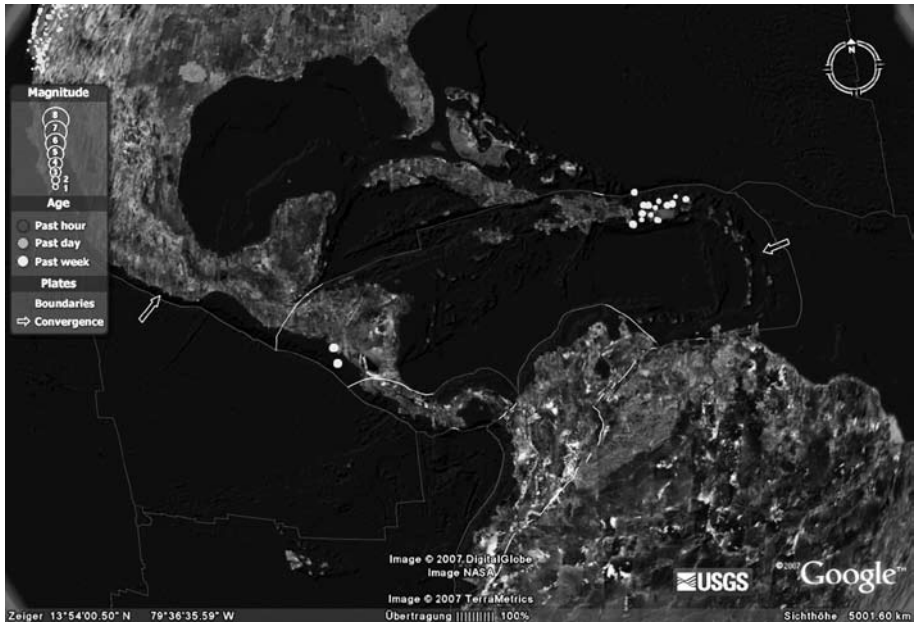


Fig. 2 Instant worldwide announcement of events: map showing all the earthquakes that occurred an hour ago, yesterday and in the past week, via Google Earth

Abb. 2 Die sofortige und weltweite Bekanntgabe des Ereignisses: Anzeige aller vor einer Stunde, gestern und in der vergangenen Woche eingetretenen Erdbeben über Google-Earth

accounts via cell phone or webcam from the tsunami or at the burning towers of the World Trade Center in New York. In connection with Oliver Stone's film »World Trade Center,« Tobias Kniebe recently remarked, »The truth is that every television viewer knows more than the men who are risking their lives at that moment at the scene of the event—perhaps the mark of a modern media disaster.«[9] Today we can use Google Earth from anywhere at any time to show us all the earthquakes that occurred today or this week (fig. 2), whereas two hundred years ago, after the rockslide in Goldau, it was three days before the »Zürcher Zeitung« in Zurich, only 60 kilometers away, brought the first notice of the disaster and seven days before it printed the first major account.[10] It was still one more day before the »Moniteur« in Paris also reported on the event; that is also how long it took for the earthquake in Messina in 1783 to be reported in newspapers north of the Alps.[11]

Although communication was much slower, media interest, measured on the possibilities at that time, was by no means any less. In particular the need for visualization was already so great that in its first reports after the Goldau rockslide the »Zürcher Zeitung,« lacking images of the event, had to recall the similar rockslide from Piuro/Plurs in Bregaglia some 190 years earlier, which was still present in its readers' visual memory thanks

Veränderungen angestoßen, hin zu einer globalen »Chronistik« in Echtzeit – man denke an die Augenzeugenberichte via Handy oder Webcam vom Tsunami oder an die brennenden Twin-Towers in New York. Dazu bemerkte jüngst Tobias Kniebe im Zusammenhang mit Oliver Stones Film »World Trade Center«: »Die Wahrheit ist, dass jeder Fernsehzuschauer in diesem Augenblick mehr weiß als die Menschen, die am Ort des Geschehens ihr Leben riskieren – vielleicht das Kennzeichen jeder modernen Medienkatastrophe«.[9] *Während man sich heute jederzeit und überall über Google-Earth alle heute oder diese Woche weltweit registrierten Erdbeben anzeigen lassen kann (Abb. 2), dauerte es vor zweihundert Jahren beim Bergsturz von Goldau drei Tage bis im nur sechzig Kilometer entfernten Zürich die »Zürcher Zeitung« eine erste Meldung, sieben Tage, bis sie erste größere Berichte über die Katastrophe drucken konnte.*[10] *Einen weiteren Tag später berichtete dann auch der »Moniteur« in Paris vom Geschehen; so lange hatte es auch 1783 gedauert, bis nördlich der Alpen vom Erdbeben in Messina in den Zeitungen berichtet wurde.*[11]

Erfolgte die Kommunikation auch viel langsamer, so war das Medieninteresse gemessen an den damaligen Möglichkeiten aber keineswegs geringer. Insbesondere das Bedürfnis nach Visualisierung war bereits damals so groß, dass nach dem Goldauer Bergsturz die »Zürcher Zeitung« in ihren ersten Berichten mangels aktuellen Bildern an den dank Matthäus Merians Stichen im visuellen Gedächtnis ihrer Leser präsenten 190 Jahre zurückliegenden Bergsturz von

9 Tobias Kniebe: Der große Tag der Einzeltäter, in: Süddeutsche Zeitung Nr. 233, 9/27/2006, p. 13.

10 See Natalie Henseler Pfyl: Eine Katastrophe als Anstoss für eidgenössische Solidarität. Der Bergsturz von Goldau als publizistische und humanitäre Herausforderung, in: Neue Zürcher Zeitung Nr. 200, 8/30/2006, p. 15; Alfred Neukom: Zwischen Erschütterung und Gerüchten. Die Berichterstattung der »Zürcher Zeitung« zur Goldau-Katastrophe, in: ibid.

11 Peter Geimer: Messina 1783—Das Beben der Repräsentation, in: Groh/Kempe/Mauelshagen 2003 (note 2), pp. 189–200, esp. p. 194.

9 Tobias Kniebe: Der große Tag der Einzeltäter, in: Süddeutsche Zeitung Nr. 233, 27. 9. 2006, S. 13.

10 Dazu Natalie Henseler Pfyl: Eine Katastrophe als Anstoss für eidgenössische Solidarität. Der Bergsturz von als publizistische und humanitäre Herausforderung, in: Neue Zürcher Zeitung Nr. 200, 30. 8. 2006, S. 15; Alfred Neukom: Zwischen Erschütterung und Gerüchten. Die Berichterstattung der »Zürcher Zeitung« zur Goldau-Katastrophe, in: ebd.

11 Peter Geimer: Messina 1783 – Das Beben der Repräsentation, in: Groh/Kempe/Mauelshagen 2003 (wie Anm. 2), S. 189–200, bes. S. 194.

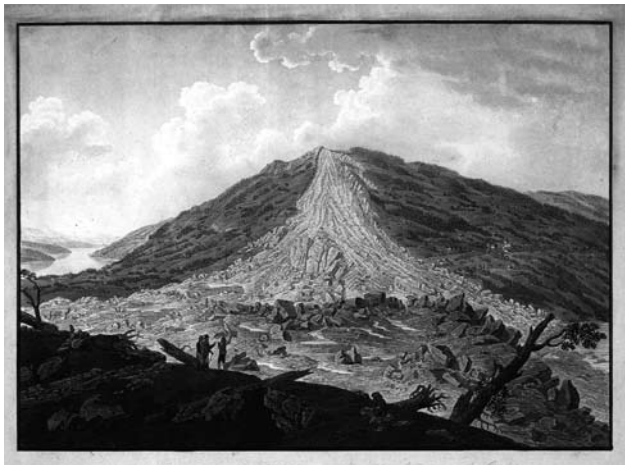


Fig. 3 Franz Xaver Triner, colored etching of the Goldau rockslide, 1806/10, Staatsarchiv Schwyz

Abb. 2 Franz Xaver Triner, kolorierte Radierung des Bergsturzes von Goldau, 1806/10, Staatsarchiv Schwyz

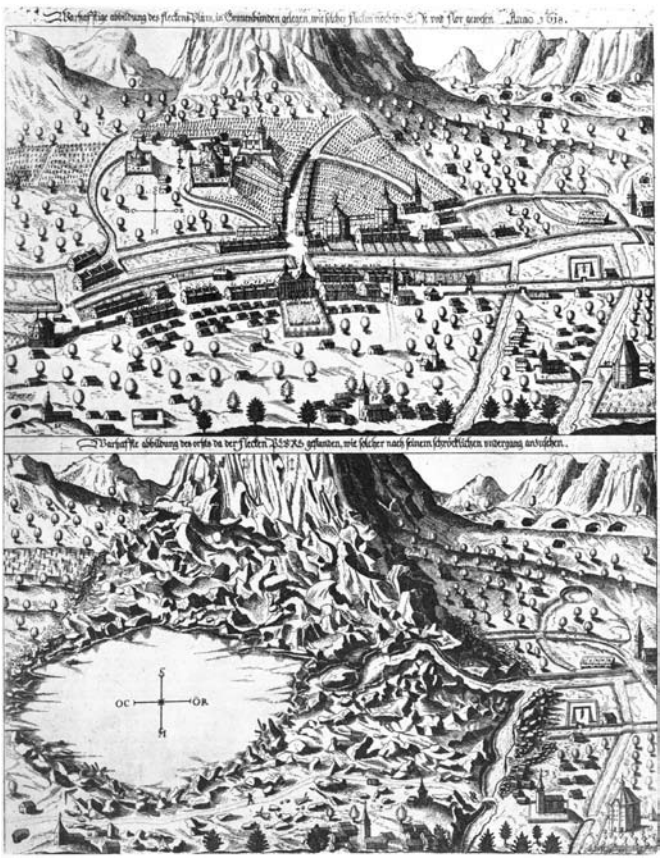


Fig. 4 Visualization of the changes caused by the disaster: Plurs/Piuro in Bregaglia is shown before (above) and after the rockslide (below, with an overlay etching), after a single-leaf print by Johann Hardmeyer, Zurich, 1618

Abb. 4 Visualisierung der von der Katastrophe bewirkten Veränderungen: So genanntes Wandelbild, mit und ohne Deckblatt von Plurs/Piuro im Bergell vor (oben) und nach (unten) dem Bergsturz von 1618, Radierung nach Einblattdrucken von Johann Hardmeyer, Zürich 1618

to engravings by Matthäus Merian.[12] At the same time the paper announced that it would be able to provide a »historic-pictorial description« of the disaster area in 10 or at the latest 14 days. When the first images from Goldau were finally available the Schwyzer canton government attempted to forbid their distribution and to secure exclusive rights for depictions, commissioning the local painter Franz Xaver Triner to produce official illustrations (fig. 3).[13] Of course this monopoly could not be enforced; numerous artists, panorama painters, and cartographers made pilgrimages to the location of the disaster and dozens—among them Goethe—vied for the most dramatic depiction. The problem to be mastered was that these artists had not observed the event itself, which anyway could hardly have been depicted as it was happening. One solution, which at least made the extent of the catastrophic changes vivid, was offered by pairs of before and after illustrations, as had already been developed in the 17th century following the rockslide in Plurs; these so-called *Wandelbilder* had been circulated with great success (fig. 4).[14] There was also no dearth of attempts to represent the dramatic moment and to find images that could come close to today's live-effect. Mention can be made in particular of Jean Houel's »Vue de la Palazzata de Messine au moment du tremblement de terre« (fig. 5), which he had published in his »Voyage pittoresque« one year after the earthquake in the Sicilian port.[15] Houel, who had traveled in Sicily *before*

Piuro/Plurs im Bergell erinnern musste, der sich in Goldau ähnlich wiederholt habe.[12] Zugleich wurde angekündigt, in zehn bis höchstens vierzehn Tagen eine »historisch-malerische Beschreibung« des Unglücksgebiets liefern zu können. Als schließlich erste Bilder aus Goldau vorlagen, versuchte die Schwyzer Kantonsregierung deren Verbreitung zu verbieten und sich ein exklusives Bildrecht zu sichern, wozu sie den heimischen Maler Franz Xaver Triner mit der Herstellung offizieller Darstellungen beauftragte (Abb. 3).[13] Das Bildmonopol war freilich nicht durchsetzbar; zahlreiche Maler, Panoramisten und Kartographen pilgerten zum Ort des Geschehens und Dutzende – unter ihnen auch Goethe – wetteiferten um die dramatischsten Darstellungen. Dabei galt es, das Problem zu bewältigen, dass das Ereignis selber ja nicht

12 Neukom 2006 (note 10).

13 Henseler Pfyl 2006 (note 10); Jost Auf der Maur: Sogar Zürcher und Basler halfen dem katholischen Schwyz. 200 Jahre Bergsturz von Goldau, in: Neue Zürcher Zeitung am Sonntag, 8/27/2006, pp. 72 f.

14 Günther Kahl: Plurs. Zur Geschichte der Darstellungen des Flekkens vor und nach dem Bergsturz von 1618, in: Zeitschrift für Schweizerische Archäologie und Kunstgeschichte 41, 1984/4, pp. 249–282.

15 Jean Houel: Voyage pittoresque des Isles de Sicile, de Malte et de

12 Neukom 2006 (wie Anm. 10).

13 Henseler Pfyl 2006 (wie Anm. 10); Jost Auf der Maur: Sogar Zürcher und Basler halfen dem katholischen Schwyz. 200 Jahre Bergsturz von Goldau, in: Neue Zürcher Zeitung am Sonntag, 27. 8. 2006, S. 72 f.

Fig. 5 Jean Houel, Vue de la Palazzata de Mesine au moment du tremblement de terre. Voyage pittoresque des Isles de Sicile, de Malte et de Lipari …, Paris 1784

Abb. 5 Jean Houel, Vue de la Palazzata de Messine au moment du tremblement de terre. Voyage pittoresque des Isles de Sicile, de Malte et de Lipari …, Paris 1784

the earthquake and had not himself seen the extent of the destruction—to say nothing of the event itself—successfully recorded before and after in one picture by depicting the palace in the margins as a ruin, but showing it still intact in the middle of the picture. Here the special quality of buildings for impressive representations of the effect of a disaster becomes evident: on a building the sudden transformation from a consummate cultural achievement to a ruin can be perceived as a symbol of transience. In Houel's engraving the observer, similar to today's television viewer, witnesses the moment of destruction from a secure distance. The churning sea in the foreground cannot bridge this distance either, but it is intended to suggest something of the danger—and thus the authenticity—to which the fictive recorder of the scene might have been exposing himself. Here is a difference to today, not as concerns the observer but rather regarding the producer of the images, since the live pictures we see today—for instance of the tsunami—are charged with the reality of the danger that their dispatcher is indeed experiencing. Of course even this immediacy cannot overcome the fact that the duration of the effect that such pictures has on us has decreased with the increased speed of their production. Today the battle for images is a battle for attention, and it has intensified with the increasing speed and range of communications. »The public media create and consume pictures in equal amounts and at equal speeds.«[16] As much as the individual event or even the individual picture may move us, it is only present in our minds as long as it has not yet been displaced by the production of even newer

beobacht- und kaum darstellbar war. Einen Ausweg, der zumindest das Ausmaß der katastrophalen Veränderungen veranschaulichte, boten Vorher-Nachher-Bildpaare, wie sie schon im 17. Jahrhundert für den bereits genannten Bergsturz von Plurs mit so genannte Wandelbildern entwickelt und äußerst erfolgreich verbreitet worden waren (Abb. 4).[14] *Es fehlte auch nicht an Versuchen, die Dramatik des Augenblicks darzustellen und Bilder zu finden, die dem heutigen Live-Effekt nahe kommen. Hier ist insbesondere Jean Houels »Vue de la Palazzata de Messine au moment du tremblement de terre« zu nennen (Abb. 5), die er ein Jahr nach dem Erdbeben, das die sizilische Hafenstadt getroffen hatte, in seiner »Voyage pittoresque« veröffentlichte.*[15] *Houel, der Sizilien vor dem Erdbeben bereist hatte und das Ausmaß der Zerstörung – geschweige denn diese selber – nicht aus eigener Anschauung kannte, gelang es, Vorher und Nachher in einem Bild zu erfassen, indem er den Palast an den Rändern bereits als Ruine, in der Bildmitte aber gerade noch intakt zeigt. Hier offenbart sich auch die besondere Qualität von Gebäuden zur eindrücklichen Veranschaulichung der Katastrophenwirkung: An ihnen wird die quasi plötzliche Transformation von der vollkommenen Kulturleistung zur Ruine als Symbol der Vergänglichkeit wahrnehmbar. In Houels Druck wohnt der Betrachter, ähnlich dem heutigen Fernsehzuschauer, dem Moment der Zerstörung aus sicherer Distanz bei. Auch das aufgewühlte Meer im Vordergrund kann diese Distanz nicht überbrücken, soll aber etwas von der Gefahr – und damit Authentizität – suggerieren, die der fiktive Bildchronist auf sich genommen haben möchte. Nicht was den Betrachter, wohl aber was den Produzenten der Bilder betrifft, liegt hier*

Lipari, où l'on traite des antiquités qui s'y trouvent encore; des principaux phénomènes que la nature y offre; du costume des Habitants & de quelques Usages, vol. 2, Paris 1784, Pl. 96; see also Geimer 2003 (note 11), pp. 195 ff.

16 Hans Belting: Das echte Bild. Bildfragen als Glaubensfragen, Munich 2005, p. 18.

14 Günther Kahl: Plurs. Zur Geschichte der Darstellungen des Fleckens vor und nach dem Bergsturz von 1618, in: Zeitschrift für Schweizerische Archäologie und Kunstgeschichte 41, 1984/4, S. 249–282.

15 Jean Houel: Voyage pittoresque des Isles de Sicile, de Malte et de Lipari, où l'on traite des antiquités qui s'y trouvent encore; des principaux phénomènes que la nature y offre; du costume des Habitants & de quelques Usages 2, Paris 1784, Pl. 96; dazu Geimer 2003 (wie Anm. 11), S. 195 ff.

images—that is, as long as even newer images of the event are being distributed. As Hans Belting has said, there is »no break and no escape route any more.«[17] Of course one way that art reacts to this is by taking up the aestheticizing of disasters and scrutinizing the observer's perception, by presenting ostensibly well-known images in a new context.[18]

Modern communication technologies ultimately change not only the speed of a disaster's perception but also the sphere of its perception, and thus the size of the community that feels solidarity with those affected. One of the constants in disaster historiography is commemoration of relief action organized by sympathizing communities. In his essay on an ethnology of the disaster, Paul Hugger has referred to the »social element in the crisis.«[19] Relief and its commemoration prove to be actions that foster a sense of community; for instance, disasters in the 19th century in Switzerland constitute one of the basic narratives of Swiss nation building.[20] Already in antiquity the list of helpers and donors for the reconstruction of Rhodes after the earthquake, for instance, included everyone who wanted to count for something in the Aegean.[21] The political importance of these acts of solidarity becomes evident not least through the fact that mention of the helpers seems to gain in importance the farther away the event becomes in time. Reports on the Basel earthquake in 1356 support this assumption: although the oldest sources make no mention of it, Justinger's Berner Chronicle reports in 1425 that delegations from Strasbourg, Freiburg im Breisgau, Colmar, Schlettstatt, Mühlhausen, Neuenburg and Rheinfelden had helped the people of Basel »to clear their streets.«[22] Up to the present day relief actions for disasters offer hostile powers the opportunity to come into contact with one another (the USA after the earthquake in Bam) on the one hand, and to reproach the receiving country for

17 Belting (note 16). One tries to recall which images from the last two or three decades are still present: the burning Twin Towers of the New York World Trade Center are probably the only omnipresent images.

18 Compare for instance Ulrike Lehmann: Naturkatastrophen und die Ästhetik des Schreckens. Zu fotografischen Arbeiten von Sonja Brass und Barbara S. Nägle, in: Eikon 55, 2006, pp. 32–41.

19 Paul Hugger: Elemente einer Ethnologie der Katastrophe in der Schweiz, in: Zeitschrift für Volkskunde 86, 1990, pp. 25–36, here p. 25.

20 Christian Pfister (ed.): Am Tag danach. Zur Bewältigung von Naturkatastrophen in der Schweiz 1500–2000, Bern 2002; Pfister: Naturkatastrophen als nationale Mobilisierungsereignisse in der Schweiz des 19. Jahrhunderts, in: Groh/Kempe/Mauelshagen 2003 (note 2), pp. 283–297; compare recent history in the Federal Republic of Germany: Martin Döring: »Das Hochwasser wirkt als prima Bindemittel.« Die metaphorisch mediale Konstruktion eines wiedervereinigten Deutschlands in Zeiten der Oderflut 1997, in: ibid., pp. 299–325.

21 Meißner 2004 (note 8), pp. 26–53, esp. p. 40.

22 Fouquet 2004 (note 2), p. 119; Werner Meyer: Da verfiele Basel überall. Das Basler Erdbeben von 1356, 184th Neujahrsblatt, published by the Gesellschaft für das Gute und Gemeinnützige Basel, Basel 2006, pp. 145 f.

eine Differenz zu heute vor, leben die Livebilder – etwa vom Tsunami – doch von der Wirklichkeit der Gefahr, in der ihre Versender tatsächlich schweben.

Freilich kann selbst diese Unmittelbarkeit nicht verhindern, dass mit zunehmender Geschwindigkeit der Bildproduktion die Dauer der Wirkung dieser Bilder abgenommen hat. Der Kampf um Bilder ist heute ein Kampf um Aufmerksamkeit, der sich mit der Geschwindigkeit der Kommunikation und ihrer Reichweite verschärft hat. »Die öffentlichen Medien erzeugen und verbrauchen Bilder in der gleichen Menge und in der gleichen Geschwindigkeit.“[16] Das einzelne Ereignis, auch das einzelne Bild, mag uns noch so sehr berühren, es ist nur solange präsent, als es von der Produktion immer neuer Bilder nicht verdrängt wird – und das heißt, so lange, wie vom Ereignis immer neue Bilder verbreitet werden. Es gibt, wie Hans Belting bemerkt, »keine Pause und keinen Fluchtweg mehr«.[17] Die Kunst freilich reagiert darauf unter anderem dadurch, dass sie die Ästhetisierung von Katastrophen aufgreift und sich scheinbar bekannter Bilder bedient, diese in einen neuem Kontext präsentiert und dadurch die Wahrnehmung der Betrachter hinterfragt.[18]

Schließlich verändern moderne Kommunikationstechnologien mit der Geschwindigkeit auch den Raum der Katastrophenwahrnehmung und damit der Solidargemeinschaften. Zu den Konstanten in der Katastrophenhistoriographie gehört die Kommemoration der Hilfeleistungen, durch die Solidargemeinschaften konstituiert werden. Denn Katastrophenerfahrungen sind nicht nur wesentlicher Bestandteil der Identitätsbildung einer Gemeinschaft, sondern ebenso der Kommunikation zwischen Gemeinschaften. Dazu gehört auch das, was Paul Hugger in seinem Versuch einer Ethnologie der Katastrophe als das »gesellige Element in der Krise« bezeichnet hat.[19] Hilfe und deren Kommemorierung erweisen sich als gemeinschaftstiftende Aktionen, wie beispielsweise Katastrophen in der Schweiz im 19. Jahrhundert ein grundlegendes Narrativ der Nationenbildung darstellen.[20] Aber bereits in der Antike umfasste etwa die Liste der Helfer und Spender für den Wiederaufbau von Rhodos nach dem besag-

16 Hans Belting: Das echte Bild. Bildfragen als Glaubensfragen, München 2005, S. 18.

17 Ebd. Man versuche sich zu erinnern, welche Bilder der vergangenen zwei bis drei Jahrzehnte noch präsent sind: Die brennenden Twin-Towers des New Yorker Worldtrade Centers sind vermutlich die einzigen omnipräsenten Bilder.

18 Vgl. z. B. Ulrike Lehmann: Naturkatastrophen und die Ästhetik des Schreckens. Zu fotografischen Arbeiten von Sonja Brass und Barbara S. Nägle, in: Eikon 55, 2006, S. 32–41.

19 Paul Hugger: Elemente einer Ethnologie der Katastrophe in der Schweiz, in: Zeitschrift für Volkskunde 86, 1990, 25–36, hier S. 25.

20 Christian Pfister (Hg.): Am Tag danach. Zur Bewältigung von Naturkatastrophen in der Schweiz 1500–2000, Bern 2002; ders.: Naturkatastrophen als nationale Mobilisierungsereignisse in der Schweiz des 19. Jahrhunderts, in: Groh/Kempe/Mauelshagen 2003 (wie Anm. 2), S. 283–297; vgl. zur jüngsten Geschichte der Bundesrepublik: Martin Döring: »Das Hochwasser wirkt als prima Bindemittel«. Die metaphorisch mediale Konstruktion eines wiedervereinigten Deutschlands in Zeiten der Oderflut 1997, in: ebd., S. 299–325.

Fig. 6 Assisi, San Francesco, photo from the upper basilica during the earthquake on 27 September 1997

Abb. 6 Assisi, San Francesco, Aufnahme aus der Oberkirche während des Erdbebens vom 27. September 1997

its inability to provide sufficient help on its own on the other hand (Venezuela's assistance after the flooding of New Orleans).

Whatever the ulterior motives may be, worldwide relief efforts and donor actions show that global communication has indeed led to a global sense of solidarity. This also applies to cultural monuments: the destroyed, the endangered, the saved, indeed even the lost-and-seemingly-regained through reconstruction would appear to be the true *world* cultural heritage. But one question can still be asked: are the Buddha statues in Bamian, the upper basilica of San Francesco in Assisi, the citadel in Bam or the Church of Our Lady in Dresden truly in the world's consciousness as monuments, as evidence of culture (fig. 6)? Or are they mainly in mind as images, which make reference, at best, to the context of their destruction, salvation or reconstruction, but above all to their own status as an icon and their perception in the media? Has their monument value perhaps become, in Riegl's sense, their »present value«?[23]

23 On Riegl's values see: Ernst Bacher (ed.): Kunstwerk oder Denkmal? Alois Riegls Schriften zur Denkmalpflege (Studien zu Denkmalschutz und Denkmalpflege vol. XV), Vienna/Cologne/Weimar 1995, passim and p. 22.

ten Erdbeben alle, die in der Ägäis etwas gelten wollten.[21] Die politische Bedeutung der Solidarleistungen wird nicht zuletzt dadurch deutlich, dass die Nennung der Helfer mit der zeitlichen Ferne zum Ereignis an Gewicht zu gewinnen scheint. Das jedenfalls lassen die Berichte über das Basler Erdbeben von 1356 vermuten: Die ältesten Quellen besagen dazu gar nichts, während nach fast einem Jahrhundert im Jahre 1425 in Justingers Berner Chronik rapportiert wird, Abordnungen von Straßburg, Freiburg im Breisgau, Colmar, Schlettstatt, Mühlhausen, Neuenburg und Rheinfelden hätten den Baslern geholfen »ihre Gassen zu räumen«.[22] Bis heute bieten Hilfsaktionen bei Katastrophen einerseits verfeindeten Mächten die Gelegenheit, miteinander in Kontakt zu treten (die USA nach dem Erbeben von Bam), andererseits dem Empfängerstaat seine Unfähigkeit zu ausreichender Eigenhilfe vorzuhalten (Venezuelas Hilfe nach der Überschwemmung von New Orleans).

Was auch immer die Hintergedanken sein mögen: Die globale Kommunikation hat – wie die weltweiten Hilfs- und Spendenaktionen zeigen – tatsächlich zu einer globalen Solidargemeinschaft geführt. Das gilt auch für die Kulturdenkmale: Die Zerstörten, die Gefährdeten und Geretteten, ja auch die Verlorenen und durch Rekonstruktion scheinbar Wiedergewonnenen erscheinen als das wahre Welt-Kulturerbe. Zumindest ein Fragezeichen sei allerdings erlaubt: Denn sind die Buddahstatuen von Bamian, die Oberkirche von San Francesco in Assisi, die Zitadelle von Bam oder die Dresdner Frauenkirche tatsächlich als Denkmale, als kulturelle Zeugnisse im Bewusstsein der Weltbevölkerung (Abb. 6)? Oder sind sie es hauptsächlich als Bilder, die bestenfalls auf den Kontext ihrer Zerstörung, Rettung oder Rekonstruktion, vor allem aber auf ihre Ikonizität und mediale Wahrnehmung verweisen? Liegt vielleicht gerade darin ihr Denkmalwert als Gegenwartswert im Rieglschen Sinne?[23]

21 Meißner 2004 (wie Anm. 8), S. 26–53, bes. S. 40.

22 Fouquet 2004 (wie Anm. 2), S. 119; Werner Meyer: Da verfiele Basel überall. Das Basler Erdbeben von 1356, 184. Neujahrsblatt, hrsg. von der Gesellschaft für das Gute und Gemeinnützige Basel, Basel 2006, S. 145 f.

23 Zu den Rieglschen Werten vgl. Ernst Bacher (Hg.): Kunstwerk oder

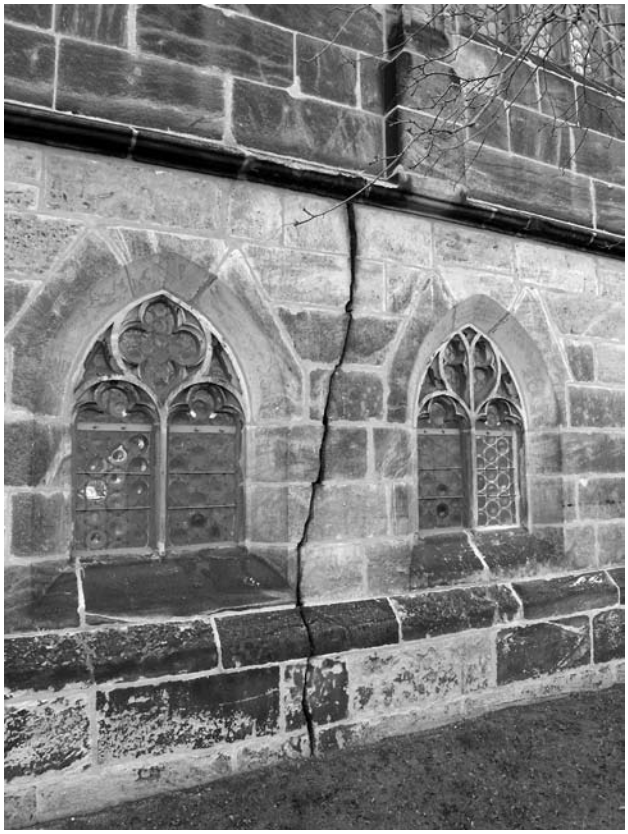


Fig. 7 Görlitz, Holy Cross Chapel, 1481–1504: Adam Chapel with artificial crack in the wall representing earthquake damage, as a reminder that, in the Gospel according to Matthew,the earth shook at the time of Christ's death on the cross.

Abb. 7 Görlitz, Heilig Kreuz-Kapelle, 1481–1504: Adamskapelle mit künstlichem Mauerriss als Erdbebenschaden, der daran erinnern soll, dass beim Kreuzestod Christi gemäß Matthäusevangelium die Erde gebebt haben soll.

Interpretation and symbolic prevention

In a different way than historiography, for which natural disasters are »extraordinary normal events,«[24] the myth asks about the nature or the deeper cause of the disaster, about what it symbolizes or punishes. Explaining a terrible event—giving meaning to the meaningless—seems to be a prerequisite, for individuals as well as societies, for working through a disaster; mental mastery of the experience of a disaster requires an explanation that gives it meaning.[25]

Whereas the flood of Schuruppak in the Gilgamesh epic is a sign of a fight among the gods, in the Christian-European tradition the theological interpretation of disasters as punishment predominates, as Noah's contemporaries had already had to suffer. Matthew 27:35ff says that upon the death of Jesus on the cross there was darkness over the land, the earth quaked and the rocks were split; in recollection of this, the Chapel of the Holy Cross in Görlitz from the early 16th century was erected with the appearance of earthquake damage (fig. 7).[26] The Bible also prophecies such *Prodigia* in the future,

24 Term borrowed from Edoardo Grendi in Andrea von Hülsen: Verona, 3. Januar 1117. Möglichkeiten und Unsicherheiten der interdisziplinären Erdbebenforschung, in: Historische Anthropologie 1, 1993/2, pp. 218–234.

25 Manfred Jakubowski-Tiessen: Mythos und Erinnerung. Einige kommentierende Anmerkungen über Städte in Trümmern, in: Ranft/Selzer 2004 (note 2), pp. 274–286, here p. 277.

26 Book of Matthew 27:35ff; Ines Anders/Marius Winzeler (ed.): Denkmal? Alois Riegls Schriften zur Denkmalpflege, Studien zu Denkmalschutz und Denkmalpflege XV, Wien/Köln/Weimar 1995, passim und S. 22.

Deutung und symbolische Prävention

Anders als die Geschichtsschreibung, für die Naturkatastrophen »außergewöhnliche normale Ereignisse« sind[24], fragt der Mythos nach dem Wesen beziehungsweise der tieferen Ursache der Katastrophe, danach, wofür sie Zeichen oder Strafe ist. Das furchtbare Ereignis erklären, dem Sinnlosen einen Sinn zu geben, scheint sowohl für Individuen wie für Gesellschaften eine Voraussetzung zu sein, um es verarbeiten zu können; die mentale Bewältigung von Katastrophenerfahrungen erfordert sinnstiftende Erklärungen.[25]

Ist die Überflutung von Schuruppak im Gilgamesch-Epos ein Zeichen für einen Streit der Götter, überwiegt in der christlich-europäischen Tradition die straftheologische Deutung von Katastrophen, wie sie bereits Noahs Zeitgenossen erleiden mussten. Beim Tod Jesu am Kreuz verfinsterte sich die Welt, bebte die Erde und wurden die Felsen zerrissen, wie es Matthäus 27, 35 ff. berichtet und wie es im Gedächtnis daran im frühen 16. Jahrhundert als Erdbebenschaden mit der Kreuzkapelle in Görlitz errichtet worden ist (Abb. 7).[26]

24 Der Begriff in Anlehnung an Edoardo Grendi bei Andrea von Hülsen: Verona, 3. Januar 1117. Möglichkeiten und Unsicherheiten der interdisziplinären Erdbebenforschung, in: Historische Anthropologie 1, 1993/2, S. 218–234.

25 Manfred Jakubowski-Tiessen: Mythos und Erinnerung. Einige kommentierende Anmerkungen über Städte in Trümmern, in: Ranft/Selzer 2004 (wie Anm. 2), S. 274–286, hier S. 277.

26 Matthäus Kapitel 27, 35 ff.; Ines Anders/Marius Winzeler (Hg.): Lausitzer Jerusalem. 500 Jahre Heiliges Grab zu Görlitz, Görlitz/Zittau 2005.

Fig. 8 Roland Emmerich's The Day after Tomorrow (2004) as an example of the latest disaster films: in the context of climatic change nature itself is the punishing actor (film poster, Twentieth Century Fox)

Abb. 8 Roland Emmerichs »The Day after tomorrow« (2004) als Beispiel für die jüngsten Katastrophenfilme, in denen im Zeichen des Klimawandels die Natur selber strafender Akteur ist (Filmplakat, Twentith Century Fox).

for instance in Luke 21:10–11 (to which the chronicles of the Basel earthquake then made reference): »Nation will rise against nation, and kingdom against kingdom. And there will be great earthquakes in various places, and famines and pestilences; and there will be fearful sights and great signs from heaven.« Far into modern times natural disasters were accordingly interpreted either as divine punishment, as a sign of the approaching end of the world, or as a warning to change one's ways and search one's soul. In the course of the Enlightenment a natural history discourse on disasters was established in addition to this theological discourse, and it ultimately became dominant in modern times. Now interpretations of disasters are explanations of nature. The changes that can be observed in the last fifty years in particular are revealing: they reflect the evolution from the belief in comprehensive technical feasibility, in which disasters are seen as malignant, unfair disruptions of technical systems by nature, to the crisis of the modern age.[27] It becomes apparent that punishment- and penance-oriented, even eschatological, interpretations are by no means gone, but that now it is not the deity that punishes man with the disaster but nature itself—nature as the victim of human action and at the same time as the punisher of mankind (fig. 8). Thus the entire spectrum of disaster interpretation still exists, from warning or consequence (i. e., as punishment for civilization's interventions in nature) to the heightened view of the disaster as a sign of the approaching end of the world or as chiliastic purgatory.[28]

Auch für die Zukunft sind in der Bibel entsprechende Prodigia prophezeit worden, etwa – worauf sich dann die Chronistik des Basler Erdbebens bezog – in Lukas 21, 10 f.: »Erheben wird sich Volk wider Volk und Reich wider Reich, und große Erdbeben werden kommen und da und dort Hungersnöte und Seuchen, und Schrecknisse und große Zeichen vom Himmel her werden kommen«. Entsprechend hat man Naturkatastrophen bis weit in die Neuzeit wechselweise als Strafgericht, als Hinweis auf das bevorstehende Weltende oder aber als Warnung zur Um- und Einkehr interpretiert. Im Laufe der Aufklärung etablierte sich neben diesem theologischen ein naturkundlicher Katastrophendiskurs, der in der Moderne schließlich dominant wurde. Katastrophendeutungen stellen nun Naturdeutungen dar. Aufschlussreich sind gerade auch die dabei zu beobachtenden Veränderungen der letzten fünfzig Jahre, welche die Entwicklung spiegeln vom Glauben an eine umfassende technische Machbarkeit, in der Katastrophen als bösartige, unfaire Störung der technischen Systeme durch die Natur gesehen werden, bis hin zur Krise der Moderne.[27] Es zeigt sich, dass straf- und bußorientierte, ja eschatologische Interpretationen damit keineswegs erledigt sind, nur ist es nun nicht mehr die Gottheit, die durch Katastrophen die Menschen straft, sondern – als Opfer menschlichen Tuns und

Lausitzer Jerusalem. 500 Jahre Heiliges Grab zu Görlitz, Görlitz/Zittau 2005.

27 Jens Ivo Engels: Vom Subjekt zum Objekt. Naturbild und Naturkatastrophen in der Geschichte der Bundesrepublik, in: Groh/Kempe/Mauelshagen 2003 (note 2), pp. 119–142.

28 See for instance Jeffrey Goodman: We are the Earthquake

27 Jens Ivo Engels: Vom Subjekt zum Objekt. Naturbild und Naturkatastrophen in der Geschichte der Bundesrepublik, in: Groh/Kempe/Mauelshagen 2003 (wie Anm. 2), S. 119–142.

Interesting in this context—and noteworthy with regard to our own perceptions (which have of course led to our present discussion of this theme)—is the repeatedly established connection between social awareness of crises and the increasing frequency of disasters.[29] This finding is interpreted with ambivalence: does the awareness that one is living in a period of upheaval foster the perception of disasters or does the significant increase of such events contribute to the crisis or to awareness of the crisis? In any case—and the present time is no exception—»disasters have a bearing on interpretive patterns.«[30]

Of course this does not apply only to the European-Mediterranean cultural sphere, and we limit our examples to this area because our own expertise and circumstances force us to do so. But, regarding the theme punishment and nature interpretations, let us at least refer briefly to one example from another cultural context, passed on by anthropologist Judith Schlehe and particularly noteworthy in respect to relations between nature and man. Pak Permadi, an indigenous expert for paranormal events from Yogya in Java, interprets natural disasters as follows: »If people are not happy with their treatment by those in power but cannot defend themselves, their anger, which expresses itself as energy, is taken up by nature. If nature is angry, disasters such as a volcanic eruption occur because nature is not afraid of human rulers.«[31]

The Apocalypse does not allow for preventive measures, but other explanations that attempt to give meaning to disasters usually involve appropriate symbolic precautions. The disaster as a sign of divine anger calls for measures to appease the deity, as prevention against a repetition of destruction. Thus in 1358, after earthquakes had rocked the Upper Rhine Valley the two previous years, the town council in Strasbourg established an annual day of petition and repentance to be held on St. Luke Day, the anniversary of the earthquake in 1356, in order »to honor God the Almighty and to temper his great anger.«[32] The procession was simultaneously a pacing off

Generation. Where and When the Catastrophes Will Strike, New York 1981; see also on the New Age generally and disaster interpretation: Ina-Maria Greverus: Die Enträumlichung der Gefahr. »Angstlust«, postmodernes Ereigniswerk und chiliastische Hoffnung, in: Zeitschrift für Volkskunde 86, 1990, pp. 14–24.

29 Paradigmatic of this in European history are the period around 400 A.D., the 6th century in the eastern Roman Empire and the 14th century. See Waldherr 1998 (note 3), p. 63; Mischa Meier: Zur Wahrnehmung und Deutung von Naturkatastrophen im 6. Jahrhundert n. Chr., in: Groh/Kempe/Mauelshagen 2003 (note 2), pp. 45–64.

30 Groh/Kempe/Mauelshagen 2003 (note 2), p. 25.

31 Judith Schlehe: Die Meereskönigin des Südens, Ratu Kidul. Geisterpolitik im javanischen Alltag, Berlin 1998, p. 156. The quotation was taken up in the report: Welt im Wandel. Strategien zur Bewältigung globaler Umweltrisiken. Jahresgutachten 1998, Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderung, Berlin 1999, p. 171.

32 Lucia Pfleger: Die Stadt- und Rats-Gottesdienste im Strassburger Münster, in: Archiv für elsässische Kirchengeschichte 12, 1937, pp. 1–55,

dieses bestrafend zugleich – die Natur selber (Abb. 8). Es bleibt das ganze Interpretationsspektrum von der Katastrophe als Warnung oder Konsequenz, das heißt Strafe für zivilisatorische Eingriffe in die Natur, bis hin zur verschärften Sicht der Katastrophe als Zeichen des nahenden Weltendes oder als chiliastisches Purgatorium.[28]

Interessant in diesem Kontext – und bemerkenswert hinsichtlich unserer eigenen, auch diese Tagung begründenden Wahrnehmung – ist der wiederholt festgestellte Zusammenhang von gesellschaftlichem Krisenbewusstsein und der Häufung von Katastrophen(erfahrungen).[29] *Dieser Befund wird ambivalent interpretiert: Fördert das Bewusstsein vom Leben in einer Umbruchperiode die Wahrnehmung von Katastrophen oder trägt die signifikante Zunahme solcher Ereignisse zur Krise beziehungsweise zum Krisenbewusstsein bei? In jedem Fall – und unsere Gegenwart ist davon nicht ausgenommen – »zeitigen Katastrophen Auswirkungen auf Deutungsmuster«.*[30]

Das gilt alles selbstverständlich nicht nur für den europäisch-mediterranen Kulturkreis, auf den wir uns in der Wahl der Beispiele nur deshalb beschränken, weil die eigenen Kompetenzen und der gesetzte Rahmen dazu zwingen. Wenigstens zum Thema Straf- und Naturdeutung sei aber ein einziges, gerade in Bezug auf Natur-Mensch-Relationen bemerkenswertes Beispiel aus einem anderen kulturellen Kontext kurz zitiert, das die Anthropologin Judith Schlehe überliefert hat. Pak Permadi, ein indigener Experte für paranormale Ereignisse aus Yogya/Java deutet Naturkatastrophen wie folgt: »Wenn die Menschen mit ihrer Behandlung durch die Machthaber nicht zufrieden sind, aber sich nicht dagegen wehren können, wird ihre Wut, die sich als Energie äußert, von der Natur aufgenommen. Wenn die Natur wütend ist, kommt es zu einer Katastrophe wie einem Vulkanausbruch; denn die Natur fürchtet sich nicht vor menschlichen Herrschern«.[31]

Die Apokalypse erfordert keine Prävention; andere sinnstiftende Erklärungen von Katastrophen ziehen dagegen in der Regel eine entsprechende symbolische Katastrophenvorsorge nach sich. Die Katastrophe als Zeichen göttlichen Zorns ruft nach Maßnahmen zur Besänftigung der Gottheit als Prävention vor einer Wiederholung der Zerstörung. So hat

28 Vgl. z. B. Jeffrey Goodman: We are the Earthquake Generation. Where and When the Catastrophes Will Strike, New York 1981; dazu und generell zu New Age und Katastrophendeutung: Ina-Maria Greverus: Die Enträumlichung der Gefahr. »Angstlust«, postmodernes Ereigniswerk und chiliastische Hoffnung, in: Zeitschrift für Volkskunde 86, 1990, S. 14–24.

29 Paradigmatisch dafür in der europäischen Geschichte die Zeit um 400, das 6. Jahrhundert im oströmischen Reich und das 14. Jahrhundert. Dazu Waldherr 1998 (wie Anm. 3), S. 63; Mischa Meier: Zur Wahrnehmung und Deutung von Naturkatastrophen im 6. Jahrhundert n. Chr., in: Groh/Kempe/Mauelshagen 2003 (wie Anm. 2), S. 45–64.

30 Groh/Kempe/Mauelshagen 2003 (wie Anm. 2), S. 25.

31 Judith Schlehe: Die Meereskönigin des Südens, Ratu Kidul. Geisterpolitik im javanischen Alltag, Berlin 1998, S. 156. Das Zitat wurde übernommen in den Bericht: Welt im Wandel. Strategien zur Bewältigung globaler Umweltrisiken. Jahresgutachten 1998, hg. vom Wissenschaftlichen Beirat der Bundesregierung Globale Umweltveränderung, Berlin 1999, S. 171.

Fig. 9 Inscriptions on a house (» Oh Saint Agatha and Saint Donata, protect us from eternal and earthly fire« – here in Warburg, Westphalia) ask for support for the building and its inhabitants, thus fulfilling apotropaic functions.

Abb. 9 Hausinschriften (hier in Warburg/Westfalen) bitten um Beistand für das Haus und seine rechtschaffenen Bewohner und sollen damit apotropäische Funktionen erfüllen.

of the territory to be protected. Another form of warding off disasters spatially through symbolic preventive measures involves the placement of architectural »signs.« Chapels, wayside shrines and crosses, for instance, can be found particularly in the Catholic regions of the Alps. Paul Hugger has mapped such tokens in Napf, a mountainous area known for its severe storms with raging rivers and streams, and has established that these small structures are located at focal points of danger. »Together they provide a meaningful, well-structured network. Legends and stories are tied to their source: there is talk of great floods, (…) of will-o'-the-wisps that led people off to their doom. On the one hand the danger is warded off through these built tokens, but on the other hand they call it to consciousness again and again because they are sought out as places to visit. Fear loses its irrationality, it is called by its name and becomes tangible.«[33]

Symbolic interpretations and actions by no means exclude pragmatic, purpose-oriented actions, as is substantiated everywhere by rural architecture in particular. Practical day-to-day behavior of a precautionary nature often goes along with the apotropaic symbols of disaster prevention that have come down to us in many places. Symbols or inscriptions on houses, etc. attest not so much to a fatalistic resignation to hope as to the belief that without Providence practical precautions alone would not be effective (fig. 9). Thus it is probably not mere chance that, at least in Switzerland, symbols and inscriptions on houses became particularly common in the 18th century,[34] a time when religious interpretations

der Rat von Straßburg 1358 nach den Erdbeben, die in den beiden Vorjahren den Oberrheingraben erschütterten, eine jährlich am Lukastag, dem Jahrestag des Bebens von 1356, zu begehende Bitt- und Bußprozession etabliert, »Gott dem allmehtigen zu eren und zu bemiltern sinen sweren zorn«.[32] *Mit der Prozession schreitet man gleichsam das zu schützende Territorium ab. Eine andere Form der räumlichen Bannung als symbolische Prävention ist die Setzung architektonischer Zeichen im Raum. Kapellen, Bildstöcke und Wegkreuze etwa finden sich insbesondere in katholischen Regionen des Alpenraums. Paul Hugger hat solche Zeichen im Napf, einem für heftige Gewitter mit entsprechend reißenden Flüssen und Bächen bekanntes Berggebiet, kartiert und festgestellt, dass die Kleinarchitekturen an Brennpunkten der Gefährdungen stehen. »Sie ergeben zusammen ein sinnvolles, wohl strukturiertes Geflecht. Legenden und Geschichten heften sich an ihren Ursprung: Von großer Wassernot ist da die Rede, (…) von Irrlichtern, welche die Menschen abseits ins Verderben führten. Wenn so durch das bauliche Zeichen die Gefahr gebannt ist, wird sie andererseits durch das Aufsuchen dieser Stätten immer wieder ins Bewusstsein gerufen. Die Angst verliert ihre Irrationalität, sie wird beim Namen genannt, sie wird fassbar.«*[33]

Symbolische Deutungen und Handlungen schließen dabei pragmatisch-zweckgerichtetes Handeln keineswegs aus, wie gerade das ländliche Bauen allenthalben belegt. Alltagspraktisches Präventionsverhalten geht oft einher mit den vielerorts überlieferten apotropäischen Symbolen zur Katastrophenprophylaxe. Hauszeichen, Inschriften und so weiter bezeugen damit weniger eine fatalistische Hoffnungsergebenheit, als die Überzeugung, dass ohne die göttliche Vorsehung die Vorsorge allein nicht greifen könne (Abb. 9). Es ist daher wohl auch kein Zufall, dass sich zumindest in der Schweiz Hauszeichen und Inschriften im 18. Jahrhundert häufen[34] *und damit in einer Zeit, in der religiöse Deutungen*

here pp. 50 ff.; on comparable practices in antiquity: Gerhard H. Waldherr: Bittprozessionen, Säulenheilige und Wasserdampf. Mentale Bewältigungen von Erdbeben der römischen Antike, in: Blick in die Wissenschaft 7, 1997, pp. 4–13.

33 Paul Hugger: Elemente einer Ethnologie der Katastrophe in der Schweiz, in: Zeitschrift für Volkskunde 86, 1990, pp. 25–36, esp. pp. 27 ff.

34 At least this is the case if one assumes that the buildings in the Ballenberg open-air museum are representative in this respect. For a categorization of the Ballenberg inscriptions according to date see: Jean-Pierre Anderegg: Hausinschriften auf dem Ballenberg, in: Jahrbuch 2000. Schweizerisches Freilichtmuseum Ballenberg, pp. 114–143. See

32 Lucia Pfleger: Die Stadt- und Rats-Gottesdienste im Straßburger Münster, in: Archiv für elsässische Kirchengeschichte 12, 1937, S. 1–55, hier S. 50 ff.; zu vergleichbaren antiken Praktiken: Gerhard H. Waldherr: Bittprozessionen, Säulenheilige und Wasserdampf. Mentale Bewältigungen von Erdbeben der römischen Antike, in: Blick in die Wissenschaft 7, 1997, S. 4–13.

33 Paul Hugger: Elemente einer Ethnologie der Katastrophe in der Schweiz, in: Zeitschrift für Volkskunde 86, 1990, S. 25–36, bes. S. 27 ff.

34 So jedenfalls, wenn man davon ausgeht, dass der Bestand im Freilichtmuseum Ballenberg in dieser Hinsicht repräsentativ ist. Zur zeitlichen Verteilung der Ballenberger Inschriften Jean-Pierre Anderegg: Hausinschriften auf dem Ballenberg, in: Jahrbuch 2000. Schweizerisches Freilichtmuseum

of disasters and secular actions coexisted in the belief that future disasters can only be hindered if the community finds its way back to a state that meets the ethic standards of Christianity.[35]

In comparison the symbolism of *modern* disaster interpretation proves one-dimensional; for instance after the 1906 earthquake in San Francisco efforts were devoted (primarily for economic reasons) to presenting the fires—which it was assumed could be controlled in the future—as the cause (and not the result) of the damage and to negating the earthquake as much as possible as the trigger of the disaster.[36] Up till the present day we can see again and again that the myth of technical feasibility is a modern form of symbolic disaster management.

From mastering the disaster to preventing it

San Francisco, where the former mayor James D. Phelan—aware that his city was not old—had stated that there was »nothing destroyed [by the earthquake] that cannot speedily be rebuilt,«[37] is a particularly vivid example of the perspective that sees disaster management as an engine of progress. This perspective can be followed in urban historiography in particular, from antiquity up to the present: from Polybios, who reported that the earthquake from 227/226 B. C. did not bring disadvantages but rather improvements to the people of Rhodes,[38] to Fritz Schumacher's book »Wie das Kunstwerk Hamburg nach dem großen Brand entstand« (how the work of art Hamburg took shape after the great fire), to recent reports in Dresden that praise the renewal of the urban infrastructure as a result of the Elbe flood in 2002. Disaster management is a component and a constituent factor of urban self-confidence: urban history as the narrative of mastered disasters confers historicity on urban self-awareness.[39]

When Aeneas Silvio Piccolomini, later Pope Pius II, reported from the council in Basel that the earthquake in 1356 was like a second founding of the city, that everything was now new and there was »no sign of age,«[40] he

also: Robert Rüegg: Haussprüche und Volkskultur. Die thematischen Inschriften der Prättigauer Häuser und Geräte, Kirchen und Glocken, Bilder und Denkmale, Basel 1970.

35 See also Jakubowski-Tiessen 2004 (note 25), p. 278.

36 Christoph Strupp: »Nothing destroyed that cannot speedily be rebuilt.« San Francisco und das Erdbeben von 1906, in: Ranft/Selzer 2004 (note 2), pp. 132–171, esp. pp. 165 f.

37 Strupp (note 36), p. 139.

38 Polybios V 88, 1–3, quoted from: Meissner 2004 (note 8), p. 39, see also Meissner, pp. 35 und 50

39 Fouquet 2004 (note 2), p. 130.

40 »Nam quae olim a terrae motu superfuere, alia postea ruina

von Katastrophen und säkulare Handlungen nebeneinander hergehen im Bewusstsein, zukünftiges Unheil ließe sich nur dann verhindern, wenn die Gemeinschaft zu einem Zustand zurückfände, der den ethischen Maßstäben des Christentums gerecht würde.[35]

Die Symbolik moderner Katastrophendeutung erweist sich im Vergleich dazu als eindimensional, wenn man sich etwa in San Francisco nach 1906 vor allem aus wirtschaftlichen Gründen darum bemühte, die – wie man annahm zukünftig beherrschbaren – Brände als Ursache (und nicht als Folge) der Schäden darzustellen und das Erdbeben als Auslöser möglichst zu negieren.[36] *Bis heute erweist es sich stets von Neuem, dass der Mythos der technischen Machbarkeit zu den modernen Formen symbolischer Katastrophenbewältigung gehört.*

Von der Katastrophenbewältigung zur Prävention

San Francisco, wo der ehemalige Bürgermeister James D. Phelan – im Bewusstsein, dass seine Stadt nicht alt war – konstatierte, das Erdbeben habe »nothing destroyed that cannot speedily be rebuilt«,[37] *ist ein besonders anschauliches Beispiel für jene Perspektive auf die Katastrophe, in welcher deren Bewältigung als Fortschrittsmotor gesehen wird. Diese Sichtweise lässt sich insbesondere in der städtischen Historiographie von der Antike bis in die Gegenwart verfolgen: Von Polybios, der berichtet, den Rhodiern habe das Erdbeben von 227/226 v. Chr. nicht Nachtteil, sondern Verbesserung gebracht,*[38] *über Fritz Schuhmachers Buch »Wie das Kunstwerk Hamburg nach dem großen Brand entstand« bis zu den jüngsten Dresdner Berichten, in denen die Erneuerung der städtischen Infrastruktur nach dem Elbhochwasser von 2002 gelobt wird. Katastrophenbewältigung ist Bestandteil und konstituierender Faktor städtischen Selbstbewusstseins: Stadtgeschichte als Geschichte bewältigter Katastrophen verleiht dem städtischen Selbstbewusstsein Historizität.*[39]

Wenn Aeneas Silvio Piccolomini, der spätere Papst Pius II., vom Konzil zu Basel berichtet, für die Stadt sei das Erdbeben von 1356 quasi eine zweite Stadtgründung gewesen, alles sei nun neu, es gebe »kein Zeichen von Alter«,[40] *ist damit aus*

Ballenberg, S. 114–143. Vgl. auch: Robert Rüegg: Haussprüche und Volkskultur. Die thematischen Inschriften der Prättigauer Häuser und Geräte, Kirchen und Glocken, Bilder und Denkmale, Basel 1970.

35 Dazu auch Jakubowski-Tiessen 2004 (wie Anm. 25), S. 278.

36 Christoph Strupp: »Nothing destroyed that cannot speedily be rebuilt«. San Francisco und das Erdbeben von 1906, in: Ranft/Selzer 2004 (wie Anm. 2), S. 132–171, bes. S. 165 f.

37 Ebd., S. 139.

38 Polybios V 88, 1–3, zitiert nach: Meißner 2004 (wie Anm. 8), S. 39, vgl. auch ebd., S. 35 und 50.

39 Fouquet 2004 (wie Anm. 2), S. 130.

40 »Nam quae olim a terrae motu superfuere, alia postea ruina cecicerunt, ut nihil uetustum, nihil caducum appareat.« Basilea Latina. Lateinische Texte

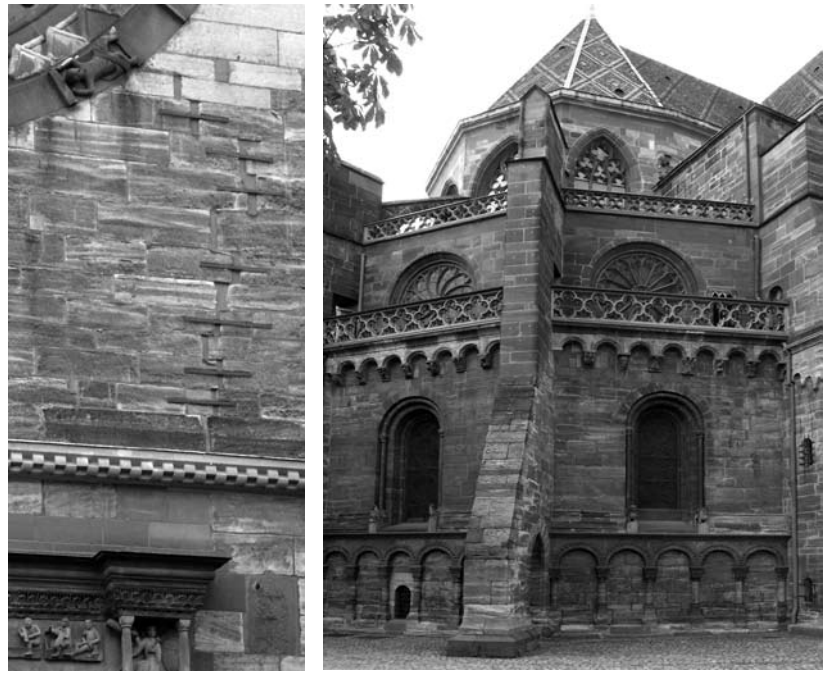


Fig. 10 An earthquake in 1356 left visible traces on the Basel Cathedral: on the one hand repairs are visible on the crossing, on the other hand the opportunity arose to redo the chancel in then-modern forms.

Abb. 10 Das Erdbeben von 1356 hat am Basler Münster sichtbare Spuren hinterlassen: Einerseits gab es Reparaturen am Querhaus, andererseits bot sich die Möglichkeit zur Erneuerung des Chores in damals modernen zeitgenössischen Formen.

of course touched upon something that is a problem from the preservationist's point of view: the disaster as the trigger of a building boom (fig. 10).[41] Reconstruction in the aftermath of a disaster brings above all a leap in structural renewal and modernization; as always during periods of accelerated architectural development there is great danger that historic buildings will also be destroyed. The so-called »second destruction« during the removal of rubble following World War II provides warning evidence of this. But it does not hinder things from repeating themselves, as recently seen on Neumarkt (New Market) in Dresden: the above-ground ruins had been removed after 1945, and now the flood in 2002 provided the superficial arguments needed for removal of the remnants that were still underground, regardless of their monument value. Although in this case it may have been commercial interests making use of the disaster as an excuse, in other places it may often be genuine efforts to help disaster victims quickly that heedlessly lead to loss of cultural property. A related phenomenon involves problematic interventions in the social and ecological structure, as illustrated by a research project on the construction of houses using concrete instead of

denkmalpflegerischer Sicht freilich zugleich ein Problem angesprochen: Katastrophen als Auslöser eines Baubooms (Abb. 10).[41] Der Wiederaufbau in Folge einer Katastrophe ist vor allem ein baulicher Erneuerungs- und Modernisierungsschub und wie immer in Phasen beschleunigter Bauentwicklung ist die Gefahr groß, dass zusätzlich bauliche Zeugnisse der Geschichte zerstört werden. Die so genannte »zweite Zerstörung« durch die Enttrümmerungen nach dem Zweiten Weltkrieg sollte warnendes Beispiel sein. Es verhindert aber, wie vor kurzem das Geschehen am Dresdner Neumarkt gezeigt hat, nicht, dass sich die Dinge wiederholen: Wie nach 1945 die oberirdischen Ruinen abgeräumt wurden, lieferte die Flut von 2002 vordergründig die Argumente, um die im Boden verbliebenen Reste unbesehen ihres Denkmalwerts zu entsorgen. Mögen es in diesem Fall kommerzielle Interessen sein, denen die Katastrophe den Vorwand lieferte, so sind es andernorts echte Bemühungen, den Opfern rasch zu helfen, die oft unbesehen zum Verlust von Kulturgütern führen. Damit verbunden sind, wie ein Forschungsprojekt zum Aufbau der Häuser von Tamil Nadu nach dem Tsunami in Beton statt in traditionellen Techniken zeigt, nicht selten problematische Eingriffe ins soziale und ökologische Gefüge (Abb. 11).[42]

cecicerunt, ut nihil uetustum, nihil caducum appareat.« Basilea Latina. Lateinische Texte zur Zeit- und Kulturgeschichte der Stadt Basel im 15. und 16. Jahrhundert, selected and with commentary by Alfred Hartmann, Basel 1931, p. 38.

41 Even disasters that did not take place can trigger a building boom, as reported by the Burgundian monk Radulfus Glaber in the mid-11th century. According to him a few years after the turn of the millenium and the non-arrival of the expected apocalypse »it was as though the very world [of Christian nations] had shaken herself and cast off her old age, and were clothing herself everywhere in a white garment« of new churches. Cecilia Davis-Weyer: Early Medieval Art 300–1150, Sources and Documents, Toronto 1986, pp. 124 f.

zur Zeit- und Kulturgeschichte der Stadt Basel im 15. und 16. Jahrhundert, ausgewählt und erläutert von Alfred Hartmann, Basel 1931, S. 38.

41 Selbst nicht stattgefundene Katastrophen können einen Bauboom auslösen, wie Mitte des 11. Jahrhunderts der burgundische Mönch Radulfus Glaber berichtet. Demnach hätten wenige Jahre nach der Jahrtausendwende und dem Ausbleiben der erwarteten Apokalypse alle christlichen Nationen Furcht und Alter abgeschüttelt und eifrig begonnen, sich mit neuen Kirchen zu schmücken. In englischer Übersetzung bei: Cecilia Davis-Weyer: Early Medieval Art 300–1150, Sources and Documents, Toronto u. a. 1986, S. 124 f.

42 Jennifer Duyne Barenstein: Neue Trends beim Aufbau in Tamil Nadu. Tradition contra Beton bei der Hilfe nach dem Tsunami, in: Neue Zürcher Zeitung Nr. 302, 27. 12. 2005, S. 5; dies.: Challenges and risks in post-tsunami housing reconstruction in Tamil Nadu, in: HPN (Humanitarian Practice Network), www.odihpn.org/report.asp?id=2798 (10. 01. 2008).

Fig. 11 Destruction of cultural property through disaster management: modern houses (left) displace the traditional in Tamil Nadu.

Abb. 11 Kulturgüterzerstörung durch Katastrophenbewältigung: Moderne Häuser (links) verdrängen in Tamil Nadu die traditionellen.

traditional techniques in Tamil Nadu after the tsunami (fig. 11).[42]

The euphoria for renewal is counterbalanced by the theme of ruin and fall. The moods in a group affected by a disaster oscillate between these extremes; moving from the latter to the former often marks the »normal« process of mastering a disaster. Whether and how fast this process gets under way, whether an affected group remains lethargic or faces its challenges dynamically—in other words the manner in which a society deals with a disaster—is an »indicator for crucial conflicts and for the processing of existential problems by and in this society.«[43] In this context an oft-cited comparison that illuminates this spectrum involves the aftermath of the earthquakes in Friuli in 1976 and in Campania four years later.[44] In the first case a burst of growth followed the initial shock, whereas in the south lethargy, emigration and continued decline were the consequences.

This is not the place to go more deeply into the sociological causes of these differences. For our investigation of the possibilities and limits of prevention there are other more interesting factors that have been recognized as important in research on disaster management. The issue of a society's ability to learn to deal with disasters seems particularly critical. When places where disasters occur again and again nonetheless continue to be settled, indicating that the danger of a catastrophe is consciously accepted, then there must be advantages to the location—probably of an economic nature but possibly also cultural—that overcompensate for this disadvantage.[45] In such locations

42 Jennifer Duyne Barenstein: Neue Trends beim Aufbau in Tamil Nadu. Tradition contra Beton bei der Hilfe nach dem Tsunami, in: Neue Zürcher Zeitung Nr. 302, 12/27/2005, p. 5, and also: Challenges and risks in post-tsunami housing reconstruction in Tamil Nadu, in: HPN (Humanitarian Practice Network), www.odihpn.org/report.asp?id=2798 (Jan. 10, 2008).

43 Waldherr 1998 (note 3), p. 62.

44 Pierotti 2005 (note 6), p. 34; Robert Geipel: Katastrophen nach der Katastrophe? Ein Vergleich der Erdbebengebiete Friaul und Süditalien, in: Geographische Rundschau 35, 1983/1, pp. 17–26.

45 Groh/Kempe/Mauelshagen 2003 (note 2), p. 12 on the complementary aspect: »Risk minimization can be seen as the central strategy of subsistence economies.«

Der Erneuerungseuphorie steht die Untergangstopik gegenüber. Die Stimmungen in einer betroffenen Gruppe pendeln zwischen diesen Extremen; oft markiert die Entwicklung von Letzterem hin zu ersterem den »normalen« Prozess der Katastrophenbewältigung. Ob und wie schnell dieser Prozess in Gange kommt, ob eine getroffene Gruppe in Lethargie verharrt oder sich dynamisch den Herausforderungen stellt, die Art und Weise also, wie in einer Gesellschaft mit Katastrophen umgegangen wird, ist ein »Indikator für die Verarbeitung existentieller Probleme und für zentrale Konflikte durch und in dieser Gesellschaft«.[43] Ein zur Veranschaulichung des Spektrums gern zitierter Vergleich ist in diesem Zusammenhang jener zwischen den Nachwirkungen der Erdbeben im Friaul im Jahre 1976 und jenem in Kampanien vier Jahre später.[44] Nach dem ersten Schock erfolgte im ersten Fall ein Wachstumsschub, während im Süden Lethargie, Emigration und fortgesetzter Verfall die Folgen waren.

Auf die soziologischen Ursachen dieser Differenzen ist hier nicht weiter einzugehen. Für unsere Frage nach den Möglichkeiten und Grenzen der Prävention sind andere in der Forschung über die Bewältigung von Katastrophen als wichtig erkannte Faktoren interessanter. Insbesondere die Frage nach der gesellschaftlichen Lernfähigkeit im Umgang mit Katastrophen erscheint dazu essentiell. Wenn an Orten, an denen Katastrophen immer wieder auftreten, dennoch weiterhin gesiedelt und damit die Katastrophengefahr bewusst in Kauf genommen wird, muss der Ort mit Vorteilen wohl hauptsächlich ökonomischer (möglicherweise auch kultureller) Art verbunden sein, die diesen Nachteil überkompensieren.[45] An solchen Orten haben sich alltägliche Verhaltensweisen der Prävention herausgebildet, aber auch Erfahrungen im Umgang mit den Katastrophen. Die Erfahrung (als vorgewusste Information) wird zum

43 Waldherr 1998 (wie Anm. 3), S. 62.

44 Pierotti 2005 (wie Anm. 6), S. 34; Robert Geipel: Katastrophen nach der Katastrophe? Ein Vergleich der Erdbebengebiete Friaul und Süditalien, in: Geographische Rundschau 35, 1983/1, S. 17–26.

45 Groh/Kempe/Mauelshagen 2003 (wie Anm. 2), S. 12 zum komplementären Aspekt: »Risikominimierung kann als die zentrale Strategie von Subsistenzökonomien angesehen werden«.

Fig. 12 An example of local disaster culture: living and building with the danger of avalanches in the high Alps (here in Cadagno, Switzerland)

Abb. 12 Lokale Katastrophenkultur: zum Beispiel Leben und Bauen mit der Lawinengefahr in den Hochalpen (hier in Cadagno, Schweiz)

day-to-day prevention-oriented behavior has evolved, but so has the experience of dealing with disasters. The experience (as previously known information) becomes of critical value.[46] In earthquake research relating to cultural property, such as that being done at Centro Universitario Europeo per in Beni Culturali in Ravello, the term »local seismic culture«[47] has been developed to refer to place-appropriate ways of dealing (also in terms of construction) with the local earthquake danger. Since this is equally valid for other types of danger, for instance in coastal or Alpine regions with their own specific disaster experiences, the term can be extended to »local disaster cultures« (fig. 12). To name only a few examples of an architectural nature, this concept can be applied to the lightweight construction methods of the traditional Japanese house and its furnishings and to the diverse forms of avalanche protection in the high Alps. Non-building related behavior patterns can also be relevant in this context: it is no coincidence that Switzerland, often endangered by disasters because of its topography, is considered the land of insurance.

Traditional knowledge of precautionary measures has been lost in many places because in the course of modernization it has been replaced with more up-to-date, mostly technological procedures. What is no longer tradition now has to be researched scientifically, not least because in the meantime we have learned that technological retrofitting of historic buildings often leads to new problems. High tech practices are moreover too expensive in many areas and very often are not repairable when damage does occur despite all the efforts.

Research into and partial reactivation of local disaster

46 From the perspective of modern disaster research this is confirmed for instance by Enrico L. Quarantelli from the Disaster Research Center of the University of Delaware in Newark, who emphasizes that man reacts correctly when he has had timely receipt of adequate, credible information; cited in: Karin Steinberger: Und täglich grüsst Kassandra, in: Süddeutsche Zeitung Nr. 99, 4/29, 4/30 and 5/1/2006, p. 3.

47 Pierotti 2005 (note 6), p. 30.

entscheidenden Wert.[46] In der Erdbebenforschung, wie sie kulturgüterbezogen etwa am Centro Universitario Europeo per in Beni Culturali in Ravello betrieben wird, spricht man dabei von »Local Seismic Culture«[47] und meint damit die dem Ort angepasste Weise (nicht zuletzt Bauweise) des Umgangs mit der lokalen Erdbebengefahr. Da dies auch für andere Gefahren etwa in Küsten- oder alpinen Regionen und ihre jeweils spezifischen Katastrophenerfahrungen genauso gilt, kann der Begriff erweitert und von »lokalen Katastrophenkulturen« gesprochen werden (Abb. 12).

Das betrifft, um nur einige Beispiele baulicher Art zu nennen, das traditionelle japanische Haus inklusive seiner Möblierung in Leichtbauweise genauso wie die vielfältigen Formen des Lawinenschutzes in den Hochalpen. Dazu zählen aber auch nicht-bauliche Verhaltensweisen: Nicht zufällig gilt die aufgrund ihrer Topographie vielfach katastrophengefährdete Schweiz als Land der Versicherungen.

Das traditionelle Wissen um Vorsorgemaßnahmen ist vielerorts verloren gegangen, da es modernisierungsbedingt durch jeweils zeitgemäßere meist technologische Verfahren ersetzt worden ist. Was nicht mehr tradiert wird, muss heute wissenschaftlich erforscht werden, nicht zuletzt weil wir inzwischen vielfach erfahren haben, dass die technologische Aufrüstung im Bereich von Baudenkmalen häufig zu neuen Problemen führt. Hochtechnische Verfahren sind außerdem vielerorts nicht bezahlbar und sehr oft, wenn sie denn allen Beteuerungen zum Trotz dennoch Schäden erleiden, nicht reparierbar.

Erforschung und teilweise Reaktivierung der lokalen Katastrophenkulturen sind daher gerade im Denkmalbereich Teil der Katastrophenprävention. Kulturgeschichtliches

46 Aus der Perspektive der modernen Katastrophenforschung wird das beispielsweise von Enrico L. Quarantelli vom Disaster Research Center der Universität Delaware in Newark bestätigt, der hervorhebt, dass der Mensch dann richtig reagiert, wenn er rechtzeitig ausreichend und glaubhafte Informationen hat; zitiert nach: Karin Steinberger: Und täglich grüßt Kassandra, in: Süddeutsche Zeitung Nr. 99, 29./30. April/1. Mai 2006, S. 3.

47 Pierotti 2005 (wie Anm. 6), S. 30.

cultures are therefore part of disaster prevention, particularly in the field of preservation. Cultural-historical knowledge—knowing and understanding old cultural practices or recapturing them by means of research—thus becomes our prevention capital.

Conclusion

The introduction to the proceedings of the historians' conference in Halle on the subject of urban destruction through disaster management ends with the postulate that historians must tell their contemporaries »that cities have been permanently endangered by disasters throughout history« and that we therefore must assume »that our future will likewise not be free of urban destruction.« However, involvement with this theme also produced a second message, namely the recognition that »new beginnings and reconstruction efforts were also part of such destructive upheavals, and they have helped to create our present urban living spaces.«[48] Unlike the historians, who can limit themselves to a dispassionate *analysis* of events, preservationists have the duty to *act* and help give shape to things. Therefore we cannot be satisfied with the—entirely correct—observation that natural disasters have always endangered and destroyed cultural monuments, but have therefore always also made room for creation of new monuments. Of course, we, too, are aware of the destructibleness and finite nature of cultural properties. A look at history shows the limits of prevention and demonstrates that the destruction of cultural property, as well as the way we deal with such destruction, can be an important cultural event that becomes an important facet of cultural memory. But it also throws light upon how man has learned to more or less effectively protect himself and his cultural properties.

48 Ranft/Selzer (note 2), pp. 24 f.

Wissen, Kennen und Verstehen alter Kulturpraktiken beziehungsweise deren erforschendes Wiederverstehen wird somit zu Präventionskapital.

Schluss

Die Einleitung der Publikation der Hallenser Historikertagung zum Thema Stadtzerstörung durch Katastrophenbewältigung endet mit dem Postulat, die Historiker müssten ihren Zeitgenossen sagen, »dass Städte in der Geschichte permanent von Katastrophen bedroht wurden« und man daher davon ausgehen müsse, »dass auch unsere Zukunft von Stadtzerstörungen nicht frei sein wird«. Die Beschäftigung mit dem Thema enthalte aber als zweite Botschaft die Erkenntnis, dass »zu solchen zerstörerischen Einschnitten auch Neuanfänge und Wiederaufbauunternehmen gehörten, die unsere heutigen städtischen Lebensräume mitgeschaffen haben«.[48] Anders als Historiker, die sich auf nüchterne Analyse *der Ereignisse beschränken können, haben Denkmalpfleger einen Auftrag zum* Handeln *und Mitgestalten. Wir können uns daher nicht mit der – völlig richtigen – Feststellung begnügen, immer schon hätten Naturkatastrophen Kulturdenkmale gefährdet und zerstört, dabei aber stets auch Raum für neue Denkmale geschaffen. Zerstörbarkeit und Endlichkeit von Kulturgütern sind freilich auch uns gegenwärtig. Ein Blick auf die Geschichte zeigt Grenzen der Prävention und weist darauf, dass die Zerstörung von Kulturgütern und der Umgang mit solchen Zerstörungen bedeutende kulturelle Ereignisse sind, die eine wesentliche Facette der Erinnerungskultur ausmachen. Er gibt uns aber auch Aufschluss, wie Menschen gelernt haben, sich und ihre Kulturgüter mehr oder weniger wirkungsvoll zu schützen.*

48 *Ranft/Selzer 2004 (wie Anm. 2), S. 24 f.*

Reto Ebnöther, Stefan Thurnherr

Loss of Cultural Property through Natural Disasters—Prevention through Risk Management: An Approach

Kulturgüterverlust durch Naturkatastrophen – Prävention durch Risk Management: ein Ansatz

Introduction

Natural disasters are a topic in the media practically every day. Hardly a month goes by without sensational news of a natural disaster that is threatening our planet. It might be an earthquake in South America, a volcanic eruption in North America, or a cyclone in Southeast Asia. Severe natural disasters occur again and again not only in these distant places but also in Central Europe, where they are largely climatic disturbances that bring storms, hail or heavy rainfall with flooding.

The media often follow such disasters with one dramatic report after the other, and photographs of the events inundate the whole world. There is great sympathy for the fate of the victims since the results of a natural disaster can indeed be devastating: homelessness, the loss of all one's possessions, and even the loss of life. A certain sense of relief at not having been affected oneself always accompanies this sympathy, but the reports of disasters nonetheless have an effect: people think more about the situation and wonder how they could protect themselves from something similar. Questions come to mind: is it only one's imagination or have natural disasters really become more common in recent years? And if so, why are they becoming more frequent? Is it the natural course of things, a cycle, or does it have to do with global warming?

For the victims natural disasters are without question a harsh stroke of fate. There can also be major effects on important cultural property. This article will attempt to assess whether the dangers to cultural properties can be diminished and their protection improved through carefully directed risk management. The first section gives a short definition of what is generally understood under the term natural disaster and an overview of types of disasters and affected regions. The second section concerns the definition of cultural goods, in particular immovable cultural properties. Discussion focuses on how and where risk management could be applied in order to determine to what extent cultural property can be insured against possible natural disasters.

Einleitung

Praktisch täglich ist das Thema Naturkatastrophen in den Medien präsent. Kaum ein Monat vergeht ohne neue Sensationsmeldung über eine Naturkatastrophe, welche unseren Planeten bedroht. Mal ist es ein Erdbeben in Südamerika, ein Vulkanausbruch in Nordamerika oder ein Wirbelsturm in Südostasien. Aber neben diesen fernen Destinationen gibt es auch in Mitteleuropa immer wieder schwerwiegende Naturkatastrophen. Vornehmlich sind dies klimatische Störungen, welche Stürme, Hagel oder starke Regenfälle mit Überschwemmungen als Folge nach sich ziehen.

Oftmals überschlagen sich danach die Medien mit neuen Sensationsberichten. Diese Bilder werden von der ganzen Welt förmlich aufgesogen. Die Anteilnahme am Schicksal der Betroffenen ist groß. Denn die Folgen einer Naturkatastrophe können verheerend sein: Obdachlosigkeit, der Verlust des ganzen Hab und Guts oder gar eines Mitmenschen. Die Anteilnahme ist aber auch immer begleitet von einer gewissen Erleichterung, nicht selbst davon betroffen zu sein. Aber trotzdem hat es einen Einfluss: Die Leute denken mehr über die Situation nach, überlegen wie sie sich vor Ähnlichem schützen können. Es drängen sich auch Fragen auf: Ist es nur Einbildung oder häufen sich in den letzten Jahren wirklich die Naturkatastrophen? Und wenn ja, warum nimmt die Häufigkeit zu? Ist es der natürliche Lauf der Dinge, des Zyklus oder steht es im Zusammenhang mit der Klimaerwärmung?

Naturkatastrophen bedeuten für die betroffenen Menschen ohne Frage einen herben Schicksalsschlag. Doch auch Auswirkungen für bedeutende Kulturgüter können die Folge sein. Mit diesem Artikel wird versucht, abzuschätzen, ob durch gezieltes Risk Management die Gefahren für diese vermindert und die Versicherungsdeckung verbessert werden können. Der erste Teil gibt eine kurze Definition, was im Allgemeinen unter Naturkatastrophen verstanden wird, sowie einen Überblick über die Arten und betroffenen Regionen von Naturkatastrophen.

Der zweite Teil widmet sich der Erklärung von Kulturgütern, insbesondere den immobilen Kulturgütern. Es wird erklärt, wie und wo das Risk Management ansetzen könnte, um herauszufinden, inwiefern Kulturgüter versicherbar sind.

Natural Disasters

The term natural disaster can be considered from two sides: either it is a disaster *for* nature, or it is a disaster caused *by* nature. Many adverse effects on the environment are provoked by man or are even his fault. These include for instance forest fires resulting from arson, the emission of greenhouse gases or accidental oil spills in bodies of water. The emphasis in this article will be on disasters caused *by* nature; whereas nature and the environment cannot insure themselves against mankind, people can take steps to insure themselves against nature. This is certainly problematic and controversial, but also inevitable: although society can change its behavior toward nature, it is faced with limits in the reconstruction of that which has already been destroyed. An effort is made here to show to what extent it is possible to insure with certainty against possible natural disasters. Special consideration is given to insuring cultural properties.

Naturkatastrophen

Das Wort Naturkatastrophe lässt sich von zwei Seiten betrachten: Entweder handelt es sich um Katastrophen für die Natur oder um Katastrophen, welche von der Natur ausgehen, so genannte Naturkatastrophen. Viele schlechte Einflüsse auf die Umwelt sind vom Menschen provoziert oder gar verschuldet. Dazu gehören zum Beispiel Waldbrände durch Brandstiftung, der Ausstoß an CO_2-Treibhaus-Gasen oder das durch einen Unfall verursachte Ausfließen von Öl in Gewässer. In diesem Artikel wird das Augenmerk auf die Katastrophen von der Natur gelegt, denn die Natur und die Umwelt können sich gegenüber den Menschen nicht versichern.

Die Menschen sind allerdings in der Lage, sich gegen die Natur zu versichern. Dieser Schritt ist sicherlich problematisch und fragwürdig, allerdings unausweichlich, da die Gesellschaft zwar das Verhalten gegenüber der Natur ändern, aber bereits Zerstörtes nur sehr begrenzt wiederherstellen kann. Daher wird versucht, aufzuzeigen inwiefern es möglich ist, sich sicher gegen etwaige Naturkatastrophen zu versichern. Speziell betrachtet wird die Versicherung von Kulturgütern.

Definition according to Plate

»A catastrophe is an event, concentrated in time and space, through which a society is subjected to severe danger and suffers such losses of life or material damage that the local social structure fails and all or some of the critical functions of the society can no longer be fulfilled.«[1] This definition presumes that a disaster has effects on a society, and it also implies, through its reference to the failure of the local social structures, that outside assistance is needed. Although it should be added that natural disasters can also have devastating consequences for the landscape without affecting people, the following discussion will be limited to Plate's definition since cultural properties are only found in societies or their proximity.

Definition nach Plate

»Eine Katastrophe ist ein Ereignis, in Raum und Zeit konzentriert, bei dem eine Gesellschaft einer schweren Gefährdung unterzogen wird und derartige Verluste an Menschenleben oder materielle Schäden erleidet, dass die lokale gesellschaftliche Struktur versagt und alle oder einige wesentlichen Funktionen der Gesellschaft nicht mehr erfüllt werden können.«[1] Diese Definition baut darauf auf, dass eine Katastrophe Auswirkungen auf eine Gesellschaft hat. Auch signalisiert sie mit den Verweisen auf das Versagen der lokalen gesellschaftlichen Strukturen, dass Hilfe von außen benötigt wird. Allerdings sollte man hinzufügen, dass Naturkatastrophen auch verheerende Folgen für die Landschaft haben können, ohne das die Bevölkerung betroffen ist. Die folgenden Erläuterungen beschränken sich auf die Definition von Plate, da Kulturgüter eigentlich nur in Gesellschaften vorkommen, beziehungsweise ihr Standort in der Nähe einer Gesellschaft angesiedelt ist.

Affected regions

To be somewhat more concrete: what kinds of natural disasters are there and which regions are endangered by which types of disaster? Natural disasters can be roughly divided into two main categories: climatic disturbances and geophysical events. The climatic category includes storms and various types of cyclones. Disasters with geophysical causes include above all earthquakes. Seismic movements are also often the cause of volcanic

1 UNDRO (United Nations Disaster Relief Organization) 1987, cited in Plate/Merz 2001, p. 1.

Betroffene Gebiete

Nun etwas konkreter: Welche Naturkatastrophen gibt es, welche Gebiete sind durch welche Katastrophen gefährdet? Grob kann man Naturkatastrophen in zwei Hauptkategorien unterteilen: in klimatische Störungen und geophysikalische Ursachen. Zu den klimatischen gehören Unwetter und verschiedenste Arten von Wirbelstürmen. Zu den geophysikalischen zählen in erster Linie Erdbeben. Allerdings sind auch Vulkanausbrüche oftmals durch seismische Bewegungen verursacht. Ein Tsunami ist hier das perfekte Beispiel. Dieser

1 UNDRO 1987, zitiert in Plate et al. 2001, S. 1.

eruptions. The tsunami is the perfect example of a geophysical disaster. It is usually triggered by the discharge of tensions built up during the shifting of tectonic plates. A tsunami is often followed by tidal waves that can move toward the coastline at unbelievable speeds.

For Central Europe the most significant natural hazards are storms, floods and earthquakes. Earthquakes may seem surprising on this list at first glance, since no such events are in the immediate consciousness of our generation, at least in Switzerland. But a look in the history books shows a different picture: there are reports of earthquakes which, if projected onto the current population density and the existing building stock, are comparable to the earthquake in Kobe in 1995. The most severe earthquake ever recorded in Northern Europe took place in Basel on 18 October 1356.[2] The earth began to shake for the first time at c. 6 p. m. This weaker preliminary tremor already caused such an uproar among the population that the majority sought safety helter-skelter outside the city walls. As a consequence many hearths in homes and businesses were left untended. Statistics on the damage vary greatly in different historical reports, but according to current estimates there were c. 100 deaths and immense destruction of buildings by fire. So few lives were lost only because most people had already fled after the first tremor. The earthquake was so strong that it was even felt on Lake Constance.

Our lack of awareness of such severe earthquakes should not, however, console us into thinking that one could not happen again. But there is often no interest in preventive measures, even though a large proportion of our building fabric would not survive a severe earthquake in its current state without extreme damage.

wird normalerweise ausgelöst durch die Entladung von Spannung, welche aufgebaut wurden durch die tektonische Verschiebung der Erdplatten. Auf einen Tsunami folgen aber oftmals Flutwellen, welche in ungemeiner Geschwindigkeit Richtung Küsten brechen.

Für Mitteleuropa sind die bedeutendsten Naturgefahren Unwetter, Überschwemmungen und Erdbeben. Erdbeben scheinen auf den ersten Blick erstaunlich, da unserer Generation keine Erdbebenvorkommnisse in der Schweiz wirklich präsent sind. Der Blick in die Geschichtsbücher zeigt ein anderes Bild: Es finden sich Berichte von Erdbeben, die hochgerechnet auf die aktuelle Besiedlungsdichte und die vorhandene Bausubstanz, mit dem Beben in Kobe von 1995 vergleichbar sind. Das stärkste Erdbeben, welches sich in Nordeuropa laut Überlieferung überhaupt zu getragen hat, ist jenes vom 18. Oktober 1356 in Basel.[2] Die Erde wurde zum ersten Mal um etwa 18 Uhr erschüttert. Dieses schwächere Vorbeben versetzte die Bevölkerung schon so in Aufruhr, dass sich ein Großteil der Menschen Hals über Kopf außerhalb der Stadtmauern in Sicherheit brachte. Dies hatte allerdings zur Folge, dass viele Feuerstellen gewerblicher und privater Natur vergessen wurden. Die Schadenszahlen gehen in den verschiedenen historischen Berichten teilweise weit auseinander. Heutigen Schätzungen zufolge gab es immense Zerstörungen an Gebäuden durch Brände und etwa hundert Todesopfer. Diese Zahl ist allerdings nur deswegen so klein, da nach den ersten Beben viele Bewohner schon geflüchtet waren. Das Beben war so stark, dass es sogar bis zum Bodensee spürbar war.

Das fehlende Bewusstsein für solch starke Erdbeben darf allerdings nicht über die Tatsache hinwegtrösten, dass es wieder passieren könnte. Es besteht aber oftmals kein Interesse an präventiven Maßnahmen; obwohl ein großer Teil der Bausubstanz in seinem heutigen baudynamischen Zustand ein stärkeres Erdbeben nur schwer beschädigt überstehen würde.

Are natural disasters increasing?

Another issue for discussion is whether natural disasters are increasing in frequency. According to the graphics in fig. 1, in recent years there has in general been a massive increase in insurance damages resulting from natural disasters. The higher concentration of buildings and people in a confined space is certainly a cause of this increase, and moreover protection measures against natural disasters have often been neglected. But it is not possible to derive conclusions pointing directly to global warming from these statistics, although studies say that there is indeed a connection and it is not merely a question of cyclical causes.

Nehmen Naturkatastrophen zu?

Es soll an dieser Stelle auch diskutiert werden, ob Naturkatastrophen in ihrer Häufigkeit zunehmen. Die Grafik zeigt, dass die Versicherungsschäden auf Grund von Naturkatastrophen in den letzten Jahren massiv zugenommen haben (Abb. 1). Die Gründe dafür liegen sicherlich in der höheren Konzentration an Bauten und Menschen auf engem Raum. Weiter wird aber auch oftmals der Schutz gegen Naturkatastrophen vernachlässigt. Ob direkte Rückschlüsse auf die Klimaerwärmung zu ziehen sind, lässt sich allerdings daraus nicht ableiten. Studien besagen allerdings, dass sehr wohl ein Zusammenhang besteht und es sich nicht nur um zyklische Ursachen handelt.

2 Werner Meyer: Da verfiele Basel überall. Das Erdbeben von 1356, 184. Neujahrsblatt, published by the Gesellschaft für das Gute und das Gemeinnützige Basel, Basel 2006; http://www.altbasel.ch/fussnoten/erdbeben.html

2 *Werner Meyer: Da verfiele Basel überall. Das Erdbeben von 1356, 184. Neujahrsblatt, hg. von der Gesellschaft für das Gute und das Gemeinnützige Basel, Basel 2006; http://www.altbasel.ch/fussnoten/erdbeben.html*

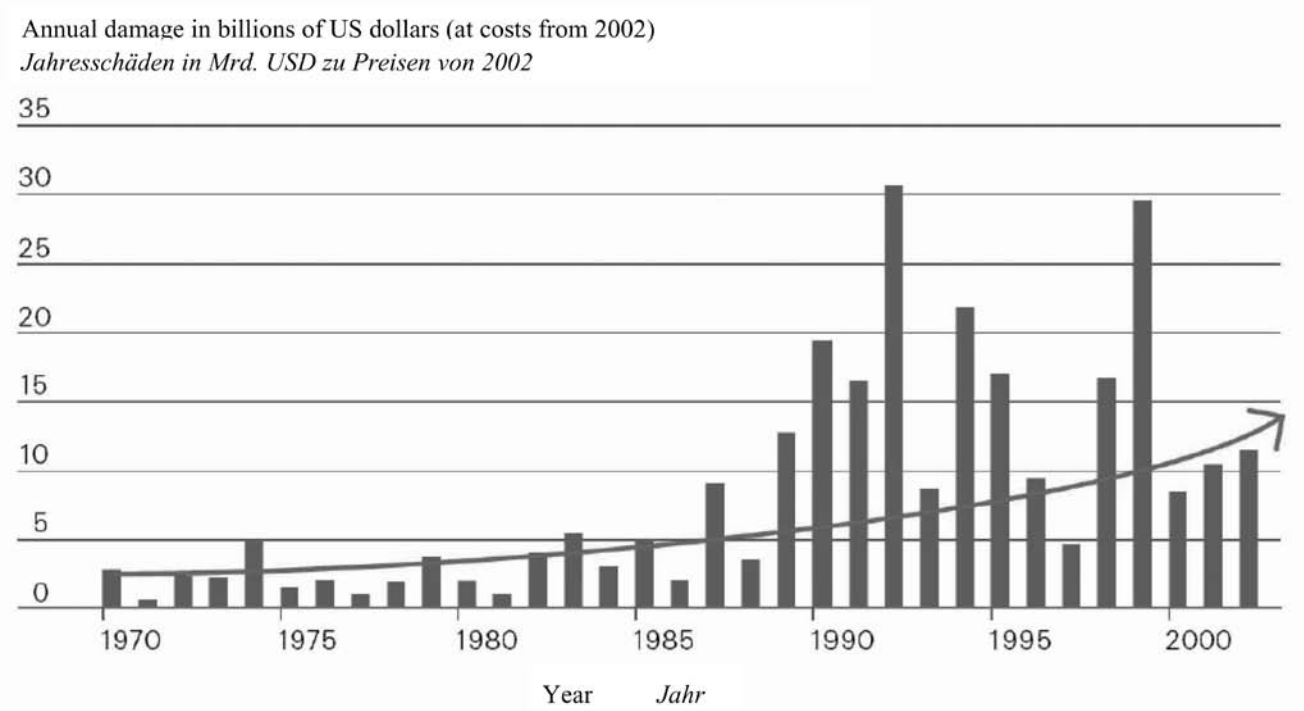


Fig. 1 Insured damage caused by natural disasters over the past 30 years
Abb. 1 Entwicklung der versicherten Schäden durch Naturgefahren in den letzten 30 Jahren

Cultural property

The threats pointed out above often affect human life, landscapes and infrastructures. The following comments concern one particular part of the infrastructure with tradition and great value: cultural property. First a distinction must be made between immovable and movable cultural property. Immovable cultural property includes buildings such as churches, palaces or castles as well as bridges or monuments. Movable cultural property comprises archives, library collections, sculpture and furniture. The focus in this article is primarily on immovable cultural property because it is often particularly affected by natural disasters. Movable cultural property, in contrast, can be brought to safety more easily. The issue of insurance for movable cultural property should not, however, be completely neglected.

Immovable cultural property can be endangered, for instance, because no value was placed on earthquake resistance at the time of its construction, or there was simply no knowledge of earthquake-safe building methods.

From today's perspective, in addition to preventive measures such as renovation or retrofitting to protect cultural property, the question quickly arises as to the extent to which it is possible to insure cultural property. And if so, are cultural goods at present sufficiently insured against natural disasters?

Kulturgüter

Die aufgezeigten Bedrohungen betreffen häufig Menschenleben, Landschaften und Infrastruktur. In der Folge soll das Augenmerk auf einen ganz bestimmten Teil der Infrastruktur gelegt werden, eine traditionelle, wertvolle Infrastruktur: die Kulturgüter. Zuerst ist zu unterscheiden zwischen immobilen und mobilen Kulturgütern. Zu den immobilen zählen Gebäude, Kirchen, Brücken, Schlösser oder Burgen und Denkmäler. Zu den mobilen Kulturgütern gehören Archive, Sammlungen in Bibliotheken, Skulpturen und Möbel. Wir wollen in diesem Artikel primär auf immobile Kulturgüter fokussieren, denn oftmals sind speziell immobile Kulturgüter von Naturkatastrophen betroffen. Mobile Kulturgüter dagegen sind eher in Sicherheit zu bringen. Die Versicherbarkeit von mobilen Kulturgütern soll allerdings nicht ganz vergessen werden.

Immobile Kulturgüter sind deshalb gefährdet, weil beim Bau beispielsweise kein Wert auf Erdbebensicherheit gelegt wurde, beziehungsweise das Wissen oftmals nicht vorhanden war.

Aus heutiger Sicht stellt sich neben präventiven Maßnahmen wie Renovationen oder Schutzmechanismen schnell die Frage nach der Versicherbarkeit. Sind Kulturgüter gegenwärtig bereits ausreichend gegen Naturkatastrophen versichert?

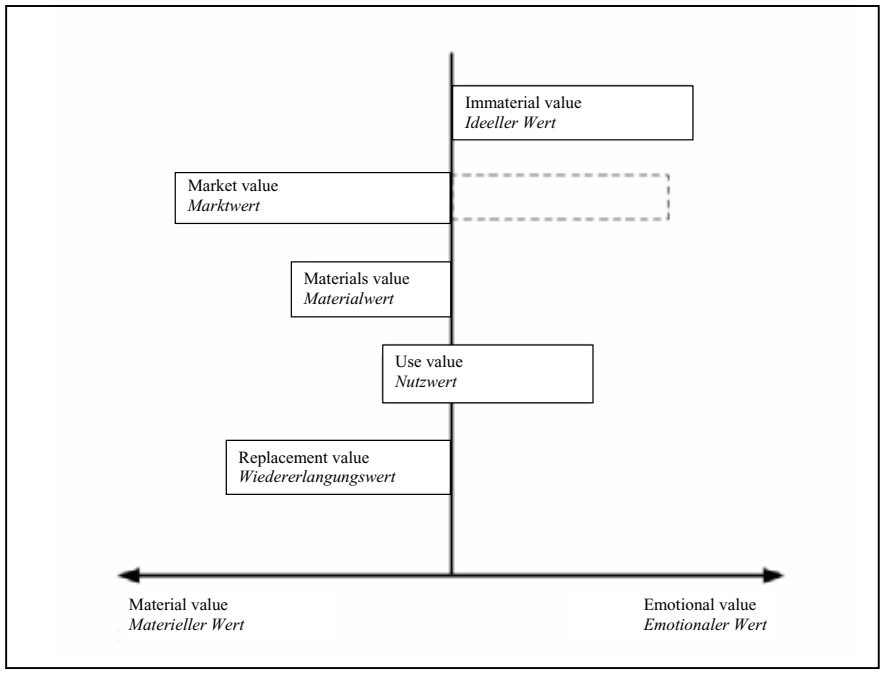


Fig. 2 Material value and emotional value

Abb. 2 Grafik zum Materiellen und Emotionalen Wert

The value of cultural property and its protection

The assessment of the value of cultural property—a crucial point in regard to possible insurance coverage—is subject to special factors: cultural goods are often unique with a high immaterial value that cannot be expressed in financial terms (fig. 2).

Cultural properties have different values according to the particular point of view; five categories of value can be differentiated:

1. immaterial value (emotional, historical, artistic-aesthetic value)
2. market value
3. materials value
4. use value
5. replacement value

Things are not made easier by the fact that these values are often determined by individual and subjective assessment. It is extremely difficult to quantify the various categories of value. This is particularly true for the immaterial value of a cultural property, which is on principle not of a material nature and also cannot be measured in monetary value. It can be indirectly oriented to the market price but the immaterial value assessment is usually related to the characteristics of a cultural property that make it original and give it its status as something unique. For cultural property, this value can be equated with the significance that the object has for our cultural heritage.

Cultural goods are threatened by a great variety of dangers, in particular armed conflicts and natural disasters. But natural deterioration can also damage cultural property. It is often possible to do something against the

Der Wert von Kulturgütern und deren Schutz

Die Wertbeurteilung von Kulturgütern – ein zentraler Punkt hinsichtlich einer möglichen Versicherungsdeckung – unterliegt speziellen Gesichtspunkten: Kulturgüter sind oftmals Unikate mit einem großen ideellen Wert, welcher nicht in finanzieller Form ausgedrückt werden kann (Abb. 2).

Kulturgüter besitzen je nach Blickwinkel einen unterschiedlichen Wert, wobei sich fünf Wertkategorien unterscheiden lassen:

1. *Ideeller Wert (emotionaler, historischer, künstlerisch-ästhetischer Wert)*
2. *Marktwert*
3. *Materialwert*
4. *Nutzwert*
5. *Wiedererlangungswert*

Dass diese Werte oftmals durch individuelle und subjektive Einschätzungen geprägt sind, macht die Sache nicht einfacher. Dabei ist es äußerst schwierig, einzelne der Wertkategorien zu quantifizieren. Dies gilt insbesondere für den ideellen Wert eines Kulturgutes. Dieser ist grundsätzlich nicht materieller Art und lässt sich so auch nicht in Geldwerten bemessen. Er kann sich zwar indirekt am Marktpreis orientieren, doch ist diese Wertschätzung meist auf das Merkmal eines Kulturgutes bezogen, welches die Originalität des Objektes und dessen Status als Unikat ausmachen. Dieser ideelle Wert kann im Zusammenhang mit Kulturgütern der Bedeutung des Objektes gleichgesetzt werden, die dieses für das kulturelle Erbe hat.

Kulturgüter sind durch eine Vielzahl von Gefahren bedroht. Im Speziellen sind dies bewaffnete Konflikte und Naturkatastrophen. Aber auch der natürliche Zerfall gehört zu den Gefahren, welche Kulturgüter beschädigen können. Gegen die natürlichen Abnutzungserscheinungen kann durch

natural signs of wear and tear, for instance through the renovation of buildings or the restoration of documents. Such renovation and revitalization work often costs tremendous sums. It is not possible to have insurance to cover this.

The Hague Convention from 1954 addresses the protection of cultural property against armed conflicts. Cultural property belonging to any people whatsoever must be respected because it belongs to the cultural heritage of mankind.[3] According to regulations in the convention, during peacetime everything possible must be done in order to ensure that in times of crisis cultural goods will be brought to safety or will be specially protected. Furthermore, during a war situation cultural property is to be protected from armed conflict, plundering and explosions or fires. But, as with wear and tear, it is not possible to insure cultural goods against war damages.

Thus attention will be given below to protecting cultural property from natural disasters.

Protection of cultural property and risk management

It has been shown in the preceding sections that the basic problem of cultural property protection is preserving value. This is already a challenge under normal conditions and is often connected with enormous costs. As already mentioned, decay of cultural property, whether a building or a historic document, cannot be stopped.

But what happens if unforeseen or suddenly changed circumstances accelerate deterioration? A sudden event such as a natural disaster or rapidly changing climatic conditions can threaten a cultural property. How can it be protected from such danger?

The risk management process—excursus into the insurance business

Let us make a digression into the insurance business: the discipline known today as risk management arose from attempts by enterprises all over the world to get better control of their own risks (fig. 3). Originally pursued purely as a way to manage dangers, risk management has evolved into a function that is no longer understood as involving only negative factors. The stated goal of so-called »enterprise-wide risk management« also includes the exploitation of possible hidden potential for success.

Both forms of risk management—that based strictly on

3 See the article by Bernhard Furrer in this book. http://www.sgkgs.ch/datei/Haager_Abkommen_KGS_SR_0-520-3-de.pdf

Erneuerungen, Renovationen von Gebäuden oder Restaurierung von Dokumenten oftmals etwas getan werden. Diese Renovationen und Auffrischungen kosten oftmals horrende Summen. Eine Versicherung hierfür ist nicht möglich.

Gegen bewaffnete Konflikte gibt es eine Konvention zum Schutz von Kulturgütern. Dies ist die Haager Konvention von 1954. Dabei geht es darum, dass Kulturgüter gleich welchen Volkes, zu schützen sind, da sie zum Kulturerbe der Menschen gehören.[3] Es geht konkret um die Respektierung dieses Gutes. Dabei ist geregelt, dass in Friedenszeiten alles dafür unternommen werden muss, Kulturgüter bei kritischen Situationen in Sicherheit zu bringen oder speziell zu schützen. Weiterhin gilt es speziell in Kriegssituationen, diese Kulturgüter vor Waffengewalt, Plünderungen oder Sprengungen und Verbrennen zu schützen. Kulturgüter gegen Kriege zu versichern, ist allerdings ebenfalls nicht möglich.

Wir wollen uns daher in der Fortsetzung dem Schutz von Kulturgütern vor Naturkatastrophen zuwenden.

Kulturgüterschutz und Risk Management

Es wurde in den vorhergehenden Kapiteln eingehend dargelegt, dass die grundlegende Problematik des Kulturgüterschutzes die Werterhaltung ist. Diese ist bereits unter Normalbedingungen eine Herausforderung und oftmals mit enormen Kosten verbunden. Der Zerfall eines Kulturgutes, sei es ein Bauwerk oder ein historisches Dokument, lässt sich – wie erwähnt – nicht aufhalten.

Doch was geschieht, wenn unvorhersehbare oder plötzlich veränderte Rahmenbedingungen den Zerfall beschleunigen? Sowohl ein Ereignis wie eine Naturkatastrophe als auch beispielsweise sich rasch ändernde klimatische Verhältnisse können ein Kulturgut bedrohen. Wie kann ein Kulturgut vor solchen Gefahren geschützt werden?

Der Risk Management Prozess – Exkurs in die Versicherungswirtschaft

Lassen Sie uns einen Exkurs in die Versicherungswirtschaft machen: Aus den Versuchen von Unternehmen auf der ganzen Welt, die eigenen Risiken besser im Griff zu haben, entstand eine Disziplin, welche sich heute Risk Management nennt (Abb. 3). Ursprünglich als reines Gefahren-Management betrieben, entwickelte sich Risk Management zu einer Funktion, in der nicht mehr nur negative Einflussgrößen verstanden werden wollen. Auch das Erschließen möglicher, verborgener Erfolgspotentiale mit diesem so genannten »Enterprise-wide Risk Management« ist das erklärte Ziel.

Unabhängig davon, ob ein reines Gefahren-Management

3 *Vgl. hierzu den Beitrag von Bernhard Furrer in diesem Band. http://www.sgkgs.ch/datei/Haager_Abkommen_KGS_SR_0-520-3-de.pdf*

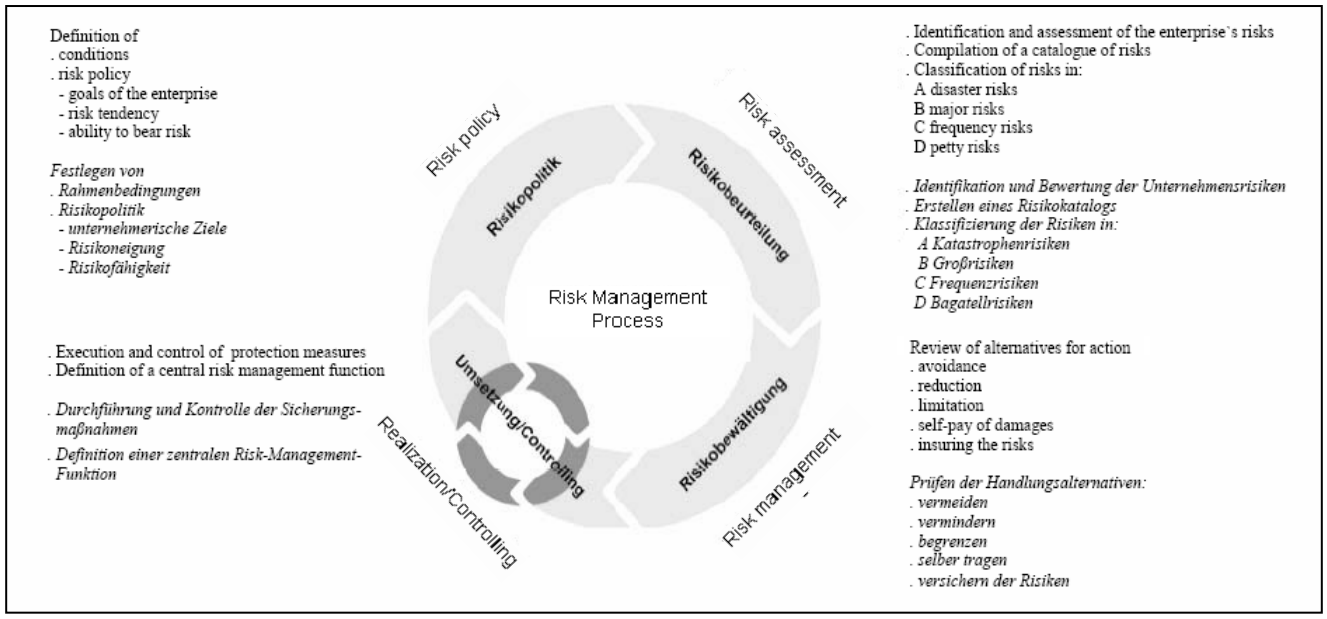


Fig. 3 Risk Management Process

Abb. 3 Der Risk Management Prozess

danger management and that based on comprehensive chance/danger management—are based on the same process.

Risk policy

The basis of risk management is identification of the given conditions for the enterprise's own actions and the definition of its own risk policy. This risk policy is dependent on several subjective factors which are derived from the enterprise as such (its activity, size, condition of its assets, context, etc.) as well as from the thoughts and actions (risk philosophy) of its decision makers. Crucial for the definition of risk policy is a focus on the enterprise's goals. Only clearly defined goals allow comprehensive identification of factors that might help to achieve these aims.

Risk assessment

In a second step the enterprise's risks are identified and assessed. A risk catalogue should include all possible factors that could influence achievement of the enterprise's goals.

Risk management

Based on the catalogue of the identified risks, available risk control measures can be tested. Whereas minor risks tend to need to be carried on their own, solutions must be sought for major risks; these solutions need to be able to ensure survival of the enterprise in the event of damage. Insurance coverage is an established instrument for this, but it is not always the best method of risk control. Often management of a risk consists of a combination of

oder ein umfassendes Chancen-/Gefahren-Management verfolgt wird, liegt beiden Formen von Risk Mangement ein identischer Prozess zu Grunde.

Risikopolitik

Die Basis bildet das Erkennen der vorgegebenen Rahmenbedingungen des eigenen Handelns und die Festlegung der firmeneigenen Risikopolitik. Diese Risikopolitik ist abhängig von mehreren subjektiven Faktoren, welche sich aus der Unternehmung als solches (Tätigkeit, Größe, Besitzstandsverhältnisse, Umfeld etc.), aber auch aus dem Denken und Handeln (Risikophilosophie) ihrer Entscheidungsträger ableiten. Zentral bei der Definition der Risikopolitik ist dabei die Fokussierung auf die unternehmerischen Ziele. Nur eindeutig definierte Ziele lassen eine umfassende Erkennung möglicher Einflussgrößen in Bezug auf die Zielerreichung zu.

Risikobeurteilung

Im zweiten Schritt werden die Unternehmensrisiken identifiziert und bewertet (Risk Identification/Risk Assessment). Ein Risikokatalog soll sämtliche möglichen Einflussfaktoren beinhalten, welche die unternehmerische Zielerreichung beeinflussen können.

Risikobewältigung

Auf Grund der Klassifizierung der identifizierten Risiken lassen sich die zur Verfügung stehenden Bewältigungsmaßnahmen prüfen (Risk Control). Während Bagatellrisiken tendenziell selbst getragen werden können, müssen für Großrisiken Lösungen gesucht werden, welche im Schadensfall das Überleben des Unternehmens sicherzustellen vermögen. Eine Versicherungsdeckung ist hierbei zwar ein probates Mittel, zuweilen aber nicht immer die beste Alternative der

several measures. Moreover, risk control options can be differentiated into measures that limit the danger of an event and those that help to reduce the extent of damage when an adverse event has already occurred.

An appropriate and at first glance cost-effective means to reduce financial loss from damage is insurance coverage, i. e., external financing of the damage. Here is not the place to go into whether and when it is appropriate to insure a risk. A critical factor in our further analysis of the possibilities for cultural property protection is that numerous risk financing methods must be available to a globally active company. Various forms of captives, alternative risk transfer and capital market solutions can be attractive alternatives to classical insurance coverage.

Risikokontrolle. Oftmals besteht die Bewältigung eines Risikos auch in der Kombination mehrere Maßnahmen. Die Optionen der Risikokontrolle lassen sich zudem unterscheiden in Maßnahmen, welche die Gefahr des Ereignisses einschränken und solche, die bei bereits eingetretenem Schadensereignis das Schadensausmaß reduzieren helfen.

Ein geeignetes und auf den ersten Blick kostengünstiges Mittel, um den finanziellen Verlust eines Schadens zu verringern, ist eine Versicherungsdeckung, also eine externe Finanzierung des Schadens. Es soll hier bewusst nicht darauf eingegangen werden, ob und wann das Versichern eines Risikos sinnvoll ist. Für die Fortsetzung der Analyse der Möglichkeiten des Kulturgüterschutzes entscheidend ist, dass einem global tätigen Konzern im Bereich der Risikofinanzierung (Risk Financing) zahlreiche Methoden zur Verfügung stehen. Verschiedene Formen von Captives, ART (Alternative Risk Transfer) sowie Kapitalmarktlösungen können attraktive Alternativen zur klassischen Versicherungsdeckung sein.

Realization and controlling

The fourth and at the same time crucial step in this process is realization of the agreed upon measures, control of their progress and regular examination of their adequacy. A change in circumstances can influence the assessment of risks and render measures superfluous or insufficient. Thus the success of systematic risk management is absolutely dependent on regular repetition of all the individual steps in the process.

Umsetzung und Controlling

Der vierte und gleichzeitig entscheidende Schritt in diesem Prozess liegt in der Umsetzung der beschlossenen Maßnahmen, dem Controlling der Fortschritte sowie der regelmäßigen Überprüfung der Adäquanz der Maßnahmen. Veränderungen der Rahmenbedingungen können Bewertung von Risiken beeinflussen und so getroffene Maßnahmen überflüssig oder aber auch nicht mehr ausreichend machen. Daher ist der Erfolg eines systematischen Risk Managements uneingeschränkt verbunden mit der regelmäßigen Wiederholung der einzelnen Prozessschritte.

Does the classic risk management approach function for cultural properties?

Can the risk management approach, which systematically supports an enterprise in discerning, mastering and financing hazard events that have actually occurred, be applied one-on-one to cultural property protection? A »policy of preservation« (= risk policy) also operates in the field of cultural property protection. What is a property worth and what are the circumstances surrounding an individual object that has been deemed worthy of protection? How much effort should be put into protecting an object from particular dangers? And is it appropriate to set priorities for protection? The answers to all these questions form the basis for a suitable philosophy of protection.

It can be assumed that successful preservation of property and documents with an immaterial value is strongly connected with preventive measures (risk control). These measures can be permanent, active protective measures (for example establishment of optimal temperature and humidity conditions in archives) on the one hand, or prepared passive precautions that only

Funktioniert der klassische Risk Management-Ansatz bei Kulturgütern?

Lässt sich der Risk Management-Ansatz, welcher ein Unternehmen im Erkennen, Bewältigen und Finanzieren von (eingetretenen) Gefahren-Ereignissen systematisch unterstützt, eins zu eins auf den Kulturgüterschutz anwenden? Auch im Spannungsfeld Kulturgüterschutz wird eine eigentliche »Erhaltungspolitik« (= Risikopolitik) betrieben. Welches Gut ist wie viel wert und welchen Rahmenbedingungen unterliegen die einzelnen schützenswerten Objekte? Wie viel Aufwand soll betrieben werden, um ein Objekt vor einzelnen Gefahren zu schützen? Und macht es Sinn, beim Schutz Prioritäten zu setzen? Dies sind alles Fragen, deren Antworten die Basis für eine angemessene Schutzphilosophie bilden.

Es ist davon auszugehen, dass die erfolgreiche Erhaltung von Immobilien und Dokumenten mit ideellem Wert stark mit präventiven Maßnahmen (Risk Control) verbunden ist. Einerseits präventiv im Sinne von permanenten, aktiven Schutzmaßnahmen (zum Beispiel die Schaffung optimaler Temperatur- und Feuchtigkeitsbedingungen in Archivräumen), andererseits im Sinne von vorbereiteten, passiven, erst nach eingetretenem Ereignis zum Tragen kommende Vorkehrungen (künstliche Deiche gegen Überflutung).

come into use when an event has occurred (artificial dikes against flooding) on the other hand.

In order to be comprehensive, protection must be built upon a catalogue of dangers. Appropriate preventive measures can be determined and set up only if there is knowledge of the risks that threaten a building (risk assessment).

Damage can occur despite the best security arrangements. As the greatest threat to cultural property, the natural disaster represents an immense potential danger, from which 100 percent protection is impossible. Therefore the basic question of financing the damage (risk financing) also arises regarding cultural property.

A cursory attempt to combine the elements of systematic risk management with concerns of cultural property protection already clearly shows that the systematic risk management approach can indeed serve as an instrument to improve the protection of cultural goods. But the areas in which there tend to be deficits also become apparent.

In the context of cultural property protection the step in the risk management process that is furthest advanced is most probably the identification of possible dangers. By definition cultural properties have a history. For buildings history alone may be enough to show what dangers are lurking. But assessment of these known dangers must be considered more critically. It is often precisely those dangers that are unlikely to occur, but whose potential for damage is catastrophic (disaster risk) that are underestimated because our experience with them is so far away in time. Among natural dangers this is certainly applicable to earthquake risk. Thus it is doubtful that the risk assessment is effective in every case. For objects worthy of protection it is therefore recommended that risk identification be done as comprehensively as possible with the assistance of appropriate specialists (insurers and reinsurers, engineers, historians, etc.). It is certainly more economical to identify a danger and classify it in the assessment as a minor risk than it is to be surprised by a risk without having appropriate measures ready.

Appropriate measures have to be defined for the greatest dangers. This step in the process has been adequately performed in cultural property protection, but there is still room for improvement. The greatest difficulty in this field is that measures either cannot be carried out retroactively (for instance, earthquake-safe building methods) or simply cannot be financed. All possible (economic) means must be used to ensure that natural events cause as little damage as possible to cultural properties. But this cannot always be done. If damages occur anyway, despite efforts to prevent them, they are usually of enormous proportions (for instance flooding: either the water is kept out or it breaks into a building with all its force), and they are seldom sufficiently insured. Here, in the opinion of the authors, is the critical point

Damit die Prävention umfassend stattfinden kann, muss als Grundlage ein Gefahrenkatalog erarbeitet werden. Nur wenn bekannt ist, welche Risiken ein Gebäude bedrohen, können die entsprechenden Präventivmaßnahmen getroffen und eingerichtet werden (Risk Assessment).

Trotz bester Sicherungseinrichtungen können Schäden entstehen. Gerade von der größten Gefahr für Kulturgüter, den Naturkatastrophen geht ein immenses Schadenspotential aus, gegen welches ein hundertprozentiger Schutz unmöglich ist. Daher stellen sich auch bei Kulturgütern grundsätzlich die Fragen nach der Finanzierung des Schadens (Risk Financing).

Schon der nur flüchtige Versuch, die Elemente des systematischen Risk Managements mit der dem Artikel zu Grunde liegenden Anliegen des Kulturgüterschutzes zu verbinden, zeigt es deutlich: Der Ansatz des systematischen Risk Managements ist sehr wohl ein Instrument zur Verbesserung des Schutzes unserer Kulturgüter. Gleichzeitig wird aber auch offensichtlich, in welchen Bereichen des Kulturgüterschutzes tendenziell Defizite herrschen.

Am weitesten fortgeschritten ist mit größter Wahrscheinlichkeit die Identifikation möglicher Gefahren. Kulturgüter besitzen per definitionem eine Historie. Bei Gebäuden vermag somit allein schon die Geschichte aufzeigen, welche Gefahren lauern. Die Beurteilung der bekannten Gefahren hingegen ist kritischer zu betrachten. Oftmals werden gerade Gefahren, deren Eintritt zwar sehr unwahrscheinlich, deren Schadenspotential jedoch katastrophal ist (Katastrophenrisiken), aus zeitlicher Distanz unterschätzt. Bei Naturgefahren ist dies mit Sicherheit auf Erdbebenrisiken zutreffend. Es muss somit bezweifelt werden, ob das notwendige Risk Assessment in jedem Fall effektiv ist. Bei schützenswerten Objekten ist es daher empfehlenswert, die Risikoidentifikation unter Beizug entsprechender Spezialisten (Erst- und Rückversicherer, Ingenieure, Historiker etc.) so umfassend wie irgendwie möglich zu gestalten. Es ist mit Sicherheit kostengünstiger, eine Gefahr zu identifizieren und in der Bewertung als Bagatellrisiko zu klassifizieren, als von einem Risiko überrascht zu werden, ohne entsprechende Maßnahmen bereit zu halten.

Für die größten Gefahren sollen entsprechende Maßnahmen definiert werden. Dieser Prozessschritt kann im Kulturgüterschutz als genügend beurteilt werden. Allerdings besteht noch Verbesserungspotential. Die große Problematik von Schutzmaßnahmen für Kulturgüter liegt darin, dass sich Maßnahmen entweder nachträglich nicht mehr umsetzen lassen – beispielsweise erdbebensichere Bauweise – oder schlichtweg nicht finanzierbar sind. Es ist mit allen (wirtschaftlichen) Mitteln anzustreben, dass ein Kulturgut bei einem Naturereignis so wenig Schaden wie möglich nimmt. Doch nicht immer ist dies möglich. Entstehen trotz vereinter Anstrengungen Schäden, sind diese erstens meist von enormem Ausmaß – zum Beispiel bei Überschwemmungen: Entweder man wird der Wassermassen Herr oder die Fluten brechen mit ganzer Kraft in ein Gebäude ein – und zweitens kaum je ausreichend versichert. Und hier ist nach Meinung

in the entire risk management process: financing or the extent to which something can be insured. The following comments are devoted to this topic.

The question arises in the context of cultural property as to whether insurance can be an adequate measure at all. If so, in what form? The following prerequisites must be met for it to be possible to insure a risk:

- the risk (likelihood of occurrence and extent of possible damage) has to be quantifiable;
- the occurrence of the event must be random rather than predictable;
- moreover insurance coverage has to hold up against economic criteria over the long-term.

The answers to these questions do not so much involve cultural property protection in particular, but rather whether the financial consequences of natural disasters such as floods and earthquakes (which we have seen represent the greatest dangers for our cultural properties) can be insured.

The relevant literature has often elucidated the fact that the problem with the »insure-ability« of natural disasters lies in the immensely high sums for damage that such events entail. Moreover the fact that the same areas are affected again and again means that there is an anti-selection. This is not really conducive to a financially acceptable insurance solution. The consequence is limited coverage. As far as cultural property is concerned, this means that in the end the state is called upon to pay.

This problem could be faced with a (solidarity-based) enlargement of the insured collective on the one side and a carefully directed distribution of the risks among various risk carriers on the other side. Damages caused by natural disasters are tending to increase. This does not automatically mean that the number of natural disasters is increasing. But in combination with increasingly dense settlement of Europe the potential dimensions of damage from such an event also rise. This fact alone shows that there is need for action. Not only government but also the insurance industry and worldwide financial and capital markets have critical functions. Analogous to the risk management process, it falls under the purview of the government or the community of states to advance prevention measures. Comprehensive risk assessment with the participation of experts from economics and science should help to identify the dangers. Their possible consequences have to be made visible and understandable, in order to increase society's sensibility to the issue. Only a permanently increasing sensibility to the dangers will bring about a long-term change in our way of thinking and sustainable (in the sense of environmentally compatible) action. Thus the main role in *ex-ante* prevention, i. e., in the reduction of the

der Autoren auch der entscheidende Punkt im gesamten Risk Management Prozess: Die Finanzierung beziehungsweise Versicherbarkeit. Daher sollen diesem Thema nachfolgend einige Gedanken gewidmet werden.

Im Zusammenhang mit Kulturgütern stellt sich hierbei jedoch die Frage, ob Versichern überhaupt eine adäquate Maßnahme bildet? Und wenn ja, in welcher Form? Folgende Voraussetzungen müssten grundsätzlich gegeben sein, damit ein Risiko versichert werden kann:

- Das Risiko (Eintrittswahrscheinlichkeit und mögliches Schadensausmaß) muss quantifizierbar sein;
- der Eintritt des Ereignisses darf nicht vorhersehbar, sondern muss zufällig sein;
- zudem muss die Versicherungsdeckung langfristig wirtschaftlichen Kriterien standhalten.

Bei der Beantwortung dieser Fragen geht es in der Folge weniger um den Kulturgüterschutz im Speziellen. Vielmehr ist zu beantworten, ob sich die finanziellen Folgen von Naturkatastrophen wie Überschwemmungen und Erdbeben, die, wie dargelegt, die größten Gefahren unserer Kulturgüter darstellen, versichern lassen.

In der einschlägigen Literatur wurde mehrfach umfassend beleuchtet, dass die Problematik der Versicherbarkeit von Naturkatastrophen in den immens hohen Schadenssummen liegen, welche solche Ereignisse nach sich ziehen. Zudem findet auf Grund dessen, dass immer wieder dieselben Gebiete betroffen sind, eine Antiselektion statt. Diese ist einer finanziell tragbaren Versicherungslösung nicht wirklich förderlich. Die Konsequenz sind beschränkte Deckungen. Bezogen auf die Kulturgüter bedeutet dies, dass schlussendlich der Staat zur Kasse gebeten wird.

Mit einer (solidarischen) Vergrößerung des Versichertenkollektivs auf der einen Seite und einer gezielten Verteilung der Risiken auf verschiedene Risikoträger auf der anderen Seite, könnte diesem Problem begegnet werden. Naturkatastrophenbedingte Schäden nehmen tendenziell zu. Dies heißt nicht automatisch, dass die Anzahl der Naturkatastrophen steigt. Aber in Kombination mit der immer dichteren Besiedlung in Europa wächst auch das potentielle Schadensausmaß eines Ereignisses. Alleine diese Tatsache zeigt, dass Handlungsbedarf besteht. Dabei übernehmen sowohl der Staat, wie auch die Versicherungsindustrie und weltweite Finanz- und Kapitalmärkte entscheidende Funktionen. Analog dem Risk Management-Prozess unterliegt es dem Staat beziehungsweise den Staatengemeinschaften, die Prävention voranzutreiben. Umfassende Risk Assessments unter Beizug der Experten aus Wirtschaft und Wissenschaft sollen helfen, die Gefahren zu erkennen. Deren möglichen Folgen müssen sichtbar und verständlich gemacht werden, um die Sensibilisierung in der Gesellschaft zu erhöhen. Nur eine permanent steigende Sensibilisierung für die Gefahren unserer Gesellschaft bringt langfristig ein Umdenken was nachhaltiges – hier im Sinne von umweltverträglichem – Handeln anbelangt. Die Führung

probability of damage occurring, falls to the state. The insurance business has to make the necessary expertise available and must carry out specialized research. This knowledge and the numerous possibilities derived from it for keeping damage as limited as possible are also of significance for *ex-post* prevention.

Insurers, reinsurers and other financial institutes are all needed to ensure funds for reconstruction after damage has occurred. Risk financing has to be guaranteed with a careful combination of various insurance products. Classic insurance products, perhaps even state imposed insurance obligations, are only part of the whole. The broad palette of ART products (Alternative Risk Transfer) has to serve to make the huge coverage sums available that are necessary in order to absorb natural disasters.

in der ex-ante Prävention, also die Reduktion der Schadenseintrittswahrscheinlichkeit, obliegt somit dem Staat. Die Versicherungswirtschaft muss hierfür das notwendige Expertenwissen bereitstellen und gezielt Forschung betreiben. Dieses Wissen und die darauf aufbauenden, zahlreich entwickelten Möglichkeiten, eintretende Schäden so gering wie möglich zu halten, ist auch für die ex-post Prävention von Bedeutung.

Um nach Schadenseintritt Mittel für den Wiederaufbau sicherzustellen, sind Erstversicherer, Rückversicherer und andere Finanzinstitute gemeinsam gefragt. Das Risk Financing muss mit einer ausgefeilten Kombination verschiedener Versicherungsprodukte gewährleistet werden. Dabei sind klassische Versicherungsprodukte, allenfalls sogar staatlich auferlegte Versicherungsobligatorien, nur ein Teil des Gesamten. Die breite Palette an ART-Produkten (Alternative Risk Transfer) muss dazu dienen können, die riesigen Deckungssummen bereitzustellen, die notwendig sind, um Naturkatastrophen abfedern zu können.

Conclusion

The question as to whether a classic risk management process can be applied to cultural property protection can definitely be answered in the affirmative. The risk management that is being done on a small scale for every individual cultural property can be put in a larger context without hesitation. It has been shown that the field of cultural property and natural disasters is extremely complex and difficult to understand. Nonetheless efforts on a small scale are rewarding because they increase the sensitivity of the groups, societies and/or nations that are involved. This increase in the sensitivity to risks forms the basis for long-term sustainable solutions for managing dangers by incorporating all of the available options.

Fazit

Die Frage, ob ein klassischer Risk Management-Prozess auf den Kulturgüterschutz angewendet werden kann, lässt sich eindeutig bejahen. Das Risk Management, welches im Kleinen für jedes einzelne Kulturgut betrieben wird, kann dabei ohne weiteres in einen größeren Zusammenhang gestellt werden. Es wurde aufgezeigt, dass die Komplexität im Spannungsfeld von Kulturgütern und Naturkatastrophen enorm und kaum fassbar ist. Dennoch lohnen sich die Anstrengungen im Kleinen, steigern sie doch die Sensibilisierung der involvierten Gruppen, Gesellschaften und/oder Völker. Und diese Risiko-Sensibilisierung bildet die Basis für langfristig nachhaltige Lösungen zur Gefahrenbewältigung unter Einbezug sämtlicher Optionen.

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Towards a More Strategic Approach to Disaster Risk Reduction

Introduction

It is evident that the damage from disasters, including to heritage resources, is increasing every year with tragic consequences for people and their livelihoods. It is believed that the risks from disasters can be significantly reduced through appropriate policies, practices, and proper planning. The intention of this paper is to highlight some of the efforts made by ICCROM (International Centre for the Study of the Preservation and Restoration of Cultural Property) together with its partners in achieving these objectives. Furthermore, the paper highlights one of the activities recently carried out on the theme of integrating traditional knowledge systems into risk management strategies.

ICCROM over the last years has worked with its Member States and partners to address the issues relevant to disaster risk planning and management by understanding the existing knowledge gaps and developing appropriate approaches to address them. Attention has also been paid to understanding the role of heritage in disaster risk reduction, as this paper will emphasize. In the process of working on our activities in this field, it was revealed that there is a lack of sufficient capacity within the heritage field to effectively plan for disaster risk, and a lack of resource materials to support those in charge of planning for disaster risk.

As an initial response to these two important problems, in 1998 ICCROM, in cooperation with ICOMOS and the UNESCO World Heritage Centre, published *Management Guidelines for Risk Preparedness for World Cultural Heritage* by Herb Stovel, which has been widely diffused and has been translated into several languages. Furthermore, with assistance from the World Heritage Centre, ICCROM developed a set of training materials which have been tested in a number of countries. Risk management components have also been incorporated into various training programmes of ICCROM, and a specific line of action on Museum Emergency Planning has been introduced in conjunction with ICOM and the Getty Conservation Institute.

Activities

Through this initial work, ICCROM recognised that the heritage sector cannot work in isolation. There is a need for recognition of the heritage sector by the national and international actors in the disaster risk management sector, and a need to integrate heritage concerns within wider disaster risk management strategies. In order to achieve these objectives, ICCROM, working with the UNESCO World Heritage Centre and other partners, engaged in a number of activities on an international level. Brief descriptions of the following key activities are given below.

1. »Thematic Session on Cultural Heritage Risk Management« within the framework of the World Conference on Disaster Reduction (Kobe, Japan—2005)
2. »Strategy for Reducing Risks from Disasters at World Heritage Properties« (2006)
3. »Integrating Traditional Knowledge Systems and Concern for Cultural and Natural Heritage into Risk Management Strategies« within the framework of the International Disaster Reduction Conference (Davos, Switzerland—2006)

I. »Thematic Session on Cultural Heritage Risk Management« within the framework of the World Conference on Disaster Reduction (Kobe, Japan—2005)

This was the first time a thematic session on cultural heritage has taken place at a major international meeting on disaster risk reduction. The World Conference on Disaster Reduction, an intergovernmental conference attended by more than 160 countries, produced the *Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters.*[1]

Specifically, the thematic session on cultural heritage was organized by ICCROM, the UNESCO World Heritage Centre, and the Agency of Cultural Affairs of Japan, with the coordination of Ritsumeikan University. The thematic session discussed a number of important themes, including:

1 International Strategy for Disaster Reduction (ISDR): Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters. World Conference on Disaster Reduction, Kobe, Japan, 18–22 January 2005.

– the systematic integration of cultural heritage and traditional technology, skills and local knowledge systems within the general development framework as an effective means of reducing the impact of disasters;
– the integration of cultural heritage into existing sustainable development goals and disaster reduction policies and mechanisms at international, national and local levels;
– the mobilization of local communities and civil society by actively involving them in the preparation and implementation of risk management plans and in all stages of disaster recovery;
– the development of scientific research and academic, education and training programmes incorporating cultural heritage in both its tangible and intangible manifestations into risk management and disaster recovery;
– the strengthening of existing networks on cultural heritage risk management and the need to link them to larger networks for disaster management.

The resulting recommendations of the thematic session on the need for better integration and research were aimed at intergovernmental organizations, nongovernmental organizations, national governments, and training and research organizations.

II. »Strategy for Reducing Risks from Disasters at World Heritage Properties«

The »Strategy for Reducing Risks from Disasters at World Heritage Properties«[2] was prepared by the World Heritage Centre and ICCROM, in collaboration with the other advisory bodies to the World Heritage Committee, ICOMOS and IUCN (International Union for Conservation of Nature). The strategy was requested by the World Heritage Committee as a means of better preparing World Heritage sites for the challenges faced in times of disaster emergencies. The purpose of the World Heritage strategy is to:

1. strengthen the protection of World Heritage and contribute to sustainable development by integrating heritage into risk reduction policies and incorporating concern for disaster reduction within site Management Plans;
2. provide guidance to integrate risk reduction into World Heritage strategic planning and management.

2 See: Issues related to the state of conservation of properties inscribed on the World Heritage List: Strategy for reducing risks from disasters at World Heritage Properties. Document WHC 06/30.COM/7.2, UNESCO, Paris, 26 June 2006, and Issues related to the state of conservation of World Heritage properties: Strategy for reducing risks from disasters at World Heritage properties. Document WHC-07/31.COM/7.2, UNESCO, Paris, 10 May 2007.

As a basis for the strategy, a number of guiding principles were developed, including:

– the need to consider heritage as a positive element in sustainable development and particularly disaster risk reduction;
– the need to promote advance planning and a culture of prevention;
– the importance of cultural diversity, local knowledge, and diverse populations;
– the need to consider heritage in all its manifestations.

Based on these considerations and the overall purpose of the strategy, a series of five objectives was developed. These objectives closely followed the five priority areas of the *Hyogo Framework for Action 2005–2015*, the result of the 2005 World Conference on Disaster Reduction. The use of the Hyogo Framework was done purposely to put this World Heritage strategy strongly within the larger framework of the international disaster risk reduction field. The objectives of the strategy are:

1. strengthening institutional support and governance for reducing risks at World Heritage properties;
2. using knowledge, innovation and education to build a culture of disaster prevention at World Heritage properties;
3. identifying, assessing and monitoring risks from disasters at World Heritage properties;
4. reducing underlying risk factors at World Heritage properties;
5. strengthening disaster preparedness at World Heritage properties.

Ten priority actions, two for each of the objectives, were also identified as part of the strategy:

Action 1.1: Promote cultural and natural heritage, and its potential positive role for disaster reduction as part of sustainable development, within relevant international development institutions, conventions and global forums and with other potential financial partners, as a means of raising support for the protection of heritage from disasters.

Action 1.2: Strengthen policies and funding provisions for disaster reduction within the World Heritage system, for instance by including disaster and risk management strategies in the preparation of tentative lists, nominations, monitoring, periodic reporting and international assistance processes.

Action 2.1: Develop up-dated teaching/learning and awareness-raising resource materials (guidelines, training

kits, case studies and technical studies, glossaries) on disaster reduction for World Heritage, and disseminate them widely among site managers, local government officials and the public at large.

Action 2.2: Strengthen the capacity of World Heritage property managers and community members, through field-based training programmes, to develop and implement risk management plans at their sites and contribute to regional and national disaster reduction strategies and processes.

Action 3.1: Support risk identification and assessment activities at World Heritage properties, including consideration of climate change impacts on heritage, consideration of underlying risk factors, all necessary expertise and the involvement of relevant stakeholders as appropriate.

Action 3.2: Develop a World Heritage Risk Map at the global level or at regional levels to assist States Parties and the Committee to develop better responses.

Action 4.1: Give priority within international assistance to helping States Parties in implementing emergency measures to mitigate significant risks from disasters that are likely to affect the »outstanding universal value,« including the authenticity and/or integrity of World Heritage properties.

Action 4.2: Develop social training programmes for communities living within or around World Heritage properties, including consideration of heritage as a resource to mitigate physical and psychological damage of vulnerable populations, particularly children, during and in the aftermath of disasters.

Action 5.1: Ensure that risk management components, with identified priorities, are integrated within management plans for World Heritage properties, as a matter of urgency. For World Heritage cultural properties, the scope of these plans should address ways of protecting the key assets that contribute towards the »outstanding universal value« and should also include the protection of any significant original archival records that contribute to their heritage value, whether or not they are located within the boundaries of the World Heritage property. For natural properties, such plans should be oriented to protect the key values for which the properties were inscribed as well as their integrity.

Action 5.2: Ensure that all those concerned with the implementation of disaster reduction plans at World Heritage properties, including community members and volunteers, are aware of their respective roles and are well and systematically trained in the application of their tasks.

III. Thematic session on »Integrating Traditional Knowledge Systems and Concern for Cultural and Natural Heritage into Risk Management Strategies« (Davos, Switzerland—2006)

The thematic session on ›Integrating Traditional Knowledge Systems and Concern for Cultural and Natural Heritage into Risk Management Strategies‹ at the International Disaster Reduction Conference addressed two issues:

1. integrating heritage concerns into national level disaster risk reduction strategies;
2. integrating traditional knowledge systems into risk management strategies.

Integrating heritage concerns into national level disaster risk reduction strategies

This part of the special session provided an opportunity for participants to define possible actions that could be taken to overcome the apparent gap between national disaster risk reduction strategies and concern for the cultural and natural heritage.

Efforts to develop overall, sustainable disaster risk reduction strategies at the national level have become stronger in the recent past, with more and more countries trying to develop proactive approaches. Unfortunately, most of these strategies have either ignored or failed to integrate concern for the cultural and natural heritage. At the same time, a few countries have developed disaster risk reduction strategies for their heritage. These strategies, in most cases, are administered by heritage agencies outside the mainstream disaster reduction infrastructure, and therefore have a limited value in responding to disasters when they occur. Problems of integration even exist at the level of terminology with heritage planners using different terms that are not well understood by the larger disaster reduction community.

Acknowledging that primary importance should be placed on protection of human lives, professionals in the heritage field feel that the positive role of heritage as a factor for sustainable development, including its role in reducing risks from disasters, is not adequately recognized within global disaster reduction policies and objectives. The de-prioritization of cultural and social concerns and its repercussions may indeed add to the existing vulnerability of affected communities. Recent examples such as the aftermaths of earthquakes in Flores, Indonesia in 1992 and Marathwada, India in 1993 demonstrate that in overlooking the importance of heritage and cultural continuity, communities are left debased and can actually experience further disaster vulnerability during the reconstruction process.[3]

3 T. Boen and R. Jigyasu: Cultural Considerations for Post-Disaster Recovery: Challenges for Post-Tsunami, in: Asian Disaster Management

Heritage professionals feel that consideration of these factors prior to disasters occurring would have the double effect of strengthening community by conserving cultural heritage and identity, while preventing or reducing damage in the response and recovery phases.

The question for the special session was, therefore, where to begin the integration process, what implications and perceptions are involved, and what kind of convincing evidence there is to prove the importance of cultural heritage in disaster risk reduction. Cooperation between governments, NGOs, IGOs and other relevant organizations is a start; however sustainability also begins at the local level, building capacities, raising awareness, and making use of the existing knowledge base, all at the community level.

The recognition of the importance of this theme was well reflected in the final Davos Conference Declaration as follows:

»Concern for heritage both tangible and intangible should be incorporated into disaster risk reduction strategies and plans which are strengthened through attention to cultural attributes and traditional knowledge.«[4]

Integrating traditional knowledge systems into risk management strategies

One of the suggested approaches in reducing risks from disasters is to integrate traditional knowledge systems (TKS) into disaster risk reduction strategies. This part of the special session was dedicated to exploring the potentials and challenges of using traditional knowledge systems as one approach for reducing risks from disasters in all phases of the process. Through a review of current initiatives taking place in different parts of the world and of the work carried out by various professionals and academic institutions in the form of case studies, the benefits of using TKS for preventing or mitigating the impact of disasters can be established and possible methods for capturing these benefits within wider disaster risk reduction strategies can be explored. Issues connected to the exploration of TKS include a better understanding of their definition, an identification of stakeholders, the compatibility of TKS with scientific knowledge, and how they are best used in larger strategies of disaster risk reduction.

Traditional knowledge is an important resource that has proven its usefulness and sustainability through its development and survival over time. Unfortunately, it is often overlooked in the face of a rising dependence on modern technology and scientific methods. Whereas western science is »truth focused, certainty-seeking knowledge technology,« traditional knowledge can be considered as value-based and decision oriented, relying on know-how and social behaviour.[5] Given that traditional knowledge has a firm standing within many cultures as a result of centuries of trial and error, refinement, and accurate prediction, it deserves to be seen as an important tool to complement modern technologies and provide nations with a useful asset for disaster prevention and mitigation without either of the two replacing the other.[6]

Traditional knowledge pertains to many aspects of a society, existing in the form of rules, beliefs, customs, and know-how created to protect populations and enable them to harness nature for their survival. Hence, TKS have been developed to combat regular environmental factors such as rain or droughts, diseases, and to predict disasters.

One example of TKS helping in disaster risk reduction is the study of animal behaviour as a warning sign for natural phenomena such as earthquakes. Changes in animal behaviour were also noted in areas that were stricken by the 2004 tsunami. Countless instances have been recorded of both domesticated and wild animals behaving erratically prior to a disaster occurring. As a result, this has become a topic of research at several institutions around the world. In 2003 a Japanese medical doctor conducted a study which demonstrated that irregular behaviour in dogs could be used to forecast earthquakes.[7] Moreover, applications of TKS regarding animal behaviour are widely used in African countries such as Swaziland, where the height of birds' nests can predict floods and moth numbers help predict drought.[8]

Traditional knowledge systems also determine the built environment, whereby traditional or historic structures in disaster-prone areas are resistant owing to long-established techniques and use of certain materials. Communities have traditionally settled in locations that were as safe as possible from immediate dangers, and that were adapted to local conditions. Structures were, therefore, more often than not, resistant, movable, or easily rebuilt. Twentieth-century activities have had serious consequences on traditional settlements and building methods owing to political, social, economic and technological implications such as resettlement programmes or modern building designs. Consequences not only include loss of life or damage to the living environment, but a loss over time of many traditional beliefs and customs that can actually be used to save lives and conserve culture.

News, vol. 11, no. 2, 2005, pp. 10–11, retrieved 11 August 2006, < www.adpc.net/Infores/newsletter/2005/4–6/02.pdf>

4 International Disaster Reduction Conference: Davos 2006 Declaration, Participant's Self-Commitment for Action, Davos, Switzerland, 8 September 2006.

5 J. Dowie: Western science and traditional knowledge—no gap to bridge, in: The Environment Times, 2004, § 2, retrieved 11 August 2006, <www.environmenttimes.net/article.cfm?pageID=31>

6 Dowie (note 5).

7 M. Mott: Can Animals Sense Earthquakes?, in: National Geographic News, 11 November 2003, retrieved 28 June 2006, <http://news.nationalgeographic.com>

8 J. Kamara: Indigenous knowledge in natural disaster reduction in Africa, in: The Environment Times, 2005, retrieved 11 August 2006, < www.environmenttimes.net/article.cfm?pageID=132>

Lessons can be learned from prior incidents, and integrating TKS into management strategies can prove cost effective and timely and could help prevent damage to cultural and natural heritage properties. The study and application of TKS could also be an effective means of bringing the community into the planning process, not only for disaster risk reduction, but also for overall management planning for heritage sites.

Consideration must be given to determining the most appropriate means in which to apply TKS to broader disaster plans and thus their most appropriate use for beneficiaries and other stakeholders. Of particular importance for the heritage is how TKS, in particular building materials and techniques, as well as town planning issues, can be integrated into the recovery phase in order to ensure that rebuilding done after a disaster has struck will lead to sustainable communities that are more resilient to future disasters.

At the thematic session in Davos, presentations on TKS were made by Kanefusa Masuda, Herb Stovel, Rohit Jigyasu, Narumon Arunotai, Randolph Langenbach, Herman Kiriama and Giovanni Boccardi. The emerging issues discussed at the meeting are summarized below.

Advantages of using heritage in disaster reduction strategies

It was revealed that the use of heritage in disaster situations is already ongoing in some situations and that there are certain advantages of utilizing heritage, both directly and in the form of traditional knowledge systems (both tangible and intangible), in disaster reduction activities. The advantages include:

1. heritage places are already available and often key landmarks in the community;
2. traditional knowledge used in disaster reduction is time tested;
3. application of the appropriate technology often is already taking place and is easy to apply;
4. heritage can be a key to integration with wider risk reduction systems;
5. traditional knowledge is not merely objective-empirical but also experiential;
6. use of heritage allows for optimum use of local resources to ensure sustainability.

Direct use of heritage

Direct use of heritage can happen at two levels. The first is the use of heritage buildings as shelter and meeting points at the time of disasters. This was proved during the recent tsunami. Heritage places were among the buildings that were saved during the tsunami because of their location and the often superior building technology. These characteristics rendered the heritage accessible to communities in their time of need. As an example, the Moken community of the Surin Islands in Phang-nga Province of Thailand sought shelter in temples during the tsunami. In Sri Lanka, the Buddhist temples that were not destroyed provided shelter for thousands of displaced people and served as places for distribution of food and clothing.

A second direct use of heritage is through existing social systems (leadership, institutions, social networks, and decision making processes) for disaster reduction planning and decision making. An example from Australia illustrated how existing social organizations of aboriginal communities were used for the development of disaster reduction plans. Such institutions are also in a position to mobilize a community quickly during disasters and in the recovery stage.

Use of traditional knowledge systems (tangible)

Within the scope of traditional knowledge systems, there are already many tangible examples currently in use for disaster reduction. Defensive methods against disasters, such as the use of disaster resistant materials and construction techniques, are among the examples. Particular materials and techniques such as wattle and daub construction with bamboo as reinforcement material, traditional masonry construction, and wood frames with masonry infill have all proved to be successful examples of disaster resistant systems, as have some projected balconies and joinery details.

Traditional structural forms have also proven effective in time of disaster. Masuda explained how the five-storied pagoda at Horyuji, Japan has stood for more than 1,300 years, withstanding many earthquakes. He pointed out that structural engineers have contributed to the structural theory of seismic resilience for modern high-rise building by learning from the traditional construction systems of pagodas.

Sustainable land use, site selection, and traditional planning are also some of the methods that have been utilized for the reduction of risks from disasters. The Kayas in Kenya, for example, had at least eight zones in their settlements with varying degrees of access to minimize and control risks. Another example is the settlement planning of the Moken community, which features large setback spaces and marine visibility to contribute to disaster preparation and early warning.

Use of traditional knowledge systems (intangible)

Intangible aspects of traditional knowledge systems existing within communities help to reduce risks from disasters. Among them are the traditions, myths, beliefs, taboos, and rituals that exist in traditional societies. People use them for predicting disasters and for signalling the community. The tsunami incident has proven that the Moken's indigenous marine knowledge and their almost forgotten »legend of the seven waves« saved them and others (especially tourists and park staff) from the disaster. Certain legendary

stories, unwritten historical records and oral traditions helped them to be warned about disasters. Of utmost importance is the transfer of these knowledge systems from generation to generation, to ensure continuity.

Conclusion

It is hoped that progress will be made towards a more systematic approach to disaster risk reduction management, which includes concern for heritage. There is a need for effective models of integration which take the heritage into account, not just as a resource to be protected, but as a means of providing more sustainable, practical disaster reduction policies for many communities around the world. In order to accomplish this integration, however, there is a need for more research in all aspects of heritage and disaster reduction. In particular, traditional knowledge systems should be examined and more examples brought to light and analyzed to draw important lessons.

In doing so, heritage will take its place along with other more modern technological approaches to provide a balanced, effective means for disaster risk reduction.

II.

Earthquake Disasters

Erdbebenkatastrophen

Bam Citadel, typical damages on masonry structures, loss of integrity (Wolfram Jäger)

Abdolrasool Vatandoust, Eskandar Mokhtari Taleqani, Mahmoud Nejati

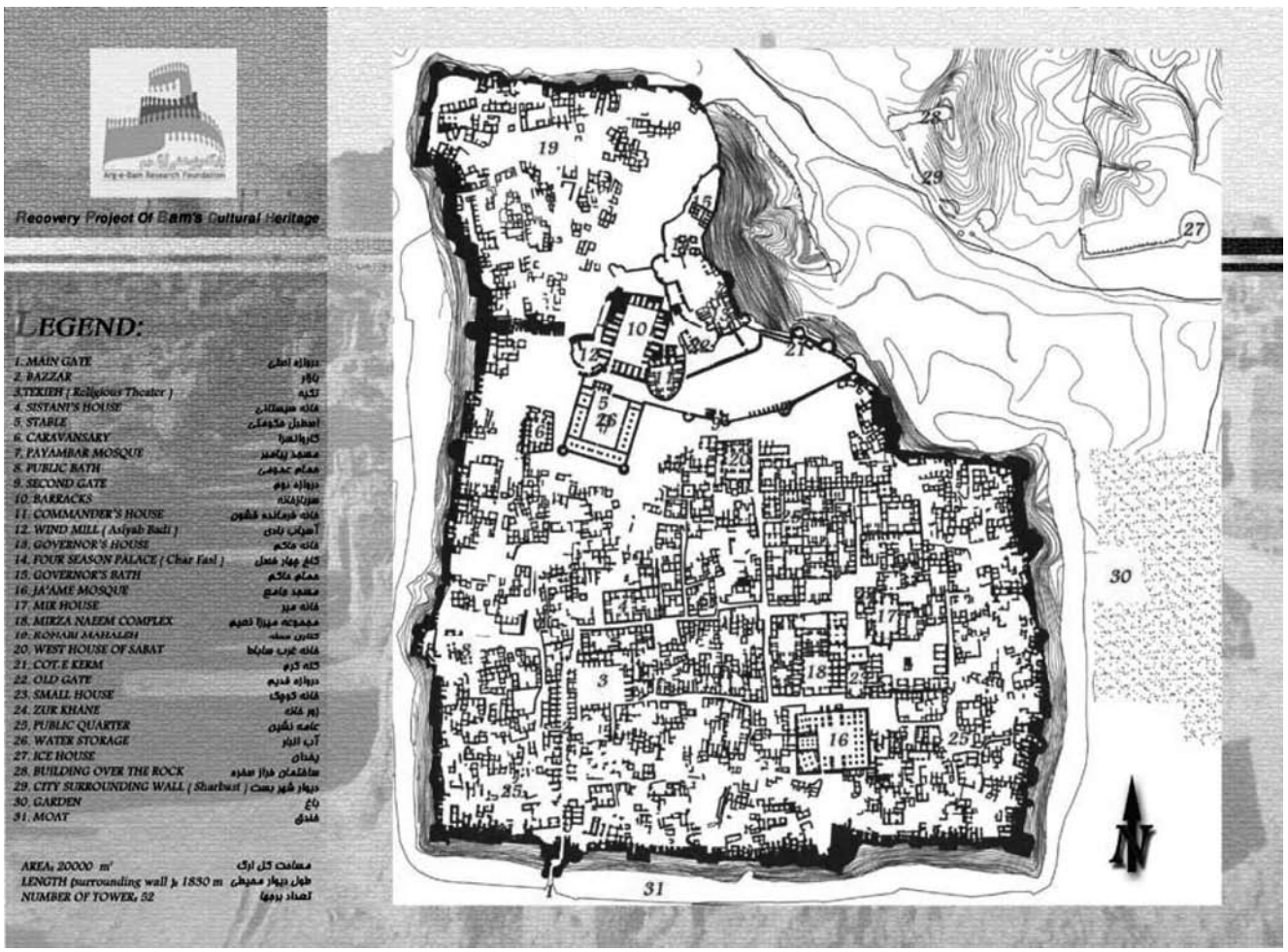
Risk Management for the Recovery Project of Bam's Cultural Heritage

Introduction

A disastrous earthquake in the morning of 26 December 2003 caused the inhabitants of one of the oldest cities in Iran to mourn the deaths of almost half of its population. It caused serious and extended damage to one of the world's largest cities made of earthen architecture. The extent of the disaster was such that even now, nearly four years later, the people have not yet recovered spiritually or psychologically. No doubt, the suffering that resulted from this earthquake has caused many changes in the social and political structure of the city. All that has happened in Bam after the earthquake has been closely connected to the Arg-e Bam, which is the most important landmark of the city. The Arg and the other historic buildings in the city are symbols of Iranian art and tradition and stand for the will of a nation to create such a beautiful city by using the most elementary building material (fig. 1 and 2).

Fig. 1 The Arg and the other historic buildings of the city as symbols of Iranian art and tradition

Fig. 2 Recovery Project of Bam's Cultural Heritage, site of plan



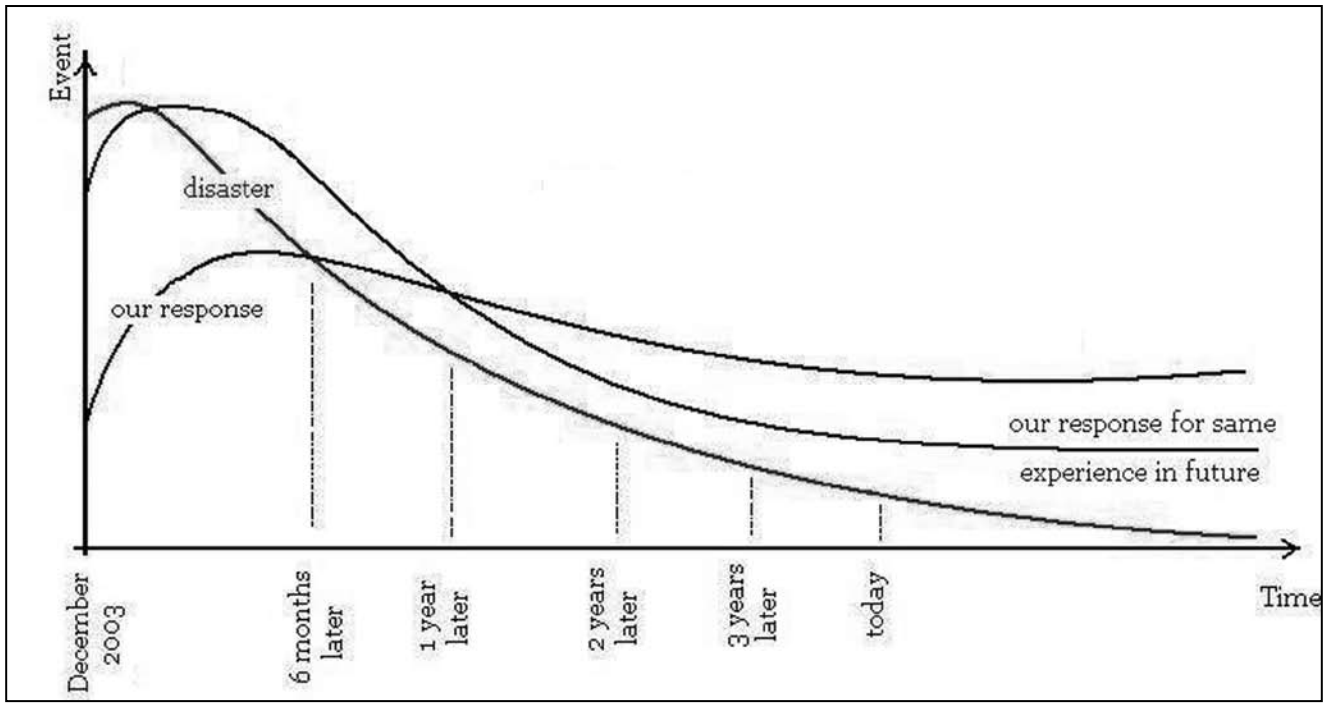


Fig. 3 Schematic graph of the December 2003 earthquake and the response of the Bam Cultural Heritage Rescue Project

After the earthquake, the rescue and restoration of these valuable historic buildings needed a comprehensive management plan, which was unprecedented in Iran. It was necessary to provide guidelines that could be implemented and adjusted as soon as problems occurred. If there were inefficiencies, other guidelines could then be prepared. In brief, although the Bam earthquake was in itself a bitter experience, it was also unique regarding its crisis management because it provided an arena for action in the most difficult conditions possible. After the earthquake, in order to rescue the cultural heritage of Bam, various studies and practical interventions were carried out, the most important of which were related to the experience of crisis management for Bam's cultural heritage on the one hand and the unanimity of international opinion on the other hand. The International Workshop in April 2004 and its final declaration paved the way for Bam to be inscribed on the World Heritage List with worldwide consensus and the support of UNESCO, the World Heritage Centre and ICOMOS. At the same time Bam was placed on the List of World Heritage in Danger. The evaluation of the three-year activities carried out to save the cultural heritage of Bam shows that such universal consensus is still strong. Today Bam remains the meeting point of all who are interested in the conservation of earthen heritage. It is also a venue for international and regional workshops for the exchange of information and new experimentation.

The purpose of this paper on the one hand is to present the experiences gained in managing the Bam Cultural Heritage Rescue Project from the beginning until today and, on the other hand, to categorise the above approaches so they could be applied in similar cases elsewhere in the world. Regarding the issue of managing the Bam Cultural Heritage Rescue Project, first the methodology for dealing with the management structure will be pointed out and the comprehensive management plan will be presented. Then, considering the vastness of the project and its different phases, the programming of the project will be presented in the following three sections:

1. Planning during the crisis, immediately after the earthquake.
2. Planning after the crisis, short-term planning.
3. Comprehensive planning, long-term planning.

Methodology

As was mentioned in the introduction, the guidelines for the Bam Project had to be made during a critical period. Sometimes, when the best method was not available, the nearest possible solution was chosen and implemented. In this regard the accommodation of technical personnel in temporary places can be mentioned. The methodology applied in the presentation of the management plan of the Bam Cultural Heritage Rescue Project always includes the two general points below:

- Management of issues that were necessary but not important.
- Management of issues that were important but not necessary.

These points have always been faced as the Bam Project advanced. For example, appropriate working and living spaces for the expert team of the project have been, and still are, one of the most necessary issues, but they have no bearing on the restoration plan that could protect the Arg from natural disasters such as earthquakes. Another example would be the construction of a visitor's pathway immediately after the earthquake, which was an important issue but not a necessity. On the other hand, if constructing this passage is considered to be important for keeping the Arg alive after the emergency phase, then it would be deemed important because of its crucial role in revitalising the Arg. If the main aim of the Bam Cultural Heritage Rescue Project is to revitalise the Arg, restore its previous identity, and to use unbaked brick as its traditional building material, then the backbone of any project should be the above issue. But is it possible to achieve this important matter without considering other issues, such as those mentioned above? In the methodology used for an appropriate planning for short-term (necessary) and long-term (important) needs, the economic capacity of the project has always had an important role and there have always been attemps to strike a balance between the needs of the project (short-term/long-term) and the economic resources. Another important aspect in this context is the special conditions regarding international aid for the project. The special conditions of the loan donor are also important, and the existing needs of the project and major coordination should be considered in order to respond both to the needs of the project and the requests of the donor.

In brief, the methodology for presenting the plan, which consists of three different parts as explained below, is based on an important principle, which is to always use general knowledge (in Iran and abroad) and to be able to present a programme with as few mistakes and overlaps as possible. It should certainly also be mentioned that planning immediately after the crisis was not much influenced by this methodology. This is because the special conditions of the project in the immediate aftermath of the earthquake and the initial solutions did not allow much time for the choice of a long-term solution. In other words, planning after the crisis mostly dealt with necessary issues rather than important ones.

Figure 3 shows the earthquake of December 2003 and the project's response in a schematic way. This figure reveals that immediately after the earthquake efforts were focused on overcoming the crisis in the best possible way (with regard to costs and results), which continued for six months after the earthquake. The vicinity of historic buildings in Bam city has had a direct influence on the planning. As shown, after overcoming the crisis the response somewhat decreased and the status of the project was changed from a crisis response to a sustainable operation. It can be said that the experience gained in Bam has put us in the condition that, were we to face a similar situation again, we would be better prepared. Furthermore, we would be able to stabilise the situation more quickly than we did in Bam.

»Planning during the crisis«: planning immediately after the earthquake

As expected, planning during the crisis includes all the actions taken in the Bam Cultural Heritage Rescue Project immediately after the earthquake. This planning phase lasted six months starting immediately after the earthquake.

The necessity to consider the quality of the buildings in the reconstruction plans on the one hand and the extent of their destruction in the city on the other caused a nationwide campaign for the reconstruction of Bam. Given that various teams of builders, consultants and experts had to come to Bam, the Bam Reconstruction Task Force arranged two daily flights to Bam which greatly helped in raising the quality of reconstruction in Bam. The presence of the builders and consultants in the city also improved the business of hotel services in the city. The capacity of the hotels has increased and, because of such interactions, the general public in Iran is now more familiar with Bam. In other words, the potential of tourism development is more advanced now than before the 2003 earthquake owing to reconstruction operations. It was decided that the Iranian Cultural Heritage, Handicraft and Tourism Organization (ICHHTO) would prepare a comprehensive tourism programme for the city of Bam, making use of the current potential.

Immediately after the earthquake, efforts were made to carry out the following actions:

1. Bring down the crisis situation from its peak to a suitable level before commencing the short-term planning.
2. Keep problems that are unexpected or dangerous for the buildings under control, such as looting, damage to remaining buildings due to passage of visitors, etc.
3. Equip a workshop and establish a base for the project as well as employ necessary human resources (fig. 4–7).
4. Coordinate international aid; as stated in paragraph 1 of the Bam Declaration of April 2004, Arg-e Bam as the most outstanding landmark in the cultural landscape of Bam became the site for carrying out the main activities.
5. Start fundamental studies in various scientific fields, such as geology, archaeology, anthropology, etc. (fig. 8 and 9).
6. Print and publish the activities and research carried out.

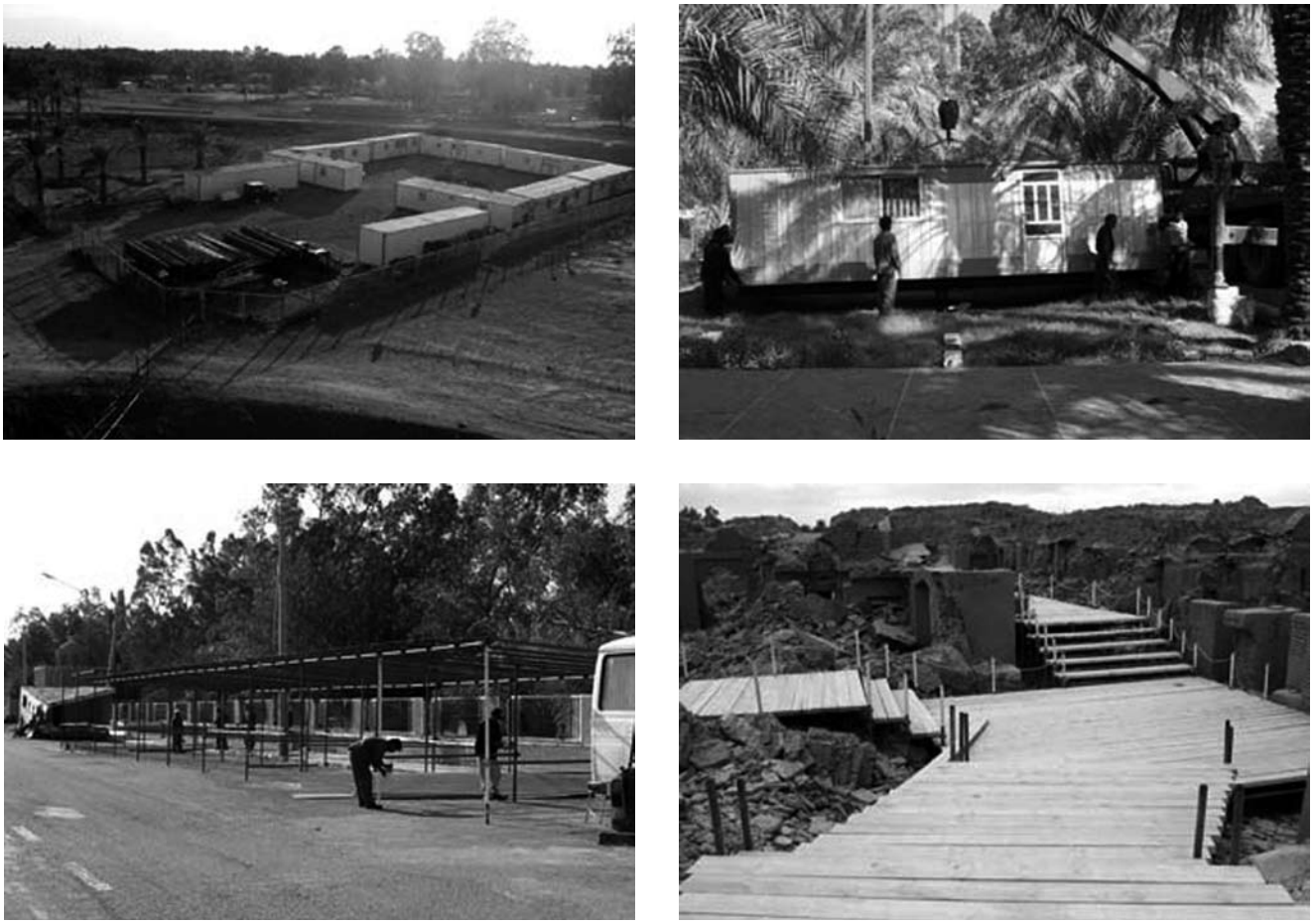
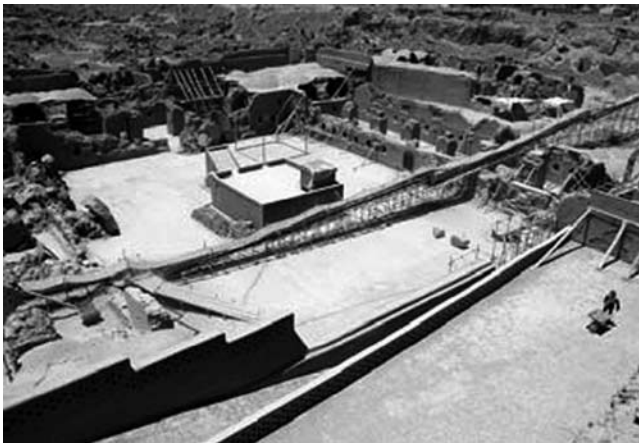


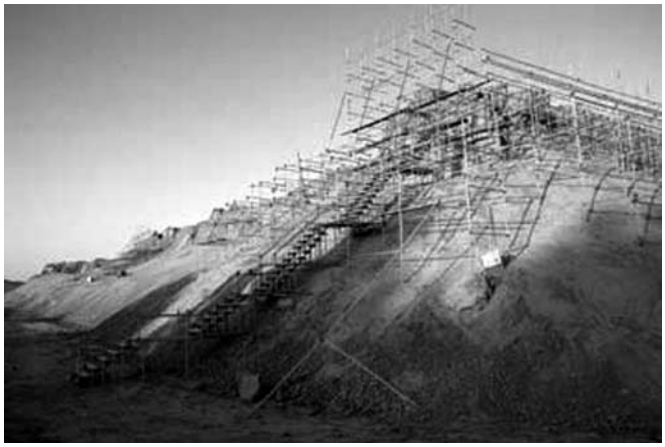
Fig. 4–7 Bam, equipping a workshop, establishing a base for the project and employing necessary human ressources

7. Invite international experts to present guidelines.
8. Provide emergency protection for crumbling buildings in order to preserve them until a comprehensive solution for their preservation is found.
9. Remove debris (fig. 10–15).
10. Secure and stabilise (fig. 16 and 17).
11. Prepare documentation.
12. Establish an earthen material laboratory (fig. 18 and 19).
13. Record testimonies and carry out archaeological investigations (fig. 20 and 21).
14. Establish an earthen material laboratory. The Bam earthquake caused such a deadly blow to the culture of building in earthen material that it will not be forgotten for a long time by the general public. However, the complete preservation of the earthen buildings that survived the earthquake has been among the first actions of ICHHTO for revitalizing the tradition of earthen architecture in Bam.
15. Establish an earthen material laboratory, relying on traditional know-how, so as to be able to produce appropriate earthen bricks. Actions such as establishing the laboratory and reconstructing religious buildings in unbaked earth were able to create some hope for the salvation of the culture of building in earthen material in the region. These actions have been helpful in reconsidering the tradition of producing unbaked brick and the technology of building in this material in Bam.
16. Put the area surrounding the Arg in order (fig. 22–25).
17. Establish a visitor passage (pathway), which was already taken into consideration in the early days after the earthquake and which later acquired a renewed image after the debris from the bazaar had been removed and the signs to show the boundaries and roads had been fixed.
18. Carry out actions focused mainly on the protection of the remaining earthen structures with maximum caution, as recommended in international conventions and charters.
19. Provide access to visitors (fig. 26 and 27). The earthquake in Bam did not reduce the number of visitors; in fact the number gradually increased. The particular condition of the monument after the earthquake attracted a number of enthusiasts to the Arg. Among

Figs. 8 and 9 Bam, basic studies in Bam include archaeology
Fig. 10–15 Bam, removal of debris


BAM.2004-W.W.






Figs. 16 and 17 Bam, securing and stabilizing walls and buildings


Figs. 18 and 19 Bam, establishment of an earthen material laboratory

Figs. 20 and 21 Bam, archaeological investigations


Fig. 22–25 Bam, putting the area arround the Arg in order

the visitors, the experts coming to Bam were the most enthusiastic. The particular situation in Bam required that visiting the Arg would be without charge. The employees started keeping records and collecting statistics on the visitors as well as offering them guidance during the visit. In this respect one of the main actions after the earthquake, also praised by the participants in the April 2004 Workshop, was the building of a temporary wooden passageway through the debris for visitors. This wooden structure was of great help for the safety of visitors and for providing access for experts to the various parts of the Arg.

20. Monitoring. The actions that were carried out according to the post-crisis plan immediately after the earthquake are briefly listed below:

   – In order to protect the character of the historic buildings of the city of Bam a group of experts

Figs. 26 and 27 Bam, visitor access

started identifying the historic and natural values of the city immediately after the earthquake. According to these studies, first 64 and then 69 buildings were identified as being valuable. In addition to these buildings, gardens and Qantas were also put under protection and maintenance. The Ministry of Housing and Urban Planning established a technical committee called the Bam Council for Architecture with the task of supervising the quality of the reconstruction projects and site works. ICHHTO has become a permanent member of this Council.

– Blocking the street in front of the Arg and turning it into a pedestrian urban centre was one of the actions taken for the convenience of the visitors. At present this street, the playground park to its south and the adjacent gardens are fully available to visitors. Furthermore, another parking lot has been provided for the staff. All these actions will improve comfort for visitors. In the area in front of the Arg, other than making the park a tourist area, a space is also allocated for the exhibition of ceramic shards discovered during the removal of the debris so that visitors can be well informed of the archaeological activities and phases of documentation of archaeological finds in the Arg.

»Post-crisis planning«: short-term planning

After the crisis phase and overcoming the challenges of the »immediate« aftermath of the earthquake, the crisis management in the Bam Cultural Heritage Rescue Project first needed a short-term programme in order to prepare the project for long-term planning. In this phase the proposed visions were expected to respond to the following three fundamental questions:

1. How much time is needed to finish the restoration of the historic buildings of Bam City?
2. What funding is necessary to finish the project?
3. What is the best method for the restoration of historic buildings considering the seismic character of the region?

Every project, similar to the Bam Project, will certainly have to face these three questions. Statistically the second and third questions have always attracted the attention of people with different specialties in seminars and conferences or in expert meetings. With regard to time efficiency this phase can be considered to take from six months to four years after the earthquake. Here, obviously no logical or precise forecast can be proposed, but there is a change most clearly taking form in the implementation of the project at present compared to the past three years after the earthquake. It is expected that by next year this process will arrive at the next phase with a very obvious change. Fortunately, the actions taken in recent years for rescuing the cultural heritage of Bam have opened new horizons in the conservation of earthen architectural heritage. A comprehensive analysis of the behaviour of earthen structures in the case of an earthquake, presently continued in Bam, offers the possibility for a better understanding of these structures. In fact, the comprehensiveness of the operations carried out in the conservation of the earthen structures of Bam after the earthquake has opened up a world of new experience.

The latest research activities include the use of new technology for stitching together the disintegrated earthen structures, a project which is presently being prepared in the restoration laboratories of Bam. These operations are benefiting from the study of the old structures, and the final aim is to enable the fissured and damaged earthen structures to bear the vertical load and possibly to block the lateral forces caused by the earthquake in a way that the authenticity of the structure can be maintained.

In brief, the short-term planning efforts have concentrated on the following actions:

1. Continuation of the crisis-phase operations that are in accordance with the needs of the comprehensive planning of the project.
2. Continuation of the crisis-phase operations (started immediately after the earthquake) that are not affected by time and must continue even after the crisis peak, such as transport of debris outside the Arg.
3. Compilation and correction of operations that had already started in the previous phase but had not been completed because of special conditions after the crisis, such as equipping the workshop.
4. Organization of expert meetings and preparation of numerous exhibitions.
5. Participation in conferences in Iran and abroad.
6. Carrying out fundamental studies regarding a better knowledge of the region of Bam, including studies on geology, seismology, environment and water resources as a completion of operational activities.
7. Inscribing Bam and its cultural landscape on the List of World Heritage in Danger has helped the project to have a more efficient role in improving the quality of the reconstruction of the city. Thus, besides the religious buildings (mosques, shrines etc.) and historic public buildings (bazaars, baths, mosques) the reconstruction of the public and governmental buildings as well as of residential housing has had to correspond to norms that provide hope that the identity of Bam can be preserved even after its reconstruction. This supervision and control is a difficult and complex process, but ICHHTO tries to have a word in all phases

of the reconstruction. Fortunately, by maintaining the structure of the city, including land-use and gardens, most of the protection of the city's heritage has been secured. Regarding the residential buildings, much effort has been made to preserve the identity of Bam by those responsible in the Task Force and the Ministry of Housing and Urban Planning, involving 20 groups of architectural consultants.

8. Prevention of speculation and unauthorised and incompatible building in the buffer zones of the Arg and other monuments. As a result it has been possible to fully preserve historic buildings and gardens.
9. Interaction with universities both in Iran and abroad and the use of existing national potential became a priority in the operations of ICHHTO. Facilitating the travel of international experts to Bam in order to study or carry out joint projects were some further actions. These operations were made possible with the support of the World Heritage Centre, ICOMOS, UNESCO Tehran Regional Office and other specialised national and international institutions and were carried out during the past three years. The April 2004 Workshop and its final Declarations should be remembered as one of the most effective examples of such operations.
10. Filming the activities of the project.

The following activities were carried out in this phase:

- Continuation of practical activities from the previous phase, including removal of debris, documentation and monitoring.
- Organisation of exhibitions, such as:
  - exhibition in Niavaran Palace, Tehran, presenting the activities carried out in Bam, on the occasion of the first anniversary of the Bam earthquake;
  - exhibition at the Faculty of Architecture, Tehran University, presenting the activities carried out in Bam;
  - exhibition at the Reconstruction Task Force engineering site of the city of Bam presenting the activities carried out in Bam;
  - exhibition at Saba House in Tehran presenting the cultural landscape of Bam, with the support of the Encyclopaedia of Art of the Islamic Republic of Iran;
  - exhibition at Khaneh-Honar, Tehran, presenting Bam and its cultural landscape;
  - exhibition on Bam and its cultural landscape, at the Conference on the Conservation of Earthen Architecture in Iran and Central Asia, University College London;
  - establishment of a workshop in the Bam building exhibition area for CRATerre Centre with the collaboration of ICHHTO and making a concrete and earthen building model.
- In April 2006 the Third Congress of the History of Iranian Architecture and Urbanism was held in Bam. The presence of more than 600 outstanding experts and professors side by side with students of architecture, archaeology, conservation and construction provided a good context for the presentation of the international activities for the rescue of the cultural heritage of Bam. The activities carried out in Bam after the earthquake give hope that through such experiences it will be possible to promote the knowledge of conserving earthen architecture. If this dream comes true it will be an important contribution to the cultural heritage of humankind, which we truly hope to achieve.
- During the previous year a model of the Arg in scale 1:60 was made so that visitors and especially children could have a more complete image of the Arg prior to the earthquake.
- The wooden passage for visitors, together with the lateral yellow protection rails and workshop scaffoldings, shows visitors the itinerary and also provides safety for the adjacent earthen structures. Presently this passage is appropriate, safe and ready for use by visitors. There are also guides at the project site to control and guide visitors. This passage ultimately leads to an open area in front of the second gate or the Governor's Quarter Gate. The people of Bam and other visitors have repeatedly expressed their satisfaction in the works carried out to guarantee safe passage for visiting the site. ICHHTO intends to gradually increase the area that can be visited, depending on the progress made in the removal of the debris.
- The World Heritage List inscription plaque for Bam was installed near the entrance bridge in front of the main gate of the Arg and the guide book of the Arg is given to visitors on request. Furthermore, local guides provide the necessary information to groups of visitors.
- The participation in international conferences and the organisation of expert meetings with scientific institutions and international centres have included:
  - Rome, Italy
  - Tokyo, Japan
  - London, England
  - Suzhou, China
  - Leipzig, Germany.
- Besides being active in the Bam Council for Architecture, ICHHTO was able to include in the master plan for the city of Bam the norms regarding the protection of the cultural landscape of the city, which were approved in 1382 (2003), one year after the earthquake. These norms strongly stress that land-use should be kept as it was prior to the earthquake; furthermore, they emphasise the protection and maintenance of the *Qantas*, the protection of gardens, as well as the protection of monuments and historic sites, and that the buffer zones of historic buildings should be respected.

- Other activities after the earthquake include the publishing of calendars and various catalogues on Bam; CDs with aerial photos of Bam; a map of important buildings of Bam on CD; maps prepared on the basis of aerial photographs by the Documentation Centre of ICHHTO; publications such as the two books *Archaeological Documentation of the Arg-e Bam* and *Between two Earthquakes*, the yearbook of the activities carried out for the rescue of the cultural heritage of Bam. Furthermore, ICHHTO intends to open an on-site bookshop to present these documents at the Arg.
- Apart from the long documentary film on Bam that was shown in the December 2005 workshop, channel 4 of the Iranian Television has prepared and broadcast comprehensive programmes on the post-earthquake activities in Bam. It has also made two documentary films for ICHHTO, which were shown at the technical meeting in Rome. The Japanese television network NHK has made a film on the different phases of international activities in Bam. Furthermore, professional documentary filmmakers have made various films taking different views of Bam and some of them are directly related to the cultural heritage. In addition to being shown on the nationwide television network these films have also been continuously shown at universities, higher education institutions, research institutions, international conferences and gatherings.

»Comprehensive planning«: long-term planning

As was mentioned in the previous section, this phase should be able to respond to the three questions regarding the necessary time for the final restoration of the buildings, the necessary funding and the acceptable methodology. If this phase can be started with a precise programme, it will be possible to claim that the Bam Cultural Heritage Rescue Project will become a »university« for the restoration of historic buildings in Iran. The long-term planning has two fundamental aims: firstly, completion of the practical part of the Bam Cultural Heritage Rescue Project through a precise plan of action and appropriate planning process, and secondly preparation of fundamental guidelines for the restoration of historic buildings (especially earthen structures in Iran and elsewhere in the world). In brief the planning work is aimed at the following goals:

1. finishing the practical part of the Bam Cultural Heritage Rescue Project;
2. compiling a charter for the restoration of earthen architecture;
3. building the first institute for the restoration of earthen architecture in Bam;
4. establishing an earthen architecture conservation laboratory;
5. training of experts at different levels of master courses and establishing a PhD programme for ICHHTO;
6. acquiring a vibration table in Bam for carrying out dynamic experiments on masonry structures.

Analysis

As has been briefly mentioned in this paper, the Bam experience has produced extensive and valuable scientific and technical results that can be presented for possible use in similar situations. It is obvious that the guidelines prepared for this particular crisis situation require a specific methodology for their implementation and adjustment during the process. These aspects have been inseparable from the start. If we set aside the special conditions in the post-crisis situation, the remaining issues that have emerged during the process in the Bam Cultural Heritage Rescue Project involve management and project control, technical and scientific issues, and the relationship of the project with the city of Bam.

The technical and scientific results have been of two kinds. First are those that have been identified and defined as aims and needs of the project from the beginning, and secondly there are those that have been obtained as a result of collaboration with colleagues in Iran and abroad. When a research proposal is made, there is always an effort to provide ways to implement it, even though it may not correspond exactly to the previously defined aims of the Bam project. Regarding management and project control, a wide range of important results have been obtained through multi-faceted interaction and the use of expert knowledge and experience from Iran and abroad. At the same time, it has been important that every decision in the Bam Cultural Heritage Rescue Project has been seen in its context, i. e. in relation to the city.

Conclusion

The experience of the Bam Cultural Heritage Rescue Project is rare in the conservation of historic buildings around the world. The reason for considering this project exceptional in comparison to others can be found in its dimensions, in the importance of its historic structures, the uniqueness of the architectural spaces of its buildings, the extent of damage and the close and profound cultural relation of its people with the cultural heritage of Bam city, especially with the Arg.

If recovery from the bitter experience of the destruction

of the historic buildings of Bam continues according to the established management principles, it can be expected that this experience will result in the progress and improvement of the quality of crisis management. This would not only be suitable for historic buildings, but also for cities exposed to natural disasters and would provide an appropriate context for collaboration and coordination of professional experience in the operations of different organizations. The variety of and interaction between the various professionals, in Iran and abroad, will surely contribute to this important result. In brief, the valuable aims listed below can be considered to be achievable in the management of the Bam Cultural Heritage Rescue Project:

- a framework for collaboration and interaction between experts in various fields and at different levels;
- an appropriate framework for collaboration and interaction between Iranian and foreign experts;
- an appropriate framework for benefiting from the knowledge and innovative technology for the restoration of earthen architecture and their seismic resistance;
- an appropriate framework for training experts and improvíng the efficiency of the use of human resources in Iran as a valuable asset for ICHHTO (mitigation of problems in field work based on a sound knowledge of theory and extensive operational experience);
- compiling a charter on the conservation of earthen structures;
- compiling professional guidelines for crisis management of historic buildings.

Wolfgang Koellisch

Umm er Rasas, a World Heritage Site, Mysterious and Hidden. Preventive Measures against Damage from Earthquakes and Heavy Rains

History of the site

Umm er Rasas is located about 70 kilometres south east of Amman, the capital city of Jordan. The site is situated on the edge of the desert. In 2004 UNESCO inscribed Umm er Rasas as the third World Heritage site in Jordan. Owing to the richness of the inscriptions, the quality of the mosaics and the Stylite tower, Umm er Rasas is one of the most important archaeological monuments in Jordan.

Umm er Rasas can be translated in two ways: the mother of lead or the mother of exact stone building. There is no evidence of lead used or found at the location, but there is stone masonry of good quality; therefore, we believe the stone translation is more plausible.

We can identify Umm er Rasas with Kastron Mefaa, a toponym known from Roman and Arabic sources and from the Bible. Eusebius mentions that a unit of the Roman army was stationed on the edge of the desert at Mephaat (Onomasticon 128. 21).

The identification of Kastron Mefaa is based primarily on the name found in the inscriptions and is reinforced by the discovery of a reused basalt pillar base with a decoration of calyx leaves dated to the Iron Age (7th–8th centuries B. C.). In 1807 the explorer Ulrich Jasper Seetzen recorded the site, which was thereafter visited by a number of travellers. In 1872 Henry Baker Tristram camped at Umm er Rasas and accurately described the ruins. He identified the high and strong walls as a fortified Roman camp. Auxiliary cavalry troops of the Roman army were stationed in the camp of Mefaa under the command of the Dux Arabiae.

The military nature of the locality is underlined by the name Kastron (fort) Mefaa, which is recorded three times in the Greek inscriptions of the Church of Saint Stephen and is also found in the mosaics of the Church of the Lions. The complex of Saint Stephen's is located north of the Kastron. Excavation of the mosaic floor in the church revealed a work of creative genius (fig. 1 and 2).

To see so many churches—more than 40 have already been discovered—on the edge of the desert, concentrated at the site and more than 30 kilometres away from the next important town, is baffling. The »mosaic carpet« from 756 in the Church of St Stephen tells us about important cities in the Nile delta as well as about animals and people. Unfortunately, nearly all the human faces were destroyed by iconoclasts.

Iconoclasts also destroyed all the figures in the hunting, agricultural and pastoral scenes. The mosaic floors, precious examples of cheerful Christian expressiveness in art, are masterpieces and still move visitors today.

Umm er Rasas lies 34 kilometres to the east of the north-south oriented Dead Sea Transform fault zone. The Siwaqa

Fig. 1 The complex of the Church St. Stephen

Fig. 2 Mosaic floor, Church of St. Stephen. The mosaic floors are of the highest quality and the inscriptions important for biblical research.

Fault, a significant east-west fault that has been associated with basalt extrusions, lies 12.5 kilometres to the south.

The Dead Sea Rift, along with its associated perpendicular faults such as the Siwaqa Fault, is the predominant earthquake generator in the region. The majority of these earthquakes are of low magnitude, although infrequent events occur with a local magnitude in excess of 6 on the Richter Magnitude Scale. All earthquakes with a magnitude in excess of 6 have occurred along the Dead Sea Rift.

According to the »Map of Natural Hazards« of the »Munich Reinsurance Company«, the area of the Mujib Dam, which is currently under construction and which is located 11 kilometres to the south-west of Umm er Rasas, belongs to »Zone 3« with intensity VIII on the Modified Mercalli Intensity Scale. Intensity VIII corresponds to 6.2 to 6.9 on the Richter Magnitude Scale and is described as follows: »Panel walls thrown out of frame structures; fall of chimneys, factory stacks, monuments, walls; heavy furniture overturned; sand and mud ejected in small amounts.« The risk is defined as »the probable maximum intensity with an accidence probability of 20 per cent in 50 years, equivalent to one occurrence in 225 years (return period) on average, for medium soil conditions.«[1]

As an illustration, all earthquakes in the region (major and minor ones) for the sample year 1998 are listed in table 1.[2]

The first reported earthquake took place in 749 A.D.; after that there are continuous records of earthquakes within an approximate distance of 200 kilometres from Damascus in 845, 974, 991 and from Tiberias in 854 and 1034.

The consequences of these earthquakes, together with a shortage of water and various other factors were responsible for the decline of Umm er Rasas.

After nearly nine months of the year without rain, there is often very heavy rainfall. The antique site becomes flooded within hours. The soil draws up water, swells and the floor with the mosaic buckles. Soil pushs against the mosaic floor (fig. 3).

The cell of the holy Stylite with its broken lintels and fallen roof construction is in danger (fig. 4 and 5). Because of the unstable situation there is a permanent risk that more damages and losses could occur in future earthquakes and in heavy rainfalls with stormy wind conditions. A conservation and consolidation is planned for 2007 with assistance from UNESCO. The consolidation will strengthen the cell construction to stop the trend toward further deterioration. The idea is to reinforce the cell construction inside with carbon fibre straps and to renew the broken and weathered lintels and some stones. Renewal of the statical construction elements is given

1 Jordan Valley Authority-Amman, personal communication.

2 Natural Resources Authority-Amman, Seismological Department, personal communication.

Fig. 3 After the soil dries up, salts, natural cover and hollows are visible.

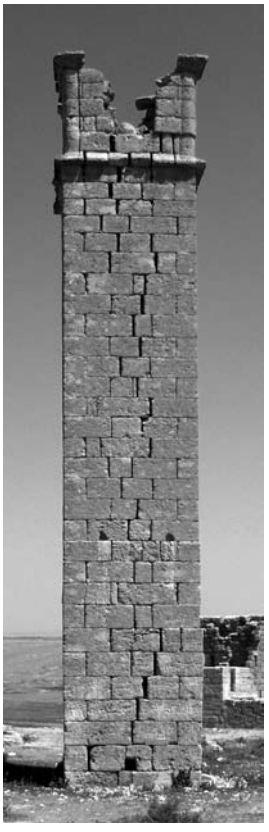


Fig. 4 and 5 The Stylite tower (Byzantine) exhibits earthquake damages.

Date	Latitude	Longitude	Mloc
98 01 05	29,374	34,926	3,29
98 01 07	29,383	34,908	2,72
98 01 07	29,365	34,922	3,2
98 01 08	29,178	34,846	2,38
98 01 09	29,173	34,836	2,42
98 01 09	29,383	34,955	2,85
98 01 10	29,226	34,694	2,68
98 01 10	29,353	34,947	2,3
98 01 13	29,363	34,94	2,52
98 01 14	29,924	35,172	2,57
98 01 14	29,379	34,926	3,23
98 01 18	29,002	34,833	3,37
98 01 20	28,816	34,745	3,23
98 01 20	28,735	34,814	3,12
98 01 24	29,187	34,898	2,49
98 01 25	28,962	34,876	2,47
98 01 25	28,921	34,882	2,81
98 01 25	28,899	34,877	2,99
98 02 01	28,818	34,795	3,04
98 02 13	29,18	34,908	2,8
98 02 13	28,808	34,78	3,16
98 02 14	28,763	34,765	3,11
98 02 20	28,917	34,792	2,95
98 02 26	29,521	35,005	2,94
98 02 27	28,431	34,699	3,5
98 02 27	28,649	34,946	2,99
98 03 01	28,891	34,755	3,27
98 03 02	28,819	34,839	3,14
98 03 04	29,235	34,787	3,1
98 03 04	29,293	34,807	2,36
98 03 06	29,709	35,214	2,53
98 03 07	29,974	34,488	3
98 03 11	29,222	34,756	3,16
98 03 22	29,233	34,736	2,46
98 04 03	29,482	34,939	1,85
98 04 07	28,781	34,57	4,09
98 04 10	28,19	34,514	4
98 04 13	28,962	34,86	2,83
98 04 13	28,995	34,844	3,01
98 04 13	28,93	34,922	2,62
98 04 16	28,873	34,848	3,07
98 04 17	28,835	34,748	4,19
98 05 02	29,399	34,867	2,36
98 05 02	29,821	34,567	3
98 05 04	28,809	34,828	2,83
98 05 09	29,45	34,954	2,81
98 05 10	29,943	35,154	2,26
98 05 12	31,638	34,662	3,09
98 05 21	28,988	34,774	3,78
98 05 24	30,216	35,048	3,26
98 05 31	28,353	34,686	3,64
98 05 31	30,207	35,075	3,3
98 06 02	29,363	35,018	2,11
98 06 04	29,259	34,791	2,86
98 06 04	29,201	34,8	3,7
98 06 05	29,127	34,869	2,86
98 06 05	29,169	34,883	2,4
98 06 06	29,396	35,334	2,58
98 06 07	29,865	35,113	2,45
98 06 12	29,408	34,965	2,24
98 06 12	29,412	34,978	2,34
98 06 12	29,413	34,949	2,18
98 06 12	29,41	34,945	1,76
98 06 12	29,416	34,946	2,07
98 06 14	29,766	34,634	3,02
98 06 14	28,711	34,579	3,52
98 06 14	29,199	34,797	2,72
98 06 14	29,242	34,794	3,08
98 06 15	28,812	34,767	3,44
98 06 18	29,15	34,876	2,64
98 06 19	29,157	34,876	2,93
98 06 19	28,976	34,894	2,56
98 06 24	29,007	34,873	3,1
98 06 25	29	34,915	3,52
98 06 26	29,351	35,017	2,78
98 07 07	29,479	34,986	3,14
98 07 12	31,831	36,519	2,8
98 07 20	29,256	34,987	2,76
98 08 17	31,921	35,56	3,07
98 09 03	28,396	34,737	3,58
98 09 06	31,68	35,624	2,21
98 09 27	28,83	34,734	3,61
98 09 27	28,83	34,795	3,03
98 10 09	28,783	34,76	3,57
98 11 03	29,799	34,54	3,28
98 11 06	29,187	34,816	3,58
98 11 06	28,881	34,849	3,27
98 11 19	29,642	34,489	4,11
98 11 29	31,114	35,166	3,17
98 12 01	28,823	34,831	2,99
98 12 14	31,117	35,202	2,93
98 12 14	31,314	35,562	2,09
98 12 14	31,323	35,582	2,46
98 12 14	31,335	35,602	3,38
98 12 14	31,332	35,537	3,46
98 12 15	32,712	35,81	3,33
98 12 25	29,389	34,884	3,2

Table 1: Earthquakes (dates, geographical co-ordinates of the epicentre) for the sample year 1998 (all registered local magnitude values on the Richter Magnitude Scale)

Fig. 6 During the last decade excavation work concentrated mostly on the period between 200 and 900 A. D. There is now evidence of more than 50 churches.

higher priority than conservation because of the required security for visitors as well as in order to keep the tower together. During the consolidation work the possibilities of an anastylosis of the roof can be studied.

Useful shelters and modest and simple roof constructions are required for the site (fig. 6). The problem of what to do with the large amount of rainwater falling over a short period cannot be solved by drainages because of the unexcavated archaeological parts of the site. At the moment a discussion is in full swing concerning the possibilities of filling the ancient cisterns, as in former times. The idea of reconstructing and revitalizing the open water channels would be very attractive for visitors and could show how the ancient water management system in a settlement on the edge of a desert was constructed (fig. 7).

The Site Management Plan (SMP) takes all necessary security aspects into consideration. The new SMP has the following targets and questions:

- No more anastylosis and reconstructions of single architectural elements.
- Would it make sense to reinforce old anastylosis measures?
- How inappropriate would reinforcement look? (Protection for the entire setting?)

The new Site Management Plan, which includes all future measures at the site, will not allow further unnecessary anastylosis and reconstruction of arches.

Through the fallen arches and stones visitors will learn about and be able to study the architecture as well as the movements and consequences of earthquakes in the past and today.

In any case, it is doubtful that individual reconstructed arches are able to give visitors an idea about ancient architecture and provide information in a third dimension for visualization of a complete building (fig. 8). The »arch architecture« of Umm er Rasas, which has become a rather

Fig. 7 Cisterns and a very intelligent historic water management system were preconditions for surviving in the desert and dry zone of Umm er Rasas.

frequent phenomenon, exemplifies the questionableness of anastylosis measures in terms of safety for visitors as well as with regard to the preservation of antiquities during seismic activities. It is not possible to reinforce the anastylosis of these arches to make them stable against earthquakes; sufficient crosswise stability is not guaranteed. The idea of dismantling these arches again could not be put through. What can we do to safeguard the site and to protect visitors during earthquakes? Build carefully planned walkways. Since the implementation of the first Site Management Plan for Umm er Rasas walkways at the site no longer go under the instable arches.

Visitors will be given an idea of what architecture looked like in ancient times by means of models and panels. One of the great educational possibilities is to study in situ the results of heavy earthquakes with horizontal acceleration of the structures. At Umm er Rasas there are also a few structures that exhibit only minor damage, even after 1300 years and heavy earthquakes; they may have been consolidated.

Fig. 8 (left) and 9 (right) Anastylosis is visible at nearly all excavated locations

Fig. 10 Very few structures at Umm er Rasas exhibit only minor damages

Conclusion

We should use all technical possibilities to safeguard and protect the antique site against natural disasters and catastrophes, to the extent that these do not disturb the setting and are acceptable as conservation measures (fig. 10). In many cases protection from natural disasters is implemented much more easily through careful organisation and planning of sites than through technical measures. Investigation, maintenance, analysis of possible situations, emergency organisation and training of staff can reduce the risk to people and heritage considerably. An anastylosis should be discussed critically, especially because in most cases only part of the architecture would be reerected. The static situation of anastylosis is often dubious, i. e., in many cases the stability is problematic.

Wolfram Jäger, Denny Napitupulu

Possibilities of Earthquake and Disaster Preparedness for Masonry Structures

Introduction

Earthquakes are frequently of short duration, but great forces arise during their action and can cause extensive damages on a structure. We cannot prevent natural disasters from striking, but we can prevent or limit their impact by making structures strong enough to resist their destructive forces[1] and by applying some methods to neutralize their harm. Structural engineers therefore need to learn about what causes an earthquake and what can be done to minimize its impact.

Masonry is a very diverse building material, strong in compression, but virtually without strength in tension. To compensate for this imbalance in masonry's behaviour, reinforcement bars are cast into it to carry the tensile loads. Reinforced masonry behaves similarly to reinforced concrete. The interface between the masonry unit (bricks, blocks, etc.) and the mortar adds additional potential for failure. Unreinforced masonry possesses little ductility and cannot be expected to behave like an elastic material during an earthquake.

This short report is focused on developing methods to prevent adverse seismic effects on masonry structures. The first issue that must be addressed is an evaluation of the characteristics of masonry; the findings can be used to verify the capacity of the structure after earthquake action.

Characteristics of masonry material

In order to understand the characteristics of masonry and scientifically describe and influence its behaviour it is necessary to perform tests to assess its mechanical properties.

Mechanical properties of masonry

Masonry is a composite material made up of units (bricks, blocks etc.) and mortar. Because of the specific characteristics of the composites it is difficult to predict the mechanical behaviour of masonry, and therefore experiments have to be carried out for different types of masonry. To assess the resistance of masonry walls the mechanical properties of the masonry, such as its compressive strength, shear strength, bending strength and stress-strain relationship, need to be determined.

Compressive strength

The behaviour of the composite material »masonry« subjected to compressive stresses is determined by the different lateral deformation behaviour of mortar and block, which results in a triaxial state of stress in mortar and masonry unit.

If the compressive strength of the mortar has a high value, the units are going to crush first under compression. The compression failure is usually determined by the lateral tensile stresses in the blocks. Therefore, the compression strength of masonry is usually lower than the uniaxial compressive strength of the blocks. A greater exploitation of the compressive strength of the blocks can be achieved if the lateral deformations of the mortar joints can be restricted, reducing the lateral tensile stresses in the blocks. Restraint of the lateral deformation of the mortar can be attained by reinforcing the bed-joints that enclose the mortar.

In other cases, the compressive strength of eccentrically loaded masonry usually affects the strength of arches, vaults, pillars and out-of-plane loaded masonry panels. The eccentric loading problem on masonry leads to tensile stresses which cannot transmit the load properly since the masonry is only able to transmit the load to a limited extent.

Shear strength

Shear along masonry unit/mortar interfaces is an important mechanism of resistance in structural masonry. Several test procedures and set-ups have been proposed to characterize this response so that test results can be used for analysis and design of masonry work, as shown in fig. 1.

By analyzing test results it has been established that the ratio between the tensile and compressive strength of any type of masonry varies within the following margins:[2]

0.03 fk <= ftk <= 0.09 fk

1 Usam Ghaidan: Earthquake-Resistant Masonry Building. Basic Guidelines for Designing Schools in Iran, Paris 2002, p. 4.

2 Kuldeep S. Virdi/Rossen D. Rashkoff, Pell Frischmann Consulting Engineers, Low-rise residential construction detailing to resist earth-

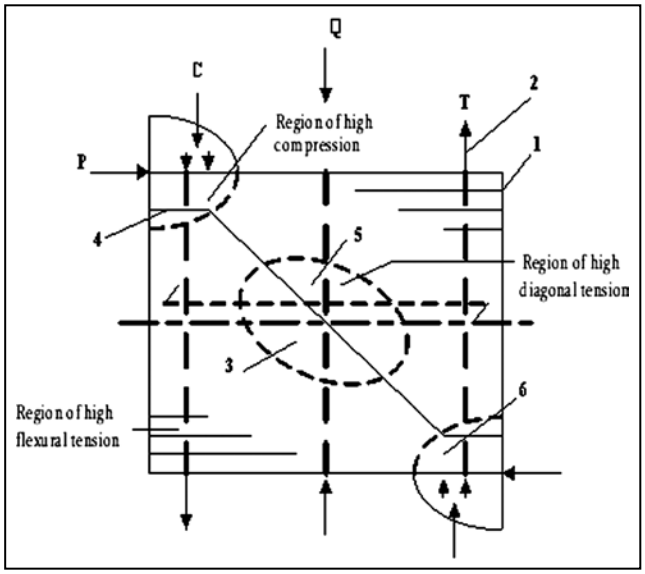
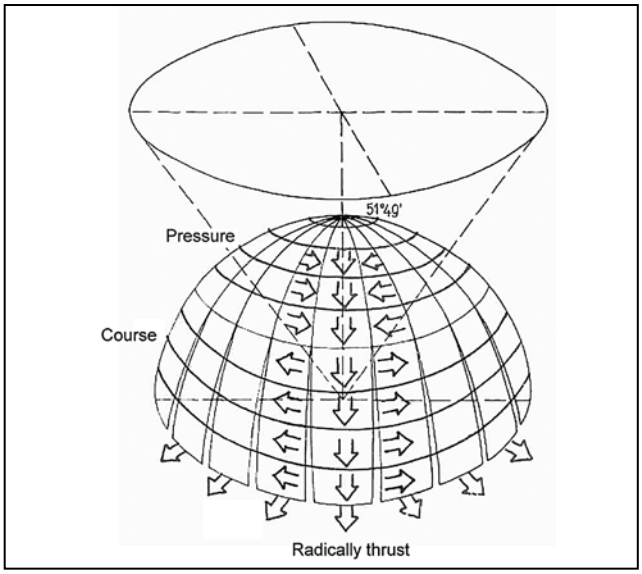


Fig. 1 Six major events in the response of reinforced masonry shear walls



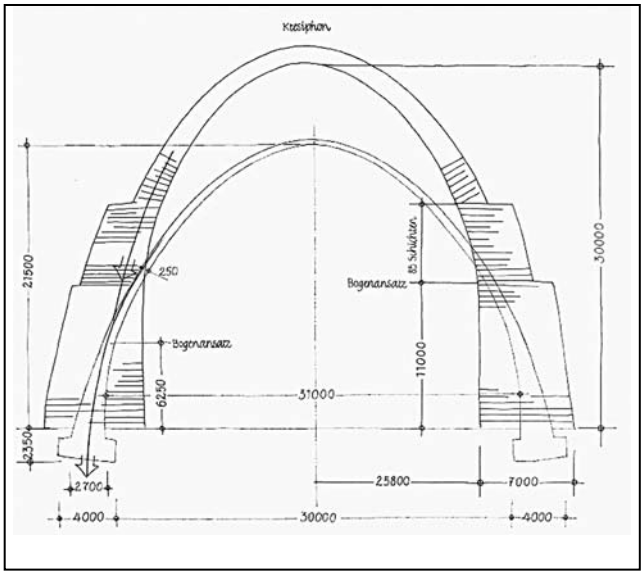


Fig. 2 Sketch of a dome: (a) distribution load and (b) dimensions

ftk - characteristic tensile strength of masonry
fk - characteristic compressive strength of masonry

If the tensile strength is lower than the compressive strength, it cannot be considered in calculations.

Bending strength

In cases where masonry needs to be verified for out-of-plane loads, the bending strength is the governing factor. According to EuroCode 6, the value of the bending strength parallel to bed joints should be taken as zero when evaluating seismic resistance.[3]

Characteristics of historic masonry structures

The main loads most historic masonry structures have to resist are their own dead weights and those imposed by wind and earthquakes. The structural resistance depends primarily on two factors: the geometry of the structure and the characteristic strength and stiffness of the material used.

Historic buildings made of masonry

The use of masonry in structures goes back about 10,000 years. Early examples of masonry structures were mud-brick dwellings. Structurally, they were not very durable and were defined by simple forms, with timber tie beams spanned between the walls. When the need for larger interior spaces arose, mostly for religious buildings, stone was usually used as the masonry unit.[4]

The most successful examples of stone masonry structures of the early period are Egyptian pyramids. Even though they have no large spaces, they have a perfect structural form for withstanding environmental effects. This perfect structure is achieved by stacking varying masses of blocks in such a way that their angles relate to the shapes of the individual blocks.

The famous lost city of Machu Picchu is the best surviving example in South America. The Inca were sophisticated stone cutters who did not use mortar for their masonry

quakes, http://www.staff.city.ac.uk/earthquakes/Repairstrengthening/RSStoneMasonry.htm

3 Ibid.

4 Ali Ishan Unay: Structural Wisdom of Architectural Heritage. Middle East Technical University, Ankara, Turkey, in: http://www.unesco.org./archi2000/pdf.unay.pdf

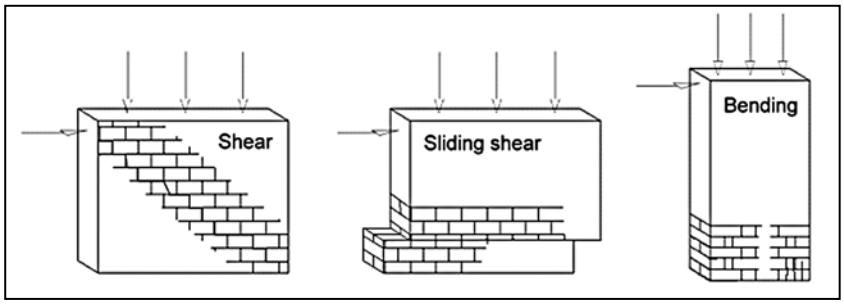


Fig. 3 Failure modes for masonry walls subject to in-plane loads

(»dry-stone walls«). Usually the walls of Incan buildings were slightly inclined inside and the corners were rounded. This, in combination with the thoroughness of the masonry work, led Incan buildings to have a peerless seismic resistance. During an earthquake of small or moderate magnitude the masonry was stable, and during a severe earthquake stone blocks would »dance« near their normal positions and remain exactly in the right order after an earthquake.[5]

Another example is the Bam Citadel, which was the largest adobe building in the world, located in Kerman Province in south-eastern Iran. Like most medieval fortresses, Bam has a wide moat outside the crenulated walls. The area within the walls is over 200,000 square metres; the outer walls are eight metres high and five metres thick (at the base).[6]

Behaviour of structural elements

The inability of masonry structures such as arches, vaults, domes and walls to resist tensile stresses required widening of their cross-sections so that compression would reduce the effect of potential bending. A substantial thickness was directed by the coarseness of their constituent materials: stone, brick and mortar joints were often intuitively necessary to prevent buckling.

For example, the dome is the structural form which distributes loads to supports through a doubly curved plane. The dome must be designed to resist compressive stresses along the meridian lines and to resolve circumferential tensile forces in the lower portion of hemispherical domes. The compressive forces within the dome are similar to those developed within an arch and must be resisted in a similar manner. The dome will spread at its base if it is not restrained by either mass or ties. The thrust at the base of the dome is continuous and traditional methods of obtaining stability rely upon massive buttressing. The dome is an extremely stable structural form and resists lateral deformation through its geometry (fig. 2).[7]

5 http://en.wikipedia.org/wiki/Machu_picchu, redirected from Machu Picchu, Historic Sanctuary of Machu Picchu, UNESCO World Heritage Sites.

6 Asad Mahbub: Bam-Citadelo, in: Irana Esperantisto (Iranian Esperantist), no. 4, vol. 2, Summer 2003, pp. 5–7; Engl. translation in: http://en.wikipedia.org/wiki/Bam_Citadel.

7 Unay (note 4).

Structural damages caused by natural disasters

A natural disaster is the consequence of a combination of natural hazards (a physical event, for example hurricanes, floods, landslides, earthquakes) and human activities. A natural hazard is an event that has an effect on people and results from natural processes in the environment.

Damages and failures caused by earthquakes

In the event of an earthquake, in addition to the existing gravity loads horizontal racking loads are imposed on walls. Unreinforced masonry behaves like a brittle material. When the state of stress within the wall exceeds the masonry strength, brittle failure occurs, followed by the possible collapse of the wall and the building. Therefore unreinforced masonry walls are vulnerable to earthquakes and should be confined and/or reinforced whenever possible.

Masonry walls resisting in-plane loads usually exhibit the following three modes of failure (fig. 3).[8]

- *Shear:* a wall loaded with a significant vertical load as well as horizontal forces can fail in shear. This is the most common mode of failure.
- *Sliding shear:* a wall with poor shear strength, loaded predominantly with horizontal forces, can exhibit this failure mechanism.
- *Bending*: this type of failure can occur if walls have improved shear resistance.

The lateral resistance and ductility of plain masonry walls can be improved by reinforcing the masonry with steel. Vertical reinforcing bars can be placed in hollow block masonry channels. The contribution of vertical and horizontal reinforcement to the resistance of the wall, failing in shear, is shown in fig. 4.

8 See note 2

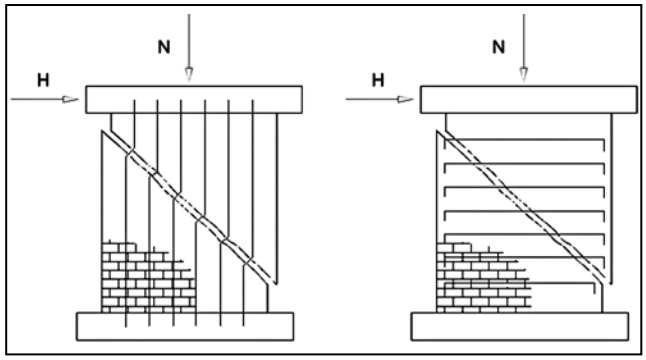


Fig. 4 Mechanism of action of vertical and horizontal reinforcement in a masonry wall failing in shear

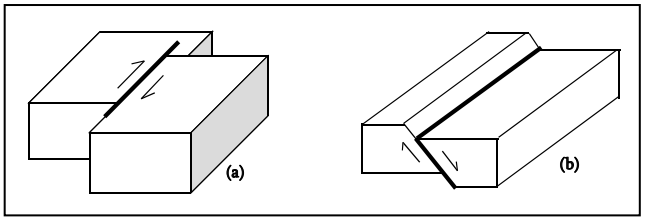


Fig. 5 Different types of faults: (a) left lateral fault/strike-slip fault and (b) dip-slip fault/normal fault

Earthquakes and typical damages

Most of the stresses that cause earthquakes can be explained by the theory of plate tectonics. The typical damages to a structure depend on the amplitude and the duration of shaking during an earthquake in the context of the structure's design and the materials used in its construction.

Characteristics of earthquakes

In general, during an earthquake there are usually one or more major peaks of magnitude of motion. These peaks represent the maximum effect of the earthquake. Although the intensity of the earthquake is measured in terms of the energy release at the location of the ground fault, the critical effect on the given structure is determined by the ground movements at the location of the structure. The effect of these movements is determined mostly by the distance of the structure from the epicentre, but it is also influenced by the geological conditions directly beneath the structure and by the nature of the entire earth mass between the epicentre and the structure.

One of the most common and modern methods for recording earthquakes is to plot the acceleration of the ground in one horizontal direction as a function of elapsed time. Thus a typical acceleration record of an earthquake allows us to simulate the effects of major earthquakes.[9]

Focus and epicentres

The point along the rupturing geological fault inside the earth where an earthquake originates is called the focus, or hypocentre. The point on the earth's surface directly above the focus is called the epicentre. Earthquake waves begin to radiate from the focus and subsequently to form along the fault rupture. If the focus is near the surface, between 0 and 70 kilometres (between 0 and 40 miles) deep, shallow-focus earthquakes are produced. If it is intermediate or deep below the crust, between 70 and 700 kilometres (between 40 and 400 miles) deep, a deep-focus earthquake will be produced. Shallow-focus earthquakes tend to be larger and therefore more damaging because they are closer to the surface where the rocks are stronger and build up more strain.

Elastic rebound theory

Different types of earthquakes are based on the movement along the fault line. In a normal fault, one side of the fault line moves up and one side moves down as shown in fig. 5a. In a strike-slip earthquake, the movement is horizontal as shown in fig. 5b. A slip is the amount of displacement that adjacent blocks move along the fault.[10]

Effects of earthquakes

The response of a building to an earthquake is dynamic, not static. Earthquake effects that can have an impact on structures include: ground-shaking in three dimensions, soil failures, ground settlement and seismic sea waves.[11]

- *Ground-shaking:* Caused by the passing waves of vibration through the ground, this can result in several types of damaging effects. Some of the major effects include destruction of rigid structures: they either totally collapse or they are knocked off their foundations.
- *Soil failures*: Soil failure, such as liquefaction, is the process by which saturated, non-cohesive soil loses its shear strength during seismic shaking and behaves like a liquid rather than a solid. The effect on structures and buildings can be devastating and is a major contributor to urban seismic risk.
- *Ground settlement*: Buildings can also be damaged when the ground gives way beneath them. This can

9 British Columbia Institute of Technology, Civil and Structural Engineering Technology Program: Earthquake Effects, from http://www.eng.bcit.ca/civil/courses/4167/unit1_01.htm

10 Earthquake Types, from http://library.thinkquest.org/03oct/00795/earthtypes.html

11 T. Weiland: Earthquakes, Introductory Geosciences I, from http://itc.gsw.edu/faculty/tweiland/quake.html

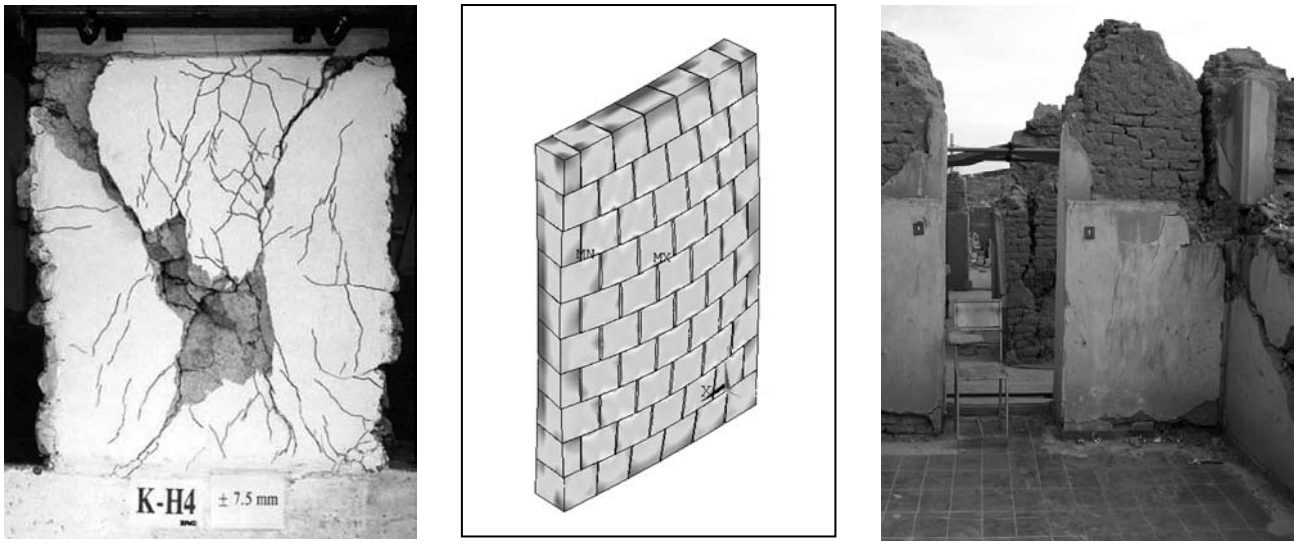


Fig. 6 Typical damages on masonry structures: (a)—X-cracking, (b)—bending, (c)—loss of integrity

happen in the form of a landslide down a hill, which can cause severe settling of the ground.
- *Tsunami*: Tsunamis are the most dangerous effects of an earthquake. They are large destructive ocean waves caused by the sudden displacement of the seafloor and are associated with earthquakes. They have been recorded at heights of up to 20 metres (around 60 feet) and speeds of up to 500 mph.

Typical damages

The following types of damage can be identified through analysis of observed earthquake damage patterns: x-cracking, crushing, bending failure, loss of integrity, cracks between walls and floors, cracks at the corners and at wall intersections, out-of-plane collapse of parametric walls, cracks in spandrel beams and/or parapets, diagonal cracks in structural walls, partial disintegration or collapse of structural walls and partial or complete collapse of the building (fig. 6).

Preservation and retrofitting against earthquakes

In the Preservation Brief »The Seismic Retrofit of Historic Buildings, Keeping Preservation in the Forefront« three important preservation principles have been spelled out for seismic retrofit projects:

- »Historic materials should be preserved and retained to the greatest extent possible and not be replaced wholesale in the process of seismic strengthening;
- New seismic retrofit systems, whether hidden or exposed, should respect the character and integrity of the historic building and be visually compatible with it in design; and
- Seismic work should be »reversible« to the greatest extent possible to allow the removal for the future use of improved systems and the traditional repair of remaining historic materials.«[12]

Base isolation

Base isolation is another technique to reduce earthquake hazards to masonry buildings. It is an energy dissipation method rather than a structural retrofitting. It shifts the fundamental period of vibration of the structure to a range outside the predominant energy content of the earthquake. Its limitations include serious physical disruption and high costs. It can be effective for safeguarding buildings of cultural value.

The concept of base isolation is explained through the example of a building resting on frictionless rollers. When the ground shakes, the rollers move freely, but the building above does not move. Thus, no force is transferred to the building when the ground is shaking, and the building therefore does not experience the earthquake.[13]

12 David W. Look, Terry Wong, Sylvia Rose Augustus, The Seismic Retrofit of Historic Buildings, Keeping Preservation in the Forefront, Preservation Brief 41, Technical Preservation Services, National Park Service, US Department of the Interior, Washington, D.C. 1997, pp.2-3; cited from http://www.oldhousejournal.com/notebook/npsbriefs/index.shtml

13 C. V. R. Murty: Earthquake Tip, Indian Institute of Technology Kanpar, Building Materials and Technology Promotion Council, New Delhi 2003.

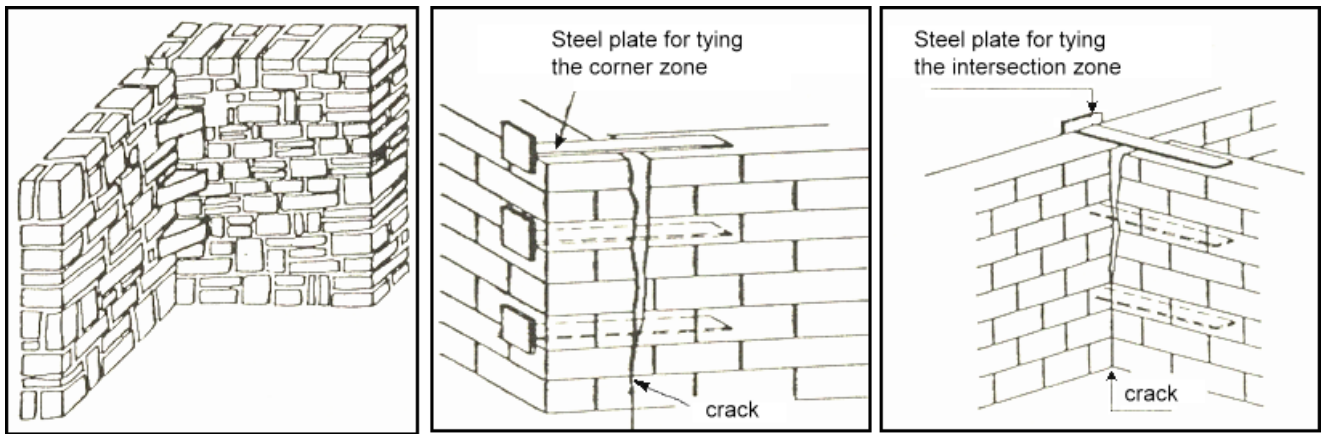


Fig. 7 Methods for improving integrity

Fig. 8a and 8b Results of a shaking table test using a model of a rural stone house with wooden floors; (a) without steel ties, (b) with steel ties

Improvement of integrity[14]

The integrity of masonry can be improved by applying anchors for tying existing building elements together (fig. 7). The forces acting in the anchors will be transmitted by bond, plates, perpendicular bars or other means. Usually the materials used should be compatible with the historic structure. Wooden and/or iron ties have been used to improve the structural integrity of masonry buildings and prevent lateral instability of masonry walls caused by the horizontal action of structural elements. More recently new materials such as glass or carbon fibres have been used.

Methods for improving structural integrity can be classified into the following main groups:

- tying of walls with steel ties;
- replacing, stiffening and anchoring of floors;
- strengthening of corners and wall intersection zones;
- strengthening of walls by construction of vertical confining elements.

14 Miha Tomaževič, Methods of Repair and Strengthening: Methods for Improving Structural Integrity, Retrofitting of Masonry Structures, in: Beate Boekhoff and Annette Lippert (ed.), International Short-Course on Architectural and Structural Design of Masonry with a focus on Retrofitting of Masonry Structures and Earthquake Resistant Design, hosted by Lehrstuhl für Tragwerksplanung, Technische Universität Dresden, 7–18 December 2003, (unpublished conference material) p. 50.

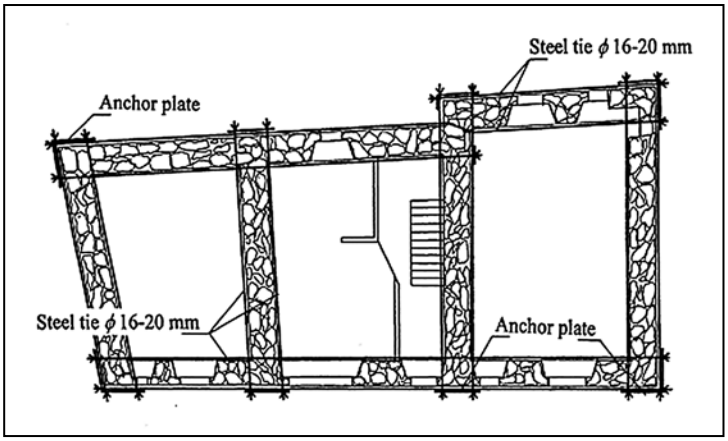


Fig. 9 The position of steel ties on the plan of a rural stone house

Post-tensioning of an existing construction[15]

Unreinforced masonry developing tension owing to either in-plane or out-of-plane bending can be strengthened by using pre-stressing steel to create axial compression in the wall. The additional axial compression increases the bending moment required to produce tension.

On the other hand, reinforced masonry can also be strengthened where the additional axial compression reduces the need for tensile reinforcement. Internal pre-stressing has been used successfully to increase the strength and provide ductility to existing unreinforced masonry structures. If a cavity or cell space is sufficiently opened to permit the placement of post-tensioning strands or bars, wall openings are required to install anchors and bearing plates. If masonry material is strong enough, the anchoring can also be carried out with bonding.

Anchoring and tying[16]

The failure of anchors of floors, roofs and walls limits their stability under lateral out-of-plane loading and limits the ability of the floor or roof system to transmit lateral in-plane loads to the rigid walls to provide overall building stability. On the other hand, walls can have vastly improved strength and stiffness characteristics if an adequate connection can be made at their intersections. Retrofit bolts, expansion anchors, or epoxy sock anchors are typical for mechanical connections.

Anchors may act in shear or tension or both but in general the most critical aspect of the design is to adequately anchor the bolts in the masonry and to ensure adequate stiffness where interconnecting elements may introduce additional displacements along the interface.

For a comparison of the collapse of stone masonry models during a shaking table test with and without ties see fig. 8a and b.

Observations showed that the freely supported wooden floors from the model without ties did not prevent the separation of the walls. As a consequence, the upper storey of the model disintegrated and partially collapsed before the model's final collapse. Severe out-of-plane vibration of transverse walls had been observed before the disintegration of the upper storey. In the case of the model with wall ties, separation and disintegration of the walls were prevented. The model collapsed because of the shear failure of the load-bearing walls in the first storey.

The results of the shaking table test led to design recommendations that should be taken into account if masonry walls are tied with additionally placed steel ties (fig. 9).

Base retrofitting[17]

Several options exist for retrofitting a building's footings and foundation walls, such as capping, replacement and parallel systems.

Capping simply means that concrete is placed over or alongside the existing foundation wall. An engineer or architect has to specify the reinforcing steel, anchor bolts and connections between the existing foundation wall and the new capping. The embedment of anchor bolts and the placement of reinforcing steel generally follow the standards for new construction.

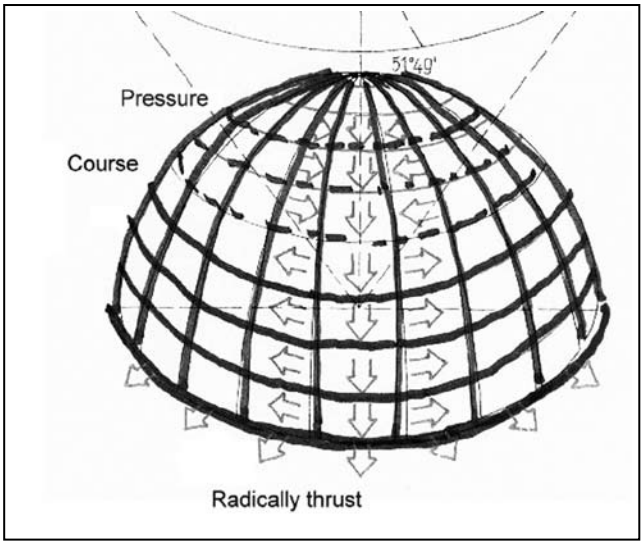
Replacement involves shoring up the building and putting in a complete or partial perimeter footing and stem wall. This method is frequently used if the conditions of the foundation do not allow verification during an earthquake. Shoring can be omitted when replacement is done in small sections at a time. The latter technique is popular for occupied structures.

Parallel systems are systems of new structural elements that create a parallel horizontal force-resisting system at the foundation level. The new structural elements are typically located near the exterior walls.

15 Ahmad A. Hamid, Robert G. Drysdale, Retrofitting of Masonry Structures, in: Boekhoff/Lippert (See note 15), pp. 165 f.

16 Ibid., pp. 156 f.

17 Richard Chylinski/Timothy P. McCormick: Foundations, Seismic Retrofit Training, p. 70, from http://www.abag.ca.gov/bayarea/eqmaps/fixit/manual/PT10-Ch-5.PDF



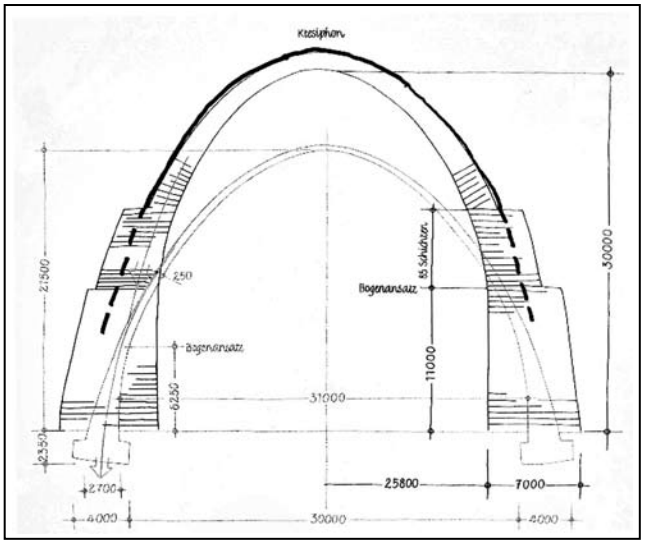


Fig. 10 Placement of reinforcement bars in a dome: (a) reinforcement in both directions, (b) detail of reinforcement

Reinforcement

Tensile failure of the bed joints or the units can be avoided by vertical reinforcing bars, which can carry tensile stresses perpendicular to the bed joints. A sufficient cross-section of reinforcing bars will be determined by flexural or tensile design. Reinforcement also can be helpful for improving the shear capacity of masonry (fig. 10).

Consolidation by injection[18]

This method is usually applied to stone and mixed stone-and-brick masonry which is frequently characterised by two outer leaves of uncoursed stones (or uncoursed stones mixed with bricks) with inner infill of smaller pieces of stones. Lime mortar used as a bonding material is of relatively poor quality. Because of the way in which such walls are constructed, they contain many voids that are uniformly distributed over their entire volume. Therefore, systematically filling the voids by injecting cementitious grout is an obvious and efficient method of strengthening in the hope that after hardening, the injected grout will bond the loose parts of the wall together into a solid structure.

During grouting, the spilling of grout out of the cracks and joints between the stones is prevented by the application of dry fast-binding cement. As indicated by experience, the quantity of the dry part of the grout needed to systematically fill the voids in stone-masonry walls does not exceed 50 to 150 kg per cubic metre of the wall.

Life cycle and historic buildings

Historic buildings are inherently sustainable. Preservation maximises the use of existing materials and infrastructure, reduces waste and preserves the historic character of old towns and cities. The energy embedded in an existing building can be 30 per cent of the energy of maintenance and operations for the entire life of the building. Sustainability begins with preservation.

Historic buildings were traditionally designed with many sustainable features that responded to the climate and site. When effectively restored and reused, these features can bring about substantial energy savings. Taking into account the original climatic adaptations of historic buildings, today's sustainable technology can supplement inherent sustainable features without compromising the unique historic character.

Conclusion

To avoid or minimize earthquake risk on historical masonry consideration should be given to the characteristics of masonry material and the historic building itself. Applying new technology might help prevent damage to the masonry building during natural disasters. Generally, the options for the level of seismic retrofitting depend on the expected seismic activity and the desired level of performance. Several methods are introduced for improving structural integrity and for strengthening masonry structures in order to significantly improve the seismic resistance of existing buildings.

18 Tomaževič (note 14), pp. 54 f.

Randolph Langenbach

Understanding What Works: Learning from Earthquake Resistant Traditional Construction

Introduction

In the morning of 26 December 2003 the world woke up to news of an earthquake in Iran, in which an entire city was reported to have been destroyed and tens of thousands of people killed—illustrated with a pair of pictures of the ancient Bam Citadel, known as the »Arg-e Bam,« a site that was claimed to be the largest earthen structure in the world. The »after« picture (fig. 2) showed a sea of rubble where layer upon layer of undulating earthen walls had once been—like a child's sand castle on the beach after it had been kicked down by rude kids. Soon this pair of pictures became the unwitting symbol for the sudden annihilation of approximately 30,000 people estimated to have died in the earthquake. *Unfired earthen construction—how can it possibly be safe? Isn't it time that it should be banned outright?*

However, the images of the destruction of this historic earthen structure hid the real truth of this earthquake—namely that almost all of the over 30,000 people who died in the earthquake, died in collapsed *modern* buildings! Even within the Arg itself, those parts that had remained abandoned and unrestored for as long as 150 years suffered very little damage. The worst damage was concentrated in those parts that had been restored and reconstructed over the previous half-century.

Bam had only 7,000 residents in 1968, but it had grown to 100,000 by the time of the earthquake. It was the new buildings housing this expanded population that killed almost all of the 30,000. Many of the new buildings did have adobe walls, as unfired earthen construction remains a common way of building here as it does in many desert areas of the globe, but their roofs frequently were constructed of steel and fired brick. Lacking any fasteners to secure them to the walls, the roofs collapsed onto the occupants. The earthquake also collapsed modern multistory steel frame structures, which were more common here than reinforced concrete buildings.

All of this raises important questions in the fields of disaster mitigation and historic preservation. Does an indisputably weak material (unfired clay) *automatically* result in construction that is unacceptably vulnerable to earthquakes? Can any form of traditional construction with the historically available materials of earth, timber, stone, and brick ever meet any reasonable modern standards of earthquake safety? Indeed, how does one determine what is acceptable risk?

Earthquakes

Earthquakes are unique among natural disasters because they come with very little or no warning. When the shaking begins, people can only take cover in the spot where they find themselves. Thus in areas where the tectonic plates shift, earthquakes engender a level of consternation that is out of proportion to their frequency and the risk to

Fig. 1. The Arg-e Bam before the earthquake (photo courtesy Iran Tourism Organization)

Fig. 2. The Arg-e-Bam, exactly the same view after the earthquake (photograph © Randolph Langenbach)

Fig. 3 Aerial view of collapsed apartment blocks, Gölcük (photo courtesy UN-ISDR)

any one individual.[1] The fact that people do not have the opportunity to evacuate structures prior to an earthquake thus continues to raise particular concerns about historic preservation. Any conservation plan for a structure has to deal with the responsibility for the safety of the occupants during a *design level* earthquake, which is one that has a reasonable chance of happening at the site anytime over a period of several hundred years.

Thus, the collapse of large parts of the Arg-e Bam in the 2003 earthquake has served to shine the spotlight onto other historic structures with thick earthen walls, raising concerns that they too could fall down suddenly. While this may spur people to upgrade other monuments at risk, the negative effect is that earthen construction will be so discredited that productive efforts to research how to improve its resistance—both for new construction and for the upgrading of existing construction—will be discouraged in favor of concrete and steel. That is why it is so important to look more carefully at the actual performance of archaic construction systems after earthquakes. Hidden by the mounds of rubble was a clue that points to a different way to interpret the results of this earthquake on the Arg-e Bam. The clue was the counterintuitive fact that the unrestored parts of the complex had suffered dramatically less damage than had those parts that had been restored and reconstructed. On further examination, it was discovered that the restored sections were infested with termites, and that modern mud stucco obscured the substantial deterioration that existed underneath. As a result what at first appeared to provide a case study for determining the threshold for the collapse of earthen structures in general shifted to one of determining why the restored sections proved to be so vulnerable.[2]

The 1999 earthquakes in Turkey

In November 2000, one year after two devastating earthquakes struck near the Sea of Marmara in Turkey, a conference was convened by UNESCO, ICOMOS and the Turkish Government in Istanbul called *Earthquake-Safe. Lessons to be Learned from Traditional Construction.*[3] The 1999 earthquakes proved that in spite of all of the knowledge gained over the last century in the science and practice of seismology and earthquake engineering, the death toll in such events had continued to rise. It has gradually become apparent that modern construction has *not* been able to guarantee seismic safety. At the time of the conference, few would have thought that »traditional construction« would provide any meaningful answers to confront the dilemma of death and destruction in modern buildings of reinforced concrete.

The 1999 earthquakes, however, provided an opportunity to re-visit this issue from a different perspective, as it was the *newest* buildings in the damage district that suffered the most damage. A new term had emerged in recent years to describe the problem—not with old buildings, but with new reinforced concrete buildings: *pancake collapse*. At the 13th World Conference on Earthquake Engineering in August 2004, Fouad Bendimerad, Director of the Earthquakes and Megacities Initiative, reported that »approximately 80% of the people at risk of death or injury in earthquakes in the world today are the occupants of reinforced concrete frame infill-masonry buildings.«

1 The effect of this phenomenon was reinforced the very morning the author began writing this chapter when a rattling tremor awakened the San Francisco area household at exactly 4:42 a. m., 20 July 2007, from a quake that emanated from only 3 miles below and 6 miles away from the home. Before the tremor ended, the first thing through everyone's mind was, »Is this going to be the ›big one‹?«

2 For detailed explanation of the findings on reasons for the earthquake collapse of the Arg-e Bam see: Langenbach 2004 and 2005, www.conservationtech.com

3 For the program details and published papers from this 2000 conference in Istanbul see: http://www.icomos.org/iiwc/istanbul2000.htm

Fig. 4 Surviving *hımış* house next to a row of collapsed reinforced concrete buildings, Adapazari, Turkey, 1999 (photograph © Randolph Langenbach)

Thousands have already died in this type of building in earthquakes in different countries around the world, including recently in Turkey and Taiwan in 1999, India in 2001 and Morocco in 2003. In Iran light steel frames, also with masonry infill, are more common than concrete frames, but many of these buildings also collapsed in the 2003 Bam earthquake.

How can a technology of building construction based on the new strong materials of steel and reinforced concrete be linked to such deadly catastrophes? At the beginning of the last century both steel and reinforced concrete held great promise for earthquake-safe buildings, yet in Turkey one hundred years later, the pre-modern buildings of timber and masonry remained standing surrounded by collapsed concrete buildings. Clearly the original promise of these new materials has not been fully realized.

After the 1999 earthquakes in Turkey, the world's scholars and engineers descended on the ruins of the buildings that took the lives of 30,000 people, pouring over the wreckage and making frequent pronouncements that the collapses were caused by bad design and poor construction. Inspection, quality control and better training was what was said to be needed. A number even asserted that »nothing new can be learned« because the myriad observed faults were well documented—and the well engineered and constructed buildings had survived. From their perspective it may seem that justice had been served, and that bad construction met its rightful fate. Contractors were arrested and developers chased out of town, and so perhaps in the future people could be taught to pay attention to building codes, and graft and corruption would cease. Then—and only then—could we expect that earthquakes will not result in such massive mortality.

The flaw in this reasoning is that, given the pressures to produce so many housing units in most developing countries, there will always be poorly built buildings. Thus the

Fig. 5 This three story house in Gölcük located less than one km from the fault was undamaged by the 1999 earthquake, while a number of reinforced concrete buildings on the adjacent blocks collapsed (photograph © Randolph Langenbach)

Fig. 6 Example of *taq* construction in Srinagar, Kashmir, 2005. The timbers in the masonry walls only run horizontally parallel to the wall and through the wall (photograph © Randolph Langenbach)

problem of earthquake hazard reduction cannot be seen primarily as an *engineering* problem. It is fundamentally a *socio-economic* problem.

What the Kocaeli and Düzce earthquakes demonstrated is that humble and unassuming survivors—traditional buildings—proved that the solution need not be sophisticated construction, but, rather, *appropriate* construction. The traditional buildings that survived the earthquakes were not engineered. They were constructed without steel or concrete. No plans for them were ever inspected because none were ever drawn. They were rarely constructed by anyone who could remotely be characterized as a professionally trained designer or builder and no precision tools were used in their construction. On the contrary, they were constructed with a minimum of tools with locally acquired materials, using a minimum of costly resources, and are held together with a minimum of nails and fasteners. In many, the timber was not even milled, being only cut and de-barked. Their frames were sometimes nailed together with only a single nail at the joint before being filled with brick or rubble stone in clay or weak lime mortar.

Thus, the traditional buildings possess the same kinds of construction deficiencies that have been identified as reasons why the concrete buildings fell down, yet they remained standing. It appears that we have one system constructed with strong materials that is subject to catastrophic failure in large seismic events if it deviates from perfection in design and construction, and another considerably less sophisticated system constructed of weak materials by relatively untrained craftsmen that is, with few exceptions, robust enough to withstand major earthquakes.

Kashmir

Srinagar has been and continues to be a city obscured to the world by decades of regional civil strife. When first viewed by the author in the 1980s, it appeared as a magical world—a city beside a mountain lake with a way of life that seemed unchanged for a thousand years. The construction practices used for the traditional houses in Srinagar, which stand in contrast to today's codes, include (1) the use of mortar of negligible strength, (2) the lack of any bonding between the infill walls and the piers, (3) the weakness of the bond between the wythes of the masonry in the walls and (4) the use of heavy sod roofs (now replaced with corrugated steel sheets).

These buildings were observed almost a century earlier by Arthur Neve, a British visitor to Kashmir, when he witnessed the 1885 Kashmir earthquake: »Part of the Palace and some other massive old buildings collapsed … [but] it was remarkable how few houses fell.… The general construction in the city of Srinagar is suitable for an earthquake country; wood is freely used, and well jointed; clay is employed instead of mortar, and gives a somewhat elastic bonding to the bricks, which are often arranged in thick square pillars, with thinner filling in. If well built in this style the whole house, even if three or four stories high, sways together, whereas more heavy rigid buildings would split and fall.«[4]

There are two basic types of traditional construction with earthquake resistance capabilities found in Kashmir. One, of solid bearing-wall masonry with timber lacing, is known as *taq* and the other, a brick-nogged timber frame construction, is known as *dhajji-dewari*. Both use timber within the plane of the masonry wall to serve to hold the buildings together. *Dhajji-Dewari* is characterized

4 Arthur Neve: Thirty Years in Kashmir, London 1913.

Fig. 7 Example of *dhajji dewari* construction in Srinagar, 2005. The timbers form a complete frame, and the masonry is inset into the frame (photograph © Randolph Langenbach)

Fig. 8 The Craticii House at Herculaneum, 2003 (photograph © Randolph Langenbach)

by having a complete timber frame, with one wythe of masonry forming panels within the frame.[5]

Even though it was remote from Srinagar and most affected buildings were different from those in Srinagar, the earthquake that centered on the Pakistan portion of Kashmir on October 2005 provides a new source of data on the comparative performance of the traditional buildings in the regions. According to the structural engineering professors Durgesh Rai and Challa Murty of the Indian Institute of Technology-Kanpur: »In Kashmir traditional timber-brick masonry (*dhajji-dewari*) construction consists of burnt clay bricks filling in a framework of timber to create a patchwork of masonry, which is confined in small panels by the surrounding timber elements. The resulting masonry is quite different from typical brick masonry and its performance in this earthquake has once again been shown to be superior with no or very little damage.«

They cited the fact that the »timber studs … resist progressive destruction of the … wall … and prevent propagation of diagonal shear cracks … and out-of-plane failure.« They went on to suggest that: »there is an urgent need to revive these traditional masonry practices which have proven their ability to resist earthquake loads.«[6]

Timber-laced construction in history

The origin of both types of timber-laced masonry systems is known to be at least as far back as the ancient world. The palaces at Knossos have been identified as having possessed timber lacing of both the horizontal and the infill frame variety.[7] This dates what can be reasonably described as timber-laced masonry construction back to as early as 1500 to 2000 B. C. Evidence of infill-frame construction in ancient Rome emerged when archeologists dug up the port town of Herculaneum that had been buried in a hot pyroclastic flow from Mount Vesuvius in 79 A. D. They found an entire two story half-timber house which is believed by the archeologists to be an example of what Vitruvius has called *Opus Craticium*. This may present the only surviving example of the form of construction used in ancient Rome for the seven or eight-story tenements (insulae) that filled that city of a million and a half people. Masonry bearing walls would have been too thick at the base to fit on the known footprints of these ancient buildings and still leave any space for rooms, so it is likely that the Romans constructed many of these tall buildings with timber frames with infill masonry.

After the fall of Rome, infill-frame construction became widespread throughout Europe. Timber-with-brick-infill vernacular construction is documented to have first appeared in Turkey as early as the eighth century.[8] The

5 For more information on Kashmiri traditional construction, see Langenbach (1989) at www.conservationtech.com and www.traditional-is-modern.net

6 Durgesh C. Rai/C. V. R. Murty: Preliminary Report on the 2005 North Kashmir Earthquake of October 8, 2005, Indian Institute of Technology, Kanpur 2005, www.EERI.org

7 Peter Kienzle, Architect, Archaeological Park Xanten, Germany, oral interview, October 12, 2002.

8 Demet Gülhan and İnci Özyörük Güney (2000): The Behaviour of Traditional Building Systems against Earthquake and Its Comparison to Reinforced Concrete Frame Systems; Experiences of Marmara Earthquake Damage Assessment Studies in Kocaeli and Sakarya, Conference

Fig. 9 and 10 Views of ruins of a house in the walled city of Ahmedabad, showing a form of timber lacing similar to that found in *taq* construction in Kashmir. In the partially dismantled building, the construction with runner beams tied together with cross-timbers pegged to the beams is visible (photographs © Randolph Langenbach)

question of whether timber-laced masonry construction evolved in response to the earthquake risk is an interesting one, but earthquakes are infrequent, and there were other compelling economic and cultural reasons for the evolution of these systems. For example, many variations of timber frame with masonry infill construction exist in areas well outside of the earthquake regions of the world, including Europe where in Britain it is called *half-timber*, in France *colombage*, and in Germany *Fachwerk*. In Madrid, this construction is hidden behind solid masonry facades in most of the 18th and 19th century buildings around the Plaza Major.[9] In non-earthquake areas of the United States, the masonry infill version derived from French *colombage* can be found in New Orleans and other historic French settlements on the Mississippi, and, derived from the German *Fachwerk*, in parts of Pennsylvania.[10]

In earthquake-prone areas of Central America, Spanish construction was combined with native methods in what is today called *taquezal* or *bahareque*, in which a bamboo or split-lath enclosed »basket« between timber studs is filled with loose earth and stone. In South America, Peru is also seismically active, and the traditional construction with earthen plaster and sticks or reeds (wattle and daub), known as *quincha*, that can be found there is thought to have predated the Spanish conquest, after which it was adopted by the Spanish and continued in use almost until the present. Despite the ephemeral nature of the material, 5,000 year old *quincha* construction has been unearthed at the Peruvian archeological site Caral.

Wattle and daub was also common in Britain, where earthquakes are rare, and in earthquake-prone Turkey, where it is called *Bağdadi*. Turkey is also important for *hımış*, mentioned above, the masonry infill-frame construction which performed well in comparison to the reinforced concrete buildings in the 1999 earthquakes. It may have been the spreading influence of the Ottoman Empire into Moghul India that carried some of these construction types east into Kashmir and also into Ahmedabad, where similar timber-laced vernacular buildings survived the 2001 Gujarat earthquake when scores of reinforced concrete buildings collapsed.

While it may be difficult to identify earthquakes as the stimulus for the above examples, in earthquake areas there are indeed two historical examples that were »invented« specifically in response to earthquakes that help to establish the credibility of all of these examples as earthquake-resistant construction: Portuguese *Gaiola* and Italian *Casa Baraccata*. The *Gaiola* was developed in Portugal after the 1755 Lisbon earthquake under the direction of the Marquis

Proceedings for Earthquake-Safe: Lessons to Be Learned from Traditional Construction, an International Conference on the Seismic Performance of Traditional Buildings. Istanbul 2000, also: http://www.icomos.org/iiwc/seismic/Gulhan.pdf

9 E. Gonzales Redondo/R. Aroca Hernándes-Ros (2003): Wooden Framed Structures in Madrid Domestic Architecture of the 17th to 19th Centuries, Proceedings of the First International Congress on Construction History, Madrid, Instituto Juan de Herra, Escuela Técnica Superior de Arquitectura, vol. 2 (2003).

10 Randolph Langenbach (2006b): From »Opus Craticium« to the »Chicago Frame«: Earthquake Resistant Traditional Construction, Proceedings, Structural Analysis of Historical Constructions (SAHC) Conference, P. B. Lorenço/P. Roca/C. Modena/S. Agrawal (ed.), New Delhi 2006, also: www.conservationtech.com

Fig. 11 Typical Turkish reinforced concrete building under construction showing installation of the hollow block infill (photograph © Randolph Langenbach)

de Pombal (which is why it is also called Pombalino construction). The *Casa Baraccata* was developed in Italy after the Calabria earthquake of 1783, and later was even registered for a patent as an invention.[11]

Reinforced concrete infill-wall construction

With the rapid spread of reinforced concrete construction during the middle of the last century, the traditional vernacular was displaced from all but the most remote rural regions within a single generation. This represented a transformation of the building process from an indigenous one to one more dependent on outside contractors, specialists, and nationally-based materials producers and suppliers of cement and extruded fired brick, and hollow clay tile. Reinforced concrete has been introduced into a building construction process that continues to exist much as it did in the past. The system of local builders with a rudimentary knowledge of materials science was sufficient only as long as they were working with timber and masonry. With concrete moment frames, it has proved woefully inadequate.

Concrete construction requires more than just good craftsmanship; it demands a basic understanding of the science of the material itself. The problem is that the builders were often inadequately trained to understand the seismic implications of faults in the construction, thus leaving a looming catastrophe hidden beneath the stucco that was troweled over the rock pockets and exposed rebars that characterize construction done without the equipment necessary to do it properly, such as transit mix and vibrators.

Structural engineering has gone through its own revolution over the past century. The 19th century was an era of enormous ferment, producing engineering giants like Brunel and Eiffel, along with Jenny and the other engineers of the first skyscrapers. In the first decades of the 20th century, buildings went from a height of 10 to 20 stories to over 100 stories. To accomplish this, engineering practice shifted from a largely empirical process to one of rigorous mathematics.

Portal frame analysis based on the contraflexure methodology of isolating moments was invented and became the standard methodology for code conforming building design. This calculation method was both simple and accurate enough for it to have remained in use through the entire 20th century, up until the present for the design of most skyscrapers.[12] For short and tall buildings alike, the isolation of the structural frame from the rest of the building fabric has made the structural design a relatively straightforward process. The enclosure systems could then be treated simply as dead weight in the calculations, eliminating the need to deal with the complexity introduced by solid walls into the calculation of the linear elements of the frame. This also meant that the frame could be standardized into a simple system of rebar sizes and overall beam and column dimension, which in turn has served to allow for the construction of multi-story buildings that are not individually engineered.

11 Franco Laner/Umberto Barbisan (2000): Historical Antiseismic Building Techniques: Wooden Contribution, Convegno Internazionale Seismic Behaviour of Timber Buildings, www.tecnologos.it, Venezia. 2000

12 Elwin C. Robison: Windbracing: Portal Arch Frames and the Portal Analysis Method, unpublished manuscript, Kent State University, Kent, Ohio, July 1989.

Fig. 12 *Hımış* interior wall in a house in the Düzce earthquake damage district showing »working« of wall that caused loss of plaster (photograph © Randolph Langenbach)

Fig. 13 Collapse of a brittle interior hollow clay block wall illustrating typical failure pattern for such walls lacking subdivision of the masonry (photograph © Randolph Langenbach)

The almost universal acceptance of the concrete moment frame as a standard form of construction, and of linear elastic portal frame analysis as the basic engineering approach, fails to recognize the fact that most buildings are solid wall structures once the rooms and exterior enclosures are finished. However, nearly all of the engineering and codes that underlie the design of these buildings are based on their being modeled as moment frames with the infill masonry walls treated as dead weight, rather than as structural elements. The collapse of so many residential structures of reinforced concrete has shown the flaw with this approach. The irrefutable fact is that the infill corrupts the frame behavior when subjected to the lateral forces on which the portal frame analysis method is based.

This methodology of treating the masonry only as dead weight was also a product of the well-recognized fact that the infill masonry is very difficult to quantify mathematically and it does not conveniently fit with portal frame analysis. Under all but the most severe wind loading, ignoring the effects of the infill rarely causes a failure because the load sharing that occurs in reality between the frame and the infill can off-set any diminished performance of the frame resulting from the infill. In a »design level« or greater earthquake, however, the situation is very different because a building's structural system is expected to deflect into the nonlinear range. In other words, the structure will go inelastic in a design-level earthquake, which means that structural damage is expected to occur.

For frames, this has been recognized in codes through the use of ductility factors which are assigned based on the individual elements that make up a structural frame. Such factors, however, are unresponsive to the conditions that exist when non-structural infill masonry is added to the system, as this masonry is usually a stiff and brittle membrane contained and restrained by the frame. The rigid »diagonal strut« provided by the masonry changes the behavior of the frame, sometimes with catastrophic results. The standard analysis method for code-conforming design, which is based on linear elastic behavior, is too remote from the actual inelastic behavior of the infilled frame for the calculations to recognize the effects of the forces on it.

An alternative to moment frames could be to convert the buildings to shear wall structures, which have a significantly better record of survival in earthquakes, but the cost of retrofitting existing buildings with shear walls is prohibitive and involves the added costs of relocating the occupants for the duration of the project. Thus, the financial cost of this and other strengthening procedures is too high for widespread adoption in the economies where vulnerability is greatest. In Istanbul, for example, mitigation schemes have recently been drawn up and promulgated with World Bank assistance, but retrofit of the vast numbers of reinforced concrete residential structures has been dropped from consideration, despite the overwhelming need, simply because the costs are so high as to come close to that of demolition and replacement.

Lessons from traditional *hımış* construction—Armature Crosswalls

Returning to the aftermath of the 1999 Kocaeli earthquake in Gölcük, an answer to this problem may lie hidden behind the heaps of rubble from the collapsed concrete apartment houses. As different as they are from their concrete cousins, the *hımış* houses that remained standing amongst the ruins also have masonry infill confined within a frame. It is their survival that has provided a source for one idea on how to keep reinforced concrete buildings from collapsing—a concept called *Armature Crosswalls*, that is based on using this ancient infill-wall masonry technology for modern reinforced concrete construction.

Figs. 14 and 15 Partially demolished house in Gölcük at the time of the earthquake showing the single brick wythe thickness of typical *hımış* wall. Fig. 14 shows the exterior and fig. 15 the interior face of the same wall. Despite its condition, the earthquake had little affect on it. 2003 (photographs © Randolph Langenbach)

Instead of the existing method of constructing infill walls in reinforced concrete buildings totally out of hollow clay tile or brick, the concept is that they be constructed with a timber, steel, or concrete sub-frame of studs and cross-pieces with the masonry infilling this sub-frame. The mortar to be used for this construction is intended to be a high-lime mix that is less strong, stiff, and brittle than ordinary cement mortar. When finished, the wall would be plastered as it would normally.[13]

The intention is that these walls would have less initial stiffness and a much greater amount of frictional damping than standard infill masonry walls. The reduced initial stiffness lessens the development of the diagonal strut effect, thus allowing the frame-action on which the portal frame analysis is based to occur. The energy dissipation from the »working« of the combination of timber, bricks and mortar against each other serves to dampen the excitation of the building by the earthquake. As demonstrated by the behavior of the *hımış* buildings in the epicentral region of the 1999 earthquakes in Turkey when compared with the surrounding reinforced concrete buildings, this working of the composite structure during an earthquake can continue for a long period before the degradation advances to a destructive level.

Two fundamental questions are raised by this proposal: (1) why traditional buildings, with their seemingly weak and fragile construction, survive earthquakes that felled their newer counterparts, and (2) is it reasonable to expect that such a technology could be exported for use in multi-story concrete buildings, which are much heavier and larger than their traditional counterparts?

The answer to these questions lies in the fact that the subdivision of the walls into many smaller panels with studs and horizontal members and the use of low-strength mortar combine to prevent the formation of large cracks that can lead to the collapse of an entire infill wall. As stresses on the individual masonry panels increase, shifting and cracking first begins along the interface between the panels and the sub-frame members before degradation of the masonry panels themselves. When the mortar is weaker than the masonry units, cracking occurs in the mortar joints, allowing the masonry units, held in place by the studs and cross-pieces, to remain intact and stable. The resulting mesh of hairline cracking produces many working interfaces, all of which allow the building to dissipate energy without experiencing a sudden drop-off in lateral resistance. By comparison, standard brittle masonry infill walls without an »armature« lose their strength leading to their collapse soon after the initial development of the diagonal tension »X« cracks.

This explains why traditional infill-frame buildings are capable of surviving repeated major earthquakes that have felled modern reinforced concrete buildings. The basic structural principle behind why this weak but flexible construction survives is that there are no strong stiff elements to attract the full lateral force of the earthquake. The buildings thus survive the earthquake by not fully engaging with it, in much the same way that a palm tree can survive a hurricane. Although the masonry and mortar is brittle, the system behaves as if it were ductile. Ductility is not a quality normally used to describe the structural behavior of unfired brick masonry, but in the paper *Earthen Buildings in Seismic Areas of Turkey* Alkut Aytun credited the bond beams in Turkey with »incorporating ductility [in]to the adobe walls, substantially increasing their earthquake resistant qualities.«[14]

13 More information on Armature Crosswall technology for reinforced concrete frame buildings can be found in Langenbach (2003) and Langenbach et al (2006a).

14 Alkut Aytun: Earthen Buildings in Seismic Areas of Turkey, Pro-

Figs. 16 and 17 After witnessing the destruction of reinforced concrete buildings in Düzce while his father's *hımış* house survived undamaged, this resident of Düzce (left) decided to stop construction of a new reinforced house and change it to *hımış* construction (right) (photographs © Randolph Langenbach)

Even though reinforced concrete buildings are often much larger and taller, their performance with Armature Crosswalls is predicated on the same phenomenon because larger residential buildings have more walls in each direction in direct proportion to their size. Since the Armature Crosswall system is based on flexibility and on a reduction in initial stiffness when compared to standard infill walls, the building's deflection in an earthquake is likely to engage all of the crosswalls parallel to its deflection in rapid succession. Because the initial cracking of each wall does not represent any loss of the ultimate strength of any given wall, the load shedding is interactive, with loads passed along from one wall to another and back again as the overall deflection increases until all of the walls have been engaged relatively uniformly.

While this behavior of traditional construction in earthquakes may seem relatively easy to comprehend, few disaster recovery engineers and other personnel have understood its significance when evaluating the performance of damaged vernacular buildings—with sad consequences in terms of the loss of cultural heritage. This failure has also seriously harmed relief efforts to provide safe and livable housing after earthquake disasters by leading sometimes to the replacement or relocation of whole villages after earthquakes, which in turn brings about destruction of the social fabric of the communities as well as an extraordinary waste of resources as many such new villages in Turkey and other countries have eventually been abandoned.[15]

All too often, the post-earthquake inspection process is where cultural heritage takes an unnecessary hit, especially with unlisted and unofficially recognized cultural properties, a category which most likely includes almost all the vernacular buildings. The inspectors who are sent into areas after a disaster often have no training and even less sympathy for vernacular buildings and archaic construction simply because they have no reference point in their training to understand how such buildings can competently resist earthquakes. Earthquake damage has often been looked at with little understanding of what it represents in terms of loss of structural capacity. The standards applicable to reinforced concrete, where a small crack can indicate a significant weakness, are often wrongly applied to archaic systems where even large cracks may not represent the same degree of degradation or even any loss of strength.

Another problem is that when linear elastic analysis methods are used to analyze confined masonry buildings, often the resistance provided by the masonry is treated as falling to zero once its elastic limit is exceeded with the onset of cracking. In such an analysis methodology, the post-elastic strength and energy dissipation of the system will remain unrecognized and unaccounted for, thus showing an unrealistically high loss of capacity from the earthquake damage when cracks are observed. Because of this unrecognized lateral resistance, historical buildings are thus often forced to meet a level of lateral resistance that is, in effect, higher than that required of fully code-conforming newly constructed buildings. This can result in the unnecessary condemnation of buildings. This phenomenon has been and will continue to be a serious problem for the preservation of historic resources that have suffered damage in earthquakes.

ceedings of the International Workshop on Earthen Buildings, vol. 2 (1981), p. 352.

15 For a description of the relocation and destruction of whole villages after the Orta earthquake of 2000 in Turkey see Langenbach (2006c) and after the Molise earthquake of 2002 in Italy see Langenbach and Dusi (2006).

Conclusion

One of the problems that plagues the assessment of existing buildings and the archaic structural systems used for non-engineered buildings is the basic difficulty of establishing a norm for earthquake safety and performance when *no damage* is not a viable objective. With wind, for example, one uses real expected maximum wind speeds with an added safety factor. With earthquakes, however, it has been determined that to require all buildings to remain within their elastic range for design-level earthquakes is economically infeasible for such a large but infrequent event, so the codes have been drafted with reduced forces to be used for linear elastic analyses. Thus, how does one properly recognize the post-elastic performance of archaic non-engineered structural systems constructed of materials that do not appear in the codes, and for which there are no codified test results?

This problem is not just academic; it is integrally connected to the longer-term issues of post-disaster recovery and regional development. Old ways of building that are based on an empirical wisdom passed down through the ages will probably defy most attempts to be rationalized into systems that can be fully calculated, but the evidence remains that some of these systems nevertheless have worked well even in large earthquakes—so much so that it is important to learn why. Because of this lack of set rules and methodologies for quantification, the evaluation of older structures after earthquakes can lead to broadly divergent views on the significance of particular damage and on the reparability of the structures. This inevitably has led to the unnecessary destruction of traditional houses and even entire city districts and rural villages. Many such drastic measures have ultimately failed at tremendous social costs.

Modern construction materials and methods have brought with them extraordinary opportunities for new spaces, forms, and ways of building, and for lower-cost housing for great numbers of residents. But in many parts of the world they have also been disruptive of local culture, resulting in building forms and ways of building that are alien to the local society, yet which have been promoted to the local populations as »safe« and »modern.« The earthquake risk is just one way in which we can observe what this disruption represents in terms of a loss of cultural and technical knowledge and memory. Earthquakes have proven to be particularly unforgiving when the new ways of building are locally not sufficiently well enough understood or respected to be carried out at an acceptable level of quality and safety. By opening up to learning from indigenous pre-modern examples of earthquake resistant technologies, we can learn to preserve the surviving examples of these now seemingly ancient ways of building in a way that respects what these buildings *are*, not just how they look.

Returning to the collapse of the Arg-e Bam, finding one and two-story high earthen remains of buildings that have been roofless and abandoned for over 150 years still standing atop the epicenter of an earthquake that turned nearby modern steel buildings into twisted pretzels and destroyed concrete buildings even farther from the epicenter has to make one reexamine some of our present-day preconceptions. As has been attributed to Mark Twain: »For every problem there is always a solution that is simple, obvious, and wrong.« There has to be a reason why the earthquake did not collapse these walls when it pulverized walls that had been repaired and rebuilt back into complete buildings, but teasing the message to be learned out of the ruins of what had been such a grand monument requires more than training in a discipline. It also requires a certain amount of humility and willingness to learn to »listen« with our eyes to the message our ancestors are telling us through the cultural artifacts they have left behind.

As the world moves from an era of profligate energy use to one where fossil fuels are gradually depleted, »sustainability« and »green« have become the catchwords in building design and construction. Wood is nature's most versatile renewable building material. Stone and unfired earth, together with wood, represent the most energy-efficient materials that can be used. To this can be added fired brick and lime mortar, which require far less energy to manufacture than cement. Thus finding traditional vernacular construction practices that have performed well against one of the strongest forces that nature can throw at structures also can serve to provide a lens through which one can see that the preservation of vernacular buildings represents far more than the saving of frozen artifacts. It is an opportunity for cultural regeneration—a reconnection with a way of building by people who traditionally had learned how to build successfully for themselves with materials readily at hand.

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III.

Storm and Flood Disasters

Sturm- und Flutkatastrophen

Veltrusy, historic country house area and landscape park, 2002 (Josef Štulc)

Pali Wijeratne

Post-Tsunami Redevelopment and the Cultural Sites of the Maritime Provinces in Sri Lanka

Introduction

Many a scholar or traveller in the past described Sri Lanka as »the Pearl of the Indian Ocean« for its scenic beauty and nature's gifts, the golden beaches, the cultural riches and the mild weather. On that fateful day of 26 December 2004, within a matter of two hours, this resplendent island was reduced to a »Tear Drop in the Indian Ocean.« The Indian Ocean tsunami waves following the great earthquake off the coast of Sumatra in the Republic of Indonesia swept through most of the maritime provinces of Sri Lanka, causing unprecedented damage to life and property.

There was no Sri Lankan who did not have a friend or relation affected by this catastrophe. It also brought about a new dimension in the hearts of the people of a nation that has seen over two decades of internal conflict based on ethnic issues. A national spirit arose amongst the people so that they shed their differences, whether they be based on cast, creed, religion, race or politics, to help fellow beings. Even though Sri Lankans had not experienced or heard of any disasters of such magnitude, they avoided starvation and epidemics amongst the refugees by getting over the initial shock very quickly and rushing to the rescue of the suffering countrymen. The first load of relief items such as food, drinking water, clothing and dry rations reached the devastated areas within the first twenty-four hours. In some areas, the existence of extended family links, so much a part of the Sri Lankan way of life, was used to house the displaced. This initial public reaction was quickly supported by the government and the international community who felt strongly about what they witnessed in the electronic media. The professional institutes in Sri Lanka rallied round to provide their services in an honorary capacity. Doctors and medical students volunteered to run makeshift health camps. The Institute of Architects and the Institute of Engineers declared that their members would provide the necessary services at no cost to help in the development of social, physical and environmental infrastructure facilities.

Natural disasters before 26 December 2004

Sri Lanka has had its share of natural disasters over the years. Limited to localised areas, they were the result of floods due to heavy monsoon rains, earth slips and landslides and occasional gale force winds caused by depressions and cyclonic effects in either the Bay of Bengal or the Arabian Sea. Sri Lanka is not located in the accepted seismic region and hence the affects of earthquakes or tsunamis are unknown to the people. The word ›tsunami‹ was not in the vocabulary of the majority of Sri Lankans until disaster struck on that fateful day.

The great historical chronicle »Mahavamsa« describes the history of Sri Lanka from the 5th c. B. C. This chronicle reports an incident in the 2nd c. B. C. when »the sea-gods made the sea overflow the land« in the early kingdom of Kelaniya, north of Colombo. It is to be noted that, by accident or otherwise, after this incident the western coast of Sri Lanka was not popular up to around the 12th c. when Colombo developed as a transshipment port to link the west to the east for trading purposes.

The records show that there have been many tsunamis in the Indian Ocean over the years. But none of them has had any significant effect on Sri Lanka. The 1883 and the 1941 tsunamis affected Sri Lanka but the highest waves were not more than one metre. There appear to have been no casualties in 1883 and only one in 1941, in Arugam Bay on the eastern coast.

The Tsunami on 26 December and its effects in Sri Lanka

The tsunami on 26 December was brought on by a massive undersea earthquake off the coast of Sumatra in the Republic of Indonesia, which was of a magnitude of 9. 3 on the Richter scale and was caused by tectonic activity resulting in the sudden faulting of a part of the contact zone between the Indian and Burma Plates. Although the epicentre of the quake was described as just off the northern coast of Sumatra, it was a rupture along a 1200 km fault line, in which a section of the Indian Plate slipped around 15 m below the Burma Plate at a depth of between 1 km and 5 km below the surface of the sea, that caused most of the damage. The origins of the quake are thought to be at a depth of 30 km below the seabed. The tsunami waves that resulted from this seismic activity affected not just the eastern part of the Indian Ocean but several other countries spreading beyond the Arabian Sea. The

countries affected include (in alphabetical order) Bangladesh, India, Indonesia, Kenya, Malaysia, Madagascar, Maldives, Myanmar, Seychelles, Somalia, South Africa, Sri Lanka, Tanzania and Thailand. Seismic activity and in particular sea waves of this nature are not as frequent in the Indian Ocean as they are in the Pacific. Therefore, the unfortunate aspect of this disaster was that it was not anticipated even though the local experts were not unaware of such possibilities.

The tsunami of 26 December was a series of waves that struck the maritime provinces of Sri Lanka less than two hours after the main earthquake. The first wave struck Kalmunai in the Ampara District on the east coast at around 8:17 a. m. and continued around the coastal belt to reach Negambo on the north-western coast about 45 minutes to one hour later. Eye witness accounts from various locations suggest that there were three (in some areas four) main waves with at least two »troughs« in which the water level receded a considerable distance from the normal coastline. The waves at their maximum appear to have reached a height of eight metres, though in most cases it was much less. As one would expect, the impact of waves differed from place to place, and sometimes within the same locality. The topography of the seabed, the coastal morphology, reefs, sand dunes, lagoons, mangroves, beech vegetation and other aspects of the natural landscape as well as the built environment had a bearing on the behaviour of the waves. It is regretted that no detailed technical study on this aspect has been carried out.

Since the 16th c. and occupation by the maritime powers, the Portuguese, the Dutch and the British, there has been extensive development in the coastal belt of Sri Lanka. This development was enhanced over the last four decades with increased infrastructure development to accommodate tourism and fishing industries. The tsunami took place on the day after Christmas, which was also a Buddhist holiday, being the full moon day. This was also the middle of the peak tourist season. All these factors contributed to a very crowded coastal zone with many leisure seekers and people visiting their families. Thus, those affected included the locals as well as foreign visitors to the country. On the other hand since it was the holiday season for schools and offices many others had kept away from the area. Probably the school holidays saved a future generation of Sri Lankans since in the aftermath many school buildings in the coastal belt have had to be rebuilt. Thus the affected people did not come from a particular catchment area but perhaps from the whole of Sri Lanka and from many other parts of the world.

The Census and Statistics Department of the Sri Lanka Government with assistance from numerous other agencies carried out surveys of the damage to the urban, rural and other coastal settlements in the affected areas. But it has been revealed that the survey is not complete or comprehensive enough to assess the full impact on the lives of the communities in the affected areas. This survey included the damage to infrastructure, shops and other commercial enterprises, employment opportunities, the hospitality trade and more important the human lives and the social fabric of the communities. The final report on the casualty list read: 26,807 killed, 4,114 missing and 23,189 injured. 5,785 children lost one or both parents. 579,000 people were displaced and the livelihoods of more than that number were lost. 62,533 houses were fully damaged whilst 43,867 were partially affected. In addition to the loss of many libraries, much archival material, »ola« leaf manuscripts and immovable cultural objects were lost from the affected religious institutions, particularly from ancient Buddhist temples. Over 150,000 vehicles were completely destroyed or seriously damaged. 259 square kilometres of rice fields were destroyed. In addition extensive salination of lands had rendered them useless to an essentially agrarian community. A large number of vehicles and machinery related to agriculture were destroyed. Many canals and drains were blocked with rubbish and debris. Underground water sources such as shallow wells (a common feature in the rural areas) were salinated. Physically this affected many cultural landscapes in the area. Total financial damage to the country has been estimated at US$1,000 million and the forecasted drop in the GDP is 0. 70 (adjusted from 6. 0 to 5. 35%).

Affects on cultural property

With just over 450 years of rule by the maritime powers, this coastal belt included some of the most densely populated areas of the country with many natural and human affected ecosystems as well as a complex and rich cultural landscape. These included some of the oldest religious buildings still in use, of Buddhist, Hindu, Christian and Moslem origin, as well as a range of secular buildings such as civic buildings, commercial structures, private dwellings, markets, port-related buildings, lighthouses, clock towers, school buildings, libraries, etc. They depicted a blend of architectural styles ranging from the local vernacular to the fusion of such vernacular architecture with the influences of the Portuguese, Dutch and British styles. In addition there were examples of the dual heritage where the styles of the maritime powers were duplicated in Sri Lanka, but using local building philosophy, materials and methodology, adapted to suit the local climatic and geographical conditions. There was also a unique urban form intermixed with various defence bastions from the past. This was the heritage that was cherished by the local community and admired by visitors.

To assess the heritage of this area, it must first be acknowledged that cultural heritage is a fundamental human right. It should be recognised irrespective of its

Fig. 1 The roof of the 18th c. market in the Old City of Galle caved in during the tsunami on 26 December 2004

Fig. 2 Remains of the Galle Maritime Archaeology Laboratory after the tsunami

Fig. 3 A historic house that escaped major damage at Hikkaduwa on the southern coast

Fig. 4 Damage to rampart wall near Akersloot Bastion in Galle Fort

Fig. 5 Damage to rampart wall near Akersloot Bastion in Galle Fort

Fig. 6 Sea water in Leyden Bastian Road inside Galle Fort on 26 December 2004

ownership because cultural heritage belongs to all people, whether local or foreign. Thus it becomes the bounden duty of those who come to help this traumatised community, whether they are from the state sector or the non-governmental organisations, to respect and help preserve the cultural background of the community and appreciate their cultural values. In this respect, the word »culture« should be looked at as comprehensively as possible. The definition given in the Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict is very apt under the circumstances. It describes the term »cultural property« as

»a. movable and immovable property of great importance to the cultural heritage of every people, such as monuments of architecture, art or history, whether religious or secular; archaeological sites; groups of buildings which, as a whole, are of historical or artistic interest; works of art; manuscripts, books and other objects of artistic, historical or archaeological interest; as well as scientific collections and important collections of books or archives or reproductions of the property defined above;

b. buildings whose main and effective purpose is to preserve or exhibit the movable cultural property defined in subparagraph (a) such as museums, large libraries and depositories of archives, and refuges intended to shelter, in the event of armed conflict, the movable cultural property defined in subparagraph (a);

c. centres containing a large amount of cultural property as defined in subparagraphs (a) and (b), to be known as »centres containing monuments.«[1]

These landmark cultural properties gave a sense of identity to the locality and a sense of pride to the local community. In some areas, even though large numbers of the host community perished in the tsunami the monuments survived, whereas in other places the monuments, too, succumbed to the inevitable. In cases where the monuments survived, the damage could be classified as ranging from »slightly damaged« to »damaged beyond repair.« Ownership of these properties varied and included different religious institutions, the government, commercial establishments and private individuals. Thus there were many hurdles to clear before access could be obtained to assess damage to such properties. In addition, the ongoing conflict in the north and east of the country did not provide a climate for any party to gain access to such sites.

Another issue is the legal protection that can be given to these properties. The country boasts several planning tools for such purposes and different state agencies that can implement different pieces of legislation. However, not all buildings, sites and monuments are listed by these agencies. The Department of Archaeology, which implements the Antiquities Ordinance, will only list those sites and monuments that are over 100 years old. Most of the structures that are listed under this ordinance are either state-owned buildings, religious monuments or archaeological sites. Thus the list can never be complete; however, once a building gets on the register, the protection granted it is noteworthy. The ordinance covers not only the monument but a buffer zone of 400 yards (365 m) around it.

In addition, other legislation such as the Urban Development Act (administered by the Urban Development Authority, with delegated powers to local authorities) and the Housing and Town Improvement Ordnance (administered by the National Physical Planning Department) covers historic buildings and natural sites. Since there is no system of granting financial benefits or tax incentives for the maintenance or sustenance of listed buildings in Sri Lanka there is a general reluctance on the part of private owners to get their properties listed under such regulations. In addition, heavy politicising of the state machinery has caused the stringent laws to be bent for the politically powerful. A good example of this political interference in heritage sites is the Galle International Cricket Stadium which lies within the buffer zone of the Dutch Fort in Galle in the south (a World Heritage Site) and was destroyed by the tsunami (fig. 1–6). Even before the tsunami in 2004, cricket officials were planning to develop massive pavilions covering two-thirds of the ground, an alien structure, thereby covering the view of the majestic ramparts of the fort. These pavilions have now been built and were opened by the highest in the land, making a mockery of the entire conservation policy for the historic buildings. This development was quite contrary to the post-tsunami redevelopment plans that were prepared.

Role of state agencies

After the tsunami, there was an unprecedented offer of aid and grants from other countries to develop the devastated areas. This meant that development plans had to be prepared and projects identified for the foreign donors in order to accept their funding. Even though the professional institutes representing architects and engineers had volunteered the services of their members towards this effort, the state sector bureaucrats and technocrats were confident that they could handle this mammoth task on their own. Some politicians used the offer of the others and handpicked individuals to work with government professionals in the preparation of development plans. In the meantime, there were many non-governmental agencies,

1 Convention for the Protection of Cultural Property in the Event of Armed Conflict, Hague, 14 May 1954, Article 1, Definition of cultural property.

both foreign and local, that pledged their willingness to construct houses, schools, hospitals and other social infrastructure facilities. By this time, the authorities had made a decision to have a buffer zone of 100 m from the coast before any development work could be permitted. This brought about undue pressure on the authorities to find suitable land for redevelopment work.

With the government priority being to provide satisfactory housing, infrastructure facilities and employment opportunities to displaced people, preserving and conserving cultural property was not a priority. The Ministry of Culture and National Heritage, under whose purview was the Department of Archaeology, and the Central Cultural Fund were looking towards the conservation of the properties that were listed under the Antiquities Ordinance. The planners in the government could not treat any cultural property as a priority. Even the foreign donors and organisations were clamouring to conserve the World Heritage site in Galle but not any other affected site in the coastal belt. It was a significant eye-opener that no authority or donor realised the importance of the less popular cultural properties affected by the tsunami. They did not even realise the importance of these sites as landmarks for the affected local communities when they eventually returned to their neighbourhoods. It is a well-known human instinct that when traumatised, people look to traditional landmarks to identify themselves with their surroundings and find solace in them. It was important that facilities had to be provided for their physical as well as mental well-being. The cultural properties in the neighbourhood had an important role to play in this endeavour.

Those in the planning fraternity were open-minded in their appreciation of the role cultural properties could play in the minds of the returning victims of the tsunami. They showed willingness to list, accept and promote conservation of any site or building of architectural quality and of cultural importance. Moreover, urban conservation became an integral part of the designs for reconstruction of tsunami-affected townships as a result of much canvassing by ICOMOS Sri Lanka. This was an important decision made from a socio-cultural point of view and augurs well in the preparation of development plans for the future.

Role of ICOMOS Sri Lanka

The limitations of the state sector in funding and other logistics were obvious. Hence, ICOMOS Sri Lanka, though a small group, got activated soon after the tsunami disaster. Most members had seen the devastation within twenty-four hours after the event. There were a few others who had firsthand experience since they were in the area when the tsunami waves came inland. Thus the Sri Lanka National Committee decided to at least carry out a survey of the cultural properties, knowing that no other party would be able to undertake such a study.

Since it was imperative that planners be involved in preparing development proposals for the affected areas, ICOMOS Sri Lanka issued a public statement within one week of the incident appealing to officials to recognise cultural properties and save them from destruction (see the end of this article for the full statement). This had the desired effect when the Sri Lanka government agreed to allow cultural sites and monuments, along with hotels and structures related to the fishing industry, to be permitted within the newly declared buffer zone from the coast line. ICOMOS Sri Lanka had to seek government intervention again because cultural sites also required the proper setting for their survival.

ICOMOS Sri Lanka next undertook the arduous task of carrying out a survey of the cultural properties affected by the tsunami. To be meaningful the survey had to be carried out as fast as possible and passed on to the planners to incorporate in the development proposals. The challenging tasks were to carry out this survey with the numbers available within the National Committee of ICOMOS Sri Lanka and to gain access to the conflict areas in the north and east of Sri Lanka.

It was decided to muster the support of the local universities in the survey under the supervision of ICOMOS members and appointed university staff members so that all the affected maritime provinces could be covered in the shortest time possible. In addition, there was the advantage of capacity-building amongst the students in regard to appreciation of the local cultural heritage. They had to work according to pre-determined guidelines set by ICOMOS Sri Lanka.

Because of the prospect of capacity-building on the part of the university students, the University Grants Commission provided the funding for the input from the various universities. This was obviously not a comprehensive survey but gave enough details to wet the appetite of the planners and others to consider the long-term effects of allowing these sites to be demolished. The survey was completed in six weeks and the results were edited and submitted to the printers within the next four weeks. Proof copies were submitted to the planners to use in their development plans. Using a grant given by the National Committee of ICOMOS USA, soft copies of the study reports were prepared in the form of a CD. The publication was to be funded by the National Physical Planning Department using the state-owned printing corporation, but it is regretted that to date this has not materialised. However, it was encouraging to note that the National Physical Planning Department agreed to incorporate these sites as listed monuments in the preparation of regional structure plans. There were many other positives that were derived from this survey.

Many ICOMOS members were co-opted to serve in planning teams preparing post-tsunami redevelopment plans. Some of the areas that benefited from this were the Eastern Province and Galle and Matara in the south.

Both Jaffna University (in the Northern Province) and Eastern University requested that workshops be conducted to expose their students to care for the cultural property in their midst. This was quite satisfying since theses universities are located in the conflict areas and their students had not been exposed to the awareness campaigns conducted elsewhere.

Having heard of the tsunami disaster and the activities of ICOMOS Sri Lanka, Tsukuba University of Japan extended a hand of friendship to join with the Sri Lankans in a detailed study of tsunami effects on historic buildings in a selected area. The universities of Moratuwa and Ruhuna participated in this exercise from Sri Lanka. In addition to the students and university lecturers from both countries, other professionals also took part in this project. At the conclusion of this study, the detailed findings were discussed at a workshop titled »Disaster Mitigation of Cultural Property« in Colombo attended by architects, engineers, planners, scientists and others interested in the subject. It was an interesting study because the Japanese delegation included experts who had been involved not only in the tsunami activities in Japan in 1993 but also the Kobe earthquake disaster in 1994.

In 2005 ICOMOS Sri Lanka was awarded funding from the US President's Fund for Culture. These funds were used to carry out a detailed study of 40 buildings in the historic Dutch Fort in Matara, south of Galle, which was affected by the tsunami. Again, university students were employed to carry out the work under the guidance of lecturers as well as ICOMOS members. At the end of the project, copies of the measured drawings of the houses were presented to the owners with the promise that ICOMOS will assist them in conservation when the funds are made available. The guidelines to urban development in these historic areas were incorporated in the Matara redevelopment plan. The Urban Development Authority was handed a set of »Special Regulations Applicable to New Developments, Alterations, Refurbishment of Buildings and Conservation of Monuments and Sites in the Conservation Areas in Matara.« These regulations were included in the Post-Tsunami Greater Matara Redevelopment Plan.

There were many negative affects, too, in the post-tsunami development process. In some areas, the development process tended to be heavily politicised. For some, the priorities seemed to be anything but helping the affected. Some international non-governmental organisations had a different agenda in helping the tsunami victims. The surveys have revealed that in some cases only about 40% of the promised funding was spent for the actual cause.

Some cultural properties suffered extensively because of hasty decisions made by politicians, bureaucrats and even the non-governmental organisations. In some cases, because the bureaucrats and technocrats of the state sector could not prepare the project reports in time, the funding that had been pledged did not come to Sri Lanka. The initial decision on the extension of the buffer zone from the coast line had adverse affects on the development process there by causing haphazard renovation of some of the cultural properties.

ICOMOS Sri Lanka continued its efforts to raise funds to conserve some of the identified buildings. The Matara Redevelopment Committee invited ICOMOS Sri Lanka to set up a regular advisory/counselling service within its own working committee. Since most of the damaged buildings are in private ownership, there is a difficulty in raising funds for conservation. Within a year of the tsunami, ICOMOS members initiated the founding of a National Trust along the lines of the British, Australian and Indian Trusts to help raise funds towards the protection of cultural and natural heritage in Sri Lanka. At the moment it is awaiting government recognition to function as a non-governmental institution. It is intended that the Sri Lanka National Trust will seek to gain membership to the newly formed International National Trust Organisation.

Of the seven World Heritage sites in Sri Lanka only the seventeenth century Dutch Fort was affected by the tsunami. From the messages that ICOMOS Sri Lanka and others received, there was much concern for the well-being of the site from both local and foreign interest groups, including many ICOMOS National Committees, members and the Secretariat. Even though at a first glance there was not much damage to the fortifications except for the breach of a short length of the rampart, a closer inspection revealed serious concerns regarding the stability of the foundation. In addition, the Marine Archaeology Laboratory located in one of the piers of the ancient harbour just south of the fort was totally destroyed and the important artefacts in the laboratory were reclaimed by the sea. ICOMOS Sri Lanka had prepared a project report for the conservation and pointing of the rampart walls in 2000. This was postponed by the government because of a lack of funds. After the tsunami the government started work on this project with funding from the Netherlands Government. It is hoped that the work will be suitably monitored in order to avoid »reconstruction« that is dubbed conservation, as has been done in the past collectively by both the host and donor country.

In 2001 ICOMOS Sri Lanka had prepared a conservation and development plan for Galle Fort and its buffer zone, which was accepted and approved by both the Urban Development Authority and the Department of Archaeology. But they were both slow in the implementation. As a result, there was much acceleration in the gentrification of the properties in the fort before the tsunami. This plan was adopted in the post-tsunami redevelopment plan for Galle.

The need to conserve the historic buildings and groups of buildings was identified, and the proposals that were submitted included urban designs for such historic areas. It is hoped that at least this time the proposals, including the special regulations, will be implemented.

A delegation from the World Heritage Centre visited Sri Lanka in March 2005 to assess the damage to cultural property due to the tsunami. Even though they were aware that ICOMOS Sri Lanka was carrying out a survey, because the National Committee had informed them through government sources of its willingness to make a presentation of the preliminary findings, the visiting mission made no attempt to find out the status of the survey. This was an opportunity lost to both Sri Lanka and UNESCO through the World Heritage Centre. This action also made a mockery of the understanding that UNESCO and the World Heritage Centre have identified ICOMOS and its National Committees as important sources for technical advice.

Non-recognition of ICOMOS Sri Lanka activities by the UNESCO World Heritage Centre was amply compensated by the ICOMOS world family, which rallied round Sri Lanka in its hour of need with help, advice and words of encouragement for the post-tsunami activities. ICOMOS Sri Lanka is grateful to its colleagues for the encouragement given.

Conclusion

It is always difficult for a developing country like Sri Lanka, which is immensely rich in its cultural property but poor in funding resources, to obtain that happy compromise to save its dying heritage. Moreover, when there is a shortage of funding, prioritising sites for conservation is extremely difficult. Some would describe the cry for conservation as an act of extreme romanticism whilst others would try to provide the bare minimum to sell in the tourism market. There are also others who would redevelop sites with pseudo-architectural replicas to sell as »boutique hotels.« The role of the conservator in Sri Lanka is challenging, but we are fortunate in the dedicated membership of ICOMOS Sri Lanka. It was also gratifying to note that the members readily agreed to venture into capacity-building during the post-tsunami activities with an eye toward future conservators. We are also looking at ways and means of finding resources and new management skills for the maintenance of our cultural property. In this sphere, we stand to be educated and helped.

The settlements that were affected by the tsunami, whether cities, towns, or villages, depict human forms of progress from a very critical era. Their continuity is a healthy dynamic tradition. In this respect, the retention of the architecture of the past was an important and invaluable source of knowledge for the affected communities. It was not merely admiring the »beautiful« but rather a recognition and appreciation of the way of life and values of the previous generations as reflected in the built environment of the communities of the area. This was the architecture developed over centuries in response to the local economic, environmental, social, political and climatic conditions. This was the cry ICOMOS Sri Lanka took up to save this heritage in the aftermath of the tsunami. Only time will tell how successful we have been.

Our optimism at this juncture was based on the words of an unknown poet,

"... There is a new start to every doom
After every summer comes the monsoon
For every hard work, there is a benediction
There is comfort after every affliction
There is laughter after every sob

Reconstruction, Conservation and the Preservation of Memory

(Appeal by ICOMOS Sri Lanka to planning officials shortly after the tsunami)

Three days after the great tsunami disaster of 26 December the Sri Lanka National Committee of ICOMOS (the International Council on Monuments and Sites) met and issued a statement which mourned the death of thousands of fellow Sri Lankans and peoples of neighbouring countries as well as visitors from far off lands. ICOMOS SL commiserated with the hundreds of thousands who were bereaved, displaced, whose lives have been disrupted and homes and work places destroyed. Although in various ways ICOMOS SL members in their individual capacities were involved in assisting the bereaved and the dislocated, and discussed how to systematize or concentrate efforts, the meeting mainly focussed on the little discussed socio-psychological and socio-cultural dimensions of the situation.

The human scale of this disaster was one of unprecedented magnitude. Within minutes, hundreds of thousands were killed, injured or displaced, lives disrupted, homes and work places destroyed. Clearly the pressing need of the hour was the burial of the dead, the search for the missing, the consolation of the bereaved and continuing and intensified assistance to all those who have been made homeless or otherwise adversely affected by the tragedy. But it was also necessary to look to the future—to the aftermath of the tragedy, the continuing effects of it on the lives of millions, where people and local communities have to rebuild their lives, restore their living and working environments and undertake the million tasks of reconstruction.

Yes, hope is still to be found
It's lurking out there, just look around

Every imagination spells optimism
For every fantasy, there is realism
For every banal, there is escapism
Every dark cloud has a silver lining
After winter comes the spring
Every dream has a meaning
Yes, hope is still to be found
It's lurking out there, just look around…«

Human tragedy and physical environment

There are, first of all, the human costs of the tragedy which need to be confronted: death and bereavement, the nightmare of the missing, trauma, injury, the possibility of disease, the longer term effects on individual health, the emerging economic consequences on occupations, employment, loss of property, living conditions …the list is long and endless. And there is not only the rebuilding of lives but also the reconstruction of the physical environment.

It is this latter task which the planning sector of government has already begun to think about. ICOMOS SL draws attention to the deepest implications of this work. As the forward planning for reconstruction begins, it is also vital that the preservationist dimension is built into the national vision that is being formulated and the national tasks that are envisaged.

- It is important therefore that the preservation or restoration of heritage buildings and other cultural monuments, environments and landscapes are incorporated as an important aspect of the rebuilding plans.
- From an economic point of view, conserving and restoring an old building or buildings is often more cost effective than tearing it down and building anew, however much clearing and new construction may seem to be the easier option—although exercising that option would need a conservationist perspective, skills and experience.
- In catastrophes of this nature, there is an important socio-psychological and socio-cultural need for local communities and individuals to see and feel that the familiar environments with which they identify are not totally wiped out.
- Conservation and restoration is a very special contribution towards preserving and carrying the memory of the past into the rebuilding of the future.
- »Maintaining the familiar« is one of the most valuable components of the entire restorative process, helping to »keep one's moorings,« to retain identity, to engender and strengthen a psychology of survival and recovery in the face of great destruction.
- In another sense, a country's coastline is part of its fundamental memory—the palaeoclimatic and archaeological remains found here are a vital and subtle source of information about its relations with the world beyond its shores in geological and historical time.
- Preserving, conserving and restoring the remains that have survived this disaster is a fitting monument to those affected by the tragedy.

Coast conservation and damage assessment

No doubt in some instances entire urban centres and rural and suburban settlements have been entirely wiped out, but in others enough is left for conservation or restoration. It is precisely for this reason that it is important that a program should begin at once to assess the damage and plan the protection and preservation of heritage buildings and environments as an integral part of the reconstruction master plan. In order to do this the University Departments of Archaeology, Architecture, and Historical and Cultural Studies are being invited by ICOMOS SL to establish small teams to undertake a rapid survey program of the coastal region. The survey will be based on the Protected Sites and Monuments scheduled under the Antiquities Ordinance and also the Report on the Inventory of Places of Religious and Cultural Significance and Areas of Scenic and Recreational Value within the Coastal Zone of Sri Lanka (P. L. Prematilleke, 1989) published by the Coast Conservation Department (1989). The preliminary situation survey is positioned to commence in the second week of January and will be completed before the end of the month.

ICOMOS, Sri Lanka

Michael S. Falser

Rebuilding New Orleans after Hurricane Katrina—Thoughts on the Role of Civil Society in the Context of Natural and Cultural Disasters

Der Wiederaufbau von New Orleans nach Hurricane Katrina – Gedanken zum Status der Zivilgesellschaft im Kontext von Natur- und Kulturkatastrophen

> For our future to be strong, all of our communities must be strong. It says in the Bible that where there is injustice in the world, the poorest people, those with the least power, are injured the most. That was certainly true for the people of Hurricane Katrina. Hurricane Katrina was a natural disaster compounded by man-made disaster. It is now 18 months past time to get our response right.[1]
>
> House Speaker Nancy Pelosi (D-California) at the National Press Club, January 2007

The following article concerns the social implications of natural and cultural disasters, using the example of New Orleans in Louisiana (USA) after the flood disaster caused by Hurricane Katrina in 2005. The focus is less on historic preservation in a »cultural-elite« sense but rather on the increasingly important role of a civil society that is directly affected and/or feels itself responsible in the context of reconstructing built, cultural and social structures in the aftermath of natural disasters.

> *For our future to be strong, all of our communities must be strong. It says in the Bible that where there is injustice in the world, the poorest people, those with the least power, are injured the most. That was certainly true for the people of Hurricane Katrina. Hurricane Katrina was a natural disaster compounded by man-made disaster. It is now 18 months past time to get our response right.[1]*
>
> *House Speaker Nancy Pelosi (D-Calif.) am National Press Club, Januar 2007*

Der folgende Beitrag hat die gesellschaftlichen und sozialen Implikationen von Natur- und Kulturkatastrophen im Blick. Am Beispiel von New Orleans (Louisiana, USA) nach der Flutkatastrophe durch Hurricane Katrina 2005 geht es hier weniger um Denkmalpflege im ›kulturelitär‹ verorteten Sinne, sondern um die zunehmend wichtige Rolle einer direkt betroffenen und/oder sich verantwortlich fühlenden Zivilgesellschaft im Kontext des Wiederaufbaus bebauter, kultureller wie sozialer Lebensräume nach Naturkatastrophen.

The natural disaster as a political and social disaster: New Orleans, Hurricane Katrina and the consequences

> A tattered social contract [...] New Orleans was broken before the storm. It was a dysfunctional city. The economy was dismal, environmental systems were a mess, social divisions were acute, and as we now know, the infrastructure was in terrible repair.

1 Quoted in: »A new agenda for the Gulf Coast. What Congress can do now to confront the ongoing crisis of Hurricane Katrina.« A special report by Gulf Coast Reconstruction Watch. A Project of the Institute for Southern Studies. Durham, NC, February 2007, p. 2. Under: http://www.southernstudies.org/NewAgendaGulf.pdf (accessed 6/2007).

Die Naturkatastrophe als politisches und soziales Disaster: New Orleans, Hurricane Katrina und die Folgen

> *A tattered social contract [...] New Orleans was broken before the strom. It was a dysfunctional city. The economy was dismal, environmental systems were a mess, social divisions were acute, and as we now know, the infrastructure was in terrible repair. Today*

1 Zitiert in: A new agenda for the Gulf Coast. What Congress can do now to confront the ongoing crisis of Hurricane Katrina. A special report by Gulf Coast Reconstruction Watch. A Project of the Institute for Southern Studies. Durham, NC, February 2007, S. 2. Unter: http://www.southernstudies.org/NewAgendaGulf.pdf (Zugriff 6.2007).

> Today the social contract is so weakened that a majority of low-income people in New Orleans, it is reported, believe the levees were deliberately opened in order to drive them out of the city.[2]

Katrina was a Category 4 and 5 hurricane (winds of up to 280 km/h) that formed over the Bahamas and hit the southeastern parts of the USA (in particular Florida, Alabama, Mississippi and Louisiana with New Orleans) in late August 2005, precipitating one of the most devastating natural and cultural catastrophes in the history of the United States. In a radius of up to 150 kilometers from the storm center Katrina and its after-effects killed almost 2000 people, left more than 500,000 homeless, devastated about 260,000 square kilometers of land (approximately the size of Italy), and caused more than $250 billion worth of damage in the states of Louisiana and Mississippi alone. According to FEMA (the Federal Emergency Management Agency) Katrina damaged more than 200,000 houses in New Orleans. This city, located between brackish Lake Pontchartrain and the Mississippi River, is itself below sea level; following the flood surge, heavy rainfall and multiple breaching of peripheral levees as well as almost all of the levees in the inner city, 80 percent of the urban area was under as much as eight meters of water. Because they were closer to the levees and lower-lying, the neighborhoods of the poorer black population were particularly badly affected[3] (fig. 1–3). Thanks to their higher elevation the so-called French Quarter and the Garden District, the two best-known historic districts with their multi-story French-Spanish colonial architecture, remained relatively undamaged, whereas other historic neighborhoods such as the Ninth Ward, Midtown and Treme with their large stock of one-story wood frame houses from the 19th and 20th centuries (above all the so-called shotgun houses) were badly destroyed. Thus a large proportion of the total of c. 37,000 buildings within the protected historic districts in Louisiana that are listed on the National Register (the federal list of historic buildings and districts) was adversely affected. In order to do damage assessments (among other tasks) for the historic buildings of New Orleans, a so-called Heritage Emergency National Task Force was assembled from a coalition of 40 non-profit professional and state organizations and institutions including FEMA, the AIA (American Institute of Architects), the National Trust for Historic Preservation, the (American) World Monument Fund and the National Park Service (which includes the

2 Robert Campbell: Critique: A few questions to ponder in the wake of a hurricane, in: Architectural Record, 2005/11, pp. 57–59, here p. 58.

3 According to the US Census Bureau (2000) New Orleans Parish was the seventh poorest county and New Orleans itself the second poorest city in the United States with c. 25,000 families below the poverty level (c. 131,000 people). Statistics indicate that African Americans make up 67 percent of the city's population, and 84 percent of them live below the poverty level.

> *the social contract is so weakened that a majority of low-income people in New Orleans, it is reported, believe the levees were deliberately opened in order to drive them out of the city.[2]*

Katrina war ein Hurrikan der Stärke 4 und 5 (bis zu 280 km/h), der ausgehend von den Bahamas Ende August 2005 in den südöstlichen Teilen der USA (besonders Florida, Louisiana mit New Orleans, Mississippi und Alabama) eine der verheerendsten Natur- und Kulturkatastrophen in der Geschichte der USA auslöste. In einem Radius von bis zu 150 Kilometern abseits des zentralen Sturmverlaufs töteten Katrina und seine Folgen fast 2.000 Menschen, ließen mehr als 500 .000 Menschen ohne Obdach, verwüsteten etwa 260.000 Quadratkilometer Land (ungefähr die Größe von Italien) und verursachten allein für die Staaten Louisiana und Mississippi mehr als 250 Milliarden US Dollar Sachschaden. Laut FEMA (Federal Emergency Management Agency) beschädigte Katrina alleine in New Orleans mehr als 200.000 Häuser. Da sich diese Stadt selbst zwischen dem Brackwassersee Lake Pontchartrain und dem Mississippi sowie unterhalb des Wasserspiegels befindet, standen nach der Flutwelle, den starken Regenfällen, den mehrfachen Brüchen der peripheren und fast aller innerstädtischen Dämme 80 Prozent des Stadtgebietes und besonders die dammnäheren, niedriger liegenden Wohnareale der ärmeren, schwarzen Wohnbevölkerung[3], bis zu acht Meter tief unter Wasser (Abb. 1–3). Das so genannte French Quarter und der Garden District, beide die bekanntesten Altstadtviertel mit mehrstöckig französisch-spanischer Kolonialarchitektur, blieben dank ihrer höheren Lage in der Stadt relativ unversehrt, während andere historische Gemeinden wie der 9th Ward, Midtown oder Treme mit ihrem großen Bestand einstöckiger Holzrahmen-Häuser des 19. und 20. Jahrhunderts (vor allem die so genannten Shotgun Houses) stark zerstört wurden. Damit wurde auch ein großer Teil der insgesamt circa 37.000 Gebäude in denkmalgeschützten Vierteln aus dem Louisiana National Register, der amerikanischen Denkmalliste in Louisiana, beeinträchtigt. Alleine für die historischen Gebäude der Stadt wurde die so genannte Heritage Emergency National Task Force unter anderem zu damage assessements (Schadenserhebung) aus einer Koalition von 40 allgemeinnützigen, professionellen und staatlichen Organisationen beziehungsweise Institutionen gruppiert, darunter FEMA, AIA (American Institute of Architects), der National Trust for Historic Preservation, der (amerikanische) World Monuments Fund und das National Park Service (die

2 *Robert Campbell: Critique: A few questions to ponder in the wake of a hurricane. Architectural Record (11. 2005), S. 57–59, hier S. 58.*

3 *Laut US Census Bureau (2000) war New Orleans der siebtärmste Landkreis und New Orleans selbst die zweitärmste Stadt der USA mit ca. 25.000 Familien unterhalb der Armutsgrenze (ca. 131.000 Menschen). Laut Statistik machen African Americans 67 Prozent der Stadtbevölkerung aus und diese leben zu 84 Prozent unter der Armutsgrenze.*

Fig. 1 New Orleans immediately after the flood in 2005

Abb. 1 New Orleans unmittelbar nach der Flutkatastrophe 2005

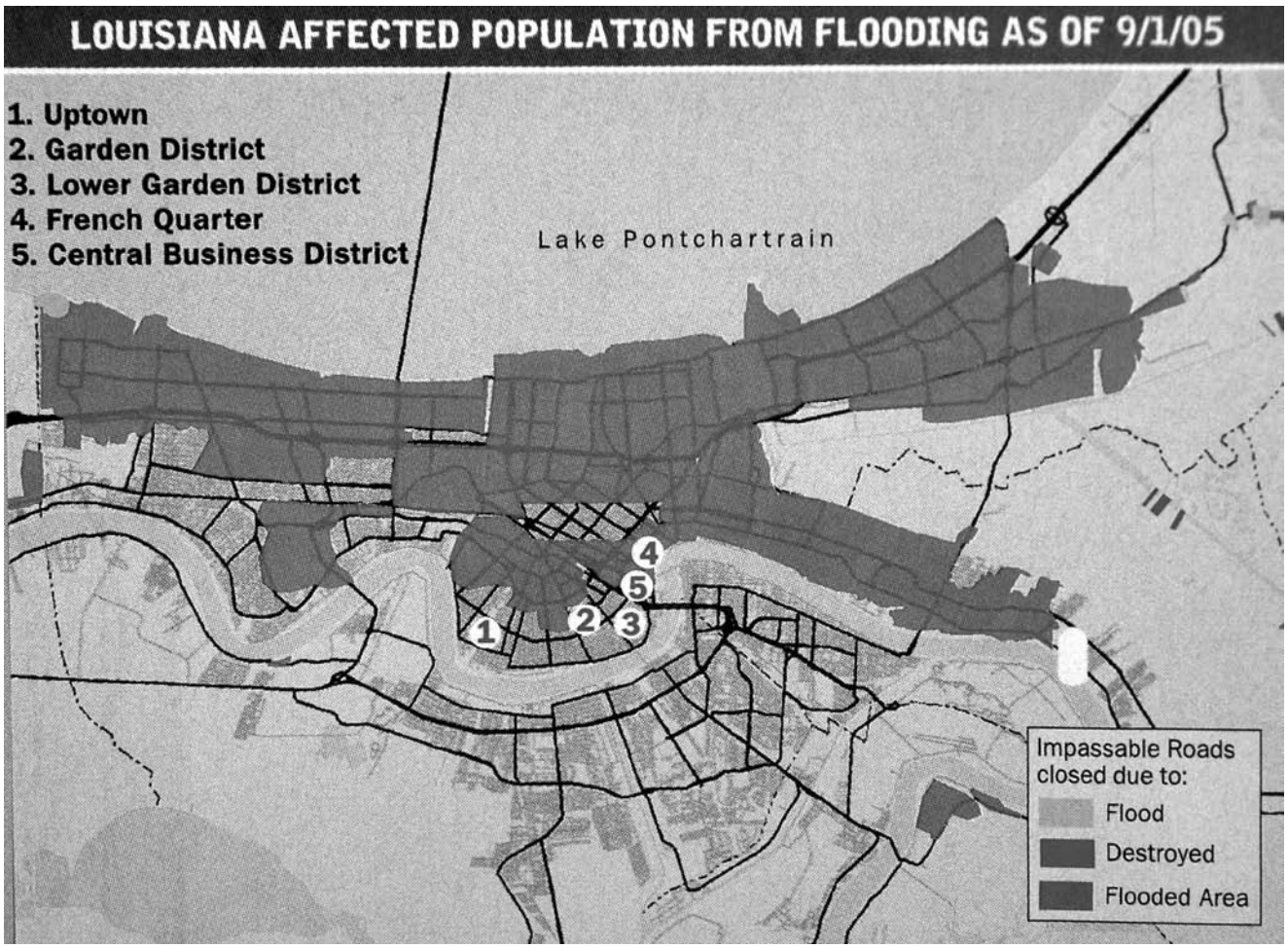


Fig. 2 Map depicting the flooded areas in New Orleans

Abb. 2 Eine Karte zur Darstellung der überfluteten Fläche von New Orleans

Fig. 3 The flooded city of New Orleans, with the Louisiana Superdome and the financial district in the background

Abb. 3 Die überflutete Stadt, im Hintergrund der Louisiana Superdome und das financial district

The Times-Picayune

No. 246 SUNDAY, SEPTEMBER 24, 2006

After Katrina, the Superdome stood as a symbol of all that went wrong a year ago.

Now it stands ready to serve as a symbol of rebirth.

BACK IN PLAY

The renovated Superdome is bathed in light ahead of Monday's Saints game. The Dome has been 'greatly improved, not just repaired,' said Doug Thornton, the regional vice president of the company that manages the building.

Fig. 4 Front page of The Times-Picayune newspaper (Back in Play!) announcing the reopening of the Louisiana Superdome on 9/24/2006—c. one year after the disaster

Abb. 4 Die Titelseite der Times-Picayune (Back in Play!) zum Wiedereröffnungsspiel der New Orleans Saints im Louisiana Superdome am 24. 9. 2006 – ein Jahr nach der Katastrophe

federal historic preservation office). A conference of all the State Historic Preservation Officers passed an emergency provision to enable owners of listed monuments to get fast loans and tax credits to rehabilitate their properties in a manner compatible with historic preservation standards. Compared to efforts to deal with the (still unresolved) housing emergency caused by the hurricane, the actions taken for heritage conservation were far more effective.

In addition to the badly maintained and inadequately designed levees, the fact that the local, regional and national evacuation and disaster warning alarm was given much too late by the accountable politicians is still considered responsible for the high number of deaths and for the overall disaster in general. The lateness of the alarm inhibited the panic-like escape of the local population shortly before the arrival of the hurricane, as people tried to flee in private or rented cars (resulting in traffic jams and gas shortages), via public transportation such as buses which had hardly been made available earlier (not to mention trains, which are almost all in private ownership in the US and have practically disappeared from public transportation in favor of 10-lane highways), or even on evacuation flights begun by the US Coast Guard. New Orleans mayor Ray Nagin ordered forced evacuation of his city only on August 28, merely 19 hours before the

amerikanischen Denkmalpflege-Behörde). Eine Konferenz aller landesweiten State Historic Preservation Officer (Denkmalschutzbeauftragten) erließ ein Notgesetz, nach dem Bewohner gelisteter Denkmäler Schnellkredite und tax credits für die denkmalgerechte Instandsetzung bekommen sollten. Der Einsatz zum Denkmalschutz war, gemessen an der bis heute nicht gelösten Behebung der entstandenen Wohnungsnot, bei weitem effektiver.

Bis heute wird neben den schlecht erhaltenen und zu schwach ausgebildeten Dämmen vor allem der damals viel zu spät lokal, regional und national ausgelöste Katastrophen- beziehungsweise Evakuierungsalarm der verantwortlichen Politiker für die hohe Anzahl an Toten und generell für die gesamte Katastrophe verantwortlich gemacht. Dieser machte kurz vor Eintreffen des Hurrikans ein panikartiges Entkommen der Lokalbevölkerung mit dem eigenen oder gemieteten Auto (Staus und Bezinmangel), mit den bis dahin kaum zur Verfügung gestellten öffentlichen Verkehrsmitteln (Busse, ganz zu schweigen von Zügen, deren Schienennetze in den USA fast alle privatisiert und damit dem öffentlichen Verkehr zugunsten zehnspuriger Autobahnen systematisch entzogen wurden) oder gar mit den angelaufenen Evakuierungsflügen der US Coast Guard unmöglich. Ray Nagin, der Bürgermeister von New Orleans, befahl die Zwangsräumung seiner Stadt sogar erst

Fig. 5 House in the Lower Ninth Ward in 2006, one year after the flood disaster (Back in Play?)

Abb. 5 Ein Lokalaugenschein 2006 im Lower 9th Ward, ein Jahr nach der Flutkatastrophe (Back in Play?)

Fig. 6 Renovation as Paradise Homes? Serial demolition of the old building stock in New Orleans

Abb. 6 Renovierung zu Paradise Homes? Serienweiser Abriss des Altbestands in New Orleans

disaster struck, and the shelters he made available for those unable to get out were inadequately equipped.[4] These included the Louisiana Superdome, the city football stadium, which was itself badly damaged but had to take in 26,000 evacuees (fig. 4); largely because of live media coverage all around the world the Superdome became the nightmare-like symbol of crass municipal and national political failure. Tens of thousands of refugees were scattered around the surrounding states and cities, and they are often still living in shocking conditions today, partly in trailers set up by FEMA. Tens of thousands of Katrina refugees still have not been able to return to New Orleans itself because the necessary infrastructure in the mostly financially and socially disadvantaged urban districts has not been made available or even promised. Houses that could indeed be rehabbed have been hastily written off since 2005, and their social relevance is threatened by private and state-supported developers with profit-oriented interests in demolition and new construction (fig. 5–7); the public housing projects are likewise endangered by hesitant rehabilitation on the part of the federal and city

am 28. August lediglich 19 Stunden vor der Katastrophe und stellte für die festsitzenden Bewohner wenig adäquat ausgestattete Zufluchtsstätten bereit.[4] Darunter befand sich auch der Louisiana Superdome, der als städtisches football stadium, selbst stark beschädigt, in der Folge 26.000 Flüchtlinge aufnehmen musste und nicht zuletzt durch die weltweite Live-Berichterstattung zum albtraumhaften »Wahrzeichen« des krassen stadt- und nationalpolitischen Versagens aufstieg (Abb. 4). Zehntausende Flüchtlinge wurden auf die umliegenden Staaten und Städte verteilt, sie leben bis heute oftmals noch in erschreckenden Verhältnissen, zum Teil in den bereitgestellten Wohnwagen (FEMA trailors). Nach New Orleans selbst können viele Zehntausende Katrina-Flüchtlinge bis heute nicht zurückkehren, da die notwendige Infrastruktur in den zumeist finanziell und sozial benachteiligten Stadtvierteln nicht bereitgestellt beziehungsweise in Aussicht gestellt wird. Die vorschnell abgeschriebenen, jedoch oftmals durchaus sanierbaren Wohnhäuser sind durch den gewinnorientierten Abriss- und Neubauwillen privater und staatlich unterstützter developer nach 2005 in ihrer sozialen Relevanz ebenso gefährdet (Abb. 5–7) wie die bisher von der Staats- und Stadtbauverwaltung nur zögerlich sanierten sozialen Wohnbauanlagen. Anfang 2007 wurde sogar der Abriss von vier, nachweisbar sanierbaren und sogar teilweise unter Denkmalschutz stehenden Housing Projects zugunsten von zukünftig herbei gewünschten, mehr ›mixed-income-orientierten‹ Wohnanlagen beschlossen, was auf breite

4 It is estimated that in this situation only c. 80 percent of the 1.3 million inhabitants of the New Orleans area could leave the city. The infrastructural parts of the evacuation plan were not coordinated with one another in any way, as exemplified by photos of hundreds of empty school buses sinking under the floor waters; they could have been used to help the population leave the city but were themselves not »evacuated« in time.

4 Es wurde geschätzt, dass damit nur ca. 80 Prozent der 1,3 Millionen Einwohner des Raumes New Orleans die Stadt verlassen konnten. In der Tat waren alle infrastrukturellen Teile des Evakuierungsplanes in keiner Weise aufeinander eingespielt worden. Beispiel dafür waren die Bilder der zu hunderten in den Fluten von New Orleans versinkenden, an sich einsatzbereiten, leeren Schulbusse, die für eine spätere Bereitstellung vor Ort vorher ebenfalls nicht »evaluiert« wurden.

Fig. 7 Aerial view of the Lower Ninth Ward after the flood waters receded (2005)

Abb. 7 Der Lower 9th Ward aus der Luftperspektive nach Absinken der Wassermassen (2005)

building authorities. In early 2007 a decision was made to demolish four housing projects, parts of which are even under historic preservation protection, although it could be demonstrated that they could be rehabbed; the demolition plan, which reflected the desire for more »mixed-income oriented« housing for the future, met with broad indignation.[5] Such actions help to spread suspicion in the US that local and national politics are making pitiless use of Hurricane Katrina in order to effectuate drastic cuts, planned long before the storm, in the social housing, education, transportation and security sectors.[6] Serious social problems, including a weak education system and a high rate of poverty and unemployment, dominated city politics already before the disaster. US-wide criticism of the deficient, reactive leadership structure gave rise to investigations in the US Congress immediately following the disaster. There was proof, for example, of long-standing state neglect of the modernization of the flood protection system.[7] Criticism was mixed with racist components (»George Bush doesn't care about black people«) and caused the (helplessly staged) dismissal of FEMA director Michael Brown. Numerous studies, including one by the National Science Foundation, document today that the flood disaster in New Orleans was not caused by the natural catastrophe of Hurricane Katrina itself but rather by an inefficiently equipped and neglected flood control system (in New Orleans conceived only for Category 3 storms). According to model studies by Louisiana State University, the so-called Mississippi River Gulf Outlet (MRGO), a 200-meter long canal that provides an artificially straightened, shortened shipping route between the city and the Gulf of Mexico, acted as a sort of funnel for the flood wave, which was then able to hit the city 200 percent faster with water that was c. 20 percent higher. An additional factor has been the systematic destruction of

Empörung stieß.[5] Damit macht sich in den USA bis heute die Vermutung breit, dass die lokale wie nationale Politik Hurricane Katrina erbarmungslos für die Umsetzung von schon lange vor Katrina geplanten, drastischen Einschnitten im Sozialbau-, Bildungs-, Transport- und Versicherungssektor instrumentalisiert.[6] Schon vor der Katastrophe dominierten erhebliche soziale Probleme die Stadtpolitik, darunter ein schwaches öffentliches Bildungssystem und eine hohe Armuts- und Arbeitslosenrate. US-weite Kritik an der fehlenden reaktiven Führungsstruktur bewirkte unmittelbar nach der Sturmkatastrophe Untersuchungen des US-Kongresses, belegte unter anderem die langjährig staatlich vernachlässigte Modernisierung des Hochwasserschutzsystems[7], vermischte sich mit rassistischen Komponenten (»George Bush doesn't care about black people«) und bewirkte die (hilflos inszenierte) Entlassung des FEMA-Direktors Michael Brown. Zahlreiche Studien wie der National Science Foundation belegen, dass die Flutkatastrophe von New Orleans nicht durch die Naturkatastrophe von Hurricane Katrina selbst, sondern durch ein nicht ausreichend ausgestattetes und vernachlässigtes Flutkontrollsystem (in New Orleans nur bis Sturmstärke 3 konzipiert) ausgelöst wurde. Nach Modellstudien der Louisiana State University stellte der so genannte Mississippi River Gulf Outlet (MRGO), ein 200 Meter breiter Kanal als künstlich begradigter, abkürzender Schiffsweg zwischen der Stadt und dem Golf von Mexiko, eine Art Trichter für die Flutwelle dar, die damit circa 20

5 The local government refuses even now to prepare the legally required alternative documentation on whether preservation would be possible for listed buildings that have been designated for demolition. Thanks for this information goes to Robert Tannen, city planner and local social activist. See also: Susan Saulny: 5000 Public Housing Units in New Orleans are to be Razed, in: New York Times (accessed on the internet 6/15/2006).

6 A cynical question has been making the rounds: »What politician will want the many poor, unemployed, elderly, in part supposedly criminal, black and non-taxpaying inhabitants back—now that they have been evacuated (removed) and distributed practically all over the southern US?«

7 This is a federal responsibility under the US Army Corps of Engineers. See: Nicole T. Carter: New Orleans Levees and Floodwalls: Hurricane Damage Protection. CRS Report for Congress, Congressional Research Service, 2005, CRS Web (accessed 6/2007).

5 Bis heute weigert sich die Lokalregierung den für denkmalgeschützte und abriss-beschlossene Objekte gesetzlich zu führenden Alternativnachweis einer möglichen Erhaltung zu leisten. Dank für diesen Hinweis gilt Robert Tannen, Stadtplaner und sozial Engagierter vor Ort. Dazu: Susan Saulny: 5.000 Public Housing Units in New Orleans Are to Be Razed, New York Times (Internet-Zugriff 15. 6. 2006).

6 Eine zynische Frage kursiert: »Welcher Politiker will schon die vielen armen, arbeitslosen, überalterten, zum Teil angeblich kriminellen, schwarzen und kaum Steuer zahlenden Einwohner zurück haben – jetzt wo sie schon einmal evakuiert (entfernt) praktisch auf die ganze südliche USA aufgeteilt sind?«

7 Diese ist als Bundessache Aufgabe des US Army Corps of Engineers. Dazu: Congressional Research Service, Nicole T. Carter (2005): New Orleans Levees and Floodwalls: Hurricane Damage Protection. CRS Report for Congress, CRS Web (Zugriff 6. 2007).

the natural wetlands before the inhabited coastal regions; these wetlands had previously been able to absorb flood waves. Naturally this viewpoint is contested by the other side, even today—as are the scientifically proven storm and flood consequences of global warming.[8] Two years after Katrina parts of New Orleans still look like a shocking battlefield. The government refuses even now to retrofit the New Orleans levee system for Category 5 hurricanes. What indeed are the prospects for residents and economic investors if they return to this city?

Prozent höher und 200 Prozent schneller auf die Stadt treffen konnte. Dazu kommt die systematische Vernichtung natürlicher wetlands vor den bewohnten Küstenregionen, die bisher Flutwellen absorbieren konnten. Diese Sicht wird naturgemäß von der Gegenseite bis heute bestritten – ebenso wie die wissenschaftlich nachgewiesenen Sturm- und Flutfolgen der Klima-Erwärmung.[8] Teile von New Orleans gleichen noch zwei Jahre nach Katrina einem schockierenden Schlachtfeld. Bis heute weigert sich die Regierung das Dammsystem von New Orleans für Hurrikans der Stärke 5 aufzurüsten. Mit welcher Perspektive sollen Bewohner und wirtschaftliche Investoren in diese Stadt zurückkehren?

»Rebuilding Together«—reactions from civil society

> We're back! You are back! Together, we bring New Orleans back! […] Rebuilding Together New Orleans (RTNO) believes that by reinvesting in and restoring the existing housing stock of the city, we can bring homeowners displaced by Hurricane Katrina back to their former homes, as well as provide a model for restoring and preserving New Orleans' historic neighborhoods. RTNO's home rehabilitation program targets the populations most affected by Hurricane Katrina in New Orleans: the urban poor. Families that return to their homes in New Orleans—rather than live in exile or in a trailer—sustain a constant, stable, healthy living environment while building their equity and regaining financial independence.[9]
>
> Rebuilding Together New Orleans, Mission Statement

The continuing controversy regarding clarification of responsibilities before, during and after the natural, cultural and above all social disaster in New Orleans brought about a country-wide discussion of general public policy issues—regarding disaster management, environmental problems, poverty and unemployment—and the role of civil society. In New Orleans, an example of reconstruction-related »help for self-help«[10] on the part of civil

»Rebuilding Together« – Reaktionen der Zivilgesellschaft

> *We're back! You are back! Together, we bring New Orleans back! […] Rebuilding Together New Orleans (RTNO) believes that by reinvesting in and restoring the existing housing stock of the city, we can bring homeowners displaced by Hurricane Katrina back to their former homes, as well as provide a model for restoring and preserving New Orleans' historic neighborhoods. RTNO's home rehabilitation program targets the populations most affected by Hurricane Katrina in New Orleans: the urban poor. Families that return to their homes in New Orleans – rather than live in exile or in a trailor – sustain a constant, stable, healthy living environment while building their equity and regaining financial independence.[9]*
>
> *Rebuilding Together New Orleans, Mission Statement*

Die andauernde Kontroverse um die Aufklärung der Verantwortlichkeiten vor, während und nach der Natur-, Kultur- und vor allem Sozial-Katastrophe von New Orleans brachte eine landesweite Diskussion über generelle public policy issues in Relation zu Katastrophenmanagement, Umweltfragen, Armut und Arbeitslosigkeit und über die Rolle der Zivilgesellschaft mit sich. Ein Beispiel dieser zivilgesellschaftlichen »Hilfe zur Selbsthilfe«[10] im

8 See Al Gore's ›Oskar‹-awarded documentary »An Inconvenient Truth.«

9 Under: http://www.rtno.org (accessed 6/2007). Thanks for detailed information to Ms Camille Lopez, Program Manager of RTNO.

10 The best example of this was the internet homepage NOLA.com, part of the New Orleans Times-Picayune, which, after local media breakdowns, directed local coverage for days by those directly affected by the disaster and became a central point for disaster coordination on the basis of thousands of blogs and »community journalism« reports. In addition to church organizations, other examples of such civil society actions include the People's Hurricane Relief Fund and ACORN

8 Dazu: Al Gore's Oskar-gekrönte Dokumentation ›Inconvenient Truth‹ Darin bezog er sich direkt auf die Sturmkatastrophen der Golf-Region.

9 Unter: http://www.rtno.org (Zugriff 6. 2007). Dank für weitere Informationen gilt Ms. Camille Lopez, Pragramm Manager von RTNO.

10 Bestes Beispiel dafür war auch die Internet-Homepage NOLA.com, die als Teil der großen Zeitung von New Orleans, der Times-Picayune, für Tage die lokal zusammengebrochene Berichterstattung von den direkt Betroffenen her steuerte und anhand tausender bloggs und »gemeindejournalistischer« Berichte ein zentraler Punkt der Katastrophenkoordination wurde. Andere Beispiele dieser zivilgesellschaftlichen Entwicklung sind neben kirchlichen Organisationen u. a. People's Hurricane Relief

society is provided by Rebuilding Together,[11] the largest non-profit home rehabilitation organization (based on volunteers and donations) in the US with about 250 local offices across the country.[12] Its »mission statement« is to preserve and revitalize houses in cooperation with affected communities—and thus also preserve and revitalize social networks—so that financially and socially disadvantaged, often older or handicapped homeowners and their families can continue to live in their own homes safely and independently. From its headquarters in Washington, D. C., the organization also supports multiplication of and coordination with associated institutions throughout the US in the fields of project, personnel and finance development and management, marketing and communications. Rebuilding Together New Orleans (RTNO) is an offshoot from Rebuilding Together and is jointly coordinated by the local Preservation Resource Center (PRC), a non-profit organization that supports preservation of New Orleans architecture and urban districts. Founded in 1974, the PRC runs several community programs. Its »Home Again Program« works with the National Trust for Historic Preservation for the renovation of historic houses that are »key buildings« for community development. »Operation Come Back« buys, renovates and promotes empty historic buildings; the »Neighborhood Council« sensitizes neighborhood groups and individual residents to preservation issues. »Preserve New Orleans« organizes discussion evenings in order to motivate state and local politicians and opinion leaders to support social-minded historic preservation policies. The »Ethnic Heritage Preservation Program« promotes local awareness in the African-American community for the same themes.[13] Through its non-profit rebuilding program RTNO itself advocates that former (often older) homeowners who were forced to evacuate return to their hurricane-damaged, disadvantaged neighborhoods. Many of these »poorer« communities are of great significance to New Orleans historically, architecturally and also socially. After Katrina the population's need for relief in these neighborhoods far exceeded the anyway modest offerings by government offices.[14] Under the

Kontext zum Wiederaufbau von New Orleans ist Rebuilding Together[11] als eine der mit etwa 250 lokalen Büros US-weit größten, auf freiwilliger Hilfe und Spenden basierenden, gemeinnützigen Organisation zur Haussanierung.[12] Ihr mission statement ist es, in Zusammenarbeit mit betroffenen Gemeinden Häuser und damit primär soziale Netzwerke zu erhalten und zu revitalisieren, so dass finanziell und sozial benachteiligte, oftmals ältere oder zum Teil behinderte Hauseigentümer mit ihren Familien im eigenen Haus sicher und unabhängig leben können. Mit der Zentrale in der US-Hauptstadt Washington D. C. fördert die Organisation auch die Vervielfältigung von und die Koordination mit Schwesterinstitutionen in den ganzen USA im Bereich Projekt-, Personal- und Finanzentwicklung und –management, Marketing und Kommunikation. Rebuilding Together New Orleans (RTNO) ist ein »Ableger« von Rebuilding Together und wird vom lokalen Preservation Resource Center (PRC) mitkoordiniert, das ebenfalls als gemeinnützige Organisation die Erhaltung der Architektur und der Stadtviertel von New Orleans fördert. Das 1974 gegründete PRC betreibt eine Reihe von Gemeindeprogrammen: Das Home Again Program setzt sich zusammen mit dem National Trust for Historic Preservation für die Renovierung historischer key houses zur gemeindlichen Entwicklung ein. Die Operation Come Back kauft, renoviert und vermittelt leer stehende historische Strukturen; das Neighborhood Council will nachbarschaftliche Gruppen und individuelle Bewohner in der Erhaltungsproblematik sensibilisieren. Preserve New Orleans organisiert Diskussionsabende, an denen staatliche und lokale Politiker und opinion leader zur sozial verorteten Denkmalpflege motiviert werden sollen. Das Ethnic Heritage Preservation Program befördert das lokale Bewusstsein der African-American community für dieselben Themen.[13] RTNO selbst setzt sich mit seinem gemeinnützigen Wiederaufbauprogramm dafür ein, dass ehemalige und zwangsevakuierte, oftmals ältere Hauseigentümer in ihre Hurricane Katrina-betroffenen, schlechter gestellten Gemeinden der Stadt zurück ziehen. Viele dieser »ärmeren« Gemeinden sind für New Orleans von hoher geschichtlich-architektonischer und sozialer Signifikanz. Nach Katrina überstieg dort der Hilfsbedarf der Einwohner das ohnehin geringe Angebot der staatlichen Stellen zum

(a community organization that, in the name of needy home owners *and* renters, advocated the prolongation of financial support by FEMA and prepared more than 1000 houses for rebuilding), the National Low Income Housing Coalition, the Road Home Action Team (advocating simplified credit for rebuilding), and the Consumer Federation of America (working against reductions in house insurance protection).

11 Since its founding in 1988 Rebuilding Together has rehabbed more than 100,000 houses and community buildings on its annual National Rebuilding Day, with the help of 2.7 million volunteers. See http://www.rebuildingtogether.org (accessed 6/2007).

12 Here it is important to mention that the so-called American Dream is very strongly based on the ideology of homeownership.

13 See: www.prcno.org (accessed 7/2007). The author would like to thank the director of PRC, Patty Gay, for her assistance.

14 Problems facing homeowners included lack of insurance protection, bureaucratic hurdles, sometimes unscrupulous property speculation,

Fund und ACORN, die sich als Gemeinde-Organisation im Namen notleidender Hausbesitzer und Mieter für die Verlängerung der finanziellen Unterstützung durch FEMA einsetzen und über 1.000 Häuser zum Wiederaufbau vorbereiteten, die National Low Income Housing Coalition, das Road Home Action Team für einfachere Wiederaufbaukredite oder die Consumer Federation of America gegen die Reduzierung des Hausversicherungsschutzes.

11 Seit ihrer Gründung 1988 sanierte Rebuilding Together über 100.000 Häuser und gemeinnützige Einrichtungen mit der Hilfe von 2,7 Millionen Freiwilligen. Dazu: http://www.rebuildingtogether.org (Zugriff 6. 2007).

12 Hier ist es wichtig zu erwähnen, dass der so genannte American Dream sehr stark auf der Ideologie des Eigenheims basiert.

13 Siehe: www.prcno.org (Zugriff 7. 2007). Der Direktorin des PRC, Patty Gay, sei an dieser Stelle für ihre Hilfe gedankt.

Fig. 8 Volunteers from »Rebuilding Together New Orleans« and »The Sovereign Order of Malta« in front of »their« renovation project, a typical shotgun house in the St. Peter Clever community, New Orleans (September 2006 assistance campaign)

Abb. 8 Freiwillige von Rebuilding Together New Orleans und des Malteser-Ordens der USA in einem Gruppenbild vor »ihrem« Sanierungsobjekt, einem typischen Shotgun House, in der St. Peter-Clever Gemeinde, New Orleans (Hilfskampagne September 2006)

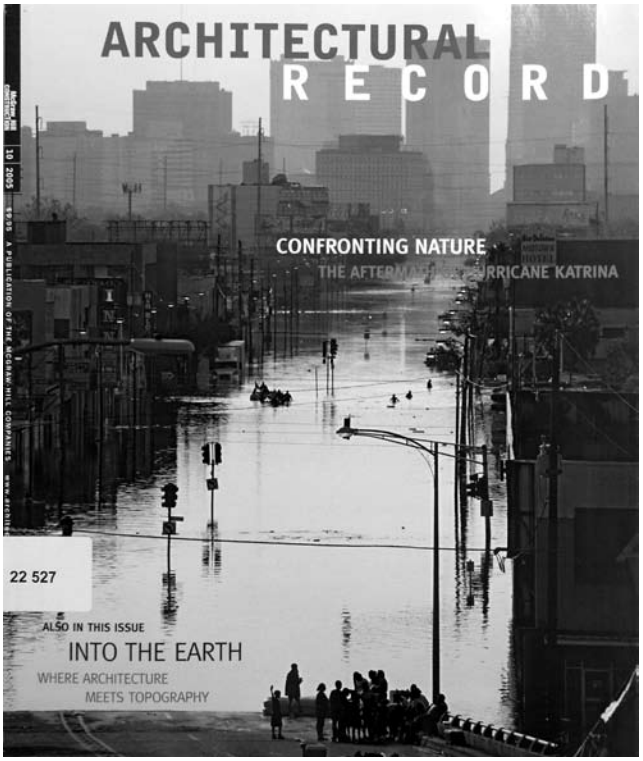


Fig. 9 Title page of the October 2005 issue of Architectural Record

Abb. 9 Titelblatt von Architectural Record zur Ausgabe Oktober 2005

newly established slogan »Rebuild 1000« the RTNO program makes a contribution to a »historic building and community preservation« that is motivated by concern for the social structure. Through this program, RTNO/PRC is providing professional rehab know-how at no cost, building materials that are often difficult to attain, and volunteer workers to assist in the rehabilitation of houses. Potential recipients of help under the rehab program are identified according to social criteria (for example, age or ties to the community) and must come from one of the five designated emergency districts.[15] Since Katrina more than 1700 volunteers from across the United States have worked with RTNO, contributing c. 40,000 manhours on c. 60 projects. »For RTNO the effects of the hurricane are an enormous challenge that can only be met with the help of partners.[16] In cooperation with Operation Helping Hands, organized by the Catholic Charities Service New Orleans, and with the support (financially, through personnel and through project coordination based in Germany) of Malteser International[17] and the three national associations

Wiederaufbau bei weitem.[14] Unter dem neu etablierten Slogan Rebuild 1000 leistet das Programm von RTNO in der unentgeltlichen Bereitstellung von professionellem Sanierungs-Know-how, oftmals schwer zu beschaffenden Baumaterialien und ehrenamtlicher Arbeitshilfe zur Haussanierung einen zivilgesellschaftlichen Beitrag zur sozialstrukturell motivierten »Denkmal- und Gemeindepflege«. Potentielle Hilfeempfänger für das Sanierungsprogramm werden nach sozialen Kriterien – zum Beispiel Einbindung in die Gemeinde und Alter – ermittelt und liegen in den fünf ausgewiesenen Notgebieten.[15] Seit Katrina haben mehr als 1 700 Freiwillige aus den ganzen USA an RTNO mitgewirkt und eine Arbeitszeit von ungefähr 40.000 Stunden beigesteuert und an etwa 60 Projekten mitgewirkt. Für RTNO stellen die Auswirkungen des Hurrikans eine enorme Herausforderung dar, der es nur mit Hilfe von Partnern begegnen kann.[16] In Zusammenarbeit mit der vom Catholic Charities Service New Orleans organisierten Operation Helping Hands und der finanziellen, personellen

lack of a work force, no access to materials, old age, and discouragement.

15 In 2007 these were the communities of Hollygrove, Treme/Esplanade Ridge, Holy Cross, Broadmore and St. Roch.

16 RTNO sponsors include Shell Oil, the New Orleans Saints football team, the Hearst Corporation, Pepsi Cola and Malteser International.

17 Coordination and execution of foreign assistance by the Sovereign

14 Kein Versicherungsschutz, bürokratische Hürden, zum Teil skrupellose Grundstücksspekulation, fehlende Arbeitskräfte, unmögliche Materialbeschaffung, Überalterung, Abschreckung.

15 2007 waren das die Gemeinden Hollygrove, Treme/Esplanade Ridge, Holy Cross, Broadmore, St. Roch.

16 Sponsoren von RTNO sind u. a. Shell Oil, das football team der New Orleans Saints, die Hearst Corporation, Pepsi Cola und Malteser International.

of the Order of Malta in the United States, RTNO was able to renovate houses for 32 families and make them livable again« (fig. 8).[18]

»After the Flood: Building on Higher Ground«—the American architectural profession's discourse on the disaster in New Orleans

> While the Dream Queen may be struck down, she's been mortally wounded before by disease and fire, by war and flood. Waters will recede; she'll pull up and remake herself, not dead or dying, but ready for a fight and another dance. Like me, too many people love her. She cannot fail—only fade for a while […] We'll dry her out, clean her up: She's ingrained in us. Sleep tonight, old beauty. We're coming back.
>
> Elegy for a Dream Queen, 2005

The following section discusses relevant contributions from the American professional journal *Architectural Record* and from the 10th International Architectural Biennale in Venice in 2006 in order to point out the blatant gap between the assistance projects in New Orleans initiated by civil society and the discourse by architectural experts concerning the disaster, in the context of political as well as commercial-medial discussions.

The first major, and somewhat emotional, mention of the subject appeared in the *Architectural Record* already in October 2005 under the title »Confronting Nature. The Aftermath of Hurricane Katrina« (fig. 9).[19] Harsh criticism in the same issue made it clear that political failure definitely had to be the foundation for a discussion of what had happened in New Orleans—quite in opposition to the politically staged discussion of the unpredictable natural disaster; this article also warned against overhasty actions to clear away the old building stock and pointed out critical ecological and social aspects of future tasks.[20] But the

Order of Malta.

18 Excerpt from the Malteser International project proposal with RTNO for the period 2006/07. For more on Malteser International, including a contribution by the author in the 2006 annual report, see: http://www.malteser.de/61.Malteser_International/61.03.Organisation/61.03.03.Zahlen_Daten_Fakten/070907_Jb-2006-d.pdf (accessed 1/2008). Thanks for more detailed information go to Ozzy Marcenaro and Janine Lietmeyer, from Malteser International.

19 «… Elegy for a Dream Queen«, in: Architectural Record, 2005/10, p. 31.

20 Michael Sorkin: Critique—After the flood: rebuilding the physical

und [aus Deutschland projektkoordinierten] Unterstützung von Malteser International[17] und den drei US-nationalen Assoziationen des Malteser-Ordens, [war] RTNO in der Lage die Häuser von 32 Familien zu renovieren und somit wieder bewohnbar zu machen« (Abb. 8).[18]

»After the Flood: Building on Higher Ground« – Die Katastrophe von New Orleans im amerikanischen Architektur-Diskurs

> *While the Dream Queen may be struck down, she's been mortally wounded before by disease and fire, by war and flood. Waters will recede; she'll pull up and remake herself, not dead or dying, but ready for a fight and another dance. Like me, too many people love her. She cannot fail – only fade for a while […] We'll dry her out, clean her up: She's ingrained in us. Sleep tonight, old beauty. We're coming back![19]*
>
> *Elegy for a Dream Queen, 2005*

Um die klaffende Lücke zwischen den zivilgesellschaftlich verorteten Hilfsprojekten und dem nicht nur politischen, sondern auch kommerziell-medialen Katastrophen- und fachlichen Architekturdiskurs zu New Orleans anzudeuten, werden in der Folge stichpunktartig Beiträge der amerikanischen Fachzeitschrift Architectural Record und der 10. Internationalen Architekturbiennale in Venedig 2006 diskutiert.

Die erste, emotional verortete Großmeldung zum Thema erschien in Architectural Record schon im Oktober 2005 unter dem Titel »Confronting Nature. The Aftermath of Hurricane Katrina« (Abb. 9). Eine scharfe Kritik stellte klar, dass der Fall New Orleans entschieden auf der Basis politischen Versagens – ganz entgegen der politisch inszenierten, unvorhersehbaren Naturkatastrophe – zu diskutieren sei, warnte vor übereilten Abräumaktionen des Altbestandes und verortete die zukünftigen Aufgaben ökologisch und sozialkritisch.[20] Doch schon das Editorial des November-Heftes 2005 »What can architects do?« lenkte

17 *Koordinierung und Durchführung der Auslandshilfe des Souveränen Malteser-Ritter-Ordens.*

18 *Ausschnitt aus dem Projektantrag von Malteser International mit RTNO für die Förderphase 2006/07. Mehr zu Malteser International im Jahresbericht 2006, auch mit einem Beitrag des partizipierenden Autors, unter: http://www.malteser.de/61.Malteser_International/61.03.Organisation/61.03.03.Zahlen_Daten_Fakten/070907_Jb-2006-d.pdf (Zufriff 1/2008). Dank für weitere Informationen geht an Ozzy Marcenaro und Janine Lietmeyer von Malteser International.*

19 *In: ›Elegy for a Dream Queen,' Architectural Record (10. 2005), S. 31.*

20 *Michael Sorkin: Critique – After the flood: rebuilding the physical and social fabric, in: ebd., S. 73–75.*

editorial »What can architects do?« in the November 2005 issue already directed attention to self-initiated, visionary competitions for new architecture (»new ways of living«) without putting the existing housing and (above all) social structure decisively in the foreground as the obligatory basis for the work of architects and city planners.[21] Another report spoke of the gap opening up between historic-oriented design ideas for housing[22] and the locally forged political efforts—criticized as being de-contextual and producing an asocial »tabula rasa«—of Mayor Ray Nagin and his personally-appointed, big-business oriented »Bring New Orleans Back Advisory Committee.«[23] The January and February 2006 issues of the *Architectural Record*[24] focused on criticism of the neo-traditionalizing building code for the entire state of Louisiana which had been pushed through politically in the context of the Congress for New Urbanism (CNU). With its strong emphasis on uniformity the building code essentially raises the price (for homeowners) of patchwork-like efforts to rebuild historic and socially acceptable architecture in low-income neighborhoods and dramatically devalues such approaches, to the advantage of new construction projects. Under the appeal »Where are the demands for citizen empowerments?« a critic speaks out against a visionary middle-class- and New Urbanism-oriented »social and architectural purifying« of the »poor districts« of New Orleans and in favor of a laboratory-like diversity of rebuilding efforts oriented to the existing communities and building stock.[25] Parallel to criticism of the declared unwillingness of the US Congress to upgrade the city's system of protective levees for Category 5 hurricanes and of city planning politics in support of new construction efforts with their standardizing effects, an increased journalistic awareness regarding the role of non-profit efforts to preserve the existing building stock and social structure could now be found—much too late! Thus there is a reference for the first time in the April 2006 issue of *Architectural Record* to the fact that 50,000 houses had already been »red-tagged« for demolition in a hasty chaotic

die Aufmerksamkeit auf selbst initiierte, visionäre Wettbewerbe neuer Architektur (»new ways of living«) ohne die bestehende Wohn- und vor allem Sozialstruktur vor Ort dezidiert als verbindliche Basis für Architekten und Stadtplaner in den Vordergrund zu stellen.[21] Ein weiterer Bericht sprach von der sich öffnenden Schere zwischen historisch orientierten Wohndesign-Ideen[22] und den lokalpolitisch forcierten, teilweise dekontextualisierten und als asoziale ›tabula rasa‹ kritisierten Bemühungen des Bürgermeisters Ray Nagin mit seinem selbst bestellten und big-business-orientierten Bring New Orleans Back advisory committee.[23] Die Januar- und Februar-Ausgaben der Architectural Record von 2006[24] standen in der Kritik des für ganz Louisiana im Kontext des Congress for New Urbanism (CNU) politisch durchsetzten, traditionalisierenden und stark uniformierenden Building Code, der speziell die »patchwork«-artigen Wiederaufbaubemühungen historischer und sozial verträglicher Architektur in low-income-Gemeinden für die Eigentümer essentiell verteuerte und zugunsten von Neubauprojekten dramatisch abwertete. Unter dem Ruf »Where are the demands for citizen empowerments?« sprach sich eine Kritik gegen eine zukunftserträumte, mittelstandsorientierte, dem New Urbanism verschriebene »Sozial- und Architekturreinigung« der »Armenviertel« von New Orleans und für eine laborartige Diversität im bestands- und gemeindeorientierten Wiederaufbau aus.[25] Parallel zur Kritik gegenüber dem deklarierten Nichtwillen des US-Kongresses zum Upgrade des städtischen Schutzdeichsystems für zukünftige Hurrikans der Stärke 5 und den vereinheitlichenden Neubaubemühungen der Stadtbaupolitik ließ sich jetzt (viel zu spät!) eine steigende Wahrnehmung der Rolle gemeinnützigen Einsatzes für den »architektonisch wie sozialen Altbestand« von New Orleans journalistisch nachweisen. So wurde das erste Mal im April-Heft 2006 des Architectural Record darauf hingewiesen, dass schon im Vorfeld der ersten systematischen, ab März 2006 begonnen Abrissaktion von 125 beschädigten Häusern durch die U. S. Army Corps of Engineers in einer chaotischen Schnellaktion von FEMA unmittelbar nach Katrina ganze 50.000 Häuser »red-tagged«, also zum Abriss frei gegeben

and social fabric, in: Architectural Record, 2005/10, pp. 73–75.

21 Editorial: What can architects do? in: Architectural Record, 2005/11, pp. 17–18.

22 For example the so-called »Habitat for Humanity« house from Architecture for Humanity in cooperation with the Heritage Conservation Network and the Foundation for Historical Louisiana.

23 Special Hurricane Report and Robert Campbell: Critique: A few questions to ponder in the wake of a hurricane, in: Architectural Record, 2005/11, pp. 29–35 and 57–59.

24 Special Hurricane Report and Correspondent's File, in: Architectural Record, 2006/1, pp. 34 f. and 51–53.

25 The chairman of the Congress for New Urbanism, the real estate developer and President Bush fundraiser Joe Canizaro, is quoted as saying, »If a neighborhood is not developing adequately to support the services it needs to support it, we'll shrink it.« In: Michael Sorkin: Critique: Will new plans for the Gulf drown it again, this time in nostalgia? in: Architectural Record, 2006/2, pp. 47–50.

21 Editorial: What can architects do?, in: Architectural Record (11. 2005), S. 17–18.

22 Z. B. das so genannte Habitat for Humanity-Haus von Architecture for Humanity in Zusammenarbeit mit dem Heritage Conservation Network und der Foundation for Historical Louisiana.

23 »Special Hurricane Report« und Robert Campbell, Critique: A few questions to ponder in the wake of a hurricane, in: ebd., S. 29–35 und 57–59.

24 »Special Hurricane Report« und »Correspondent's File«, in: Architectural Record (1. 2006), S. 34 f. und 51–53.

25 Dazu ein Zitat des Congress for New Urbanism-Vorsitzenden, real estate developer und Präsident Bush fund-raiser Joe Canizaro: »If a neighborhood is not developing adequately to support the services it needs to support it, we'll shrink it.«, in: Michael Sorkin, Critique: Will new plans for the Gulf drown it again, this time in nostalgia?, in: Architectural Record (02. 2006), S. 47–50.

Fig. 10 Citation-winning entry by Workshop/APD (New York City) for a 160-unit housing project in the »High Density on the High Ground Competition,« 2006

Abb. 10 Ein Wettbewerbsbeitrag (»Citation«) zum »160-Unit Housing Project – High Density on the High Ground Competition«, 2006, Beitrag von workshop/apd (New York City)

Fig. 11 Simulation of the planned Jazz Heritage Center in New Orleans, design by Morphosis (Santa Monica, California), architect Thom Mayne

Abb. 11 Eine Simulation zum geplanten Jazz Heritage Center von New Orleans, vom Büro Morphosis (Santa Monica, CA, USA), Architekt Thom Mayne

action by FEMA immediately after Katrina, long before the first systematic demolition of 125 damaged houses by the US Army Corps of Engineers began in March 2006.[26] The subsequently officially revised number of 25,000 and finally 5,500 houses tagged for demolition was corrected to 1,900 in a re-evaluation carried out by the New Orleans Preservation Resource Center and the National Trust for Historic Preservation using volunteer architects and building engineers.[27] Not until the June 2006 issue did an article address for the first time the lack of a coordinating clearinghouse for the thousands of volunteers who came to New Orleans from all over the US to help rebuild the city, as well as the problem of tying these volunteers into the local tradition of neighborhood assistance and even into higher level disaster and reconstruction planning; the article did not, however, suggest any solutions.[28]

The organization and coverage of the US contribution to the 10th International Architectural Biennale (»Cities, Architecture and Society«) in Venice in 2006 was certainly symptomatic of this attitude, which was rooted in socially oriented reconstruction planning on the one hand and in well-known internationalist visionary ideas of architecture on the other. Under the title »After the flood: Building on higher ground. An exhibition presenting proposals for replacement housing and redevelopment in New Orleans,

worden waren.[26] Die später offiziell redigierte Abrisszahl zwischen 25.000 und letztlich 5 500 Häusern wurde in einer Re-Evaluierungsaktion vom New Orleans Preservation Resource Center und dem National Trust for Historic Preservation mit freiwilligen Architekten und Bauingenieuren auf 1.900 korrigiert.[27] Erst im Juni-Heft 2006 wurde erstmals auf die Problematik einer bisher nicht realisierten Koordinations- und Clearing-Stelle der vielen tausenden, für den Wiederaufbau aus den ganzen USA in New Orleans eintreffenden Freiwilligen und einer Einbindung derselben in die lokale Tradition der Nachbarschaftshilfe und gar in eine übergeordnete Katastrophen- und Wiederaufbauplanung eingegangen – ohne Lösungsansätze anzuregen.[28]

Symptomatisch für diese einerseits einer sozial verorteten Wiederaufbauplanung und andererseits altbekannt internationalistischen und architektur-visionären Vorstellungen verhaftete Einstellung war sicherlich die Ausrichtung und Berichterstattung des US-Beitrags zur 10. Internationalen Architekturbiennale (»Cities, Architecture and Society«) in Venedig 2006. Der US-Pavillon unter dem Motto »After the flood: Buildling on higher ground. An exhibition presenting proposals for replacement housing and redevelopment in New Orleans, Louisiana in the aftermath of Hurrican Katrina«[29] stellte neben einem Film, einer

26 Angelle Bergeron: Demolition begins in New Orleans, as designers and preservationists fight to limit its scope, in: Architectural Record, 2006/4, p. 36.

27 Of these, the number of historic houses threatened by demolition went from 369 down to 199.

28 James S. Russell: Can New Orleans and the Gulf Coast face the hard questions? in: Architectural Record, 2006/6, pp. 130–138. This includes the so-called »New Orleans shrinking footprint debate.«

26 Angelle Bergeron: Demolition begins in New Orleans, as designers and preservationists fight to limit its scope, in: Architectural Record (4. 2006), S. 36.

27 Davon 369 historische, abrissgefährdete Gebäude auf 199.

28 James S. Russell: Can New Orleans and the Gulf Coast face the hard questions?, in: Architectural Record (6. 2006), S. 130–138. Darunter auch die Darstellung der sog. »New Orleans shrinking footprint debate«.

29 Organisiert von Architectural Record und dem Department of Educational and Cultural Affairs of the U. S. Department of State.

Louisiana in the aftermath of Hurricane Katrina,«[29] the US pavilion mainly presented—in addition to a film, a storm simulation, maps, photos of the disaster and socio-economic statistics concerning Hurricane Katrina and New Orleans—the modern-visionary results of two idea competitions,[30] one for multi-family housing (fig. 10) and one for a simple three-bedroom infill house for post-Katrina New Orleans.[31] At the Biennale Katrina was only treated as a natural disaster that triggered the problem;[32] the subsequent socio-political difficulties as well as topics such as resource-friendly preservation or civil responsibility were blended out. The overview of the American project in the official exhibition catalogue also complied completely with this tendency.[33] Only in the accompanying volume did a contribution from the University of Texas at Austin voice criticism, pointing out that there is need in the future for ecological insights and a broader sense of »culture« with respect to natural and cultural disasters and calling for a recalibration of engineering and nature conservation with the component of social uses in the coastal region.[34] Altogether the architectural discourse in the above-mentioned media never achieved sound preservation or socio-political dimensions, which should in fact be the mandatory starting point for all future interventions in New Orleans. The monstrous new international-style »Jazz Center and Heritage Park«—a $715 million, 20-acre glass multi-use center by the architecture firm Morphosis[35] that is not at all appropriate to the local color of New Orleans—was presented as the first large (and simultaneously »heritage-conscious«) post-Katrina project (fig. 11), whereas the storm- and flood-damaged but nonetheless repairable former home of Kidd Skidmore, a jazz musician who is famous not only in New Orleans, in the financially and socially disadvantaged Holy Cross community stood ready for overhasty demolition.[36]

Sturmsimulation, Katastrophenphotos, Karten und sozioökonomische Statistiken zu Hurricane Katrina und New Orleans im Wesentlichen die modern-visionären Ergebnisse zweier Ideen-Wettbewerbe[30] zum Mehrfamilien-Hausbau (Abb. 10) und zu einem einfachen Three Bedroom-infill House für Post-Katrina-New Orleans aus.[31] Als Auslöser des Problems wurde Katrina auf der Biennale ausschließlich als Naturkatastrophe thematisiert[32], die sozialpolitische (Folge-)Problematik ebenso ausgeblendet wie Themen über ressourcenschonende Denkmalpflege oder zivilgesellschaftliche Verantwortung. Auch der amerikanische Projektüberblick im offiziellen Ausstellungskatalog folgte ganz dieser Tendenz.[33] Lediglich im Begleitband fand der Beitrag der University of Texas in Austin kritische Worte zu einem in Zukunft notwendigeren ökologischen Verständnis und einer breiteren »Kultur« in Hinblick auf Natur- und Kulturkatastrophen und forderte eine Nachkalibrierung von Ingenieurs- und Naturschutzaspekten mit sozialen Benützungskomponenten der Küstenregion.[34] Insgesamt erreichte der architektonische Diskurs in den erwähnten Medien nie eine denkmalpflegerisch und sozialpolitisch fundierte Dimension, die als Ausgang aller zukünftigen Interventionen in New Orleans als verbindlich hätte gelten müssen. Und während der monströse, internationalistische und dem Lokalkolorit von New Orleans so gar nicht entsprechende Glas-Neubau des so genannten Jazz Center and Heritage Park als 715 Millionen Dollar schweres, 20-acre multi-use Center, erstes und gleichzeitig »heritage«-bewusstes Großplanungsprojekt nach Hurricane Katrina des Architekturbüros Morphosis vorgestellt wurde (Abb. 11)[35], stand das einfache, sturm- und flutbeschädigte, aber durchaus reparable, ehemalige Wohnhaus des nicht nur in New Orleans berühmten Jazz-Musikers Kidd Skidmore in der finanziell und sozial geschwächten Gemeinde Holy Cross zum übereiligen Abriss bereit.[36]

29 Organized by Architectural Record and the Department of Educational and Cultural Affairs of the US Department of State.

30 Carried out by Architectural Record and Tulane University in New Orleans.

31 See Architectural Record, 2006/6, pp. 112–138.

32 «[…] beset by the largest natural disaster this country has ever experienced […],« in: On the ground in Venice: The 10th International Architecture Biennale, in: Architectural Record, 2006/11, pp. 59–63, here p. 59.

33 Richard Burdett, Francesca del Puglia (ed.), Cities, Architecture and Society. Catalogue of the 10th Biennale of Architecture in Venice, Venice 2006, vol. I, pp. 128–129.

34 Searching for resilient foundations: The Gulf Coast after Katrina, The University of Texas at Austin, in: Burdett (note 33), vol. II (Participating Countries, Collateral Events), pp. 330 f.

35 Angelle Bergeron: Morphosis unveils plan for downtown New Orleans, in: Architectural Record, 2006/7, p. 25.

36 Angelle Bergeron: Wreck or Protect: Preservation of historic homes in New Orleans, under: http://findarticles.com/p/articles/mi_qn4200/is_20060410/ai_n16180683 (accessed 7/2007).

30 Durchgeführt von Architectural Record und der Tulane University New Orleans.

31 Dazu der Bericht in: Architectural Record (6. 2006), S. 112–138.

32 »[…] beset by the largest natural disaster this country has ever experienced […]«, in: On the ground in Venice: The 10th International Architecture Biennale, in: Architectural Record (11. 2006), S. 59–63, hier S. 59.

33 In: Richard Burdett/Francesca del Puglia (Hg.): Cities, Architecture and Society, Catalogue of the 10th Biennale of Architecture in Venice, Venice 2006, vol. I, S. 128–129.

34 In: Searching for resilient foundations: The Gulf Coast after Katrina. The University of Texas at Austin, in: Burdett, Cities… vol. II (Participating countries, collateral events), S. 330. f.

35 Angelle Bergeron: Morphosis unveils plan for downtown New Orleans, in: Architectural Record (7. 2006), S. 25.

36 Angelle Bergeron: Wreck or Protect: Preservation of historic homes in New Orleans. Unter: http://findarticles.com/p/articles/mi_qn4200/is_20060410/ai_n16180683 (Zugriff 7. 2007).

»Homeland security threat is at level orange today«—emotional concluding remarks

Anyone staying in the United States since 9/11 (the terrorist attack on the World Trade Center in New York in 2001) is permanently pursued by an apprehensive loudspeaker voice in public institutions reminding the traveler of the supposedly ubiquitous danger of annihilation on America's native soil. In fact on the entire US continent there has probably been no more dramatic example over the last decades of a politically deliberate expulsion of US citizens (in this case socially disadvantaged and mostly black citizens) from their native soil than after the natural, cultural and social disaster of Hurricane Katrina. Tens of thousands of storm refugees are still living in inhumane circumstances in temporarily erected trailers scattered throughout the US and are hoping in vain to return to their homes or housing projects, which in fact have often already been demolished or have been tagged in hasty actions for future demolition. Regarding disaster prevention, New Orleans has taught us that in the aftermath of the destruction of built living spaces by natural disasters social-oriented priorities are not congruent with, let alone can they be satisfied by, the established culturally elite protection of designated historic buildings. The case of New Orleans has made it particularly clear that in the USA as in the rest of the world—in a future with periodically recurring natural disasters—established mechanisms for protection of cultural goods will have to work in coalition with an indispensable civil society network based on non-profit volunteer commitments to cultural, natural, social and heritage protection and rebuilding on the part of victims, sympathizers, activists and relief organizations and institutions. Moreover there is a need for multiple uses of the media and for the »preservationist in the ivory tower« to redirect his thinking toward new, publicly more effective coalitions. It is also a matter—and one that affects all citizens—of establishing a more conscious, resource-friendly »culture« for dealing with (natural) disasters, one that no longer relies on state assistance mechanisms alone, since these are anyway diminishing worldwide. Building up this culture and making it part of our civil society must be given much more definite priority in the future—not least among preservationists.

»Homeland Security threat is at level orange today« – eine emotionale Schlussbemerkung

Wer sich seit 9/11 (dem Terroranschlag 2001 auf das New Yorker World Trade Center) in den USA aufhält, wird bis heute permanent in allen öffentlichen Einrichtungen von einer besorgten Lautsprecherstimme verfolgt, die die Reisenden auf eine vermeintlich allgegenwärtige Vernichtungsgefahr des amerikanischen Mutterbodens hinweist (siehe Zitat oben). Tatsächlich gibt es wohl auf dem US-amerikanischen Kontinent kaum ein dramatischeres Beispiel der letzten Jahrzehnte für eine politisch gewollte forcierte Vertreibung der (hier sozial schlechter gestellten, zumeist schwarzen) US-Bevölkerung von ihrem tatsächlichen Mutterboden als nach der Natur-, Kultur- und Sozialkatastrophe nach Hurricane Katrina. Viele zehntausende Sturmflüchtlinge leben bis heute, menschenunwürdig und in den USA verstreut, in notdürftig bereitgestellten Wohnwagen und hoffen vergeblich auf die Rückkehr in ihre, oftmals schon abgerissenen oder vorschnell zum Abriss vorgesehenen Häuser oder Wohnsiedlungen. Der Fall New Orleans hat hinsichtlich Katastrophenprävention gelehrt, dass nach der Zerstörung gebauter Lebensräume durch Naturkatastrophen die Prioritäten der sozialen Belange eben nicht mit dem etablierten, kulturelitären Schutz ausgewiesener Baudenkmäler kongruent sind. Der Fall New Orleans hat auch deutlich gemacht, dass in den USA wie in der restlichen Welt – in einer Zukunft periodisch wiederkehrender Naturkatastrophen – neben und in Koalition mit den etablierten Kulturgüterschutzmechanismen ein zivilgesellschaftliches Netzwerk, basierend auf gemeinnützig-ehrenamtliches Schutz- und Wiederaufbau-Engagement von Betroffenen, Mitfühlenden, Engagierten und Hilfsorganisationen- und -einrichtungen in Sachen Kultur-, Natur-, Sozial- und Denkmalschutz unabdingbar sein wird. Dazu bedarf es auch der Multiplikation durch die Medien und eines Umdenkens der »Denkmalpfleger im elfenbeinernen Turm« in Richtung neuer, öffentlich wirksamerer Koalitionen. Es geht damit aber auch um eine bewusstere, einen jeden Bürger betreffende, ressourcenschützende Umgangskultur mit (Natur-)Katastrophen, die sich nicht mehr alleine nur auf die weltweit zurückgehenden, staatlichen Hilfsmechanismen verlassen darf. Der Aufbau dieser Umgangskultur und ihre zivilgesellschaftliche Vernetzung mussen in Zukunft eine deutlichere Priorität einnehmen – nicht zuletzt unter Denkmalpflegern.

Dieter Polkowski

Flood Protection and Heritage Conservation in Large Cities. Case Study of Hamburg

Hochwasserschutz und Großstadtdenkmalpflege. Erfahrungen aus Hamburg

It is not yet possible to assess the potential consequences of climatic change. They will partly depend on whether agreement can be reached at an international level on goals for climatic protection and on how successful the resulting measures will be. There is a general consensus that flood protection is facing new challenges for which new concepts and plans will have to be developed. Effective flood protection must start with a broad regional perspective and must be directed toward avoidance of high tidal surges because there are limits to the height to which dikes can be raised. But large-scale flood protection is not the subject here at hand; rather, this article will address the additional necessity of improving flood protection on a local basis and developing specific project-oriented protection systems.

Effective local flood protection is a prerequisite for sustainable city development. But flood protection systems also usually produce structural impediments to urban development that can only be surmounted with great difficulty or not at all. They are often in conflict with particular goals or aspects of a city's development, such as urban design or heritage conservation objectives. This is the starting point for my discussion of flood protection and heritage conservation in large cities, based on a case study of Hamburg. An outline of Hamburg's potential flood dangers will be followed by a discussion of the historic warehouse district and the adjoining new development, HafenCity.

Die möglichen Folgen des Klimawandels lassen sich heute noch gar nicht abschätzen. Sie werden auch davon abhängen, ob eine Einigung auf Klimaschutzziele auf internationaler Ebene erreicht wird und wie erfolgreich die abgeleiteten Maßnahmen sein werden. Darin, dass der Hochwasserschutz vor neuen Herausforderungen steht und neue Konzepte und Planungen entwickelt werden müssen, sind sich alle einig. Ein wirksamer Hochwasserschutz muss zunächst großräumig ansetzen und versuchen, hohe Flutwellen zu vermeiden, denn die Deiche lassen sich nicht beliebig erhöhen. Damit wären wir aber bei einem völlig anderen Thema, das ich hier nicht behandeln kann. In jedem Fall muss auch der Hochwasserschutz vor Ort und objektbezogen verbessert werden.

Ein wirksamer Hochwasserschutz vor Ort bildet eine Voraussetzung für eine nachhaltige Stadtentwicklung. Zugleich sind Hochwasserschutzanlagen meist bauliche Grenzen für die Stadtentwicklung, die gar nicht oder nur schwer überwunden werden können. Sie stehen oft im Konflikt mit einzelnen Zielen oder Aspekten der Entwicklung der Stadt, wie stadtgestalterischen Zielen oder auch solchen des Denkmalschutzes.

Mein Beitrag setzt hier an und behandelt das Thema »Hochwasserschutz und Großstadtdenkmalpflege in Hamburg«. Zunächst möchte ich das Gefährdungspotential für Hamburg skizzieren. Das Thema »Hochwasserschutz und Denkmalpflege« werde ich am Beispiel der historischen Speicherstadt und der angrenzend neu entstehenden HafenCity darstellen.

Flood protection in Hamburg

The Elbe is mainly perceived as a peaceful river by the city's inhabitants. The river becomes a danger for those living in the low-lying marshlands only if winter storms over the North Sea drive immense masses of water into the funnel-shaped mouth of the Elbe.

After Hamburg had been spared severe storm floods for more than 100 years, on the night of February 16–17, 1962, a flood caused 315 deaths (fig. 1). The water encircled 100,000 people; 20,000 had to be evacuated and 6,000 were left homeless. The highest water level ever known in

Hochwasserschutz in Hamburg

Die Bewohner der Stadt nehmen die Elbe in erster Linie als einen friedlichen Fluss wahr. Nur wenn in den Wintermonaten Stürme über der Nordsee gewaltige Wassermassen in den Mündungstrichter der Elbe treiben, wird der Fluss zur Gefahr für alle Bewohner, die in den tief liegenden Marschgebieten leben.

Nachdem Hamburg über hundert Jahre von schweren Sturmfluten verschont geblieben war, forderte die Sturmflut in der Nacht vom 16. zum 17. Februar 1962 315 Todesopfer (Abb. 1). 100.000 Menschen wurden vom Wasser eingeschlossen, 20.000

Fig. 1 Elbe River flood in Hamburg in 1962

Abb. 1 Sturmflut der Elbe in Hamburg, 1962

Fig. 2 Flood wall in downtown Hamburg

Abb. 2 Hochwasserschutzanlage in der Hamburger Innenstadt

Hamburg up till then was measured on February 17th. At 5.70 meters over mean sea level, it was the same height as the inundated dikes, which had failed at 60 locations. One-sixth of the city of Hamburg was flooded.

Improvements to the flood protection system had already been proposed before the disaster. The plans were reexamined and in the following years the dikes were raised in height. There were flood walls rather than dikes downtown; these structures were not always easy to integrate into the city (fig. 2). The city center and public spaces were increasingly cut off from the Elbe, and unavoidable conflicts with objectives for urban design, the use of public spaces and heritage conservation arose.

There were no more violent storm floods for several years after 1962, until a series of severe floods in 1973 and 1976. In 1976 the water level was the highest ever measured on almost all the gauges on the North Sea coast. At 6.45 meters above mean sea level the water was .75 meters over that of 1962 and was only 25 centimeters below the newly established base flood elevation (the high water level calculated for a base, or 100-year, flood). A disaster was averted by the stronger and higher dikes.

After studies of storm flood dynamics for the tidal Elbe, a base flood elevation of 7.30 meters was established as the basis for further development of the flood protection system. A construction program to meet these goals was begun in 1993 and largely completed by 2007. Construction of a flood barrier was rejected as a possibility because of the major effects it would have had on the hydrology and ecology of the Elbe, as well as the obstructions it would have caused for ship traffic, technical difficulties in its construction and operation, and, of course, the costs.

mussten evakuiert werden und 6.000 Menschen verloren ihr Obdach. Am 17. Februar wurde in Hamburg der höchste Wasserstand gemessen, den die Stadt je erlebt hat. Er war mit 5,70 Meter über NN (Nullmarke) genauso hoch wie die Deiche, die überströmt wurden und an 60 Stellen brachen. Ein Sechstel des Hamburger Stadtgebietes wurde überflutet.

Bereits vor der Katastrophe war der Ausbau der Hochwasserschutzanlagen beabsichtigt. Die Planungen wurden überprüft und in den folgenden Jahren die Deiche erhöht. In der Innenstadt handelt es sich nicht um Deiche, sondern um Flutschutzmauern. Die Abbildung zeigt, dass sich diese Bauwerke nicht immer einfach in die Stadt integrieren lassen (Abb. 2). Die Innenstadt beziehungsweise die öffentlichen Räume werden zunehmend von der Elbe abgeriegelt. Es entstehen unvermeidbare Konflikte mit den Zielen der Stadtgestaltung, der Nutzbarkeit der öffentlichen Räume und des Denkmalschutzes.

Nach 1962 hat es mehrere Jahre keine schweren Sturmfluten mehr gegeben. 1973 und 1976 kam es jedoch zu Serien von schweren Fluten. 1976 wurde der höchste Wasserstand an fast allen Pegeln der Nordseeküste gemessen. Mit 6,45 Meter über NN lag der Wasserstand 75 Zentimeter über dem von 1962 und nur 25 Zentimeter unter den neu festgelegten Bemessungswasserstand. Eine Katastrophe wurde durch die verstärkten und erhöhten Deiche verhindert.

Nach Untersuchungen zur Sturmflutdynamik der Tideelbe wurde für den weiteren Ausbau des Hochwasserschutzes der Bemessungswasserstand von 7,30 Meter festgelegt und 1993 ein entsprechendes Ausbauprogramm eingeleitet, das im Jahr 2007 weitgehend abgeschlossen sein soll. Der Bau eines Sturmflutsperrwerkes wurde verworfen. Gründe hierfür waren voraussehbare erhebliche Folgen für die Hydrologie und Ökologie der Elbe, Behinderungen für die Schifffahrt, technische Schwierigkeiten beim Bau und Betrieb und natürlich auch die Kosten.

Fig. 3 View of downtown Hamburg from the harbor

Abb. 3 Ansicht der Hamburger Innenstadt vom Hafen aus

Fig. 4 Plan of the historic Hamburg harbor complex with Sandtorhafen, 1868

Abb. 4 Plan des historischen Hamburger Hafens mit dem Sandtorhafen, 1868

The Hamburg port and the warehouse district

Hamburg's port is far away from the sea but can nonetheless be reached quickly by large ships via the Elbe (fig. 3). The city owes its early economic rise to the port, which remains a significant economic factor today. Development and improvement of the port have always been an important theme for the city's Senate. Intensification of international trade relations and the invention and advancement of steam-powered ships in the 19th century placed new demands on the port's development. By the mid-19th century there was extreme crowding of ships in the harbor, and transshipping delays had become a significant problem. In terms of harbor development, Hamburg found itself in direct competition with London's port.

After lengthy discussions under the city's then-director for waterways and hydraulic engineering, Johannes Dalmann, Hamburg opted for construction of a modern »open tidal port« with a docking harbor open to the Elbe. That means that the harbor basins are not protected against changing water levels at high and low tide but that no time is lost in locks when ships enter and leave the harbor basins.

As constructed for the first time at Sandtor Harbor on Grasbrook, the system of harbor basins with on-land storage and further transport was the most modern in the world at the time and brought Hamburg the reputation of a high-speed port (fig. 4).

The new harbor basin was dug deeper than previous ones and was equipped with quay walls so that large ships could tie up directly on land and no longer had to anchor at a distance from the bank. The quay walls were masterpieces of engineering, able to withstand the pressure of earth on one side and water on the other (the latter moreover changing according to the tide) as well

Der Hamburger Hafen und die Speicherstadt

Hamburgs Hafen liegt weitab vom Meer und ist dennoch über die Elbe auch für große Schiffe schnell erreichbar (Abb. 3). Dem Hafen verdankt die Stadt ihren wirtschaftlichen Aufstieg. Auch heute noch ist der Hafen ein bedeutender Wirtschaftsfaktor. Die Entwicklung und der Ausbau des Hafens waren immer ein wichtiges Thema für den Hamburger Senat. Die Intensivierung der internationalen Handelsbeziehungen, die Erfindung und Fortentwicklung dampfgetriebener Schiffe im 19. Jahrhundert stellten neue Anforderungen an die Hafenentwicklung. Spätestens Mitte des 19. Jahrhunderts wurde das Gedränge der Schiffe im Hafen zu stark, die Verzögerungen beim Umschlag zu groß. Hamburg sah sich bei der Entwicklung des Hafens in unmittelbarer Konkurrenz zum Londoner Hafen.

Nach langen Diskussionen entschied sich Hamburg unter dem damaligen Wasserbaudirektor Johannes Dalmann für den Bau eines modernen »offenen Tidehafens« mit zur Elbe offenen Liegbecken. Das bedeutet, dass die Hafenbecken zwar nicht gegenüber den unterschiedlichen Wasserständen bei Ebbe und Flut abgeschottet sind, aber Schleusenzeiten beim Einlaufen und Verlassen von Hafenbecken vermieden werden.

Das System von Hafenbecken und landseitigem Lagern und Weitertransport, das zum ersten Mal mit dem Sandtorhafen auf dem Grasbrook verwirklicht wurde, war das modernste der Welt und brachte Hamburg den Ruf eines schnellen Hafens ein (Abb. 4).

Es wurde ein Hafenbecken ausgehoben, tiefer als die bisherigen und mit Kaimauern versehen, damit die großen Schiffe direkt an Land festmachen konnten und nicht mehr entfernt vom Ufer ankern mussten. Die Kaimauern sollten dem Erdruck auf der einen und dem tidenbedingt unterschiedlichem Wasserdruck auf der anderen Seite und den Belastungen durch die nicht immer kunstvoll anlegenden Schiffe standhalten und waren statische Meisterwerke. Das

Fig. 5 Historic view of the Hamburg harbor with the Speicherstadt, c. 1880

Abb. 5 Historische Ansicht des Hamburger Hafens mit der Speicherstadt, um 1880

as stresses from ships that did not always dock skillfully. The proximity of harbor basin and quay zone also made a direct railroad link possible. Steam-powered portable cranes speeded up loading operations. Sandtor Harbor was developed from 1862 to 1866 and still survives today; Grasbrook Harbor was constructed by 1881. Additional harbor basins were built in the following years.

The warehouse district

Following establishment of the German Empire in 1871 Hamburg initially remained outside the customs frontiers of the empire. The entire city was a »free port,« which greatly facilitated the movement of goods since there was no need to deal with onerous custom formalities. Under pressure from the imperial government Hamburg joined the Zollverbund (Customs Union) in 1881. The compromise worked out with the empire provided for establishment of a free port zone—an area that remained outside the customs frontiers of the city and the empire. One consequence of this compromise was construction of the Speicherstadt, or warehouse district.

Trading activities and the movement of goods had to be organized anew. The traditional merchant's house with its combination of warehouse, office and home—once located on any of the city's many waterways—became superfluous. This combination of various functions in one building was given up. Business began to be conducted in the growing city, and a new type of office building developed to accommodate the Hamburg shipping company offices. The merchants now built their private homes on the Elbe or the Alster. Goods were stored, transferred and processed in the free port, necessitating construction

Nebeneinander von Hafenbecken und Kaizone ermöglichte den direkten Anschluss auch an die Eisenbahn. Dampfbetriebene, fahrbare Kräne beschleunigten die Ladevorgänge. Von 1862 bis 1866 entstand der heute noch erhaltene Sandtorhafen, bis 1881 wurde der Grasbrookhafen errichtet. In den folgenden Jahren kamen weitere Hafenbecken hinzu.

Die Speicherstadt

Nach der Reichsgründung 1871 blieb Hamburg zunächst Zollausland gegenüber dem Reich. Das gesamte Stadtgebiet war »Freihafen«, was den Warenumschlag erheblich erleichterte, da keine lästigen Zollformalitäten erledigt werden mussten. Auf Druck des Reichs schloss sich Hamburg 1881 dem Zollverbund an. Der mit dem Reich ausgehandelte Kompromiss sah die Einrichtung des Freihafens vor – ein Gebiet, das gegenüber der Stadt und dem Reich Zollausland blieb. Eine Konsequenz war der Bau der Speicherstadt.

Der Warenumschlag und der Handel mussten neu organisiert werden. Das Kaufmannshaus mit der Verbindung von Speicher, Kontor und Wohnung, das an allen Wasserwegen in der Stadt liegen konnte, wurde überflüssig. Die Verbindung unterschiedlicher Funktionen in einem Haus wurde aufgegeben. Jetzt handelte man in der sich entwickelnden City. Es bildete sich mit dem Hamburger Kontorhaus ein neuer Typus des Bürohauses. Die Kaufleute errichteten ihre Wohnhäuser an der Elbe oder der Alster. Die Waren wurden im Freihafen gelagert, umgeschlagen und veredelt. Hierfür musste eine zusammenhängende Speicherfläche im Freihafen geschaffen werden – die Speicherstadt entstand (Abb. 5).

Bei der Standortwahl für die Speicherstadt spielte die Nähe zu den Geschäften, dem Rathaus und der Börse in der

there of a new large-scale warehouse district—the birth of the Speicherstadt (fig. 5).

Proximity to the business offices, city hall and the stock exchange played an important role in choosing the location for the new warehouse district. Approximately 1000 buildings were destroyed and 20,000 inhabitants (mostly belonging to the lower classes) were dislocated for its construction. The city negotiated a construction subsidy of 40 million reichsmarks from the imperial government for construction of the warehouse district, the first phase of which was dedicated in 1888.

Rising as high as seven stories, the new buildings in the Speicherstadt were not merely warehouses. Valuable goods such as coffee, tea and spices were not only stored in them but were also sorted, cleaned and blended there by highly trained specialists. Seagoing vessels now unloaded their goods on the quay into one-story sheds, where they were sorted according to destination or owner and then hauled with the help of barges to the warehouse that the owners had rented. A crane distributed the wares to the various floors.

The architecture of the warehouse district was based on its relationship to the business world. A self-contained architectural ensemble that recalls medieval cities was constructed in the Speicherstadt, in order to emphasize civic pride and Hamburg's independence—despite forced membership in the German Empire. But from a technical viewpoint the warehouse district was by no means medieval. An ultra-modern »central station« with steam-powered hydraulic and electric power plants moved 260 winches and 36 cranes and lifts.

The city of Hamburg had reacted to external pressure for change self-confidently, in a manner that set trends for the future. Today the warehouse district is one of Hamburg's most important and also best-known landmarks.

Structural change in the port and downtown development

A far-reaching revolution in transportation, changing ports as well as ships, began with the construction of container ships. On May 31, 1968, a vessel that was strictly a container ship docked for the first time in Hamburg.

The sequence of quay moorings, rails, streets and quayside sheds was now no longer needed; rather, as the time ships spent at the docks became shorter and shorter, large unobstructed areas with comparatively short quays were required. Since the containers are themselves receptacles, which moreover can be piled up to the height of a high-rise building, the quayside sheds were no longer needed. The old core of Hamburg's modern port no longer corresponds to contemporary

City eine wichtige Rolle. Für den Bau mussten etwa 1.000 Gebäude und 20.000 Bewohner, die eher zu den »minderbemittelten Schichten« zählten, weichen. Die Stadt handelte dem Reich einen Baukostenzuschuss für den Bau der Speicherstadt von 40 Millionen Reichsmark ab. 1888 wurde der erste Bauabschnitt der Speicherstadt eingeweiht.

Bei der Speicherstadt ging es sich nicht um reine Speicher. Gebaut wurden bis zu siebengeschossige Bauten, in denen hochwertige Güter wie Kaffee, Tee oder Gewürze nicht nur gelagert, sondern von bestens ausgebildeten Spezialisten sortiert, gereinigt und neu gemischt wurden. Die Seeschiffe löschten jetzt also am Kai ihre Waren, die in die ebenerdigen Schuppen – nach Bestimmungsort oder Besitzer sortiert – und dann in die von den Besitzern gemieteten Speicher mit Hilfe von Schuten verholt wurden. Ein Kran verteilte die Waren auf die verschiedenen Böden.

Die Lage zur Geschäftswelt begründete auch die Architektur der Speicherstadt. Es wurde eine an mittelalterliche Städte erinnernde, geschlossene architektonische Einheit gebaut, die den Bürgerstolz und die Eigenständigkeit Hamburgs betonen sollte – der erzwungenen Eingliederung ins Deutsche Reich zum Trotz. In technischer Hinsicht war die Speicherstadt keineswegs mittelalterlich. Eine hochmoderne »Centralstation« mit dampfbetriebenen hydraulischen und elektrischen Kraftanlagen bewegte die 260 Winden, 36 Kräne und Aufzüge.

Die Stadt Hamburg hat auf den äußeren Druck zu Veränderungen selbstbewusst und durchaus auch zukunftsweisend reagiert. Die Speicherstadt ist heute eines der bedeutendsten und auch bekanntesten Denkmale in Hamburg.

Strukturwandel im Hafen und Innenstadtentwicklung

Eine tief greifende Revolution im Transportwesen, die den Hafen und auch die Schiffe veränderte, begann mit dem Bau der Containerschiffe. Am 31. Mai 1968 machte das erste Vollcontainerschiff in Hamburg fest.

Die Abfolge von Kailiegeplatz, Schiene und Straße sowie der Kaischuppen wurde nun nicht mehr benötigt, sondern man brauchte große zusammenhängende Flächen mit vergleichsweise kurzen Kais, weil die Liegzeiten der Schiffe immer kürzer wurden. Da die Container selbst Behältnisse sind, die zudem bis zu Hochhaushöhen gestapelt werden können, werden auch keine Schuppenanlagen mehr benötigt. Der ursprüngliche Kern des modernen Hamburger Hafens entspricht nicht mehr den heutigen Anforderungen an einen

Fig. 6 Overall view of HafenCity in Hamburg

Abb. 6 Übersicht der Hamburger HafenCity

demands on modern harbor operations. Thus a unique chance has opened up for downtown development and for the city as a whole (fig. 6).

HafenCity is now under construction south of the warehouse district. Here 155 hectares formally used by the port and directly adjoining the inner city are being re-used to develop and invigorate the city. In a unique setting—on the Elbe between the warehouse district and the harbor—an urbane, diverse inner city quarter is arising with special cultural and recreational features, including the Elbe Philharmonic Concert Hall, a science center with an aquarium, and a maritime museum; central public institutions such as the HafenCity University; new shopping opportunities and restaurants; significant private enterprises such as a cruise terminal; 5000 apartments for around 12,000 new inhabitants and jobs for more than 40,000 employees.

Establishment of the free port zone with the customs fence as its boundary had cut downtown off from the Elbe. With the removal of the warehouse district from the free port zone and the development of HafenCity, the inner city once again draws closer to the Elbe and gains a riverbank: the warehouse district becomes part of downtown.

Despite considerable war damage the warehouse district is largely preserved and is one of Hamburg's landmarks and outstanding monuments. With its numerous historic warehouses from the late 19th and early 20th centuries and its specific functional, architectural and urban design structure with streets, canals, railroads and interconnected buildings it represents the largest coherent, uniformly designed warehouse ensemble in the world. At the same time it is a picturesque quarter with great visual appeal. The entire warehouse complex has been under protection as a designated historic district since 1991. The city is striving for recognition of the warehouse district together with the shipping company office district as a World Cultural Heritage site.

modernen Hafenbetrieb. Für die Entwicklung der Innenstadt und damit auch für die Entwicklung Hamburgs eröffnet sich eine einmalige Chance (Abb. 6).

Südlich der Speicherstadt auf den alten Hafenflächen entsteht derzeit die HafenCity. 155 Hektar ehemals vom Hafen genutzte Flächen unmittelbar angrenzend an die Innenstadt sind für die Entwicklung und Stärkung der City von Hamburg nutzbar. In einmaliger Kulisse – an der Elbe zwischen Speicherstadt und Hafen – entsteht ein urbanes vielfältiges Innenstadtquartier mit besonderen Angeboten für Kultur und Freizeit, wie die Elbphilharmonie, das Science Center mit Aquarium sowie ein Maritimes Museum, mit zentralen öffentlichen Einrichtungen, die HafenCity-Universität, mit neuen Einkaufsmöglichkeiten und Restaurants, mit bedeutenden privaten Einrichtungen wie ein Kreuzfahrtterminal, mit 5.000 Wohnungen für rund 12.000 neue Bewohner und mit Arbeitsplätzen für mehr als 40.000 Beschäftigte.

Durch die Einrichtung des Freihafens mit dem Zollzaun als Grenze war die Innenstadt von der Elbe getrennt. Mit der Herauslösung der Speicherstadt aus dem Freihafen und der Entstehung der HafenCity rückt die Innenstadt wieder an die Elbe heran und bekommt ein Elbufer, die Speicherstadt wird ein Teil der Innenstadt.

Die Speicherstadt ist trotz erheblicher Kriegszerstörungen zu großen Teilen erhalten geblieben und gehört zu den Wahrzeichen und herausragenden Denkmalen Hamburgs. Mit ihren zahlreichen historischen Speicherbauten des ausgehenden 19. Jahrhunderts und Beginn des 20. Jahrhunderts, ihrer spezifischen funktionalen, baulichen und städtebaulichen Struktur mit Straßen, Wasserstraßen, Eisenbahnanschlüssen und zwischengeschalteten Bauten bildet sie das größte zusammenhängende, einheitlich geprägte Speicherensemble der Welt. Gleichzeitig stellt sie ein malerisches Quartier mit hohen optischen Reizen dar. Seit 1991 steht die Gesamtanlage der Speicherstadt unter Denkmalschutz. Die Stadt strebt die Anerkennung der Speicherstadt zusammen mit dem Kontorhausviertel als Weltkulturerbe an.

Aufgrund der Entwicklung kann die ursprüngliche

Fig. 7 Hamburg, design for the Elbe Philharmonic Concert Hall in HafenCity

Abb. 7 Hamburg, Plan für eine Elblandphilharmonie in der HafenCity

Fig. 8 Hamburg, footbridge for flood-safe access on the northern riverbank, Große Elbstraße

Abb. 8 Hamburg, Stege als hochwassersichere Zugänge am nördlichen Elbufer, Große Elbstraße

Because of modern developments the warehouse district's original use as a place for moving goods cannot be maintained. With this function already partly lost, the warehouse district is increasingly becoming a home for service-oriented offices and cultural institutes. Compatibility with heritage conservation interests is in the foreground for decisions involving future development of this district.

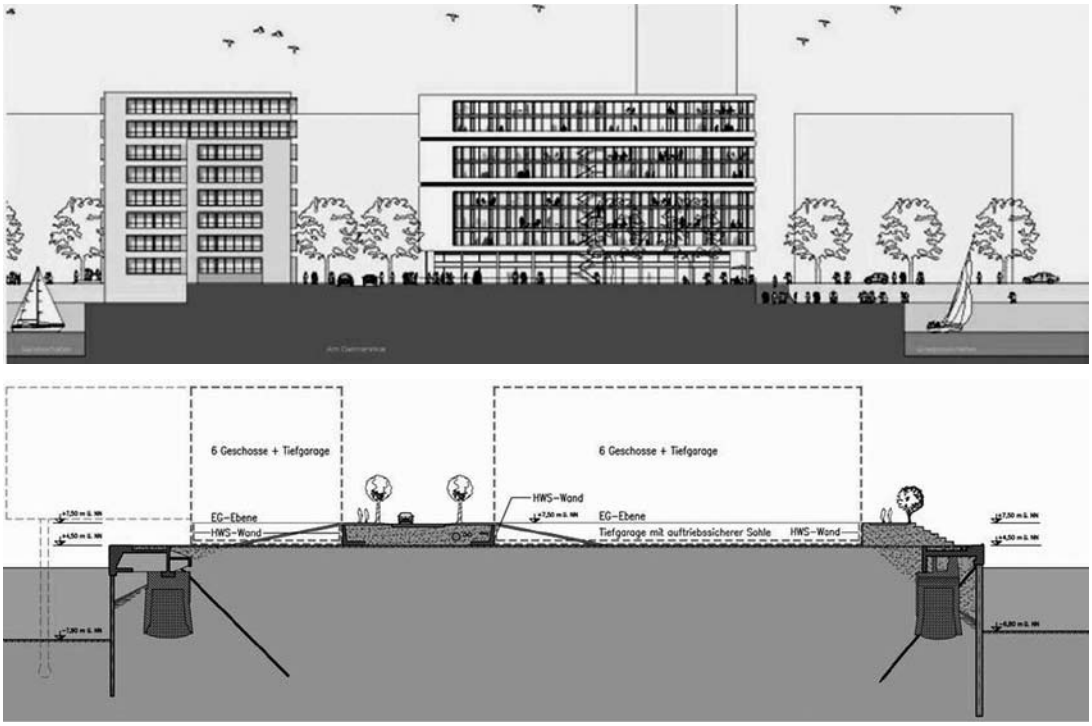
HafenCity is being built on land formerly used by the historic harbor, with the relationship of harbor basins and land areas remaining largely as it was. The Sandtor Harbor basin with its quay walls is preserved and is a listed monument. Only a few historic buildings have survived in the HafenCity area. The old port office at Magdeburg Harbor, in the future center of HafenCity, will be used primarily for gastronomy. Kaispeicher B, also in Magdeburg Harbor, will be reused as a maritime museum. The Heinemann Warehouse next to it is an office building. Kaispeicher A from the 1950s on Dalmann Quay is being rebuilt as the Elbe Philharmonic Concert Hall (fig. 7).

One historic building remains east of Magdeburg Harbor in a row of structures mostly from the 1950s; behind them is Hildebrand Warehouse, which will be reused as a services and cultural »warehouse.«

Nutzung der Speicherstadt nicht aufrecht erhalten werden. Ihre ursprüngliche Funktion als Warenumschlagplatz ist bereits in Teilen verloren gegangen, zunehmend finden Dienstleistungsagenturen und kulturelle Einrichtungen eine Bleibe in der Speicherstadt. Bei Entscheidungen über die künftige Entwicklung steht der denkmalgerechte Erhalt im Vordergrund.

Die HafenCity entsteht auf den historischen Hafenflächen, die Struktur aus Hafenbecken und Landflächen bleibt weitgehend bestehen. Das Sandtorhafenbecken mit seinen Kaimauern ist erhalten und steht unter Denkmalschutz. Im Gebiet der HafenCity sind nur wenige historische Gebäude erhalten geblieben. Das alte Hafenamt am Magdeburger Hafen wird im künftigen Zentrum der HafenCity liegen und überwiegend gastronomisch genutzt werden. Ebenfalls am Magdeburger Hafen steht der Kaispeicher B, der zum Maritimen Museum umgebaut wird. Der daneben stehenden Heinemannspeicher ist ein Bürogebäude. Der aus den 1950er Jahren stammende Kaispeicher A auf dem Dalmannkai wird zur Elbphilharmonie umgebaut (Abb. 7).

Östlich des Magdeburger Hafens stehen noch ein historisches Gebäude in einer überwiegend aus den 50er Jahren stammenden Gebäudezeile und dahinter der Hildebrandspeicher, der zum Dienstleistungs- und Kulturspeicher umgestaltet wird.



Figs. 9 and 10
Hamburg, flood protection in HafenCity: earth mounds and garages are employed to raise the level of streets and buildings above anticipated flood elevations

Abb. 9 und 10
Hamburg, Hochwasserschutz in der HafenCity, Erhöhung der Straßen und Bauflächen durch Dämme und Tiefgaragen

Flood protection for HafenCity and the warehouse district

The flood protection line in the inner city area runs north of the warehouse district. Thus both the warehouse district and HafenCity are within the area endangered by flooding.

The warehouse district has to adapt to high water and possible flooding. Protection is only possible on the buildings themselves, through the use of flood protection gates or doors for the openings. For most of the buildings the possibility of flooding on the lower floors has to be accepted.

Residential uses are not allowed in areas that are not protected from high water. An exception can be permitted only if flood protected access or escape routes can be built (fig. 8).

A new flood protection plan has been developed for HafenCity. Instead of a new line of dikes the city has opted for the so-called *Warften* solution (recalling the artificial dwelling mounds built to protect early settlements in the marshlands of northwestern Germany from floods and high tides) that calls for streets and building sites to be raised about two meters in accordance with the calculated base flood elevation established for Hamburg. Because the quay walls cannot bear any additional loads and the walls themselves should not be raised, promenades along the quay will remain at the original level. The old harbor basins are being preserved.

Garages beneath the buildings will provide the necessary raised level. The ground floors are thus raised above the flood protection level (fig. 9 and 10). This solution

Hochwasserschutz für die HafenCity und die Speicherstadt

Die Hochwasserschutzlinie im Bereich der Innenstadt verläuft nördlich der Speicherstadt. Die Speicherstadt und auch das Areal der HafenCity liegen damit im hochwassergefährdeten Bereich.

In der Speicherstadt musste man sich auf das Hochwasser und mögliche Überflutungen einstellen. Ein Schutz ist nur an den Gebäuden selbst möglich – durch Flutschutztore oder -klappen an den Öffnungen. Bei den meisten Gebäuden bleibt nur die Möglichkeit, Überflutungen im unteren Geschoss hinzunehmen.

In den Bereichen, die nicht hochwassergeschützt sind, ist die Nutzung als Wohnraum ausgeschlossen. Eine Ausnahme kann nur dort zugelassen werden, wo hochwassergeschützte Zugänge oder Fluchtwege gebaut werden können (Abb. 8).

Für die neue HafenCity wurde ein neues Hochwasserschutzkonzept entwickelt. Der Hochwasserschutz wird nicht durch eine neue Deichlinie hergestellt, sondern die Stadt hat sich für eine so genannte »Warften-Lösung« entschieden. Die alten Hafenbecken bleiben erhalten. Straßen und Bauflächen werden entsprechend dem für Hamburg festgelegten Bemessungswasserstand um etwa zwei Meter erhöht. Weil die Kaimauern keine zusätzlichen Lasten aufnehmen können und die Mauern selbst nicht erhöht werden sollen, bleiben Promenaden entlang der Kaimauern auf dem ursprünglichen Niveau.

Unter den Gebäuden werden die Warften durch die notwendigen Tiefgaragen gebildet. Die Erdgeschosse befinden sich oberhalb des hochwassergeschützten Niveaus (Abb. 9 und 10).

allows a quarter-by-quarter development of HafenCity. In the long-term this approach would also make flood protection for the warehouse district possible. When HafenCity is finished and thus the level of the entire area is raised, it would become possible to establish a new flood protection line in front of the warehouse district, by means of a few barriers. This would, however, mean that the historic harbor basins that had always been open to the Elbe would be closed off, and the image of the warehouse district would be changed considerably. Whether or not this solution will be put into effect remains completely open. The decision depends on the future development of the warehouse district, on storm flood dynamics and also on the costs of such a solution, in particular for the necessary barriers.

This discussion should make clear that inner city flood protection, urban development and heritage conservation are closely woven together in the city of Hamburg. It is not always possible to insert the necessary protective structures into the cityscape without causing problems, and flood protection systems are not always without conflict with heritage conservation goals. Moreover there are discernible limits to an effective flood protection system because external influences, such as the consequences of climatic change, can hardly be controlled.

All planning decisions have to take multiple aspects into consideration and must be carefully balanced with a view toward sustainable urban development.

Diese Lösung erlaubt die quartierweise Entwicklung der HafenCity. Langfristig ermöglicht diese Lösung auch den Hochwasserschutz für die Speicherstadt. Wenn die HafenCity fertig gestellt sein wird und damit insgesamt erhöht wurde, ergibt sich die Möglichkeit für eine neue Hochwasserschutzlinie vor der Speicherstadt, die über wenige Sperrwerke herzustellen wäre. Damit würden allerdings die bisher zur Elbe offenen historischen Hafenbecken geschlossen werden, das Bild der Speicherstadt würde sich erheblich verändern. Ob diese Lösung realisiert wird, ist jedoch völlig offen. Eine Entscheidung bleibt abhängig von der künftigen Entwicklung der Speicherstadt, der Sturmflutdynamik und auch der Kosten einer solchen Lösung, insbesondere für die erforderlichen Sperrwerke.

Ich hoffe, mit meinem Beitrag verdeutlicht zu haben, dass in Hamburg in der Innenstadt Hochwasserschutz, Stadtentwicklung und Denkmalschutz eng mit einander verwoben sind. Notwendige Schutzbauwerke lassen sich nicht immer problemlos in das Stadtbild einfügen und stehen nicht immer konfliktfrei zu den Zielen des Denkmalschutzes. Zudem sind Grenzen eines wirksamen Hochwasserschutzes erkennbar, weil äußere Einflüsse, wie Folgen des Klimawandels, wenig beeinflusst werden können.

Alle planerischen Entscheidungen müssen mehrere Aspekte berücksichtigen und mit Blick auf eine nachhaltige Stadtentwicklung wohl ausbalanciert sein.

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Josef Štulc

The 2002 Floods in the Czech Republic and their Impact on Built Heritage

Disastrous floods that surpassed all historical records hit a vast area of Bohemia in August 2002. Hydrologists estimate that the water reached peak levels corresponding to a 500-year flood. Approximately 505 towns and villages were flooded, including cities whose historic cores are protected as conservation areas; two of them, Prague and Český Krumlov, are listed on the UNESCO World Heritage List (fig. 1–3). In five regions of the Czech Republic the government had to declare a state of emergency during the floods, which enabled it to take extraordinary measures (fig. 4–10). The gross estimate of the damage incurred is 3 billion Euros, of which Prague is supposed to have suffered losses of about 330 million Euros.

Since stone, brick and lime were the usual building materials in Bohemia from the Middle Ages onwards, our soundly built historic towns as well as churches, castles, country houses and other important components of our built heritage survived the floods in surprisingly good condition. Fortunately, only a few really important monuments with valuable artistic decoration were seriously damaged.

The broader summary of the flood's impact on the stock of non-listed vernacular buildings, which nonetheless represent a traditional way of construction, is by far not so optimistic. In contrast to the monumental stone and brick structures, vernacular houses in villages and suburbs were frequently built with adobe (raw-brick) or different second-hand materials joined with a very lean mortar. The flood had a fatal impact on such buildings. A large number of them collapsed immediately, many others had to be pulled down because of serious cracks and other irreparable structural damages. In my view any building, even the poorest traditional building, has become irreplaceable because of globalization and standardization of present-day building production. Therefore, the collapse of so many traditional buildings must not only be considered as a material loss, but also as a great and irreversible cultural loss.

The collections of museums and art galleries, libraries and archives suffered immensely. Unfortunately, the depositories of these institutions were frequently located in the basements and ground floors of their buildings. Many valuable items from these collections were lost, a great part of them was salvaged from the stinking mud in a very damaged condition and stored provisionally in capacity deep-freezers.

What failed most during the floods was risk preparedness and on-time information. In areas with frequent floods people have never stored any goods and materials of high value in the cellars and ground floors of their houses. They have always left the roof space of their houses free to be able to transfer their belongings there from the lower floors

Fig. 1 Prague, Malá Strana, Nostic Palace, an important Baroque palace from the 17th century, featuring rich decorations of its interiors from the first third of the 18th century. The palace was flooded up to a height of 50 centimeters. Consequently, all wooden floors on the ground floor were destroyed, the walls were waterlogged and the wooden doors were damaged.

Fig. 2 Prague, Karlin. In the historical quarter St. Cyril and Methodius Church, an important work of neo-Romanesque architecture by Ignacius Ullmann, was flooded. Water rose there to a height of 1.6 meters, damaging the wall paintings and all movable objects.

Fig. 3 Český Krumlov, historical centre of the Conservation Area. As one of the most complex town cores from the Gothic and Renaissance periods, it was listed on the UNESCO List of World Cultural and Natural Heritage in 1992.

in the case of a flood. When the flood was over they never removed the plaster but patiently waited until the walls had become dry again. Then they lime-washed the rooms and cellars and put the furniture back.

This wise practice, the result of long experience, was completely forgotten in recent times. During the last ten or twelve years the value of the houses situated in the central parts of the cities, including the inundation zones, has increased enormously. The owners therefore have not left an inch of usable space unused. They installed new offices or flats in the roof spaces and opened shops or various pubs, taverns, bars etc. with expensive equipment in the basements and cellars.

The result was that when the flood came, they had no chance to move their belongings to a safe place. The situation was even worse since no evacuation plans existed. For decades, the citizens of Prague had lived with the false conviction that the vast system of dams on the Vltava River would completely protect the city against high water. A warning and information on the enormous scale of the coming flood was released by the authorities only a couple of hours before the catastrophe. Immediately after that people had to be evacuated in the shortest time possible, so that they had to leave all their belongings behind. To prevent looting the police made flooded quarters inaccessible for a couple of weeks. If people had been informed earlier and if the evacuation had been better prepared, owners could have saved much of their property. The losses of movable cultural properties in museums could also have been minimized.

For the authenticity of historic buildings, the period after the flood is perhaps even riskier than the disaster itself. Serious problems started when the contractors and producers of building materials used the opportunity to extract money from the situation. They started a fierce campaign offering their services and products to the owners of flooded buildings. Their aim was to repair the affected buildings not only on the necessary scale, but in the form of a radical reconstruction. They suggested ripping out all the plaster and replacing wooden elements such as floors, windows, doors, in many cases even ceiling timbers with steel, plastic and other modern materials. This was done without any serious assessment as to whether the suggested interventions were justified by truly bad conditions of the elements that were to be replaced. The financial help given to the victims of the flood by the state even accelerated this process. The badly needed money was often wasted on unnecessary interventions, depriving the traditional buildings of their former beauty, authenticity and the feeling of age.

The position of the professional state conservators in the process of eliminating flood damages was not an easy one. We organized colloquia and specialist meetings on how to treat buildings affected by water. With the participation of the best specialists from the Technical Universities in Prague, Brno and Ostrava as well as of the most experienced conservators, we produced booklets containing useful know-how and practical advice on how to treat the affected buildings considerately and with adequate respect for their material authenticity. The booklets were distributed to a large number of concerned state and municipal authorities free of charge.

Nonetheless, in the tense atmosphere after the flood these activities failed to work. In the newspapers and other media the conservationists were described as notorious troublemakers who were making the uneasy, sometimes rather tragic situation of people deprived of all their properties even more difficult. Our well meant technical advice was frequently taken as an »undue« or even »impertinent« interference into the owner's rights and interests. We

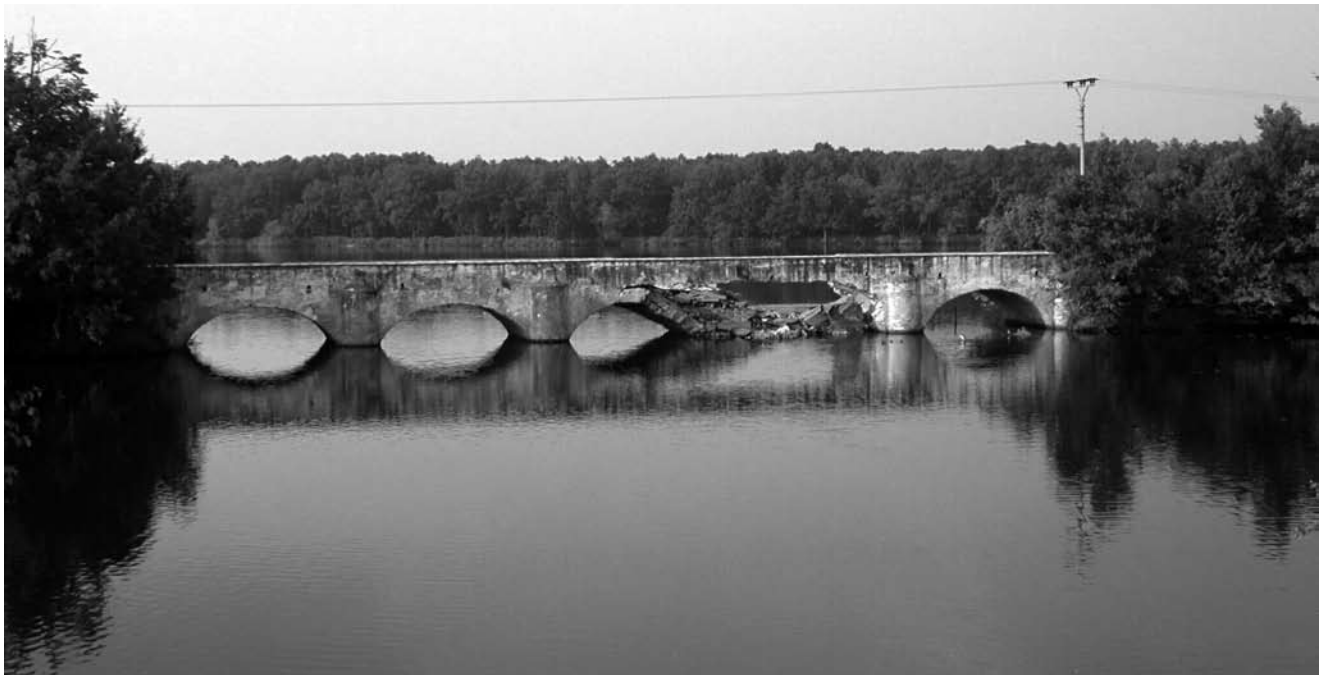


Fig. 4 Stará Hlína, the Inundation Bridge, a masonry bridge from 1781, historically located in the Třeboň pond system. Part of the bridge collapsed; it is necessary to reconstruct the bridge pillar as well as two bridge spans.

practically lost our struggle against building contractors and their massive publicity. Finally, since we found no support among the state authorities, including the Ministry of Culture, our part in the after-flood recovery of the country nearly collapsed. We had to focus our efforts only on the handful of first-rate monuments owned by the state. After difficult negotiations, we were able to cooperate positively with some municipal authorities when municipal property was concerned and with the churches. In the case of private proprietors, however, we became practically powerless.

The results of this situation were rather sad: a number of fully reparable traditional buildings pulled-down without sufficient reason and hundreds of them mutilated by the »reconstructions« mentioned above. A very dangerous after-flood process could be observed in some big cities: real estate speculation. Many owners and developers who wished to invest in the historic centres of towns tried to put their houses into the category of so-called »irreparably damaged structures« to be allowed to pull the houses down and replace them with larger buildings no longer used for housing (with rents regulated by the state), but for more lucrative offices, commerce and parking.

There is another field in our post-flood situation which deserves a critical comment. It is our unpreparedness to accept and efficiently use the help from abroad offered immediately after the flood was over. Only a few clerks working for the authorities can speak English. The result was that they preferred to wait until the money from the state budget came and did not bother to accept rather complicated foreign help. In this context I would like to express my thanks from the bottom of my heart for extremely generous financial and material help that came from Great Britain, Germany and Switzerland. Among others it helped to save and restore an extremely valuable archive of architectural drawings and plans which was in the care of the National Technical Museum in Prague.After this very brief description I would like to give some conclusions and generalizations derived from our experience.

First of all we must realize and get used to the fact that the floods are going to come again and again in the future. We must become much better prepared. The terrible losses caused by the last flood could have been much less had the human factor not failed so blatantly.

- No factories and storehouses producing or storing oil and chemicals should be located in the inundation areas (a strong opposition and lobbying against this idea is under way); no big chemical plant has been transferred to a safer place yet.
- In houses threatened by floods no valuable objects, equipment or goods should be stored. All items of cultural value should be definitely transferred away from inundation areas (this principle has already been partly fulfilled by the state museums and archives).
- Historic buildings of stone or brick can resist high water without serious consequences. Such buildings hardly need any special protective interventions. It is better to let the water flow in and out of them rather than to mutilate them by protective walls. A very wise measure proved to be that of the Hilton Hotel which

Fig. 5 Písek, the oldest medieval stone bridge in Bohemia from the period after 1250 with Baroque sculptural decorations. The bridge was completely under water, the breastwork walls made of granite square stones and one copy of the Baroque statues collapsed because of the flood.

Fig. 6 Liběchov, historic country house and park, an important Baroque building by the excellent Czech architect F. M. Kaňka, built about 1730, with a park established in a formal style and decorated with numerous sculptures. The historic country house was flooded up to a height of 3.5 meters. Very valuable wall paintings by the well-known Czech painter Josef Navrátil are in critical condition. The valuable park was devastated and muddied.

Fig. 7 Terezín, fortress. The original fortifications are based on Baroque fortification systems of the 17th century. During the August 2002 floods, Terezín and surroundings were flooded up to a height of 3 meters. The historically valuable underground protection system of the fortress was also badly damaged.

Fig. 8 Veltrusy, historic country house area and landscape park, an important work of the high Baroque period from the first half of the 18th century, probably designed by the important architect F. M. Kaňka or G. B. Alliprandi. The Veltrusy historic country house was flooded up to a height of about one meter. Interior plasterwork in the ground floor, wall paintings and valuable decorations in the sala terrena were damaged. The landscape park is completely destroyed

filled its basement with clean water, thus avoiding having it fill with dirt and mud.

– It is not good to rely exclusively on protective walls or mobile barriers; the water finds its way into the buildings nonetheless in the form of »subterranean rivers« of subsoil water penetrating also through the drainage and sewerage, through collectors and other man-made ways. In my opinion, good risk-preparedness programmes and individual well-prepared and trained evacuation plans are more effective than the barriers whose function may have very bad side-effects (e. g. water penetrating from drainage can create lagoons which are difficult to exhaust).
– The flood water is heavily contaminated; during all rescue operations strict hygienic rules must be followed.

Fig. 9 Děčín, stone bridge in the late medieval Gothic style with a sculptural group of St. Vitus, St. John of Nepomuk and St. Wenceslas by the sculptor M. J. Brokof from 1714. One of the pillars was damaged by the flood and the bridge statics was affected.

Fig. 10 Štětí, area of St. Simon and Juda Church, 1785. Church foundations at the sidewall were undermined; plasterwork, stone components and movable objects are damaged.

- After a flood it takes a long time before subsoil water levels drop again. This process should not be speeded up. Premature pumping out of water from the cellars can result in cracks and other structural problems.
- The drying of wet masonry is also a slow process. It is possible to speed it up by carefully chosen means (heating, ventilation, dehumidifiers). In the case of murals, stucco decorations and other artistic elements the assistance of specialists is absolutely necessary. Experience has proved that removing lime plaster has no speeding effect and that only building contractors will benefit from it. On the other hand, it is highly advisable to remove all cement plasters, oil paints and other vapour-proof materials from the walls. The same applies to materials used on the floors.
- High humidity supports the growing of all kinds of mould and rot. It is advisable to dismantle and remove all wooden elements from the flooded rooms and let them dry and be specially treated in a separate place. After the appropriate treatment these elements can be returned later to their original place and can continue to fulfil their function without any problems.
- The post-flood condition of culturally valuable buildings and objects and all rescue operations should be carefully documented (photographs, sketches etc.).
- Floods generate emotions, hysteria and unpredictable reactions not only on the part of the victims but among the entire population. People tend to make unreasonable decisions and unobjective judgements. Especially those who objectively speaking are to be blamed will soon start looking for scapegoats. Conservationists are often among the first to be unjustly accused.

Thomas Will

Integrating Technical Flood Protection and Heritage Conservation Planning for Grimma, Saxony[1]

Integration von Hochwasserschutz und Denkmalschutz. Das Beispiel von Grimma/Sachsen[1]

August 2002 brought unprecedented amounts of rainfall in Saxony that within a few hours turned small creeks into terrifying torrents and calm rivers into devastating masses of muddy water. The city of Grimma was one of the worst affected of the many places flooded in Saxony. The Mulde River, a tributary of the Elbe, reached the highest water level ever recorded there, putting the historic center under as much as 3.5 m of flood waters. The steep gradient of the Mulde Valley and the town's location at a bend in the river contributed to the very high velocity of the flood waters, which destroyed or badly damaged almost 700 houses in Grimma alone (fig. 1).

The loss of lives, houses, property, places of work and infrastructure abruptly boosted people's awareness of the high risks of living by a river and of the need to meet that risk with prevention. It also convinced the Saxon State Ministry for Environment and Agriculture to update public flood protection on both a regional and a local scale. Comprehensive flood protection concepts for all the bigger rivers in Saxony and their catchment areas were prepared by the Dam Authority; the concept for the Mulde was approved in 2004 and is the basis for planning in Grimma[2] (fig. 2 and 3).

Grimma is a small city of c. 18,000, situated on a terrace in the Mulde River valley, not far from Leipzig. What distinguishes it from many other towns is its unusually well preserved setting in the river landscape, with a largely intact medieval city wall still bordering the riverbank. Historic urban and landscape ensembles of great beauty,

1 A preliminary version of this article appeared under the title Denkmalschutz vs. Hochwasserschutz? Abwägungen zwischen Substanzschutz, Stadtbildschutz und technischem Hochwasserschutz für Grimma, Sachsen, in: Konferenz Nationaler Kultureinrichtungen (ed.), Sicherheit und Katastrophenschutz für Museen, Archive und Bibliotheken, Dresden 2007, pp. 70–75.

2 Hochwasserschutzkonzept Mulden im Regierungsbezirk Leipzig, Planungsgesellschaft Dr. Scholz mbH, unpublished action plan authorized by the Landestalsperrenverwaltung (Dam Authority) des Freistaates Sachsen, Dresden, January 2004.

Im August 2002 erlebte Sachsen, wie auch einige der benachbarten Regionen, Regenfälle in einer bislang unbekannten Größenordnung. In wenigen Stunden verwandelten sich kleine Bäche in reißende Sturzfluten und beschauliche Mittelgebirgsflüsse führten verheerende, schlammige Wassermassen heran. Unter den zahlreichen überschwemmten Städten in Sachsen war Grimma mit am schwersten betroffen. Die Mulde, ein Nebenfluss der Elbe, stieg auf den höchsten je gemessenen Pegelstand und überflutete die Altstadt bis zu 3,50 m hoch. Das Gefälle der Talsohle und die Lage im Flussbogen führten zu hohen Strömungsgeschwindigkeiten, fast 700 Häuser wurden teils stark beschädigt oder zerstört (Abb. 1).

Die Verluste an Menschenleben, an Häusern und Ortschaften, an Sacheigentum, Arbeitsstätten und Infrastruktur machten den Menschen schlagartig (wieder) bewusst, in welchem Risiko Städte am Fluss sich befinden und wie entscheidend es ist, dieses Risiko durch vorbeugende Maßnahmen zu minimieren. Das Sächsische Staatsministerium für Umwelt und Landwirtschaft reagierte auf die Flutkatastrophe im März 2003 mit dem Erlass zur Bearbeitung von Hochwasserschutzkonzepten (HWSK) für alle Gewässer 1. Ordnung. Das Konzept für die Vereinigten Mulden wurde 2004 bestätigt und ist Grundlage der Planungen für Grimma.[2]

Grimma, eine Kleinstadt mit ca. 18.000 Einwohnern, liegt auf einer Flussterrasse im Muldental nicht weit von Leipzig. Die Altstadt ist in einer für Sachsen einzigartigen Weise in ihrer vorindustriellen Geschlossenheit und Bezogenheit auf den Fluss erhalten geblieben. Die in die Flussaue eingebettete städtische Uferzone ist als Silhouette prägend für das Stadtbild und für das Selbstverständnis der

1 Eine Kurzfassung dieses Beitrags unter dem Titel: Denkmalschutz vs. Hochwasserschutz? Abwägungen zwischen Substanzschutz, Stadtbildschutz und technischem Hochwasserschutz für Grimma, Sachsen, erschien in: Sicherheit und Katastrophenschutz für Museen, Archive und Bibliotheken, hg. von der Konferenz nationaler Kultureinrichtungen (knk), Dresden 2007, S. 70–75.

2 Hochwasserschutzkonzept Mulden im Regierungsbezirk Leipzig, Planungsgesellschaft Dr. Scholz mbH, Dresden, Januar 2004.

Fig. 1 Grimma. Historic town center during the flood in August 2002

Abb. 1 Altstadt während des Hochwassers im August 2002

Fig. 2 Grimma. Aerial photo

Abb. 2 Grimma, Luftbild

mostly situated along the river, make the city attractive to both inhabitants and visitors.

The comprehensive regional plans led to the commission of more detailed flood control planning, carried out by hydraulic engineers. An initial, technically oriented proposal for Grimma was promptly rejected by both the city council and the permit authority. The citizens saw themselves confronted with the prospect of being blocked off from the river by a monolithic concrete wall stretching 1200 m and rising about 3 m (fig. 4a and 4b). It was obvious that realization of this proposal would inevitably involve severe and irreversible damages not only to the river landscape, but also to the functional and aesthetic qualities of the city and in particular to the historic fabric and the visual experience of the architectural heritage. The functional aspects of the proposal were not questioned, but controversial discussions led to the general agreement that for a place such as Grimma with its valuable stock of historic buildings flood control planning based solely on hydraulic and monetary parameters is insufficient, if not counteractive, since it is likely to screen off, damage or even destroy those elements and features that (in addition

Stadt. Mit der spätmittelalterlichen Stadtmauer vor einer Kette von Bürgerhäusern, mit markanten uferbegleitenden Monumentalbauten, den begrenzenden Grünanlagen entlang des ehemaligen Wallrings sowie der barocken Steinbrücke – die beim Hochwasser 2002 leider weitgehend zerstört wurde – besitzt das Stadtensemble hohen Denkmalwert. Die seltene Situation, dass eine mittelalterliche Stadt sich mit ihrer Mauer so nah an den Fluss herangewagt und dort bis heute ohne wesentliche Änderungen überdauert hat, macht Grimma in dieser Hinsicht zu einem besonders schützenswerten, aber auch schwierigen Sonderfall (Abb. 2 und 3).

Erste von der Landestalsperrenverwaltung (LTV Sachsen) als zuständiger Behörde beauftragte Planungen für einen Schutz vor neuerlicher Überflutung stießen sowohl beim Stadtrat wie bei der höheren Genehmigungsbehörde auf Ablehnung, denn sie ließen erkennen, dass damit erhebliche Eingriffe in das überlieferte Stadt- und Landschaftsbild verbunden sein würden. Die Bürger sahen sich mit der Vorstellung konfrontiert, durch eine monolithische Betonmauer von über drei Metern Höhe und mehr als 1 km Länge vom Fluss abgeschnitten zu werden (Abb. 4a und 4b). Zwar wurden die Schutzbemühungen und die funktionale

Fig. 3 Grimma. Bank of the Mulde River with the city wall

Abb. 3 Grimma, Muldeufer mit Stadtmauer

Fig. 4a View from the stone bridge to the palace

Abb. 4a Blick von der Steinbrücke zum Schloss

Fig. 4b Preliminary technical planning for a flood wall, photomontage

Abb. 4b Technische Vorplanung der Schutzwand, Fotomontage

to its foremost task of safeguarding the population) it is supposed to protect.

As a consequence, an individual course of action has been called for: flood protection in historic urban areas must be seen as part of a complex planning process and needs to be integrated with other related activities, such as town planning and urban design, historic preservation, environmental protection and design, local economy and infrastructure, recreation, and tourism.

Our team of architects and landscape architects from the Technical University (TU) in Dresden was called in for consultation to help meet these objectives. The TU project supports specialized flood protection planning in its design phase and is intended to raise the quality of the hydraulic-technical proposals with regard to their urban design, landscape design and historic preservation

Leistungsfähigkeit dieser Vorschläge nicht in Zweifel gezogen, doch wurde deutlich eingefordert, ein anderes Vorgehen zu wählen: für eine Stadt wie Grimma mit ihrem wertvollen Denkmalbestand muss der technische Hochwasserschutz als komplexe städtebauliche Maßnahme behandelt und sorgfältig in die Altstadt integriert werden.

Diesem Ziel dient das Projekt der Arbeitsgruppe Grimma der Technischen Universität Dresden.[3] Es unterstützt die wasserbaulich-technische Fachplanung im Entwurfstadium und soll diese hinsichtlich ihrer städtebaulichen, landschaftsgestalterischen und denkmalverträglichen Ausbildung weiter

3 Thomas Will und Joachim Tourbier, mit Heiko Lieske, Antje Fleischer, Tobias Reckert, Andreas Ammon: Hochwasserschutz für Grimma. Städtebauliche Einordnung, 2 Bde., unveröffentlichtes Plangutachten im Auftrag der Landestalsperrenverwaltung des Freistaates Sachsen, GWT/TU Dresden mbH, Dresden 2005.

components. To this end, alternatives were drawn up for placement of the flood protection structure along the riverbank.[3]

Flood protection as an urban design task

Flood protection that is directed to saving lives and property in a city is a priority task. Yet it must not be considered in isolation from other urban functions, if only for the reason that the affected people will themselves be weighing the importance of flood risk reduction against other merits of their town, for instance the attractiveness and functionality of its urban spaces and its relationship to the river.

Two crucial questions arise here regarding the urban design of a flood protection system:

- How can the structure be designed so that, in addition to its central but only rarely needed protective function, it can make a positive contribution to urban development?
- How should the structure present itself within the city, particularly in a historic center where small-scale, pre-industrial building patterns cannot easily absorb a large-scale technical intervention?

In the historic city of Grimma the planned erection of flood walls will permanently change the familiar appearance of the waterfront. Thus it is within the public's interest that the structures that will protect it against a so-called »one-hundred-year flood,« planned in the aftermath of just such an event, not be conceived as a purely technical measure focused only on this rare emergency situation. In addition to the protective function other tasks must be fulfilled if the intervention is to be useful as a whole. Just as, long ago, the city walls or later the railway lines took on other functions beyond their specific, practical task and helped shape the city's image and identity, the flood protection wall will take on a meaning that goes beyond fulfillment of its central task. Consideration must be given here above all to the requirements of public space, townscape and historic preservation, since these factors contribute significantly to a town's quality of life and to its attraction as a location.

Initial design conclusions can be derived from the type and purpose of the protective structure:

3 Thomas Will and Joachim Tourbier, with Antje Fleischer, Heiko Lieske, Andreas Ammon, Tobias Reckert: Hochwasserschutz für Grimma. Städtebauliche Einordnung, 2 vol., unpublished study commissioned by the Landestalsperrenverwaltung (Dam Authority) des Freistaates Sachsen, GWT/TU Dresden mbH, Dresden 2005.

qualifizieren. Hierzu wurden für die uferbegleitenden Bauabschnitte Alternativen zur Einordnung der Schutzbauwerke aufgezeigt.

Hochwasserschutz als städtebauliche Aufgabe

Die zu schützenden Menschen und Sachen besitzen als Schutzgüter beim Hochwasserschutz erste Priorität. Doch darf dieser Schutz nicht isoliert von den Standortbedingungen, vor allem den städtebaulichen Funktionen betrachtet werden, schon deshalb, weil die betroffenen Menschen selbst abwägen können und werden, wie wichtig ihnen die Verminderung des Hochwasserrisikos ist im Vergleich mit anderen Vorzügen der Altstadt, zum Beispiel der Attraktivität und Funktionalität des städtischen Raums und seiner Bezüge zum Fluss. Nur wenn die Menschen den geschützten Ort auch schätzen, ist der Schutzaufwand sinnvoll und vertretbar.

Für die städtebauliche Integration der Hochwasserschutzbauten ergeben sich hieraus zwei Kernfragen:

- *Wie lassen sich die Schutzbauwerke so gestalten, dass sie neben ihrer eigentlichen, aber nur selten auszuübenden Schutzfunktion auch andere städtebauliche Aufgaben übernehmen können, die zu einer positiven Stadtentwicklung beitragen?*
- *Wie sollen sie sich in der Stadt zeigen, insbesondere in der historischen Altstadt, deren kleinteilige, vorindustriell geprägte Baustruktur für technische Großbauwerke nur begrenzt aufnahmefähig ist?*

Die vorgesehene Errichtung von Schutzbauten wird das vertraute Gesicht der Altstadt auf Dauer verändern. Es liegt deshalb im öffentlichen Interesse, dass diese »Jahrhundertmaßnahme«, die einer »Jahrhundertflut« folgt, nicht auf den selten eintretenden Ernstfall beschränkt und als rein technische Maßnahme konzipiert wird. Neben die Schutzfunktion treten weitere Aufgaben, die zu erfüllen sind, wenn die Anlage insgesamt funktionstauglich sein soll. Wie einst die alten Stadtmauern oder später die Eisenbahnlinien neben ihrer spezifischen, praktischen Funktion zusätzliche – teils praktische, teils symbolische – Funktionen übernommen haben und damit auch das Bild und die Identität der Stadt und die Praxis des täglichen Lebens prägten, so wird der Hochwasserschutzmauer eine Bedeutung zukommen, die über die Erfüllung ihrer Kernaufgabe hinausgeht. Vor allem die Belange des öffentlichen Raumes, des Stadtbildes und des Denkmalschutzes sind hierfür zu berücksichtigen, tragen diese Faktoren doch maßgeblich zur Standort- und Lebensqualität der Stadt bei.

Aus der Art und dem Zweck des Schutzbauwerks lassen sich erste gestalterische Folgerungen ableiten:

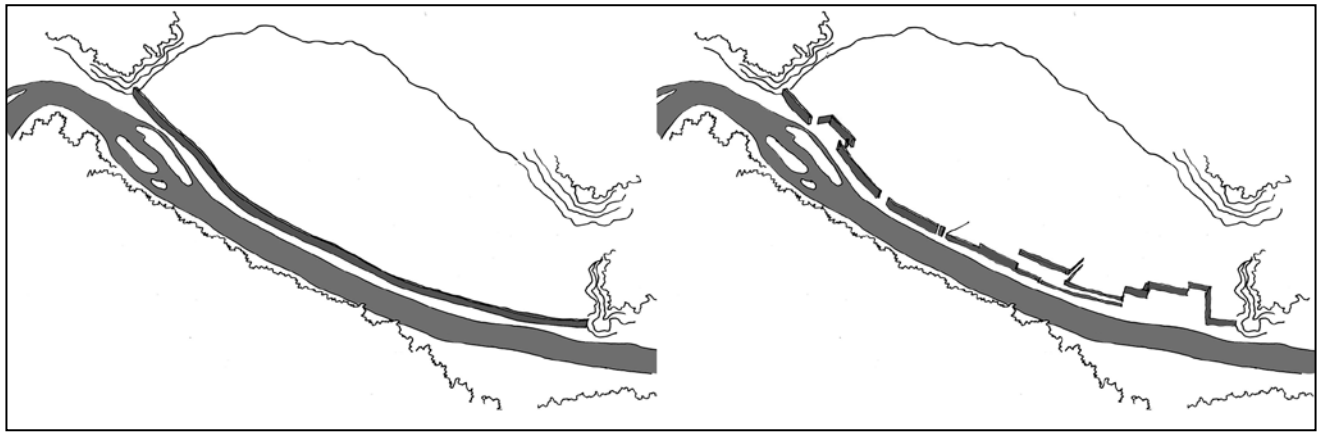


Fig. 5 Technical flood wall (left) and integration into urban fabric (right)

Abb. 5 Technische Hochwasserschutzbarriere (links) und städtebauliche Integration der Trassenführung (rechts)

Legibility, unity in diversity

A structure that is intended to protect against a devastating flood will not go unnoticed in the urban fabric. In Grimma it will be clearly discernible because its corridor is narrow and runs precisely along those parts of the riverbank that are clearly visible and are among the most valuable public spaces.

Because it will not be possible to conceal a barrier more then a kilometer long and as much as one story high, it is all the more imperative that it be:

1. appropriately subdivided and carefully integrated into the existing waterfront,
2. but also designed so that its purpose is recognizable.

Just as the hydro-mechanical flood control system will consist of various components that must function together as a whole at the crucial moment, the structure's urban and architectural form should be marked by the diversity of its pieces, which should nonetheless be perceivable as a whole. This poses the almost paradoxical task of rather discreetly fitting a large technical structure that demands functional unity and perfection into the existing situation in an unimposing, almost casual manner (fig. 5).

Preservation of character, necessity for innovation

Since the flood protection structure cannot be isolated from the town but rather must be integrated into it, it should respect the town's special character. If designed contextually, it can even strengthen certain characteristic features. But because of its size and its necessary linearity (a result of the horizontal line of the base flood elevation), it will also introduce something new that cannot be overlooked, and thus must be designed to make a valid contribution to the development of the townscape. If design efforts were instead limited to restricting damage to the

Ablesbarkeit, Einheit in der Vielfalt

Der Korridor für die Trassenführung der Schutzanlage ist eng und liegt in jenen ufernahen Bereichen, die gut einsehbar sind und zu den wertvollsten des öffentlichen Stadtraums zählen. Da es nicht möglich sein wird, eine fast zwei Kilometer lange, geschosshohe Barriere zu verbergen, ist es um zwingender, dieses Schutzbauwerk:

1. *einerseits sinnvoll zu gliedern und behutsam in die bestehende Stadtkante zu integrieren.*
2. *es aber auch so auszubilden, dass seine Aufgabe im Stadtraum erkennbar wird.*

So wie das hydromechanische Gesamtsystem der Anlage aus verschiedenen Teilbereichen bestehen wird, die im entscheidenden Moment als Ganzes funktionieren müssen, so sollte auch die städtebauliche Präsenz des Bauwerks durch eine Vielfalt der Teile geprägt sein, die sich dennoch in der Wahrnehmung und der städtischen Praxis als Einheit erweist. So stellt sich die fast paradoxe Aufgabe, ein großes technisches Bauwerk, das funktional Geschlossenheit und Perfektion erfordert, gestalterisch eher diskret und locker gegliedert, fast spielerisch und jedenfalls nicht auftrumpfend in den Bestand einzufügen (Abb. 5).

Bewahrung der Eigenart, Anspruch auf Neues

Da das Bauwerk nicht isoliert neben die Stadt gestellt werden kann, sondern in sie integriert werden muss, sollte es ihre Eigenart respektieren. Wenn es wie gute kontextuelle Architektur geplant wird, kann es bestimmte Charakteristika sogar verstärken. Es wird aber bei seiner Größe und der horizontalen Linearität, die aus der einheitlichen Pegelhöhe des vorgegebenen Schutzniveaus zwingend folgt, auch etwas Neues hereinbringen. Weil dies unübersehbar sein wird, sollte es mit dem Anspruch gestaltet sein, einen gültigen Beitrag für das Stadtbild im Sinne einer Weiterentwicklung

Fig. 6 Grimma. Analysis map: historic town center surrounded by circular green belt and city park

Abb. 6 Grimma, Karte aus der Stadtanalyse: Die Altstadt umgeben von Grünring und Stadtwald

townscape or creating a pretty facade for a necessary evil, it would hardly be possible to avoid development of anonymous, unpractical or unfriendly situations in the urban environment.

A careful aesthetic *integration*, however, would not be enough by itself. Such a large and complex structure also presents a challenge and a chance for the *development* of the riverbank area. Therefore the more comprehensive goal must be not to degrade the waterfront to a purely protective zone for the rare case of a disaster, but rather to increase its value for the city by improving its usability and quality for residents and guests. Flood protected, well-designed and easily accessible riverfronts are highly attractive urban features today. They improve the living and recreational conditions in the dense cores of old cities and thus also enhance the value of the real estate. In the future the quality of urban public space will be one of the most important factors as decisions are made about where to live, establish businesses or services, or visit as a tourist.

zu leisten. Wollte man die Gestaltungsbemühungen auf die Schadensbegrenzung oder die hübsche Verpackung eines notwendigen Übels beschränken, wäre es kaum zu verhindern, dass anonyme und im städtischen Alltag unpraktische oder unfreundliche Situationen entstehen. Das Flussufer darf also nicht zur reinen Schutzzone für seltene Katastrophenfälle degradiert werden. Umfassenderes Ziel muss es vielmehr sein, seinen Stellenwert für die Stadt zu steigern, indem auch die Nutzbarkeit und Aufenthaltsqualität für Einwohner und Gäste verbessert wird. Hochwassersichere, gut gestaltete und großzügig erschlossene städtische Uferbereiche genießen heute höchste Attraktivität. Sie können den Wohn- und Freizeitwert der Altstadt steigern und damit auch zum Wert des Standorts insgesamt und seiner uferbegleitenden Immobilien beitragen. In einer Zukunft zunehmend mobiler Menschen und Arbeitsplätze wird die Qualität des öffentlichen Raumes in der Stadt einer der wichtigsten Standortfaktoren sein für die Wohnortwahl, den Einzelhandel, die Dienstleistungsunternehmen und für die Touristik.

Integrated flood control planning

Hydraulic preconditions and requirements

In accordance with legal requirements in Saxony, flood control structures have to be dimensioned to withstand flooding events up to a 100-year base flood elevation. Because of the limited space in the narrow river valley in the town of Grimma, such structures there need to be rather high, in some sections up to 3.7 m. Unfortunately there is no possibility of employing temporary elements such as stop logs in Grimma, since the forecast lead time in case of a flood is only about 10 to 12 hours.

Investigations were undertaken already during development of the regional flood protection plans to determine the extent to which other preventive measures—such as reservoirs, establishment of retention areas in the upper course of the river, clearing off of foreland, flow ditches or tunnels, etc.—could help to avoid or diminish massive flood walls in the town. But regional hydrological analyses and extensive hydraulic engineering models (both computational and physical) showed that, because of the specific hydro-morphological situation, precautionary regional flood protection measures used effectively to protect other towns would not be sufficient to significantly reduce the danger of flooding in Grimma.[4]

Townscape, landscape, and cultural heritage considerations

In order to devise flood control structures that would meet the hydraulic requirements without destroying or unduly damaging the cultural, spatial and landscape values of the Grimma riverside, alternatives to the initial plan had to be developed. To this end comprehensive analyses were made to describe and visualize topographical, spatial, environmental, aesthetic and functional qualities of the city and its relationship to the river (fig. 6).

Evaluation of these findings led to the formulation of four main strategies for the design of the flood control structures:

1. *Location*: pushing the alignment beyond the river banks as far as possible

4 Hochwasserschutzkonzept (note 2) and Hans-B. Horlacher/Dirk Carstensen/Holger Haufe: Hochwasserschutz Vereinigte Mulde, Stadt Grimma—Hydraulische Modellierung zur Erfassung der Hochwasserabflussverhältnisse und zur Ermittlung der Auswirkungen von Hochwasserschutzmassnahmen, Forschungsprojekt am Institut für Wasserbau und technische Hydromechanik der TU Dresden, Dresden 2006.

Integrierte Hochwasserschutzplanung

Hydraulische Anforderungen

Nach den gesetzlichen Vorgaben in Sachsen müssen Hochwasserschutzbauwerke so dimensioniert werden, dass sie einem Hochwasserfall von HQ 100 standhalten, das heißt, dass sie vor Hochwasserereignissen schützen, die statistisch einmal in 100 Jahren auftreten. Wegen des engen Talraumes, in dem die Stadt Grimma liegt, erfordern entsprechende Schutzbauwerke dort eine Höhe bis zu 3,7 Metern. Weil zudem die Vorwarnzeit im Hochwasserfall nur 10 bis 12 Stunden beträgt, ist der Einsatz temporärer Elemente nicht möglich.

Schon bei der Entwicklung der regionalen Hochwasserschutzkonzepte war geprüft worden, inwieweit durch andere vorbeugende Maßnahmen, etwa Rückhaltebecken und Ausweisung größerer Retentionsflächen im Oberlauf, Vorlandabtrag oder Umflutgräben bzw.- tunnel, ein so massiver technischer Hochwasserschutz für die Stadtlage vermieden oder deutlich reduziert werden könnte. Großräumige hydrologische Untersuchungen und umfangreiche wasserbauliche Modellierungen haben jedoch ergeben, dass aufgrund der spezifischen hydromorphologischen Situation hier der vorbeugende Hochwasserschutz und außerörtliche Maßnahmen, wie sie andernorts effektiv eingesetzt werden, nicht ausreichen, um die Hochwassergefährdung deutlich zu vermindern.[4]

Berücksichtigung von städtebaulichen, landschaftlichen und baukulturellen Werten

Um die hydromechanischen Anforderungen des Hochwasserschutzes zu erfüllen, ohne die kulturräumlichen und landschaftlichen Werte der Stadt in inakzeptabler Weise zu schädigen, waren verschiedene Alternativen für das Schutzbauwerk zu entwickeln. Hierfür wurden zunächst die topographisch-landschaftlichen, räumlich-morphologischen, ästhetischen und funktionalen Merkmale und Qualitäten der Stadt und ihrer Beziehung zum Fluss untersucht und dargestellt (Abb. 6).

Aus der Analyse der räumlichen und kulturhistorischen Werte konnten vier Hauptstrategien für die Ausbildung der Schutzbauwerke definiert werden:

1. *Positionierung: Zurücksetzen der Trasse vom Flussufer soweit wie möglich*

4 Hochwasserschutzkonzept Mulden (wie Anm. 2) und Hans-B. Horlacher/Dirk Carstensen/Holger Haufe: Hochwasserschutz Vereinigte Mulde, Stadt Grimma – Hydraulische Modellierung zur Erfassung der Hochwasserabflussverhältnisse und zur Ermittlung der Auswirkungen von Hochwasserschutzmaßnahmen, Forschungsprojekt am Institut für Wasserbau und technische Hydromechanik der TU Dresden, Dresden 2006.

2. *Height*: reducing the maximum height of the structure
3. *Typology*: differentiating the structure according to the specifics of various sites by articulating or emphasizing either their architectural/urban or landscape character
4. *Surface/texture*: visually adjusting the structure to its historical surroundings.

Stakeholder participation and professional expertise

At the analysis stage the process of generating new alternatives was continued through stakeholder and expert meetings. Finding out about the image of the city as perceived by its inhabitants, about their shared values and expectations, and about their fears and hopes regarding flood protection contributed as much to the planning process as the expertise of hydraulic engineers, civil engineers, landscape architects and our own analyses. Through stakeholder participation we were able to rate the perceived absolute and relative benefits of some of the main issues like flood control, public access to the waterfront, townscape and compatibility with heritage preservation.

This approach departs from conventional engineering procedures by exploring and visualizing consequences of various options. It involves the setting of goals and objectives, and the development and evaluation of options in a process that is transparent and open to public scrutiny. The method relates to the establishment of strategic environmental assessment including the screening of existing conditions, scoping for goals and objectives, setting integrated goals that will lead to proposals and alternative concepts which can then be evaluated and presented in a form that can be comprehended by the public.

Integrated planning proposals

Equipped with a comprehensive body of information, we were able to identify and define characteristic sections and focal points within the project area. This step was followed by the production of a number of alternative design proposals for each of the special sections and points. Exposure of these proposals to professional and public scrutiny several times led to either their rejection or refinement and eventually to the general agreement regarding

2. *Höhe: Reduzierung der Maximalhöhen durch flankierende Maßnahmen*
3. *Typologie: Differenzierung nach Standort; Betonung des architektonisch-urbanen bzw. des landschaftlichen Charakters*
4. *Oberfläche, Textur: Abstimmung der Sichtflächen auf den historischen Kontext*

Bürgerbeteiligung und Fachexpertise

In der Analysephase wurde die Suche nach Alternativen systematisch erweitert. Dazu dienten einerseits Treffen mit Anliegern und Interessenvertretern, andererseits interdisziplinäre Expertenrunden. Die Einwohner wurden nach dem Bild, das sie von ihrer Stadt besitzen, über ihre gemeinsamen Werte und Zukunftsvorstellungen und auch über die Ängste und Hoffnungen hinsichtlich des Hochwasserschutzes befragt. Die Ergebnisse flossen in das integrierte Planungskonzept ein, ebenso wie die Fachbeiträge von Wasserbauingenieuren, Tragwerksingenieuren und Landschaftsarchitekten. Durch die aktive Beteiligung der betroffenen Bürger ließ sich beispielsweise einschätzen, welcher absolute und welcher relative Wert den zentralen Aspekten, das heißt dem Hochwasserschutz, der Verträglichkeit für die Kulturdenkmale, dem Stadtbild und dem öffentlichen Zugang zum Flussufer beigemessen wird.

Diese fachübergreifende Herangehensweise, die auf der von der EG eingeführten Strategischen Umweltprüfung (SUP) beruht, zielt auf einen dynamischen Planungsprozess, wie er bei komplexen öffentlichen Vorhaben zur Abwägung der unterschiedlichen Belange erforderlich ist. Dazu gehören:

– *die frühzeitige, öffentliche Diskussion der unterschiedlichen Zielsetzungen,*
– *die nachvollziehbare Bewertung der Alternativen anhand der Zielkriterien,*
– *die frühzeitige Erkennung von negativen Auswirkungen und die Benennung entsprechender Ausgleichsmaßnahmen,*
– *sowie die Nutzung der Synergieeffekte zwischen Stadtplanung und Hochwasserschutz als Chance für die Entwicklung von Ressourcenpotentialen.*

Integrierte Planung

Auf der Basis der genannten Untersuchungen konnte unser Team charakteristische Abschnitte und Brennpunkte innerhalb des Projektgebietes unterscheiden und definieren. Für jeden Bereich wurden alternative Lösungsvorschläge entwickelt und in mehren Schritten vor Fachleuten und vor der Öffentlichkeit präsentiert. Dieser Prozess führte entweder zum Ausschluss oder zur Überarbeitung und schließlich zu einer allgemeinen Zustimmung für eine

solutions tailored to the special needs of Grimma. Because the weighing of public interests had been a constant issue already in the concept and planning phase, this method proved to be a practical path toward a technically competent, culturally responsible and politically acceptable solution.

Reihe von Lösungen, die den speziellen Bedürfnissen von Grimma gerecht werden sollen. Da es bei der gestellten Aufgabe bereits in der Konzept- und Planungsphase laufend um die Abwägung öffentlicher Belange ging, hat sich dieser Weg als praktikabel erwiesen, um dem Ziel einer genehmigungsfähigen, fachlich kompetenten und auch politisch durchsetzbaren Lösung näher zu kommen.

Examples

General principles for positioning the flood protection structures

A differentiation in the positioning of the flood protection structures along the diverse sectors of the riverbank was identified as a priority goal (fig. 5). In order to preserve the dominant and unimpeded positions of the listed buildings directly on the riverbank, the following principles were developed:

- No protective wall is planned in front of public buildings (the monastery church, the palace, the high school and the district administration building); instead their own exterior walls will be structurally retrofitted to meet flood protection requirements. Shutters are installed to seal up windows and doors in case of flooding.
- For historic buildings in private ownership, where integration of the protective wall into the building is not possible for legal reasons, the flood wall will be placed directly in front and will be adapted like a facing.
- In the open spaces between buildings the flood wall will be clearly set back.
- A special solution has to be developed for the city wall in order to harmoniously integrate the new flood wall in the historic waterfront ensemble.

Historic stone bridge/palace

The arched bridge by the famous Baroque architect Matthäus Daniel Pöppelmann marks the main entrance to the town, close to the former palace. Partially destroyed by the water in 2002, the bridge is still unusable. Because of the damming effects caused by its piers during floods, it is difficult to decide to what extent the bridge should be rebuilt. An accurate reconstruction of this architectural monument would result in increased danger to the historic town center or in the need for even higher flood walls.

A continuous monolithic concrete wall along the riverbank and adjoining the remnants of the bridge, as suggested initially, would spoil the sense of place at this critical location, severely and irreversibly damaging the

Beispiele

Allgemeine Prinzipien der Trassenführung

Als hochrangiges Ziel wurde die Staffelung der Trassenführung (Positionierung) entlang der abwechslungsreichen Stadtkante am Muldeufer benannt (Abb. 5). Um die dominante und eigenständige Position der Baudenkmale in der vorderen Uferlinie zu erhalten, wurden u. a. folgende Prinzipien vorgesehen:

- *Vor den öffentlichen Bauwerken – Klosterkirche, Schloss, Gymnasium etc. – wird auf eine eigene Schutzmauer verzichtet, indem die Außenwände dieser Bauten konstruktiv für den Hochwasserschutz ertüchtigt werden. Im Bereich der Fenster und Türen sind stationäre Klappenelemente vorgesehen.*
- *Bei den privaten Baudenkmalen, wo eine vollständige Integration der Schutzmauer in die Gebäude aus rechtlichen Gründen ausscheidet, wird die Mauer gebäudenah als Vorsatzschale ausgeführt und gestalterisch integriert.*
- *In den Zwischenbereichen werden die Mauerabschnitte deutlich zurückgesetzt (Nischenbildung).*
- *An der Stadtmauer ist eine Sonderlösung zu entwickeln, um die neue Schutzmauer harmonisch in das Uferensemble einzuordnen.*

Historische Steinbrücke/Schloss

Die Steinbrücke, entworfen von dem berühmten Barockarchitekten Matthäus Daniel Pöppelmann, markiert den Haupteingang zur Stadt unmittelbar neben dem ehemaligen Schloss, dem heutigen Amtsgericht. Bei der Flut von 2002 wurde die Brücke teilweise zerstört. Die Art ihres Wiederaufbaus ist nach einem Architektenwettbewerb weiter in der Diskussion, auch deshalb, weil die aufstauende Wirkung der Brückenpfeiler ein zusätzliches Problem darstellt. Ein weitgehend originalgetreuer Wiederaufbau der Brücke hätte zur Folge, dass die Bauten der Altstadt erhöhter Gefährdung ausgesetzt wären bzw. durch entsprechend höhere Schutzbauwerke gesichert werden müssten.

Ursprünglich war eine durchlaufende, monolithische Betonwand vor dem Schloss und im Anschluss an die Brücke

Fig. 7 View from the stone bridge to the palace, integrated proposal, photomontage

Abb. 7 Blick von der Steinbrücke zum Schloss, integrierter Vorschlag, Fotomontage

view toward the city, its historic buildings and the river landscape (fig. 4a, 4b).

Site studies showed that not only could the alignment of the structure be moved considerably away from the river, following the remnants of a wall along the former moat, but also that the riverside wall of the former palace (today the regional law courts) could be treated to integrate flood control into the building. With this solution, which requires special technical and legal arrangements, the structure merges into the architectural fabric and thus nearly disappears from sight (fig. 7).

However, more in-depth study and discussion led to the conclusion that the integration of the protective structure is not appropriate everywhere. Because of the underground sealing that is necessary in Grimma, the flood wall has to have a very deep foundation, necessitating the use of large equipment. This work would destroy the valuable archaeological sites along the former moat between the castle and the bridge. Thus it was necessary to weigh townscape protection, which made complete integration of the flood wall into the historic remnants desirable, against protection of these archaeological sites.

It was ultimately decided to position this section of the flood wall close to the riverbank, linking it directly to the bridge with pedestrian access. As an urban connector, this section of the flood wall belongs to the bridge and will be faced with stone, whereas structurally it does not intervene in its historic fabric. As a result, the area behind the wall can remain largely in its original state. Extensive interventions in the fragile archeological area are avoided (fig. 8).

vorgeschlagen worden. Damit wäre die Ansicht der Stadt, der Baudenkmale und der Flusslandschaft ernstlich und dauerhaft beschädigt worden (Abb. 4a, 4b).

Die Alternativuntersuchungen ergaben, dass der Trassenverlauf deutlich vom Ufer abgerückt werden kann und sich der Hochwasserschutz in die Außenwand des Schlosses integrieren lässt. Eine solche Lösung erfordert spezielle technische, eigentumsrechtliche und organisatorische Vorkehrungen, doch erlaubt sie den weitgehenden Verzicht auf eine sichtbare Mauer in diesem Abschnitt (Abb. 7).

In der weiteren Durcharbeitung hat sich allerdings gezeigt, dass die Integration des Schutzbauwerkes in historische Anlagen nicht überall sinnvoll ist. Für die erforderliche Untergrundabdichtung müssen die Schutzwände sehr tief gegründet werden, eine Maßnahme, die großes Tiefbaugerät erfordert. Im Bereich zwischen Schloss und Brückenanlauf befinden sich jedoch wertvolle archäologische Bereiche, die hierbei zerstört worden wären. So war es nötig abzuwägen zwischen dem Stadtbildschutz, der die vollständige Integration der Schutzmauer auch hier am ehemaligen Schlossgraben wünschenswert erscheinen ließ, und dem Schutz der archäologischen Substanz, der für ein Abrücken des Schutzbauwerks sprach. Schließlich fiel die Entscheidung, die Trasse im Anschluss an die Brücke zunächst ufernah als eigenständiges, begehbares Bauwerk auszubilden. Es wird gestalterisch der Brücke zugeordnet und erhält deshalb eine analoge Steinverkleidung, ohne aber in die historische Konstruktion einzugreifen. Der Bereich am ehemaligen Schlossgraben kann damit weitgehend im überlieferten Zustand verbleiben, aufwendige Eingriffe in die historischen Mauerreste werden vermieden (Abb. 8).

Fig. 8 Alternative proposal: flood wall as accessible extension of the bridge, archaeological remnants in the area of the former moat (left side in the back) remain intact

Abb. 8 Alternativlösung: begehbare Schutzmauer im Anschluss an die Steinbrücke, archäologische Reste im Bereich des ehemaligen Schlossgrabens (hinten links) bleiben unberührt.

The medieval city wall

One outstanding feature of Grimma is its city wall, stretching 450 m along the riverbank. Since placement of flood protection structures inside the city wall was ruled out because of the adjoining garden and property walls, the preliminary proposals called for construction of a new concrete wall directly in front of the city wall toward the river (fig. 9–11).

Investigations of the structure and condition of the historic wall gave reason to hope that the wall could be injected and stabilized by bored micro piling, enabling it (with some additions) to meet flood protection requirements on its own. Thus it would be largely preserved in appearance as well as in terms of its historic fabric (fig. 12, 13).

Unfortunately in the course of planning work this preferred solution had to be given up because it was not possible with the available funds to prove that this method would be technically and economically feasible. (Although the city of Grimma is classified as a special case within the state flood protection program and therefore receives more than average funding, the experimental solutions proposed here reached their limits at the point where their potential results could not be adequately assessed.) Furthermore, it became clear that structural retrofitting would also have severely damaged the historic wall.[5] Therefore after long debates it was decided by the two responsible ministries

5 From the side of committed citizens came the argument that the old city wall had defied flood waters for centuries, also in 2002, and that it therefore could also be adequate for the future. This observation does not take into consideration, however, that up till now in major floods the city wall was inundated from both sides and thus was not subjected to one-sided water pressure, which would be the case if it was in fact acting itself as a flood wall.

Die mittelalterliche Stadtmauer

Eines der herausragenden Bauwerke der Stadt ist ihre Stadtmauer, die über 450 Meter Länge am Flussufer erhalten geblieben ist. Da eine Errichtung des Hochwasserschutzbauwerks stadtseitig hinter der Mauer wegen der anstoßenden Garten- und Parzellenmauern ausscheidet, sahen die ersten Vorschläge die Errichtung einer neuen Schutzwand unmittelbar vor der alten Stadtmauer vor (Abb. 9–11).

Untersuchungen der Struktur und des Zustandes der historischen Mauer gaben jedoch zu der Hoffnung Anlass, dass diese durch Injektionen und Mikrobohrpfähle soweit zu stabilisieren wäre, dass sie, mit gewissen Ergänzungen, selbst den Hochwasserschutz übernehmen könnte. So bliebe sie sowohl in ihrer historischen Substanz als auch in ihrem Erscheinungsbild weitgehend erhalten (Abb. 12, 13).

Diese Vorzugslösung musste im Verlauf der Planung leider aufgegeben werden, da mit den zur Verfügung stehenden Mitteln der Nachweis der angemessenen Realisierbarkeit nicht erbracht werden konnte. (Obwohl die Stadt Grimma im Rahmen des staatlichen Hochwasserschutzprogramms als Sonderfall eingestuft wurde und weit überdurchschnittliche Kosten veranschlagt wurden, fanden die hier vorgeschlagenen experimentellen Lösungen dort ihre Grenzen, wo sie sich als technisch und wirtschaftlich nicht hinreichend abschätzbar erwiesen.) Dazu kam allerdings auch, dass die zur Stabilisierung erforderlichen Eingriffe die historische Mauer sehr stark beschädigt hätten.[5] Deshalb wurde nach

5 Hier kam von Seiten engagierter Bürger das Argument, dass die alte Stadtmauer doch seit Jahrhunderten den Hochwassern getrotzt habe, auch zuletzt im Jahre 2002, und sie deshalb auch für die Zukunft ausreichen könne. Diese Beobachtung lässt außer Acht, dass bisher bei größeren Hochwässern die Stadtmauer stets von beiden Seiten umspült wurde, also nicht dem einseitigen Wasserdruck ausgesetzt war, den sie als Hochwasserschutzwand auszuhalten hätte.

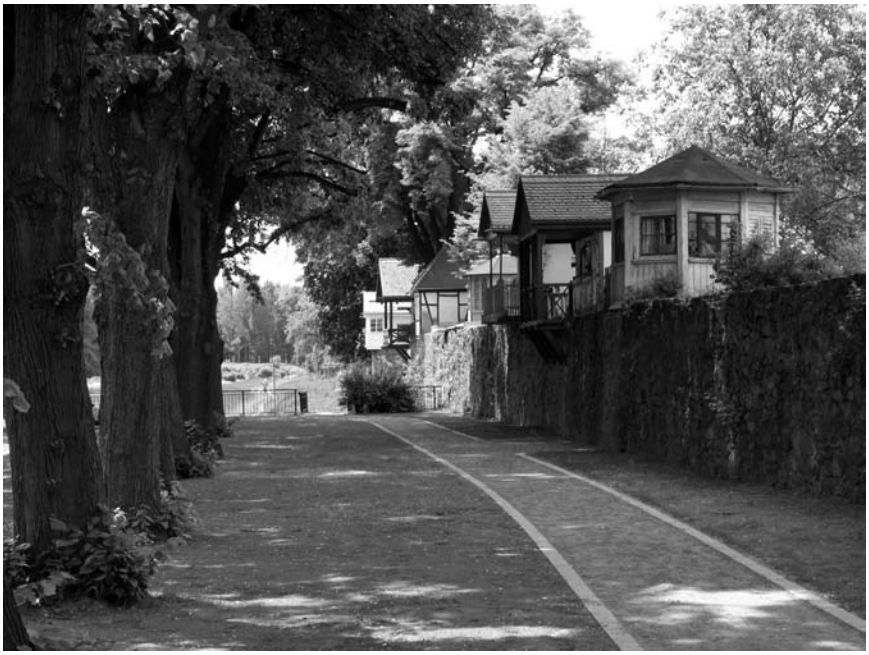
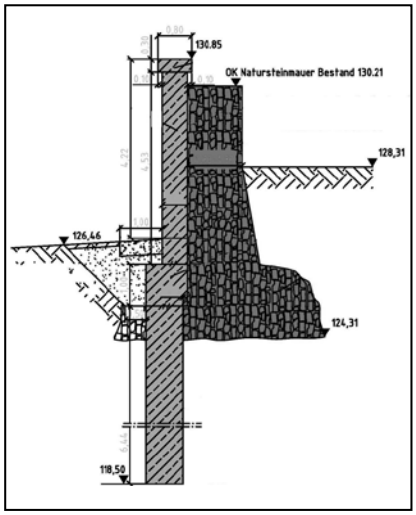


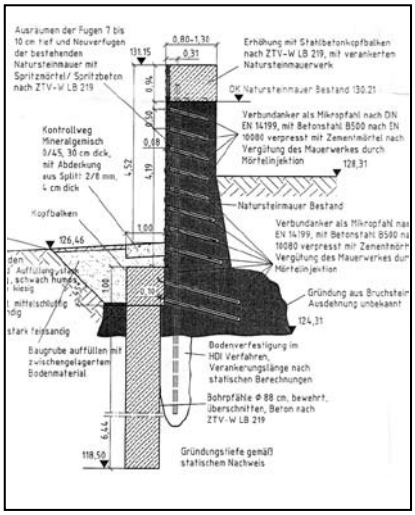
Fig. 9 Medieval city wall with private cottages

Abb. 9 Mittelalterliche Stadtmauer mit privatem Mauerhäuschen



Figs. 10 (above) and 11 (below left) Medieval city wall, preliminary technical planning for flood wall, photomontage and section

Abb. 10 (o.) und 11 (u. l.) Mittelalterliche Stadtmauer, Technische Vorplanung der Hochwasserschutzmauer, Fotomontage und Schnitt



Figs. 12 (above) and 13 (below right) Medieval city wall, proposal for retrofitting the city wall, photomontage and section

Abb. 12 (o.) und 13 (u. r.) Mittelalterliche Stadtmauer, Vorschlag zur Ertüchtigung der Stadtmauer, Fotomontage und Schnitt

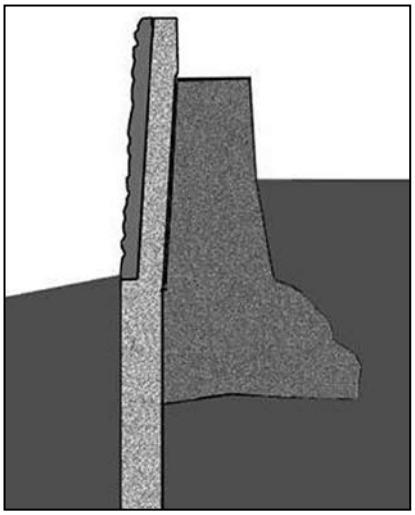


Fig. 14 (above) Compromise solution for flood wall assimilated to the old city wall behind it, schematic section

Abb. 14 (oben) Kompromisslösung mit vorgesetzter, verkleideter Mauerschale, Schemaschnitt

that a new flood wall would be built in front of the old city wall (fig. 14). The following principles for this compromise were worked out in agreement with the State Heritage Preservation Office:

- The old city wall, including its existing openings, is preserved in its current state because it does not assume any functions for flood protection.
- The basis for the design of the new flood wall, which will be faced in stone, is the status quo of the old city wall. The latter will be documented, and its basic pattern/texture will be transferred into the new stone facing. This facsimile-representation should serve the integrity of the traditional townscape. It will not be built as a perfect copy, but rather in an analogous manner, according to architectural design principles that follow the rules of good craftsmanship. The facing of the reinforced concrete wall will thus be different in detail from the very inhomogeneous mixed masonry of the old city wall.
- In some sections, where the old wall is higher than the required base flood elevation, it will rise above the new wall. Also at the transition points the layering of the old and the new walls will be legible.

Conclusion

If flood control is planned from a hydraulic engineering perspective only, it can easily do damage to the very values it is intended to protect.[6] It needs to be integrated with issues of urban function, cultural heritage, and city and landscape aesthetics. As the project in Grimma shows, this extra planning effort as well as stakeholder and interdisciplinary expert participation more than pay off, if long term flood protection structures can be designed to merge successfully into the valuable fabric of historic towns and landscapes. In some cases the measures can even lead to improvements beyond mere flood proofing and can add extra beauty and amenities to these places. Conceived positively as long-term investments in urban development, they should secure life on the river and stimulate another forward-looking move: the return to the inner city, towards an urban culture which makes more efficient use of energy and of its own resources, its land and its infrastructure.

Historic experience shows that riverfront cities must

6 If flood protection was reduced to its prime task, i. e. the protection of people, then in cases like Grimma evacuation would be a much simpler, cheaper and less intrusive alternative.

langer Debatte durch die beiden zuständigen Ministerien entschieden, die neue Hochwasserschutzmauer unmittelbar vor der alten Stadtmauer zu errichten. (Abb. 14) Für diesen schwierigen Kompromiss wurden in Abstimmung mit dem Landesamt für Denkmalpflege folgende Grundsätze erarbeitet:

- *Die alte Stadtmauer bleibt in ihrem überlieferten Gefüge einschließlich der bestehenden Öffnungen weitgehend unangetastet erhalten, da sie keine HWS-Funktionen übernimmt.*
- *Grundlage für die Oberflächenausbildung der neuen, vorgestellten Schutzmauer, die mit Naturstein verblendet wird, ist der Status Quo der alten Stadtmauer. Er wird dokumentiert und in der neuen Steinverkleidung abgebildet. Diese Nachbildung dient der Wahrung des überlieferten Stadtbildes. Sie erfolgt nicht als täuschende Kopie, sondern nach architektonisch-denkmalpflegerischem Gestaltungsentwurf und nach den Regeln des Handwerks. Die Verblendung der Stahlbetonwand wird sich demnach im Detail von dem sehr inhomogenen Mischmauerwerk der alten Stadtmauer unterscheiden.*
- *In Teilbereichen, wo die alte Stadtmauer höher ist, wird sie die neue Schutzmauer überragen. Auch an den Übergängen wird die Schichtung von alter und neuer Mauer ablesbar sein.*

Resümee

Eine Hochwasserschutzplanung, die ausschließlich aus ingenieurtechnischer Perspektive erfolgt, läuft Gefahr, jene Werte zu vernachlässigen oder gar zu beschädigen, die sie eigentlich beschützen sollte. Ein noch so effektiver Hochwasserschutz würde in Zeiten erhöhter Mobilität von Bürgern und Gewerbe sein Ziel verfehlen, wenn er zugleich die Aufenthaltsqualität des Standorts dauerhaft beeinträchtigte.[6] Insofern geht es hier nicht nur um die Bewahrung vertrauter Stadtbilder, sondern um langfristige städtebauliche, standortpolitische und auch wirtschaftliche Entscheidungen. Vor allem im Bereich historisch wertvoller Städte und Kulturlandschaften muss der technische Hochwasserschutz zusammen mit den Belangen der städtischen Funktionen, des Denkmalschutzes sowie des Stadt- und Landschaftsbildes betrachtet und geplant werden.

Die Langfristigkeit solcher Maßnahmen und der erforderliche Aufwand legen es nahe, diese nicht defensiv auf den Schutzaspekt einzuschränken, sondern positiv als Entwicklungsmaßnahmen zu konzipieren, um das Leben am Fluss

6 Wollte man den Hochwasserschutz ganz auf sein primäres Ziel, den Schutz der Menschen, reduzieren, so wäre hier die Evakuation eine erheblich einfachere, günstigere und schonendere Alternative.

not be restricted in their amenities of daily life by flood protective structures. They can even profit from them. Some river flood regulation measures of earlier epochs, having carefully considered the urbanistic effects, have not only contributed to flood protection of old town centers and to their very survival, but have also opened up access to new and valuable areas along the water, which until then were, albeit picturesque, often inaccessible and dangerous stretches of land between the usable urban space and the river.

Even if concerned citizens call for accelerated action after a flood, technical flood protection structures are tasks for generations, comparable to the erection of city walls in former times. Only with a long-term perspective which requires a clear political and civic commitment to a location will the high costs and the extensive planning and construction process of an integrated urban flood protection system be plausible and acceptable to the general public. Neither a city nor a flood management authority will be able to reach such a goal on its own. Through interdisciplinary cooperation of planning authorities and agencies involving urban planning, real estate development, historic preservation, and tourism and through skillful integration into long-term funding programs, there will be opportunities to combine up-to-date flood protection with the preservation of the urban heritage and a general upgrading and stabilization of a historic location.

zu sichern und eine weitere wegweisende Entwicklung zu befördern: die Rückkehr zum Ortskern, zu einer flächen-, energie- und infrastrukturschonenden Stadtentwicklung.

Die historische Erfahrung zeigt, dass eine Stadt am Fluss durch aufwendige technische Schutzbauwerke in ihrer Lebensqualität nicht behindert werden muss, sondern sogar gefördert werden kann. Manche Wasserbaumaßnahmen früherer Epochen haben, wenn sie den urbanistischen Aspekt mitbedacht haben, nicht nur zum unmittelbaren Hochwasserschutz der Altstädte und damit zu ihrer Überlebensfähigkeit beigetragen. Sie haben diesen auch neue und wertvolle Bereiche am Wasser erschlossen, wo vormals eine zwar vielleicht malerische, aber häufig unzugängliche und gefährliche Uferzone zwischen dem nutzbaren Stadtraum und dem Fluss existierte.

Auch wenn die Bürger nach einem Schadensereignis zur Eile mahnen: Es handelt sich bei einer solchen Maßnahme um eine Generationenaufgabe, durchaus vergleichbar der einstigen Errichtung der Stadtmauern. Mit einer langfristigen Zukunftsperspektive, die ein klares politisches und bürgerschaftliches Bekenntnis zum Standort voraussetzt, werden die hohen Kosten und auch der aufwendige Planungs- und Herstellungsprozess eines städtebaulich integrierten Hochwasserschutzes plausibel und vermittelbar.

Alleine wird weder die Stadt noch die zuständige Wasserbaubehörde ein so hochgestecktes Ziel erreichen können. Durch fachübergreifende Zusammenarbeit mit anderen staatlichen Maßnahmenträgern – Stadtentwicklung, Denkmalschutz, Tourismus – und mittels geschickter Integration in langfristige Förderprogramme bieten sich jedoch Chancen, einen zukunftsfähigen Hochwasserschutz mit dem Erhalt des historischen Stadtbildes und einer allgemeinen Aufwertung des Standortes zu vereinen.

Christiane Schmuckle-Mollard

The big windstorm of 26 December 1999 in France

The storm that occurred in France on 26 December 1999 was of rare violence, with winds blowing up to 180 kilometres per hour. It caused a lot of damage to old buildings and forestry heritage from Brittany to Alsace. The Parisian area was particularly badly hit; the most serious damages were situated in the west and east departments of the capital, especially in the Yvelines and the Val de Marne departments. Large hospital complexes that date back to the 18th and 19th centuries and are often badly maintained today suffered a lot from the storm, especially the Esquirol hospital, the hospice of Charenton (fig. 1 and 2).

Fig. 1 Esquirol Hospital, building C, detail of the storm-damaged roof

Fig. 2 Esquirol Hospital, building E with storm damage

Five weeks after the storm, an overall assessment estimated the damage at 102 million Euros. That is why the architects of the Historic Monuments Department set up an exceptional financial plan and assisted every owner of a listed or registered historic monument, private and public, civilian and military. The aim of this help was to rapidly establish a reliable estimate of the storm damage on the monuments, so it would be possible to suggest emergency measures, to evaluate the design and restoration costs and to check the estimates made for the owners by the restoration firms of the Historic Monuments Department.

In January 2000, the Ministry of Culture presented an assessment of the storm damage on the monuments (the roofing, frameworks, steeples and stained-glass windows) and on the historic parks and gardens (trees, paths, surrounding walls and basins). According to this appraisal, 324 monuments were damaged, including built heritage and historic gardens. Forty-eight per cent of the monuments suffered only minor damage and did not need more than 15,000 Euros each to be repaired. The overall renovation costs of 102 million Euros for the Paris area included the five departments of the outer suburbs of the capital.

The historic garden of the Château de Versailles represented the largest part of the financial assessment, with an estimate for exceptional financing of 91,470,000 Euros, reduced to 60,980,000 Euros after a meeting of the insurance companies. Part of the restoration work became an important extra item for the 2000 and 2001 annual programs, so that preventive measures could be taken into account wherever they were necessary.

The Hospice of Charenton—The Esquirol Hospital

Built between 1833 and 1866 by the architect Gilbert (»Grand Prix de Rome«), this monument is exceptional for its organisation and its Italian architecture, which follows the plan of the Escorial on a high slope (fig. 3 and 4).

Of 55,000 square metres of roofing on the hospital complex, 5,000 square meters were destroyed by the storm, with 50 per cent completely blown off. The central part of

Fig. 3 Esquirol Hospital, historic view

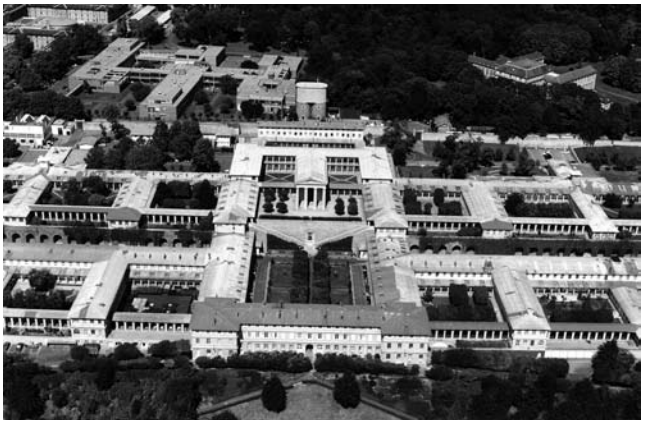


Fig. 4 Esquirol Hospital, current view

Fig. 5 Versailles, Ceres basin with storm damage

Fig. 6 Versailles, Etoile Royale with storm damage

Fig. 7 Versailles, sculpture knocked from its socle by the storm

Fig. 8 Versailles, Swiss Gate with storm damage

the building had been restored shortly before the storm, and fortunately it resisted the disaster well. The roofing of the pavilions, exposed to the south-east wind, had been restored after the 1990 storms, but was completely blown off in 1999. The aerial photo taken after the 1990 restorations could be used to determine that the roofing destroyed in 1999 was that which had been restored nine years earlier. The damaged structures showed that the roofing of the pavilions suffered from a lack of connection between its principal pieces (some tenons had disappeared, metal pieces were bolted). Big wood beams and oak rafters were without a secondary frame; fir laths were only 15 millimetres thick. Roofings are made of frameworks on a simple support on 35 cm-thick walls and jut out over 80 cm.

The park of the »Château de Versailles«

The palace's park, which was the object of an alarming forestry investigation in 1989, was damaged in 1990 during a very violent wind (fig. 5–8). Following this event, financing was set up that aimed at regenerating the bushes and the alignment of the trees.

By 26 December 1999, half the program had been realised. The storm caused the loss of about 10,000 trees, which were not replanted. These trees were 100 years old and had resisted the 1990 storm. Funds of three million Euros were immediately provided for operation of the program for which studies were already available.

The parks of Vincennes and Saint-Cloud, which also suffered from the 1999 storm, did not receive the same care and financing, and are therefore not yet completely restored.

Conclusion

Generally speaking, French historic parks do not receive sufficient funds to enable regular upkeep; they also suffer from the old age of the trees, which were all replanted at the end of the 19th century. As some trees were more than 140 years old, the public admired them and tried to prevent a clear cutting, which would normally be made once every 70 years.

The well-built structures kept and restored by the Historic Monuments Department resisted this very violent storm well, in contrast to those neglected by their public or private owners or to those that were anticipating annual funding from the Ministry of Culture.

A charter was set up with the insurance companies, which agreed to adapt their prices to the quality and the upkeep of a monument, rather than to its age and size. In January 2000 this dramatic event showed how relevant the work of the Historic Monuments Department is and how effective its agents can be, also in emergency situations.

IV.

Risk Preparedness and Long-term Perspectives

Risikovorsorge und Langzeitperspektiven

The Great Wall of China (Future Greenhouse Effect as depicted by Yannick Monget, 2006)

Bernhard Furrer

Danger from the Alps. On the Value of Foresighted Organization

Die Gefährdung durch die Alpen. Vom Wert vorausschauender Organisation

Switzerland's situation in the Alps has always entailed specific dangers such as avalanches and rockslides. The historic Goldau rockslide in 1806 still remains in the public memory.[1] Already then the question was raised as to whether and how the catastrophe could have been foreseen or its impact reduced—the issue of prevention (fig. 1).

In the medical field »exercising prevention« means practicing medicine in such a manner that foreseeable health problems can be avoided to the greatest extent possible. This definition can also be applied to cultural property, although in this context there is need for supplementation: not only should appropriate measures be undertaken to avoid potential damage, but precautions must be taken so that the consequences are as limited as possible if damage does indeed incur. Accordingly a differentiation must be made between *prevention*—prophylactic measures that are taken before damage occurs—and *intervention*—prepared actions that can be carried out when a disaster does occur to reduce the damage it causes.

During the following discussion of prevention and intervention on the behalf of cultural property, it must not be forgotten that the primary goal of prevention and intervention is the well-being of people during and after disasters. The major share of our vigilance is rightly directed toward them. Only about two percent of civil defense costs in Switzerland goes to the field of cultural goods.[2] Moreover in the course of general efforts on the part of the cantons and communities to save money there has been a reduction in the number of personnel responsible for cultural property protection and expenditures are half of what they were five years ago.

Für die Schweiz bringt die Situation in den Alpen seit jeher spezifische Gefährdungen wie Schneelawinen und Felsstürze mit sich. Der historische Felssturz von Goldau von 1806 ist noch heute im Bewusstsein der Menschen präsent.[1] Schon damals stellte sich die Frage, ob und wie die Katastrophe hätte vorausgesehen, ihre Auswirkungen hätten verringert werden können – die Frage nach der Prävention (Abb. 1).

Im medizinischen Bereich bedeutet »Prävention betreiben« so zu handeln, dass vorhersehbare gesundheitliche Schädigungen so weit wie möglich vermieden werden können. Auch für Kulturgüter greift diese Definition, sie ist indessen zu ergänzen. Nicht nur sollen mögliche Schäden durch geeignete Maßnahmen vermieden werden, sondern es sind vorsorglich Vorkehrungen zu treffen, um beim Eintreten von Schäden so eingreifen zu können, dass deren Auswirkungen möglichst gering bleiben. Es ist demnach zu unterscheiden zwischen Prävention – vorbeugenden Maßnahmen, die vor dem Eintreten eines Schadens ergriffen werden – und Intervention vorbereiteten Maßnahmen, die nach dem Eintreten eines Schadens zur Minderung seiner Folgen getroffen werden.

Wird in der Folge von Prävention und Intervention zugunsten von Kulturgütern gesprochen, ist nicht zu vergessen, dass das erste Ziel von Prävention und Intervention die Menschen und ihr Wohlergehen während und nach Katastrophenfällen sind. Ihnen gebührt richtigerweise der überwiegende Teil der Aufmerksamkeit. In der Schweiz betreffen bloß knapp zwei Prozent der Aufwendungen des Zivilschutzes den Bereich der Kulturgüter.[2] Zudem ist anzumerken, dass im Zuge der allgemeinen Sparanstrengungen der Kantone und Gemeinden die Personalbestände des Kulturgüterschutzes reduziert und die finanziellen Aufwendungen im Vergleich zum Stand vor fünf Jahren halbiert worden sind.

1 About 36 million cubic meters of rock fell on 2 September 1806.

2 Of 250,000 work days annually in civil defense, 4000 go to cultural property protection.

1 2. September 1806 mit rund 36 Millionen Kubikmeter Gestein.

2 Von 250.000 Diensttagen pro Jahr im Zivilschutz 4.000 im Kulturgüterschutz.

Fig. 1 The shock of a natural disaster: contemporary depiction of the 1806 rockslide in Goldau, canton of Schwyz

Abb. 1 Der Schrecken einer Naturkatastrophe: Felssturz von Goldau, Kanton Schwyz, 1806 in zeitgenössischer Darstellung

Necessity and limits of prevention

As a governmental activity, heritage conservation has always been engaged in prevention. Heritage conservation *is* prevention. Its exponents strive to foresightedly protect cultural goods from attacks on their material integrity. Natural influences can cause these impairments, but damages to built monuments are much more frequently attributable to man and his own free decisions: insufficient maintenance, alterations and interventions of all kinds, and even willful destruction in order to forget the old and make room for the new. Thus preservationists must collaborate in urban planning with a view toward the future, help to ensure that changes to historic buildings are undertaken in a manner that does not damage historically significant building fabric, and support all the measures necessary to guarantee long-term maintenance.

These actions-conservation, transformation, extension—are not actually carried out by the preservation offices but rather by their partners, the architects, restorers, craftsmen and others who work directly on historic buildings.

Prevention is the basis of cultural property protection. It can and must support, and in some cases even supplement, the long-term efforts of heritage conservation. Cultural property protection also involves direct action, with quick efficient interventions in response to special occurrences such as disasters. This applies to organizations involved in cultural property protection in any country.

Rockslides in particular are events that are often difficult to predict, so that precautionary measures are only possible in exceptional cases. The limits of prevention become apparent here. It is important for us to remain

Notwendigkeit und Grenzen der Prävention

Denkmalpflege als staatliche Organisation betreibt seit jeher Prävention. Denkmalpflege ist Prävention. Ihre Exponentinnen und Exponenten bemühen sich vorausschauend, das bauliche Kulturgut vor Angriffen auf seine materielle Integrität zu schützen. Diese sind natürlichen Einflüssen zuzuschreiben, weit stärker und häufiger jedoch Schädigungen, die den Baudenkmälern von den Menschen in deren freiem Entscheid zugefügt werden: durch mangelnden Unterhalt, durch Veränderungen und Eingriffe aller Art bis hin zur willentlichen Zerstörung, um das Alte zu vergessen, um Platz für Neues zu schaffen. So haben Denkmalpflegende vorausschauend in der Stadtplanung mitzuarbeiten, helfen mit, Veränderungen an Baudenkmälern so auszulegen, dass sie die historisch bedeutungsvolle Substanz nicht schädigen, unterstützen all die Maßnahmen, die notwendig sind, um einen langfristigen Unterhalt sicherzustellen.

Die eigentliche Umsetzung der Maßnahmen – Konservierungen, Transformationen oder Erweiterungen – wird nicht von der Denkmalpflege selber getätigt. Es sind ihre Partner und Partnerinnen, Architekten, Restauratorinnen, Handwerker und andere, die am Denkmal handeln.

Grundlage des Kulturgüterschutzes ist die Prävention. Er kann und muss sie auf die langfristig ausgelegten Anstrengungen der Denkmalpflege abstützen, kann sie in spezifischen Fällen ergänzend unterstützen. Darüber hinaus befasst sich der Kulturgüterschutz mit dem direkten Handeln, der Intervention eben, mit dem raschen, effizienten Einsatz bei besonderen Ereignissen, bei Katastrophenfällen. Dies gilt für die Kulturgüterschutz-Organisationen in allen Staaten.

Gerade Felsstürze sind Ereignisse, die sich in vielen Fällen nur schwer voraussagen lassen; daher sind vorausschauende Maßnahmen nur in Ausnahmefällen möglich. Hier zeigen sich die Grenzen der Prävention. Wichtig ist das Bewusstsein,

Fig. 2 Avalanche protection dams near Selkingen, canton of Valais

Abb. 2 Lawinenschutzdämme bei Selkingen, Kanton Wallis

aware, as our forefathers were, that we have to be able to live with such natural events; there are limits to the precautionary measures that can be taken. Not only do we need to remind ourselves of this again and again, but it is also our responsibility to convey this fact to the public.

Restraint is advisable, for instance, if large-scale obstructive construction work would be necessary to eliminate the danger to only a few houses in the path of a possible avalanche. If such measures would involve destruction of a cultural landscape of great value, or if villages would be split in two, then we must urgently address the question as to whether the sacrifice of a few buildings and their replacement at a safe location would not be a more adequate solution. In such cases the Swiss public authorities have shown their preference for expensive structures that promise total protection, as opposed to precautionary organizational measures that leave a small possibility of danger.[3] Safety at any price (fig. 2).

Another limit to prevention, going beyond the narrow context of the Alps, involves precautionary measures that are themselves destructive. For instance it cannot be appropriate for a historic structure to be retrofitted against the highly unlikely possibility of an earthquake in a technically perfect manner that happens to completely destroy or badly damage the building's historic and design value. In many cases modest additive retrofitting can already bring about critical improvement.

Prevention at any price in terms of materials, values and finances cannot be the goal; as with every public

3 Such readiness to build can also be seen in flood protection measures for the Aare River in the Matte district of Bern; walls costing €35 million were erected in an attempt to achieve absolute safety. In Hamburg organizational precautions are used to keep spring floods from causing serious damage.

dass wir wie unsere Vorfahren mit solchen Naturereignissen leben können müssen, dass Vorsorge an Grenzen stößt. Diese Erkenntnis sollten wir uns selber immer wieder in Erinnerung rufen, haben sie jedoch auch der Öffentlichkeit zu vermitteln.

Zurückhaltung ist beispielsweise angezeigt, wenn durch Verbauungen in großem Maßstab die Gefährdung weniger Häuser eliminiert werden soll, die in einem Lawinenzug stehen. Ist damit die Störung einer Kulturlandschaft von hohem Wert verbunden, werden dabei Dörfer entzwei geschnitten, stellt sich dringlich die Frage, ob die Aufgabe einiger Häuser und ihr Ersatz an einem sicheren Ort nicht die adäquatere Lösung darstellen würde. In solchen Fällen zeigt sich die Vorliebe schweizerischer Behörden, teuren Bauten, die totalen Schutz versprechen, gegenüber organisatorischen Vorkehren den Vorzug zu geben, bei welchen eine kleine Restgefährdung bestehen bleibt.[3] Sicherheit um jeden Preis (Abb. 2).

Eine andere Grenze – sie weist über den engen Alpenzusammenhang hinaus – befindet sich dort, wo die Vorsorgemaßnahme selber zerstörerisch ist. Beispielsweise kann es nicht angehen, die Ertüchtigung eines Baudenkmals für den nicht sehr wahrscheinlichen Fall eines Erdbebens technisch so zu perfektionieren, dass sein historischer und gestalterischer Wert zerstört oder doch stark gestört wird. In vielen Fällen können bescheidene additive Ertüchtigungen bereits wesentliche Verbesserungen bringen. Prävention nicht zu jedem materiellen, ideellen und finanziellen Preis: Wie jede Aufgabe der öffentlichen Hand darf sie nicht absolut gesetzt werden. Sie muss vielmehr mit allen anderen öffentlichen und privaten Anliegen und Interessen, namentlich auch mit

3 Solche Baufreudigkeit zeigt sich auch im Hochwasserschutz für das am Fluss Aare liegende »Matte« – Quartier in Bern, wo mit einer rund 35 Millionen Euro teuren Ummauerung absolute Sicherheit gesucht wird. In Hamburg wird mittels organisatorischer Maßnahmen dafür gesorgt, dass Springfluten keine gravierenden Schäden anrichten können.

Fig. 3 Landslide in Gondo, canton of Valais, October 2000: destruction of the Stockalper Palais from 1645 and numerous other buildings

Abb. 3 Der Erdrutsch von Gondo, Kanton Wallis, Oktober 2000: Zerstörung zahlreicher Häuser und des Stockalper-Palastes von 1645

responsibility, prevention cannot be taken as an absolute. Rather, prevention must be weighed along with all the other public and private concerns and interests, in particular the preservation of historic buildings in their authentic state.

der Erhaltung der Baudenkmäler in ihrem authentischen Bestand, abgewogen werden.

Short warning notice

In addition to the mountain-related dangers of avalanches and rockslides, special circumstances in the Alps give rise to another peculiarity for disaster prevention: conditions in the Alps themselves as well as in the adjacent foothills and midlands allow only extremely short warning times. Flooding from streams and rivers, which usually carry great amounts of mud and rubble, can only be predicted at short notice, if at all. Whereas high water resulting from a storm can be announced days in advance for the lower course of a river, in the upper stretches in the Alps flood waters arrive already a few hours after an unusually heavy rainfall.

Earth slides in the Alps are particularly dangerous. They occur abruptly, and there are generally no verifiable signs to announce them. This almost always means that people are taken by surprise in their houses and often lose their lives. Cultural goods are totally unprotected from the masses of earth and rock, and there can be massive destruction (fig. 3).

Because circumstances in the Alpine region make particularly dangerous and sudden natural disasters likely, a general awareness has developed in Switzerland of the great importance of foresighted organization.

The conditions that are peculiar to an Alpine country require extraordinary measures to prevent damage to cultural property. In case damaging disasters do occur in spite of preventive measures, Alpine conditions also

Kurze Vorwarnzeiten

Neben den bergbezogenen Gefährdungen durch Lawinen und Felsstürze ergibt sich aus den spezifischen Verhältnissen in den Alpen eine weitere Besonderheit in der Katastrophen-Prävention: Die Umstände erlauben in den Alpen selbst, wie auch im direkt angrenzenden Hügelland und im Mittelland, nur extrem kurze Vorwarnzeiten. Überschwemmungen von Bächen und Flüssen, die meist grosse Mengen Schlamm und Geröll mit sich führen, können – wenn überhaupt – nur kurzfristig vorausgesagt werden. Während eine Hochwasserwelle für den Unterlauf eines Stroms um Tage angekündigt werden kann, trifft sie im Oberlauf, in den Alpen, bereits wenige Stunden nach ungewöhnlich grossen Regenfällen ein.

Besonders gefährlich sind in den Alpen Erdrutsche. Sie treten unvermittelt ein, kündigen sich meist nicht durch überprüfbare Zeichen an. Dies bedeutet fast immer, dass Menschen in ihren Häusern überrascht werden und dabei häufig ihr Leben verlieren. Kulturgüter sind der Wucht von Erd- und Felsmassen schutzlos ausgeliefert und die Zerstörungen können sehr massiv sein (Abb. 3).

Aus dem Umstand, dass in alpinen Gebieten mit speziell gefährlichen und besonders unvermittelt eintretenden Naturkatastrophen zu rechnen ist, hat sich in der Schweiz ganz allgemein ein Bewusstsein für den hohen Wert vorausschauender Organisation gebildet.

Auch für die Prävention von Schäden an Kulturgütern verlangen die für ein Alpenland spezifischen Voraussetzungen außergewöhnliche Maßnahmen. Und falls trotz Prävention

require special orientation on the part of those designated to respond to the disaster. Although based on conditions in the Alpine region, this approach is valid for all of Switzerland. The Swiss experience in this field, originating from the country's particular circumstances, could nonetheless be of broader interest and can perhaps provide new impetus to discussions of cultural property protection.

Switzerland's three levels of government

A brief outline of governmental organization in Switzerland is necessary for a better understanding of the following presentation. The complicated-seeming government structure can be explained by historic developments, but it is also very much a consequence of the small-scale geographic compartmentalization of the country in the Alpine landscape.

Switzerland is a federal country made up of 26 cantons. These are political entities of very different sizes, population structures, mentalities, languages and religions. The cantons are the main carriers of governmental authority, with responsibility for areas directly affecting citizens such as economics, infrastructure, education, health and the police.

One level higher, the cantons are joined together in the Swiss Confederation, which has above all responsibility for foreign policy and the army. The confederation also has substantial influence over legislation, through which it coordinates the activity of the cantons.

The level beneath the cantons is constituted by approximately 3000 communities, which in general have retained considerable, and in some cantons very extensive, autonomy. With their not inconsiderable tax income, the communities carry out various important tasks in fields such as education, local planning, architecture and culture.

These three governmental levels—the cantons with the confederation above and the communities below—are variously interlocked and dependent on one another.

Legal foundations and their effect

Preventive measures for cultural property protection function in Switzerland, as in many other countries, on the basis of the »Hague Convention for the Protection of Cultural Property in the Event of Armed Conflicts« from 1954 and the so-called Second Protocol from 1999. The convention provides for the signing countries to designate particularly important cultural properties,

ein Schadensereignis eingetreten ist, bedingen sie für die Intervention eine besondere Ausrichtung der Einsatzkräfte. Diese fußt auf den Bedingungen des Alpengebiets, gilt indessen für die ganze Schweiz. Die in diesem Zusammenhang entstandenen schweizerischen Erfahrungen könnten von einem breiteren Interesse sein und vielleicht Impulse für die Diskussion liefern.

Die drei schweizerischen Staatsebenen

Zum besseren Verständnis der nachfolgenden Darstellung ist ein kurzer Exkurs über den Staatsaufbau der Schweiz notwendig. Die kompliziert erscheinende staatliche Struktur erklärt sich aus der historischen Entwicklung, ist jedoch ebenso sehr eine Folge der kleinräumigen geografischen Kammerung des Landes in der Alpenlandschaft.

Die Schweiz ist ein Bundesstaat, der von den 26 Kantonen gebildet wird. Es sind dies politische Einheiten von sehr unterschiedlicher Größe, Bevölkerungsstruktur, Mentalität, Sprache und Konfession. Die Kantone sind die hauptsächlichen Träger der staatlichen Gewalt, sind verantwortlich für die den Bürger, die Bürgerin direkt betreffenden Bereiche wie Wirtschaft, Infrastruktur, Bildungswesen, Gesundheitswesen und Polizei.

Auf der darüber liegenden Ebene sind die Kantone in die Eidgenossenschaft eingebunden. Dieser sind vor allem die Außenpolitik und die Armee mit den damit verbundenen Aufgaben übertragen. Sie hat zudem wesentlichen Einfluss in der Gesetzgebung, durch die sie die Tätigkeit der Kantone koordiniert.

Die unter den Kantonen liegende Ebene bilden die nahezu 3.000 Gemeinden. Ganz allgemein haben sie sich in der Schweiz eine grosse Autonomie bewahrt, die in einzelnen Kantonen sehr weit reichend ist. Die Gemeinden erfüllen mit den eigenen, nicht unbeträchtlichen Steuereinnahmen wichtige Aufgaben, so in Schulwesen, Ortsplanung, Bauwesen und Kultur.

Diese drei staatlichen Ebenen – Kanton, darüber der Bund, darunter die Gemeinde – sind vielfältig miteinander verflochten und voneinander abhängig.

Rechtliche Grundlagen und ihre Wirkung

Die Prävention für Kulturgüter wird in der Schweiz, wie in vielen anderen Staaten auch, auf der Grundlage des »Haager Abkommens zum Schutz von Kulturgut bei bewaffneten Konflikten« von 1954 und des so genannten Zweiten Protokolls von 1999 betrieben. Das Abkommen sieht vor, dass die Signatarstaaten die besonders wichtigen Kulturgüter bezeichnen, verlangt von ihnen, dass im Bereich dieser Objekte jegliche

requires them to refrain from any kind of military use in proximity to these objects, and forbids hostile parties from adversely affecting these cultural goods through warfare.[4]

These regulations, developed out of the experience of the Second World War and drawn up during the Cold War, are certainly commendable. Their effect in concrete cases of conflict, however, is questionable. During the war in former Yugoslavia, for example, it became apparent that the maps of cultural property served to distinguish objects to be destroyed, including the bridge in Mostar and the National Library in Sarajewo. The Hague Convention also does not provide any reliable help during the state of insecurity that accompanies warfare, as manifested in plundering (even of museums) or in increased smuggling of movable cultural goods. During a state of war the agreement probably often has the character of a wish-catalogue far removed from military application and from reality in the zones of conflict.

Nevertheless, the Hague Convention has opened up another dimension that is much more important in its concrete application: it has sharpened our awareness that disasters of all kinds represent an immense endangerment to cultural property, dangers that the affected people do not want but can only influence to a limited extent. At least in our latitude civil disasters caused by fires, lightning, floods, avalanches and rock or earth slides are more relevant in this context than armed conflicts. There have been enormous losses from such disasters in Central Europe just within the last decades.

Although this effect was not planned, the great strength of the Hague Convention is the fact that the preventive measures it stipulates are not only sensible when correctly applied during a state of war, but are also particularly applicable for civil disasters.

In Switzerland the organization of cultural property protection was also originally aimed at precautions involving military events. It profits enormously from the compulsory military service, as a consequence of which a sufficient number of people can be trained and deployed. In a sense it has a military–like rigid organization, and the funds at its disposal are not insignificant. People who have a close professional and personal relation to cultural goods are assigned to service in cultural property protection.[5]

A system that was set up with a military background now serves above all in times of civil disaster: for some time now the realization has prevailed that civil disasters represent the main danger and that precautionary measures must therefore be oriented toward them. This

4 It is not widely known that Protocol I (1977) to the Geneva Convention from 12 August 1949 already includes a similar prohibition (Protection of Victims of International Armed Conflicts, article 53a).

5 These are museum employees, preservationists, free-lance restorers, art historians and architects.

militärische Nutzung unterbleibt, und verbietet im Gegenzug gegnerischen Parteien, die Kulturgüter durch kriegerische Handlungen zu beeinträchtigen.[4]

Diese aus den Erfahrungen des Zweiten Weltkriegs entstandenen, im Kalten Krieg ausgearbeiteten Regeln sind bestimmt lobenswert. Was sie im konkreten Konfliktfall bewirken, ist fraglich. So zeigte sich beispielsweise während der Kriege im ehemaligen Jugoslawien, dass die Kulturgüterschutz-Karten dazu dienten, die zu zerstörenden Objekte zu identifizieren, unter anderen die Brücke von Mostar oder die Nationalbibliothek in Sarajewo. Auch für den Zustand der mit Kriegen einhergehenden Unsicherheit, die sich in Plünderungen (auch von Museen) oder vermehrtem Schmuggel mobiler Kulturgüter zeigt, bietet das Haager Abkommen keine verlässliche Hilfe. In Kriegszuständen wird das Abkommen wohl häufig den Charakter eines Wunschkatalogs aufweisen, der fernab einer militärischen Umsetzung und der Realität in den Konfliktgebieten existiert.

Das Haager Abkommen hat indessen eine zusätzliche, in der konkreten Anwendung weit bedeutendere Dimension eröffnet: Es hat das Bewusstsein geschärft, dass Katastrophen aller Art eine immense, von den betroffenen Menschen nicht gewollte und nur bedingt beeinflussbare Gefährdung für die Kulturgüter bedeuten. Wichtiger als kriegerische Auseinandersetzungen sind in diesem Zusammenhang zumindest in unseren Breitengraden zivile Katastrophen, wie Brände, Blitzschläge, Überflutungen, Lawinen, Bergstürze und Erdrutsche. Die durch solche Ereignisse allein in den letzten Jahrzehnten in Zentraleuropa entstandenen Verluste sind enorm.

Die große, in dieser Auswirkung nicht geplante Stärke des Haager Abkommens liegt demzufolge in dem Umstand, dass die darin vorgesehenen präventiven Maßnahmen zwar bei richtiger Umsetzung für kriegerische Ereignisse Sinn machen würden, dass sie jedoch ebenfalls und vor allem für zivile Katastrophen anwendbar sind.

Auch in der Schweiz ist der Kulturgüterschutz eine Organisation, die ursprünglich auf die Vorsorge bei militärischen Ereignissen ausgerichtet war. Er profitiert enorm von der allgemeinen Wehrpflicht, die es mit sich bringt, dass genügend Personal ausgebildet und eingesetzt werden kann. In gewissem Sinn ist er »militärisch straff« organisiert und es stehen ihm nicht unbedeutende finanzielle Mittel zur Verfügung. Eingeteilt im Kulturgüterschutz sind Personen, die einen engen professionellen und persönlichen Bezug zum Kulturgut haben.[5]

Was auf militärischem Hintergrund aufgebaut worden ist, dient heute vorab bei zivilen Katastrophen: Seit einiger Zeit hat sich die Erkenntnis durchgesetzt, dass die Gefährdung durch zivile Ereignisse im Vordergrund steht

4 Es ist kaum bekannt, dass das I. Zusatzprotokoll (1977) zu den Genfer Abkommen vom 12. August 1949 über den Schutz der Opfer internationaler bewaffneter Konflikte im Artikel 53a bereits ein entsprechendes Verbot enthält.

5 Es handelt sich um Museumsangestellte, Mitarbeitende der Denkmalpflege, Freischaffende wie Restauratoren, Kunsthistoriker und Architekten.

applies equally to prevention and to concrete interventions.

Cultural property protection in Switzerland employs precautionary measures that follow the same principles used in heritage conservation,[6] with which there is intensive cooperation. The basis of prevention in cultural property protection consists of four elements.

und vorausschauende Maßnahmen deshalb auf solche Fälle auszurichten sind. Dies gilt gleichermaßen bei der Prävention wie bei konkreten Einsätzen.

Vorausschauende Maßnahmen richten sich im schweizerischen Kulturgüterschutz nach denselben Grundsätzen, wie sie die Denkmalpflege anwendet[6], und basieren auf der intensiven Vernetzung von Kulturgüterschutz und Denkmalpflege. Vier Elemente bilden die Grundlage für die Prävention zugunsten der Kulturgüter.

Inventory

One only protects that which one knows: the »Schweizerisches Inventar der Kulturgüter von nationaler und regionaler Bedeutung« (Swiss Inventory of Cultural Property of National and Regional Significance) designates the important immovable and movable cultural goods in public and private ownership.[7] The compact brochure, accompanied by an instructive map, is surprisingly well known and helps military and above all civil authorities to attain an overview of the historic buildings and movable cultural goods relevant to their jurisdiction.

The valid version of the inventory of cultural property from 1995 is currently being comprehensively revised.[8] It will become possible to call up the inventory information on the internet as part of the Geographic Information System (GIS).

Inventar

Man schützt nur, was man kennt: Das »Schweizerische Inventar der Kulturgüter von nationaler und regionaler Bedeutung« bezeichnet die wichtigen immobilen und mobilen Kulturgüter in öffentlichem und privatem Eigentum.[7] Die handliche Broschüre, begleitet von einer instruktiven Karte, ist erstaunlich breit bekannt und verhilft militärischen, vor allem jedoch zivilen Stellen zu einem Überblick über die für sie relevanten Baudenkmäler und mobilen Kulturgüter.

Die gültige Version des Inventars der Kulturgüter von 1995 steht gegenwärtig in einer umfassenden Neubearbeitung.[8] Die Inventaraussagen werden im Rahmen des Geografischen Informationssystems (GIS) im Internet abrufbar sein.

Documentation

During annual courses »safeguarding documentation« is prepared for all objects or collections listed in the inventory; this documentation, which takes all pre-existing materials into consideration, is drawn up according to fixed rules and is available to owners and to the military. The condition of the object is described, as are measures for protecting or evacuating it in case of a disaster. Thus if there was a fire in the village church the fire department would know to rescue not the pretty but worthless plaster cast of the Virgin Mary but rather the

Dokumentation

Anlässlich der alljährlich stattfindenden Kurse werden nach klaren Vorgaben für alle im Inventar verzeichneten Objekte oder Sammlungen »Sicherstellungsdokumentationen« erstellt; sie beziehen selbstverständlich das gesamte bereits existierende Material mit ein und stehen den Eigentümerschaften und den Wehrdiensten offen. Eine solche Dokumentation erfasst den Bestand des Objekts, enthält jedoch auch Überlegungen zu Sicherungsmaßnahmen oder Evakuierungen im Katastrophenfall. So wird die Feuerwehr bei einem Brand der Dorfkirche nicht den hübschen, aber wertlosen Gipsabguss

6 A clear and concise presentation of the principles guiding heritage conservation in Switzerland has recently been published in: Eidgenössische Kommission für Denkmalpflege: Leitsätze zur Denkmalpflege in der Schweiz, Zurich 2007.

7 This differentiation of cultural properties (as being of »national, regional or local significance«), commonly used in Switzerland, contradicts the principle that distinctions cannot be made in preservation, but it has proved efficient as an administrative categorization.

8 Work is done under the direction of the Swiss Committee for Cultural Property Protection; it is financed by the federal offices for civil defense and for culture and is advised by a working group of experts. Completion is planned for late 2008.

6 Seit kurzem sind die denkmalpflegerischen Grundsätze, wie sie in der Schweiz Gültigkeit haben, knapp und übersichtlich dargestellt in: Eidgenössische Kommission für Denkmalpflege: Leitsätze zur Denkmalpflege in der Schweiz, Zürich 2007.

7 Die in der Schweiz gängige Unterscheidung der Kulturgüter als von »nationaler, regionaler oder lokaler Bedeutung« widerspricht dem Grundsatz, wonach der Denkmalbegriff nicht differenzierbar ist, hat sich aber als administrative Kategorisierung bewährt.

8 Die Arbeit steht unter der Leitung des Schweizerischen Komitees für Kulturgüterschutz; sie wird von den Bundesämtern für Bevölkerungsschutz und Kultur finanziert und durch eine wissenschaftliche Arbeitsgruppe begleitet. Die Fertigstellung ist Ende 2008 vorgesehen.

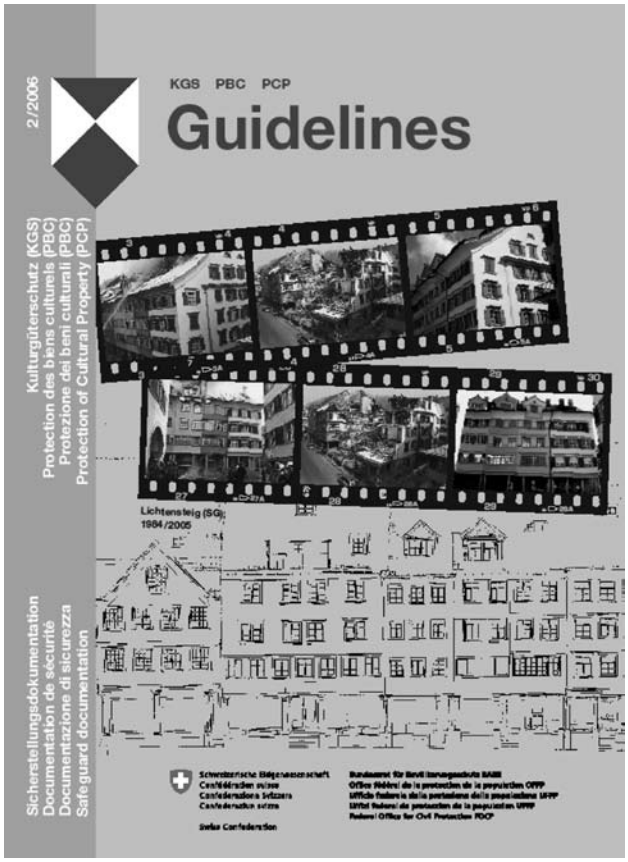


Fig. 4 Guidelines for preparation of »safeguarding documentation« by cultural property protection teams

Abb. 4 Anleitungsheft zur Erstellung von »Sicherstellungsdokumentationen« durch Angehörige des Kulturgüterschutzes

Fig. 5 Microfilm archive in a mining shaft

Abb. 5 Archivierung von Mikrofilmen in einem Bergwerkstollen

irreplaceable, although in its aged condition perhaps somewhat shabby-looking altarpiece retable (fig. 4).

einer Muttergottes retten, sondern das unersetzbare, in seinem gealterten Zustand eher etwas schäbig erscheinende Altarretabel (Abb. 4).

Archival storage

The long-term archival storage of the compiled materials is also important. There is considerable financial means available for cultural property protection to cover the systematic microfilming of the materials. The relevant films remain with the cantons for use, and the confederation files a copy in a central storehouse in the shaft of a former quarry, under constant ideal climatic conditions (fig. 5).[9]

Archivierung

Wichtig ist sodann die langfristige Archivierung der erstellten Unterlagen. Der Kulturgüterschutz stellt zur systematischen Mikroverfilmung von Unterlagen beträchtliche Finanzmittel zur Verfügung. Die Gebrauchsfilme verbleiben bei den Kantonen, der Bund archiviert ein Exemplar in einem zentralen Lager im Stollen eines stillgelegten Steinbruchs bei konstanten idealen Klimabedingungen (Abb. 5).[9]

Protective shelters

Construction of protective sites for cultural property, urgently pursued for a long time, is now proceeding with a great deal more circumspection. In general these sites are underground complexes that offer a high degree of protection, analogous to protective shelters for people during warfare, but they are also conceived to offer adequate

Schutzräume

Lange Zeit stark vorangetrieben, heute mit wesentlich mehr Umsicht verwirklicht, wird der Bau von Kulturgüterschutzräumen. Es handelt sich dabei in der Regel um unterirdische Anlagen, die analog zu Personenschutzräumen bei kriegerischen Ereignissen einen hohen Schutzgrad aufweisen, jedoch auch so konzipiert sind, dass sie bei Lawinen, Überflutungen,

9 At a temperature of 10° C, with 35 percent humidity.

9 *Temperatur 10 °C, Luftfeuchtigkeit 35 Prozent.*

security from avalanches, floods and fire storms. In most cases these protective sites for cultural property are the permanently used depots of large cultural institutions such as museums, collections, libraries and archives. Switzerland has c. 280 protective shelters for cultural goods, with a total volume of more than 200,000 m³.[10]

But exceptions prove the rule, even in the case of protecting cultural property from natural disasters in special shelters. During the severe flood in August 2004 a cultural property protective site established only a few years earlier in the Benedictine convent St. Andreas in Sarnen in central Switzerland was flooded. The valuable inventory, which had been kept before in an attic that was secure from flooding, was badly damaged. This was a case of a negligent choice of a site—that too can happen, even in Switzerland.

This has covered the foundations of prevention—the »hardware« so to speak—which is similarly conceived in principle in most countries. The necessity of knowing which objects are to be taken care of; precise knowledge of them, translated into accessible documentation; preservation of the compiled data in a shelter; secure storage of movable cultural goods in protective sites—all these elements are regarded worldwide as accepted principles for prevention. Of course their deployment is dependent on many circumstances, in particular political will and the availability of financial means.

Feuersbrünsten genügend Sicherheit bieten. Die Kulturgüterschutzräume sind in den meisten Fällen permanent genutzte Depots großer Kulturinstitutionen, wie Museen, Sammlungen, Bibliotheken und Archive. Die Schweiz verfügt über rund 280 Kulturgüterschutzräume mit einem Gesamtvolumen von über 200.000 m³.[10]

Sicherheit bei Naturereignissen durch Kulturgüterschutzräume: Ausnahmen bestätigen auch hier die Regel. Bei den grossen Überschwemmungen im August 2004 wurde der wenige Jahre zuvor errichtete Kulturgüterschutzraum des Benediktinerinnen-Klosters St. Andreas in Sarnen in der Innerschweiz überflutet. Die wertvollen Bestände, die zuvor überschwemmungssicher im Dachboden aufbewahrt gewesen waren, wurden arg in Mitleidenschaft gezogen. Es handelt sich um einen Fall von fahrlässiger Wahl des Standorts – auch das gibt es, auch in der Schweiz.

Soweit die Grundlagen der Prävention, gewissermaßen die »Hardware«. In den Grundsätzen wird sie in den meisten Staaten ähnlich konzipiert sein. Die Notwendigkeit zu wissen, um welche Objekte man sich zu kümmern hat, ihre genaue Kenntnis, umgesetzt in zugängliche Dokumentationen, das Aufbewahren der erarbeiteten Daten in einem Shelter, das sichere Einlagern beweglicher Kulturgüter in Schutzräumen – all diese Elemente werden weltweit als anerkannte Grundlagen zur Prävention betrachtet. Ihre Umsetzung ist selbstverständlich von manchen Umständen, namentlich vom politischen Willen und von den zur Verfügung stehenden finanziellen Mitteln, abhängig.

People, the key element

Regarding the »software«—the people who look after cultural property and their deployment in case of an intervention—with its aforementioned tri-level governmental system Switzerland has a specific, advantageous basis upon which an extremely efficient, quickly responding system of deployment can be built up.

The foundations for efficient and rapid intervention, made possible by this organizational structure, are very simple ideas that are based on common sense. What are the disaster scenarios? How can they be faced quickly and efficiently? What means are necessary to do this?

It is obvious that in answering such questions one thinks first of all of a deployment team that is already on location and that moreover finds the necessary infrastructure on site. These are people who are committed to their personal surroundings, who in many cases take on work far beyond what they are obligated to do, and who

Der Mensch, das zentrale Element

Bei der »Software«, den Menschen, die sich um die Kulturgüter kümmern, und ihrem Einsatz im Fall einer Intervention hat die Schweiz mit dem eingangs geschilderten dreistufigen Staatsaufbau eine spezifische und günstige Ausgangsbasis, auf der sie ein überaus effizientes, rasch agierendes Einsatzpotenzial aufbauen konnte.

Grundlage dieser organisatorischen Leistung zugunsten der effizienten und raschen Intervention sind sehr einfache Überlegungen, die auf dem gesunden Menschenverstand basieren. Welches sind die Katastrophenszenarien? Wie kann ihnen rasch und effizient begegnet werden? Welche Mittel sind dazu notwendig?

Es versteht sich von selbst, dass bei der Beantwortung solcher Fragen in erster Linie an Einsatzkräfte zu denken ist, die bereits vor Ort sind und vor Ort auch die nötige Infrastruktur vorfinden. Es sind Menschen, die sich in ihrem persönlichen Lebensumfeld engagieren, in vielen Fällen weit über ihre Verpflichtung hinaus Arbeiten übernehmen, von denen sie

10 In the future construction of new shelters to protect cultural goods will focus on larger collections; appropriate shelters built earlier for the civil population will be reused for smaller holdings.

10 Der Bau neuer Kulturgüterschutzräume wird künftig vor allem für größere Sammlungen vorangetrieben werden; für kleinere Bestände werden geeignete ältere Personenschutzräume umgenutzt.

are convinced that they are benefiting cultural properties that are important to them, that »belong« to them.

The communities

As already mentioned, under the Swiss governmental system the communities play an important role and have extensive autonomy. They in fact bear the main responsibility for the protection of cultural property.

Every community in which there are cultural goods of importance has its own cultural property protection organization within its civil defense system, with a chief who organizes precautionary measures and has direct contact to the local military services and to the fire department (particularly if historic buildings are involved). He is a member of the crisis team in communities large enough to have their own emergency committee. Thanks to his precise knowledge of the locale and his contacts to the community's political and cultural authorities, information is direct and pathways are short.

The strength of Swiss disaster protection is in this organizational form, with the community as the smallest unit at the lowest governmental level. People with the appropriate expertise are available within a short time; they are networked with related organizations and have excellent knowledge of local conditions. This makes unconventional solutions possible; private assistance in the form of neighborly help also functions within this system. In case of large-scale disasters the services of additional regional or even national associations can be requested.

As an example of the importance of this locally structured organization we can consider the response to a large fire that destroyed a row of houses in the historic center of Bern on January 30, 1997. The professional fire department alarmed the chief of the cultural property protection team shortly after firefighting began. He was able to inspect the buildings while the fire was still being extinguished and could give the fire department advice on how to proceed in a manner that would have the least adverse affect on the historic building fabric (fig. 6).

Notices were already available to residents the morning after the nighttime fire with advice for dealing with water-damaged furniture and pictures, rugs and books. After only a few days the burned roofs were provisionally covered with tarps, buildings were temperature controlled in order to prevent frost damage, dehumidifiers were in service, and floors had been opened up for ventilation.

»Follow-up care« is of great importance in case of a disaster. Through the constant presence of the Bern

überzeugt sind, dass sie dem Kulturgut zugute kommen, das ihnen am Herzen liegt, ihnen »gehört«.

Die Gemeinden

Wie bereits erwähnt, kommt den Gemeinden im schweizerischen Staatsverständnis eine bedeutende Rolle zu und sie verfügen über eine ausgedehnte Autonomie. Im Kulturgüterschutz sind sie de facto die hauptsächlichen Träger der Verantwortung.

Jede Gemeinde, in welcher Kulturgut von Belang vorhanden ist, hat im Rahmen des Zivilschutzes eine eigene Kulturgüterschutz-Organisation, der ein Dienstchef vorsteht. Dieser organisiert die vorbeugenden Maßnahmen, hat direkten Kontakt mit den örtlichen Wehrdiensten, im Zusammenhang mit Baukulturgütern vor allem mit der Feuerwehr. In größeren Gemeinden mit eigenem Krisenstab nimmt er darin Einsitz. Dank seiner genauen Kenntnis der Örtlichkeiten und seiner Kontakte zu den politischen und kulturellen Verantwortungsträgern der Gemeinde sind die Informationen direkt, die Wege kurz.

In dieser auf der untersten Staatsebene, in der Gemeinde als kleinster Einheit gründenden Organisationsform liegt die Stärke der schweizerischen Katastrophenvorsorge. Es sind kurzfristig zur Verfügung stehende Kräfte vorhanden, die über ein angemessenes Fachwissen verfügen, mit verwandten Organisationen vernetzt sind und die Örtlichkeiten ausgezeichnet kennen. Dadurch werden unkonventionelle Lösungen möglich und es funktioniert auch private Hilfeleistung im Sinne der Nachbarschaftshilfe. Bei Großereignissen können regional oder gar national zusätzliche Verbände angefordert werden.

Als Beispiel für die Bedeutung einer lokal strukturierten Organisation sei die Bewältigung des großen Brandes aufgeführt, der am 30. Januar 1997 in der Berner Altstadt eine Häuserzeile verwüstet hat. Die Berufsfeuerwehr alarmierte kurz nach Beginn der Brandbekämpfung den Dienstchef Kulturgüterschutz. Dieser konnte noch während des Löscheinsatzes die Gebäude inspizieren, der Feuerwehr Hinweise für eine die Gebäudesubstanz schonende Brandbekämpfung geben (Abb. 6).

Bereits am Morgen nach der Brandnacht lagen Merkblätter für die Bewohnerschaft mit Ratschlägen für den Umgang mit löschwassergeschädigten Möbeln und Bildern, Teppichen und Büchern bereit. Nach wenigen Tagen waren die ausgebrannten Dächer provisorisch mit Blachen gedeckt, die Häuser wurden temperiert, um Frostschäden zu verhindern, Entfeuchtungsgeräte waren im Einsatz, Böden wurden zum Durchlüften geöffnet.

Von großer Bedeutung ist bei einem Katastrophenfall die »Nachsorge«. Durch die konstante Präsenz des Dienstchefs Kulturgüterschutz auf dem Brandplatz konnte der Übereifer

Fig. 6 Major fire in the historic center of Berne, canton of Berne, January 1997

Abb. 6 Der Großbrand in der Altstadt von Bern, Kanton Bern, Januar 1997

Fig. 7 Box with the von Erlach family archive before its salvage

Abb. 7 Die Kisten mit dem Archiv der Familie von Erlach vor ihrer Bergung

chief of the cultural property protection team at the site of the fire it was possible to prevent fire fighters or property owners from overzealously disposing of materials or objects which seemed irreparably destroyed to the layman's eye. For instance, a simple wooden box that was saved instead of being thrown away when the attic was cleared out turned out to contain a valuable family archive that had been forgotten in the excitement. The water-soaked papers, dating back to the 15th century, were then frozen so that they could be freeze-dried later and thus preserved for posterity (fig. 7).

The possibilities of freeze drying are well known in Switzerland. Members of cultural property protection teams are well informed regarding technical possibilities and know how cultural goods (in this context mostly on paper) must be separated into manageable batches, packed and frozen. Many organizations keep suitable plastic containers and plastic bags on hand and have reserved refrigerated spaces in large butcher shops. The capacity of the central dehydration and lyophilization institute, formerly public but now privately operated, is adjusted to needs.

Since the major fire in Junkerngasse it has become routine for the Bern fire department to alarm the cultural property protection team. A notation in the brief dossier on the burning object that is handed to the officer in charge as the fire truck leaves the firehouse indicates if it is a historic building listed as »worthy of protection« in the inventory. Thus by the time he arrives on site the chief fireman already knows if he has to work particularly carefully and use as little water as possible (fig. 8).

The members of the cultural property protection team, alarmed at the same time by the central telephone operator, arrive at the burning object shortly thereafter and can begin giving advice. Thus timely and efficient cooperation that benefits cultural property can be achieved by means of a simple organizational provision.

der Feuerwehrleute oder der Eigentümerschaften, Material oder Gegenstände wegzuwerfen, die dem Laienauge als unreparierbar zerstört erschienen, entgegnet werden. So war es möglich, eine einfache Holzkiste zu retten, die beim Räumen der Dachböden entsorgt werden sollte: Sie enthielt ein wertvolles, in der Aufregung vergessen gegangenes Familienarchiv. Die vom Löschwasser durchfeuchteten Papiere, die bis in das 15. Jahrhundert zurückgehen, wurden eingefroren, später gefriergetrocknet und so der Nachwelt erhalten (Abb. 7).

Die Möglichkeiten der Gefriertrocknung sind in der Schweiz gut bekannt. Die Angehörigen des Kulturgüterschutzes sind orientiert über die technischen Möglichkeiten und wissen, wie das Kulturgut, in diesem Zusammenhang meistens auf Papier, in handliche Chargen portioniert, verpackt und eingefroren wird. Viele Organisationen halten geeignete Plastikbehälter und-tüten in Reserve und haben in Großmetzgereien Kühlraum reserviert. Die Kapazität der zentralen, früher in einem öffentlichen Institut, heute in einer privat betriebenen Dehydrierungs- oder Lyophilisierungsanlage ist den Notwendigkeiten angepasst.

Seit dem Grossbrand an der Junkerngasse erfolgt die Alarmierung des Kulturgüterschutzes durch die Feuerwehr in Bern routinemässig. Im kleinen Dossier zum Brandobjekt, das dem Einsatzleiter des aus der Kaserne ausfahrenden Tanklöschwagens ausgehändigt wird, befindet sich ein Vermerk, wenn es sich um ein im Bauinventar als »schützenswert« eingetragenes Baudenkmal handelt. Der Schadenplatzkommandant weiß damit bereits zum Zeitpunkt des Eintreffens beim Brandobjekt, dass er besonders sorgfältig und mit möglichst geringem Einsatz von Löschwasser zu arbeiten hat (Abb. 8).

Gleichzeitig alarmiert die Telefonzentrale mit einem Ringruf die Zuständigen des Kulturgüterschutzes, die wenig später ebenfalls beim Brandobjekt eintreffen und beratend aktiv werden. Durch diese kleine organisatorische Vorsorge kann eine frühzeitige und effiziente Zusammenarbeit zu Gunsten des Kulturguts sichergestellt werden.

Solche organisatorische Maßnahmen sind nur im kleinen

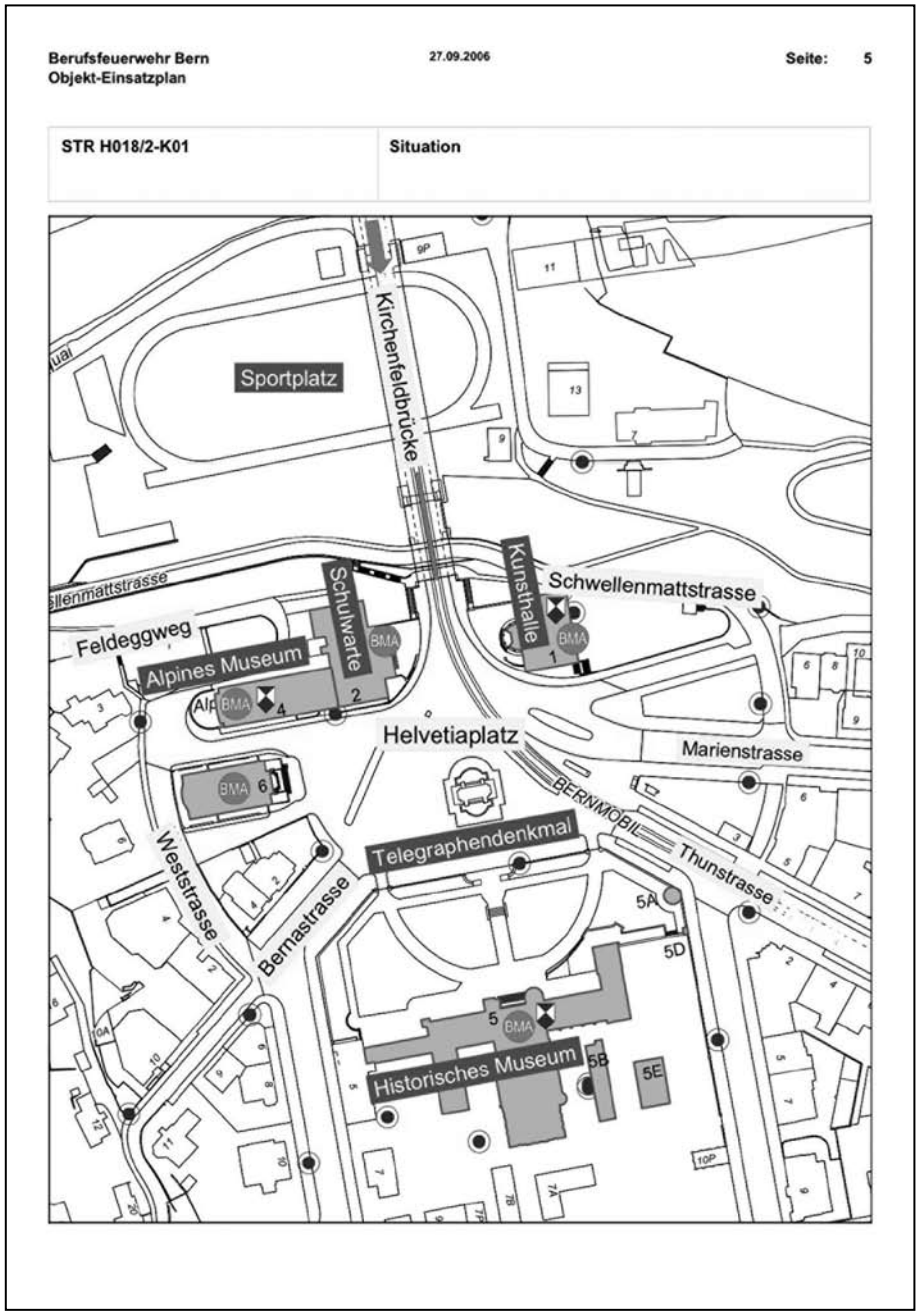


Fig. 8 Example of a deployment map for the Berne fire department with notations indicating cultural goods

Abb. 8 Beispiel einer Einsatzkarte der Berner Berufsfeuerwehr mit eingetragenen Kulturobjekten

Such organizational measures are only possible within the small framework of the community. People know, trust and help one another. These measures cost little and achieve a great deal. They are effective if all those involved can depend on them being applied even in the excitement of an emergency.

Rahmen der Gemeinde möglich. Man kennt, vertraut und hilft sich. Diese Maßnahmen kosten wenig und bewirken viel. Sie greifen dann, wenn sich alle darauf verlassen können, dass sie in der Aufregung des Ernstfalls tatsächlich angewendet werden.

The cantons

The cantons form the middle political level; they are responsible for execution of federal provisions. In particular they take charge of large-scale planning and the training of those doing their compulsory service. The

Die Kantone

Die mittlere politische Ebene bilden die Kantone; sie sind verantwortlich für den Vollzug der eidgenössischen Vorschriften. Sie übernehmen namentlich die großflächige Planung sowie die Ausbildung der Dienstleistenden. Die schweizerische Milizarmee verlangt von jedem jungen Mann eine Dienstleistung.

Fig. 9 Flood damage in Brig, canton of Valais, September 1993, Schweizer Illustrierte

Abb. 9 Überschwemmung von Brig, Kanton Wallis, September 1993, Schweizer Illustrierte

Swiss army demands service from every young man.[11] Those who cannot perform this service for medical reasons are assigned to civil defense. During the Cold War this was a large organization; today it has shrunk to a rather small size. As one part of civil defense, cultural property protection has likewise been reduced in size, but it nevertheless continues to function at a good standard.[12] These services include drawing up the aforementioned inventories and documentations of cultural properties and planning precautionary evacuations.

One example of evacuation plans prepared by a community on the basis of directives from the canton involves the windows in the chancel of Bern cathedral, which are among the most important Late Gothic stained glass in Europe. When protective outer glass was installed, the historic glass paintings were inserted in metal frames that allow relatively easy dismantling. In case of evacuation, the necessary hoist, transport boxes and storage frames are at hand in a cultural property protection shelter. Moreover the civil defense officers have been instructed regarding the proper handling of these precious glass paintings.

Together with the communities the cantons are also responsible for designation of areas of danger. Maps of these danger zones are to be drawn up for all of Switzerland by 2011. Construction of new buildings is not to be allowed in areas of increased danger from flooding, avalanches or earth slides, and it is possible that even existing

11 Civil *defense* has to be differentiated from civil *service*. The latter is served by young men who have conscientious objections to doing military service.

12 About 4000 days of service are devoted annually to cultural property protection, partly as mandatory service and partly voluntarily, which is astonishing considering the daily pay of 10–15 CHF.

Wer diese aus medizinischen Gründen nicht leisten kann, wird in den Zivilschutz eingeteilt.[11] Dieser war in der Zeit des Kalten Krieges eine Großorganisation, heute ist er auf eine recht kleine Dimension geschrumpft. Der Kulturgüterschutz als Teil des Zivilschutzes wurde ebenfalls redimensioniert, funktioniert indessen nach wie vor auf gutem Niveau.[12] Im Rahmen dieser Dienste werden die geschilderten Inventare erarbeitet, die Sicherstellungsdokumentationen erstellt und vorsorglich Evakuationen geplant.

Zum Thema der Evakuationsplanungen, die von den Gemeinden aufgrund von Weisungen des Kantons erstellt werden, sei das Beispiel der Chorscheiben des Berner Münsters aufgeführt, die zu den wichtigsten spätgotischen Glasmalereien in Europa zählen. Anlässlich des Einbaus einer äußeren Schutzverglasung waren die historischen Glasmalereien in Metallrahmen eingesetzt worden und können verhältnismässig leicht demontiert werden. Für eine allfällige Evakuierung durch den Kulturgüterschutz sind die notwendige Hebebühne, die Transportkisten und die Aufbewahrungsrechen in einem Kulturgüterschutzraum bereitgestellt. Zudem sind die Zivilschutzleistenden hinsichtlich der richtigen Handhabung der kostbaren Glasmalereien instruiert.

Die Kantone sind zusammen mit den Gemeinden auch zuständig für die Bezeichnung von Gefährdungsgebieten. Dazu sind bis zum Jahr 2011 in der ganzen Schweiz Gefahrenkarten zu erstellen. In Gebieten mit erhöhter Gefährdung durch Überschwemmungen, Lawinenniedergänge

11 Vom Zivilschutz zu unterscheiden ist der Zivildienst. Er muss von denjenigen jungen Männern geleistet werden, die aus Gewissensgründen nicht Militärdienst leisten wollen.

12 Jährlich werden in der Schweiz rund 4.000 Tage im Dienst des Kulturgüterschutzes geleistet, teilweise als obligatorische Dienstleistung, teilweise aber aus eigenem Antrieb; ein erstaunlicher Umstand, wenn man sich den Tagessold zwischen CHF 10 und CHF 15 vor Augen hält.

buildings may be given up in view of new information. This will hardly have any effect on cultural property—our forefathers were much wiser and more careful than we are now about where they erected a building such as a chapel in the mountains.

The cantons are also making an effort to control risks from lightning and the oft resultant fires. Cantonal support is available for the erection of installations for the safe deflection of lightning. Over the long term such small preventive measures can make it possible to avoid disasters like the one that befell the church of Santa Maria delle Grazie from 1505 in Bellinzona, which burned to ashes when lightning struck it on December 31, 1996; its appurtenances, including the magnificent Renaissance frescoes on the rood screen wall, were damaged so badly that some parts were irretrievably lost.

In the aftermath of a disaster, prevention means thinking about the precautions that can be taken to preclude or minimize damages from a similar event. The individual communities are often overtaxed by such future-oriented reflections, and here the cantons must step in. The devastating flood in Brig can be taken as an example. In addition to considerable damage in cellars and on ground floors throughout the city, a restoration atelier where important art objects were being stored before treatment was also flooded. On the community level, the cultural property protection team was concerned with the evacuation and appropriate handling of these objects. On the canton level, there were deliberations about how to avoid a similar event in the future. The solution that was found involved a movable bridge that prevents driftwood from becoming wedged and thus damming up water in the stream (fig. 9).

oder Erdrutsche dürfen keine Neubauten errichtet werden, unter Umständen sind bei Vorliegen neuer Erkenntnisse gar bestehende Gebäude aufzugeben. Dies betrifft Kulturgüter kaum – unsere Vorfahren waren weit klüger und vorsichtiger als wir, wenn es darum ging, eine Baute, beispielsweise eine Kapelle in den Bergen, zu errichten.

Die Kantone sind überdies bemüht, das Risiko eines Blitzschlags mit dem häufig daraus entstehenden Feuer einzudämmen. Die Einrichtung von Anlagen zum gefahrlosen Ableiten von Blitzen wird kantonal gefördert. Durch kleine vorbeugende Maßnahmen dieser Art an einzelnen Gebäuden und Baudenkmälern können längerfristig Katastrophen vermieden werden, wie diejenige des 31. Dezember 1996, als die 1505 geweihte Kirche Santa Maria delle Grazie in Bellinzona nach einem Blitzschlag eingeäschert und deren Ausstattung samt den großartigen Renaissancefresken an der Lettnerwand stark, teilweise unrettbar beschädigt wurde.

Im Anschluss an Katastrophen bedeutet Prävention das Nachdenken darüber, was vorzukehren ist, um bei einem vergleichbaren Anlass Schäden auszuschließen oder zu minimieren. In solchen zukunftsweisenden Überlegungen ist die einzelne Gemeinde vielfach überfordert, hier muss der Kanton einspringen. Als Beispiel sei die verheerende Überschwemmung in Brig erwähnt. Neben bedeutenden Schäden in Kellern und Erdgeschossen der ganzen Stadt wurde auch ein Restauratorenatelier geflutet, in dem bedeutende Kunstobjekte vor deren Behandlung eingelagert waren. Das Interesse des Kulturgüterschutzes auf der Stufe der Gemeinde galt der Evakuierung und sachgerechten Behandlung dieser Objekte. Auf der Ebene des Kantons wurde überlegt, wie ein ähnliches Ereignis künftig ausgeschlossen werden kann. Die Lösung bestand in einer beweglichen Brücke, die verhindert, dass sich Treibholz verkeilt, welches das Wasser des Bachs aufstauen kann (Abb. 9).

The confederation

The highest political level is the confederation. It enacts the legal provisions concerning cultural property protection, with which the cantons and communities must comply. There is a small staff in the Federal Office for Civil Defense for the special field of »cultural property protection.» This staff has responsibility for the national inventory of immovable and movable cultural goods, trains the uppermost cadre, provides advice for executing protection measures, coordinates training, arranges subsidies, and maintains contacts with foreign offices.

The confederation provides direct assistance in case of large-scale disasters. For instance the army is able to carry out construction work with heavy equipment on short notice for purposes of cultural property protection,

Der Bund

Die oberste politische Ebene stellt der Bund dar. Er erlässt die gesetzlichen Bestimmungen zum Kulturgüterschutz, an die sich Kantone und Gemeinden zu halten haben. Im Bundesamt für Bevölkerungsschutz unterhält er eine kleine Stabsstelle, den Fachbereich »Kulturgüterschutz«, der für das nationale Inventar der immobilen und mobilen Kulturgüter verantwortlich ist, die obersten Kader ausbildet, Hinweise zur Durchführung von Maßnahmen liefert, die Ausbildung koordiniert, Subventionen ausrichtet und Kontakte mit ausländischen Stellen unterhält.

Bei Katastrophenereignissen großen Ausmaßes hilft der Bund direkt. So ist die Armee in der Lage, im Rahmen des Kulturgüterschutzes mit schwerem Gerät kurzfristig Baumaß-

or it can provide members of the armed forces to help in the aftermath of disasters.

The confederation is particularly active regarding precautions against earthquakes. The new Swiss norms not only demand proof of earthquake safety for new buildings but also require appropriate retrofitting for existing buildings. However, a policy statement by the Federal Commission for Heritage Conservation indicates that interventions on historic buildings should be undertaken only insofar as they do not damage the historic building fabric and appearance.[13] Thus the confederation is active in prevention but also points out the limits of such measures in regard to cultural property.

The fortress church Valeria in Sitten dates from the 13th century. Since that time there have been several severe earthquakes in this particularly earthquake-prone area of Switzerland. The first proposals for preventive measures in the basilica itself in case of a future seismic event would have entailed massive interventions. A detailed examination of the damages resulting from several severe earthquakes since the 16th century and their repair showed that cracks had developed at that time, but that there were no structural problems.[14] Therefore none of the large-scale measures that had been proposed were carried out, and instead only an obvious weak point was repaired.[15]

Prevention means using common sense to do something appropriate, striving for the optimum rather than the maximum.

Summary

In Switzerland the precautionary measures drawn up for the protection of cultural property in civil disasters are similar to those in other countries. The particular danger that arises from the topographic situation in the Alps has led to the realization that there are clear limits to prevention, and these must be accepted. Further restraints result of course from what is feasible financially and from what is advantageous for the cultural object under protection: prevention, yes, but not at any price.

Drawn up as a means to protect cultural goods in times of war, the Hague Convention from 1954 is now above all a foundation for prevention and intervention

13 Eidgenössische Kommission für Denkmalpflege: Grundsatzpapier »Erdbebensicherheit bei Baudenkmälern«, 2001.

14 The most significant earthquakes occurred in 1524 (magnitude of over 6), 1755 (magnitude unknown), 1855 (magnitude unknown) and 1946 (magnitude of 6.1).

15 This involved the connection between the west outer wall and the wall of the main nave. Cracks caused by earlier earthquakes, previously repaired only on the surface, were repointed in their full depth.

nahmen zu treffen, oder sie kann bei der Bewältigung von Katastrophen Armeeangehörige zur Verfügung stellen.

Der Bund ist namentlich auf dem Gebiet der Erdbebenvorsorge aktiv. Die neuen schweizerischen Normen verlangen nicht bloß bei Neubauten den Nachweis der Erdbebensicherheit, sondern auch die entsprechende Ertüchtigung bestehender Bauten. Ein Grundsatzpapier der Eidgenössischen Kommission für Denkmalpflege weist indessen darauf hin, dass bei historischen Bauten nur so weit eingegriffen werden soll, als nicht ihre Substanz und ihre Erscheinung darunter leiden.[13] Der Bund ist demnach bei der Prävention aktiv, zeigt jedoch auch die Grenzen solcher Maßnahmen bei Kulturgütern auf.

Die Kirchenburg Valeria in Sitten besteht seit dem 13. Jahrhundert. In diesem besonders erdbebengefährdeten Gebiet der Schweiz sind seither mehrere starke Beben aufgetreten. Erste Vorschläge zur Prävention in der eigentlichen Basilika bei einem künftigen seismischen Ereignis hätten massive Eingriffe verursacht. Die genaue Untersuchung der als Folge mehrerer großer Erdbeben seit dem 16. Jahrhundert eingetretenen Schäden und deren Behebung hat gezeigt, dass damals zwar Risse entstanden, indessen keine strukturellen Probleme aufgetreten sind.[14] Es wurde daher keine der vorgeschlagenen großmaßstäblichen Maßnahmen umgesetzt, sondern nur eine offensichtliche Schwachstelle behoben.[15]

Prävention bedeutet, mit gesundem Menschenverstand das Sinnvolle zu tun und das Optimum, nicht das Maximum anzustreben.

Zusammenfassung

In der Schweiz sind die vorsorglichen Maßnahmen zum Schutz von Kulturgütern bei zivilen Katastrophen ähnlich wie in anderen Staaten konzipiert. Das besondere Gefahrenbild, das von der topografischen Situation in den Alpen ausgeht, hat zur Erkenntnis geführt, dass es klare Grenzen der Prävention gibt, die zu akzeptieren sind. Weitere Schranken ergeben sich selbstverständlich durch das finanziell Machbare und das dem Kulturgut Zuträgliche: Prävention ja, aber nicht um jeden Preis.

Das Haager Abkommen von 1954, erarbeitet als Instrument zum Schutz von Kulturgütern in Kriegszeiten, ist heute vor

13 Eidgenössische Kommission für Denkmalpflege: Grundsatzpapier »Erdbebensicherheit bei Baudenkmälern«, 2001, http://www.bak.admin.ch/bak/themen/kulturpflege/00513/01129/index.html?lang=de

14 Die bedeutendsten Ereignisse traten 1524 (Magnitude höher als 6), 1755 (Magnitude nicht bekannt), 1855 (Magnitude nicht bekannt) und 1946 (Magnitude 6,1) auf.

15 Dabei handelt es sich um den Verbund der westlichen Abschlusswand mit der Hauptschiffwand. Ferner werden die bei früheren Erdbeben aufgetretenen Risse, die nur oberflächlich geflickt worden waren, in voller Tiefe neu verfugt.

in civil disasters. It is the prerequisite for allocating the necessary instruments and personnel.

The poor predictability of events in the Alps is a characteristic that certainly also applies to disasters such as lightning, fire or earthquakes. In Switzerland it has led to an organizational form that begins with the smallest unit, the community. Primary responsibility not only for prevention but also for intervention in the event of damages lies with the community; precautionary measures are taken at the community level, and that is where the people are who can act quickly and efficiently because they have detailed knowledge of local conditions.

This emphasis on individual, local responsibility is a peculiarity that can be explained by the small scale of Switzerland's topographic and political landscape and by the need to be able to react quickly.

Finally, although the destruction of important cultural property through deliberate damage or through natural occurrences always represents a bitter loss, we must not forget that such losses cannot be made good again by next-best reconstructions; rather, they offer a chance for something new—perhaps a new cultural asset—to be created.

allem Grundlage für die Prävention und Intervention bei zivilen Katastrophen. Es ist die Voraussetzung zum Bereitstellen der nötigen Instrumente und der personellen Mittel.

Die schlechte Voraussehbarkeit von Ereignissen in den Alpen ist eine Besonderheit, die sich ohne weiteres auf andere Katastrophenfälle wie Blitzschlag, Feuer oder Erdbeben übertragen lässt. Sie hat in der Schweiz zu einer Organisationsform geführt, die von der kleinsten Einheit, von der Gemeinde ausgeht. Dies betrifft sowohl die Prävention, die Vorsorge, wie auch die Intervention, den Einsatz nach einem Schadensfall. In der Gemeinde ist primär die Verantwortlichkeit angesiedelt, hier werden die vorsorglichen Maßnahmen getroffen, hier befinden sich die Personen, die in genauer Kenntnis der örtlichen Verhältnisse rasch und effizient handeln können.

Dieses Betonen der individuellen, örtlichen Verantwortlichkeit ist eine Besonderheit, die sich aus der Kleinräumigkeit der topografischen und politischen Landschaft der Schweiz und aus der Notwendigkeit, überaus rasch reagieren zu können, erklärt.

Abschließend ist nicht zu vergessen, dass die Zerstörung wichtiger Kulturgüter durch willentliche Beschädigung oder durch Naturereignisse zwar immer einen herben Verlust bedeutet, dass sie jedoch nicht durch irgendwelche Rekonstruktionen wettgemacht werden kann, sondern vielmehr die Chance bietet, dass Neues, auch neues Kulturgut, entsteht.

Jenifer White

Twenty Years on. The 1987 Storm and Managing Future Climate Change Impacts in Historic Parks and Gardens in England

Whole Parks ruin'd
Fine Walks defac'd
And Orchards laid flat.
Daniel Defoe on the 1703 Great Storm
(Countryside Commission, 1988)

Climate change, and its potential impacts, is on everyone's agenda. Turbulent weather in the United Kingdom this summer reminded all of the havoc generated by floods and storms, and the mild weather seems to have enabled new pathogens to spread. The newspapers in the UK have carried a succession of stories about exceptionally early flowers such as spring bulbs, new records for butterflies and tree pathogens such as the leaf miner and the damage caused to a highly valued amenity and historic parkland tree, the Horse Chestnut (*Aesculus hippocastanum*), and more recently the arrival of the blue tongue disease in livestock. An analysis of records shows that the growing season for plants in central England has lengthened by about one month since 1900.[1]

Owners and managers of parks and gardens are observing and tracking changes in climate and how it affects their conservation, presentation and maintenance work from tree planting, to summer bedding schemes, the welfare of park livestock, and changes in patterns of visitor numbers. Climate change potentially opens up new opportunities but also heralds challenging long term conservation decisions. There are likely to be cost and resource implications, and owners and managers are seeking guidance on how landscape management should be adapting and responding to climate change.

On the night of 16 October 1987 15 million trees—or the equivalent to 3.9 million cubic metres or 5 years' cut timber—were lost across a great swathe of southern England stretching from the Dorset coast, across London, to East Anglia.[2] The storm was described as a once in three hundred years event. The Forestry Commission's Director General, G. J. Francis, wrote that the 1987 storm was »the worst damage to trees ever recorded … Not only was the storm of October 1987 unique for the sheer volume of timber blown down, but it occurred in a highly populated part of the country and in one not noted for its extremes of climate.«[3] This part of the country is one of the most wooded areas; approximately one quarter of the south east is protected as Areas of Outstanding Natural Beauty, a national landscape designation of equivalent scenic interest to national parks. As well as wrecking woodlands, the damage to trees in parks, streets, gardens and orchards was dramatic as shown in the table below. The town of Sevenoaks lost all bar one of its seven oaks. Hundreds of London streets were blocked by fallen trees. Close to the capital, there is also a concentration of parks, gardens and historic estates. Nearly fifty per cent of the parks and gardens registered as being of special historic interest lay in the zone of the storm and at least half of these were badly damaged. A second wave of storms at the beginning of 1990 created further damage.

Table 1: The Department of the Environment's Joint Technical Coordination Committee's 1988 estimated numbers of non-woodland trees blown down or damaged.[4]

Type of location	Trees blown	Trees damaged
Non-woodland rural landscape	200,000	500,000
London Borough street trees	55,000	35,000
Roads and/or railways	7,000	
Royal Parks	3,540	
Other parks and gardens	3,000 to 4,000	
Royal Botanic Gardens, Kew	500	500

1 See www.ukcip.org.uk

2 A. J. Grayson (ed.): The 1987 Storm. Impacts and Responses, Forestry Commission Bulletin 87, Edinburgh 1989.

3 Ibid.

4 Ibid.

The storm was followed by a year of extreme weather with a very cold winter, hot spring and summer floods. Twenty years on it is now seen as an example of the types of events we might experience as climate changes, and it is timely to reflect on the lessons learnt and the opportunities that arose for historic park and garden conservation.

The scale of damage to historic parks and gardens necessitated special publicly funded programmes to restore these devastated landscapes. Ten million pounds were spent in clearance, ground preparation, replanting, restoration and repairs.[5] There was a need to develop strategies for targeting grants and organising programmes of restoration work. How to identify which features should be repaired or renewed, and what was practical in relation to modern use? A plan-led approach to planning and conservation of landscapes was beginning to become established prior to the storm and was adopted for the storm damaged historic parks and gardens. These plans included a suite of site specific conservation policies and detailed programmes based on research of the historic designs and conservation interests, and a review of the business operation needs of the estate. Many of these sites had been at a critical stage of neglect. Their lack of active conservation management over many decades had made them vulnerable to the winds. The storm and the grant programmes that followed enabled forgotten vistas to be revealed, designs to be rejuvenated with new planting, and new public access to be negotiated. As John Watkins, Head of Gardens and Landscapes at English Heritage, points out twenty years on, the 1987 storm was »… a critical moment and hugely important … Grants stimulated research because you had to understand the landscape before replanting.«[6] Used effectively, the plan provides a means of testing past management decisions, integrating any new evidence, and, most importantly, ensuring continuity of the design and its aesthetics. The plan could be a useful tool for monitoring and responding to climate change impacts too.

The scale of restoration work demanded principles for restoration. David Jacques' 1995 paper summarises the approach he developed for English Heritage and its storm damage work:

- » Historical survey of surviving features, and analysis with the help of documentary sources, are the essential precursors to any form of treatment of historic parks and gardens, since they define the nature and degree of historical interest of the various parts of the site.
- A management policy and plan incorporating historical objectives into the overall aims is desirable at every site so that its historic interest may be given adequate weight.
- The conservation priorities for parks and gardens are (in order): protection of the historic fabric of surviving features, recording of fabric, and repairs to conserve the design.«[7]

Jacques also includes guidelines relating to historically important fabric, repairs and restoration:

- »The fabric of important surviving features should be protected for as long as feasible. Maintenance is thus essential to avoid rapid deterioration. Continuity of maintenance is preferable to premature decay followed by reconstruction.
- The aim of protecting fabric need not extend to ill-advised recent repair, or works resulting from mere short-sightedness, financial pragmatism or neglect, and eroding a planned ornamental design.
- Maintenance plans, which specify achievable and sustainable levels of care, are desirable.
- The fabric of surviving features should be recorded sufficiently for future repairs to be accurate.
- Once the historic fabric is so decayed that it is dangerous or has failed the emphasis of treatment shifts to the recovery of the design.
- A detailed record and substantial survival of fabric are preconditions to repairs that seek to replicate it accurately.
- Repairing the layout and content resulting from the last significant and deliberate change should normally be the aim of restoration.
- Replacement of plants and some other forms of fabric will be necessary at intervals, and a restoration strategy should anticipate and harmonise the processes of vegetative change and replacement as far as possible.
- Conjectural detailing, especially of planting, may have to accompany true repairs in order to recover a design. Research on authentic style, detailing and materials should be a precondition to conjectural detailing.
- The reasons for, and process of, any repairs or reconstruction should be fully recorded. A graphic or photographic record should be undertaken during and after.
- Reconstruction is where a feature that has largely or wholly disappeared is replaced. Often reconstruction involves removal of sound, more recent, fabric, and substitution by invented detail. It can thus be destructive as well as of dubious historical value.
- Consideration should be given to whether interpretation can satisfy presentation aims, and prove a satisfactory alternative to reconstruction.

5 English Heritage: After the Storms, London 1997, also: www.english-heritage.org.uk

6 Jez Abbott: A sense of history, in: Horticulture Week (6 September 2007), p. 13.

7 David Jacques: The treatment of historic parks and gardens, in: Journal of Architectural Conservation, vol. II (July 1995).

- The preconditions to reconstruction should be that a detailed record of the original is available, and that the work is consistent with the treatment of associated buildings, or allows recovery of the design as a whole.
- Restoration-in-spirit (i. e. re-creating the general spirit of the layout without attention to accuracy) erodes a site's genuine historical interest; straightforward maintenance and repair is nearly always preferable.
- New work in a historic style should not attempt to give the impression that it is authentic historic fabric.
- All new or reconstructed fabric, except that which can be classed as repair, should be designed so that it can be installed and removed with no alteration to historic fabric.«[8]

John Sales, the National Trust's former Head of Gardens, says that conservation and management principles should »guide every aspect of management, upkeep, repair, adaptation, renewal, access, interpretation, opportunity and constraint.«[9] In 2007, English Heritage issued a consultation document on its own conservation principles, policies and guidance to develop a consistent approach to making decisions affecting the historic environment and balancing protection with economic and social needs. The new guidance reflects the evolution of other guidance such as UK planning policy but also international conventions such as The World Heritage Convention, Granada Convention, Valetta Convention and the European Landscape Convention. The plan is now to revise and update Jacques' principles for historic parks and gardens within the framework provided by the new English Heritage principles for the historic environment as a whole.

The storm damage also opened up opportunities for new research. Forestry Commission surveys looked at the frequency of failure and types of failures in common species. Poplars (Populus spp) were the most frequently damaged trees, whereas species such as Scots Pine (Pinus sylvestris), London Planes (Palatanus x acerifolia) and Atlantic Cedars (Cedrus atlantica) were at the other end of the scale; branch damage was frequent in Horse Chestnuts (Aesculus hippocastanum) and root damage in Beeches (Fagus sylvatica).[10] Led by David Cutler, the Royal Botanic Gardens Kew used the exposed root plates to study root system development and develop advice about trees. The Nature Conservancy Council set up ecological monitoring of storm damage sites and their natural regeneration.

The chaos of the night of 16 October 1987 had to be sorted out. Streets were blocked and many homes were without power. Perhaps only naturally, people wanted to clear the fallen trees and to repair the damage, but some of the woodland operations were large scale and intensive. As noted in the English Heritage publication, »The ecologist and landscape historian, Oliver Rackham, pointed out that in ecological terms it was not the storm itself which was the catastrophe, but the panic invasion of chainsaws which followed.«[11] Sixty-five per cent of the blown volume of trees had been cleared 21 months later.[12] In order to restore many historic parks and gardens, some clearance work was needed on these sites too. Ecologists challenged the extent of the clearance work, and their research has shown that gaps opened up by the storm allowed trees and shrubs to naturally regenerate and created new warm and sunny habitats that allowed flowers, butterflies and other insects to flourish, and that dead wood was itself a valuable habitat. Indeed the important collections of rhododendrons and azaleas like those at Leonardslee Gardens (West Sussex) and vistas were restored at other parks.

The need to resolve apparently clashing historic restoration and nature conservation objectives pushed greater understanding of the interrelationship of these features at many sites. The plan offered an approach to integrating management for both historic and wildlife interests. Important habitats have evolved from the historic management of sites and the wildlife interest is intertwined in the appeal of many places. One example is the veteran tree. These ancient trees are a feature of many historic parks and their wildlife significance is now highlighted in the national priority action plan for wood, pasture and parkland developed by both historic and nature conservation specialists.[13] The rejuvenation of derelict avenues often provokes debate. Replanting solutions need to be site specific and respond to the form, design and historic and nature conservation values of the avenue. The restorations of the storm damaged avenues, shown in figures 1 and 2, illustrate two of many possible solutions. At Melbury Park (Dorset) a new row of trees was planted and at Brockenhurst (Hampshire) the wind blown trees were re-erected and pollarded. Avenues emphasise the need for well researched and holistic conservation management plans.

The storm and the huge work programmes also in turn stimulated a review of the *Register of Historic Parks and Gardens of Special Historic Interest in England* and development of more detailed designation entries and maps that have since proved invaluable in considering planning applications and changes, and indeed have contributed to the model being developed for the proposed new single

8 Ibid.

9 John Sales: Landscape, History, Nature and Aesthetics, Views 38, Cirencester 2003, pp. 16–17.

10 Grayson (note 2).

11 English Heritage (note 5).

12 Grayson (note 2).

13 English Nature UK Biodiversity Action Plan. Lowland Wood Pasture and Parkland in English Nature: UK Biodiversity Group Tranche 2 Action Plan Terrestrial and Freshwater Habitats, Peterborough 1998, vol. II, p. 63, also: www.ukbap.org.uk

Fig. 1 Melbury Park (photograph © English Heritage Library)

Fig. 2 Brockenhurst Park (photograph © English Heritage Library)

heritage protection designation system, the *Register of Historic Buildings and Sites in England*.[14]

Whilst the 1987 and 1990 storms cannot be directly linked to climate change, the scientific evidence does indicate accelerating climate change, and storm events will become increasingly likely. The UK government's Stern Review stresses the importance of investing to both reduce impacts and to adapt to climate change. David Milliband, as Secretary of State for the Environment, Food and Rural Affairs, saw climate change not as an environmental issue but an economic, moral (past and present), political, national security, social and cultural issue. As well as conservation of historic properties, the historic environment sector will need to engage in these wider issues too.

UKCIP (United Kingdom Climate Impacts Programme) provides scenarios that show how the country's climate might change and co-ordinates research on dealing with our future climate. The scenarios have been developed using the latest global climate model from the Hadley Centre for Climate Prediction and Research. They can be distilled to three main types of change: temperature, rainfall and precipitation, and sea level rise:

- The UK climate will become warmer.
- The temperature of coastal waters will also increase, although not as rapidly as over land.
- High summer temperatures will become more frequent, whilst very cold winters will become increasingly rare.
- Winters will become wetter and summers may become drier throughout the UK.
- Snowfall amounts will decrease throughout the UK.
- Heavy winter precipitation will become more frequent.
- Relative sea level will continue to rise around most of the UK's shoreline.
- Extreme sea levels will be experienced more frequently.[15]

The initial work concentrated on scoping studies for both themes such as gardens and wildlife, and UK geographical regions. The *Gardening in the Global Greenhouse* report[16] is an example of 10 organisations, ranging from property owners like the National Trust, advisory bodies such as English Heritage, and industry and scientists, working together to understand the impacts on plant growth, garden design, conservation and management, and areas needing research.

Gardens are an important visitor attraction in the UK. In 2004 10.6 million people visited gardens.[17] In a changing climate new opportunities may open up as cool and refreshing gardens grow in appeal and potentially the visitor season extends at both ends. Garden design often aims to adjust microclimates.[18] Features like grottoes, pergolas, calm lakes, bosky walks and the like are designed to create cool escapes, fountains refresh the atmosphere, and terraces, courtyards and sheltered seats offer warmth and shelter. Historic gardens potentially offer many ready made refuges in a changing climate. The ASCCUE modelling research project based on Manchester, in north west England, has shown the importance of green spaces as a

14 Department for Environment, Food and Rural Affairs (Defra): Draft Climate Change Bill. Consultation document, London 2007, www.defra.gov.uk/corporate/consult/climatechange-bill/consultation.pdf

15 From UKCIP www.ukcip.org.uk/climate_change/uk_future.asp

16 Richard Bisgrove/Paul Hadley: Gardening in the Global Greenhouse. The impacts of climate change on gardens in the UK, Oxford 2002, also: www.ukcip.org.uk

17 English Heritage personal communication.

18 Chip Sullivan: Garden and climate, New York 2002.

group in tempering urban heat island effects.[19] Of course, these parks and gardens need to be well managed and kept verdant if they are to help manage city temperatures. Such well managed green spaces will also have a role in managing heavy rainfall run off.

There are of course many challenges too. The National Trust is faced with possible saline inundation of its rare 17th century Westbury Court garden which sits on the tidal River Severn, and with the question of whether to replant beech in south east England with its increasingly drought conditions. The Trust's Council has agreed upon a Statement of Intent with eight guiding principles such as minimising risks, taking innovative approaches to adaptation where appropriate, and being proactive in raising awareness; and a campaign was launched to involve its 3.5 million members and 13 million visitors (including school children) in these issues. One example in the campaign is a Green Solutions Fund that was set up to help raise money for renewable energy technology solutions for its properties. The Trust has also stated that »it will not always be possible to preserve our properties and contents entirely unchanged; unless critical interests require intervention we should seek to work with the grain of natural processes.«[20]

One of the problems for historic park and garden owners and managers is translating the climate change scenarios for their own property, and over time, and looking at cumulative impact of changes rather than just one aspect. It is also worth stressing that the climate change scenarios are not yet predictions. The science is developing all the time and there is a need to keep abreast of climate change advice and guidance. It is perhaps easier to focus on the extreme long term climate change scenarios and large scale or high impact adaptation measures and overlook immediate action needed to both improve environmental performance through good horticultural practice such as mulching, and mitigation measures such as recycling and changing to more sustainable buying practices. The potential enormity of the long term climate changes seems to have resulted in inertia yet there is much that is achievable and incrementally can help make a difference.

Landscapes are dynamic, constantly changing, and the essence of horticulture and landscape management is about managing change. Skilled and well resourced professional gardeners and landscape managers are well placed to take historic parks and gardens through many early stages of progressive climate change without costly, possibly invasive and irreversible adaptation measures. Adaptation is likely to involve many stages with many incremental changes; and new technologies will also come on stream. The Royal Parks in London are looking at water conservation and landscape design. In addition to making new bore holes they are looking at their water consumption from irrigation to sanitation. New building development offers opportunities to integrate climate change adaptations.

Whilst the potential need for major scale changes needs to be recognised, immediate term planning should develop better understanding about the scale and rate of changes and the range and time scale of mitigation and adaptation measures that might be practical and appropriate for special landscapes like parks and gardens of historic interest. Mitigation and adaptation measures will need to be site specific and will depend on a thorough understanding of the property and its environment. Many longer term adaptation measures such as managing water catchment are likely to involve collaboration with other landowners and agencies. The English Heritage conservation principles (2007) offer a basis for making such decisions and plans are a tool for tracking climate change impacts and programming adaptation work.

The new English Heritage handbook[21] reflects the progress in researching, conserving and managing the historic parks and gardens in England over the last 20 years and provides guidance for students. The public bodies responsible for managing the landscape rehabilitation programmes published reports and these should perhaps now be revisited and the storm damage advice drawn out for future use. Similarly there are probably lessons to be learnt and shared from the recent floods. New guidance on adaptation such as the TCPA's one on design which looks at adaptation options for conurbations, neighbourhoods and individual buildings is coming on stream.[22] At this early stage of understanding and planning for climate change and its potential impacts on historic parks and gardens, the focus should be on:

- Ensuring each historic park and garden has a conservation management plan
- All conservation management plans should be revised to consider climate change risks and mitigation and adaptation needs and related timescales
- Monitoring sites, tracking climate change effects, and reviewing plans to consider mitigation and adaptation strategies are needed
- Minimising risks and adaptation needs through high quality maintenance
- Securing, training and retaining skilled personnel to ensure high quality maintenance
- Establishing a historic park and garden sector forum to

19 www.sed.manchester.ac.uk/research/cure/research/asccue/

20 National Trust: Forecast?—Changeable!—examples of climate change impacts around the National Trust, Swindon 2007, also: www.nationaltrust.org.uk/main/w-climate_change-forecast_changeable.pdf

21 John Watkins/Tom Wright: The management and maintenance of historic parks, gardens and landscapes. The English Heritage handbook, London 2007.

22 R. Shaw/M. Colley/R. Connell: Climate change adaptation by design. A guide for sustainable communities, London 2007.

discuss, develop and evolve mitigation and adaptation strategies and share best practice
- Developing a climate change research strategy for the sector
- Working closely with other land management sectors to share expertise and develop new management techniques
- Involving visitors and the wider public in historic park and garden mitigation and adaptation work through interpretation and promoting good practice such as offering recycling facilities for visitors to use on site
- Seeking future fiscal support through public grant schemes to assist mitigation and adaptation work, and
- Where climate change extremes lead to decisions to abandon historically important gardens, sites should be fully recorded before damaged or lost.

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Uta Hassler

Space-Time Risks and the Ideal of Long-Term Stability

Räumliche-zeitliche Risiken und das Ideal langfristiger Stabilität

The sum of all texts and artefacts[1] that a culture can preserve as documents of its past and identity is finite, exclusive and limited. The »archive« of cultural tradition is being constantly changed materially—reconstituted through loss, new selection and addition. It is also continually revalued and newly defined in ever-new processes of appropriation and »reinvention of the old.« Strategies to establish cultural privileges are often acts of negative accommodation to cultural tradition and invisible reinterpretations of the existing, but they also involve processes that could be described as »economic logic.«[2] The »exchange cycle«[3] that is kept going by modernity, generating as it does the return of meaningless cultural goods through the appropriation of oppositional practices, applies as well to the cultural landscape and the architectural heritage.

The »imaginary archive of that which is worthy of protection« is by nature always endangered by loss and alteration. Questions of risk are therefore implicitly not only questions of the endangerment of individual objects, but also questions of the stability of the entire system. The normative protection of the stock of crucial resources against (private and public) short-term interests has been

Die Summe aller Texte und Artefakte[1], die eine Kultur als Dokumente ihrer Vergangenheit und Identität bewahren kann, ist endlich, exklusiv und begrenzt: das »Archiv« kultureller Überlieferung wird materiell stetig verändert, neu konstituiert durch Verlust, Neuauswahl und Hinzufügung, aber auch umgewertet und in immer neuen Prozessen der Aneignung und »Neuerfindung des Alten« neu definiert. Strategien kultureller Privilegierung sind oftmals Akte negativer Anpassung an kulturelle Tradition und unsichtbare Uminterpretationen des Bestehenden, aber auch Prozesse, die als »ökonomische Logik« beschrieben werden können.[2] Auch für die Zeugnisse der Architekturgeschichte und die Kulturlandschaft gilt der von der Moderne in Gang gehaltene »Austauschzyklus«[3], der über die Aneignung oppositioneller Praktiken die Rückkehr sinnentleerter Kulturgüter erzeugt.

Das »imaginäre Archiv des Schutzwürdigen« ist durch seine Eigenart von Verlust und Veränderung immer bedroht. Risikofragen sind daher implizit nicht nur Fragen der Gefährdung einzelner Objekte, sondern auch Fragen der Stabilität des Gesamtsystems. Die normative Abschirmung

1 This formulation makes reference to and extends Michel Foucault's concept of the archive, see Michel Foucault: Archäologie des Wissens, Frankfurt am Main 1973, especially pp. 183 ff., on the historic a priori and the archive: »The archive is … also that which causes all these … things not to accumulate ad infinitum in an amorphous multitude, and also not to disappear merely through coincidental external circumstances…« (p. 186).

2 Boris Groys describes this process: »… that which is acknowledged as true or fine becomes devalued. … Innovation, as the revaluation of values, is an economic operation. The demand for the new belongs … in the realm of the economic constraints that determine the life of society as a whole. Economics is the trading of values within certain value hierarchies. This trading is required of all those who want to take part in social life. And culture is a part of it.« In: Groys: Über das Neue. Versuch einer Kulturökonomie, 3rd edition, Frankfurt am Main 2004, p. 14; for a definitive work on the subject »privatization of common cultural property« see Jeremy Rifkin: The Age of Access, New York/Frankfurt am Main 2000.

3 See also Thomas Crow, who points out comparable phenomena for the art market: »The exchange cycle that is kept going by modernity only moves in one direction: appropriation of the oppositional practices from above, return of the meaningless cultural goods downwards. If some piece of the inventions of the avant-garde re-enters the lower zone of mass culture, then in a form that is robbed of its original force and genuineness.« In: Thomas Crow: Moderne und Massenkultur in der bildenden Kunst, in: Texte zur Kunst N1, 1990, pp. 79 ff.

1 Diese Formulierung nimmt Bezug auf den Archivbegriff Michel Foucaults und erweitert ihn, siehe Michel Foucault: Archäologie des Wissens, Frankfurt am Main 1973, besonders S. 183 ff., Das historische Apriori und das Archiv: »Das Archiv ist … auch das, was bewirkt, dass all diese gesagten Dinge sich nicht bis ins Unendliche in einer amorphen Vielzahl aufhäufen, auch nicht allein schon bei zufälligen äußeren Umständen verschwinden…« (S. 186).

2 Boris Groys beschreibt diesen Prozess: » … das als wertvoll geltende Wahre oder Feine wird … abgewertet … Als Umwertung der Werte ist die Innovation eine ökonomische Operation. Die Forderung nach dem Neuen gehört … in den Bereich der ökonomischen Zwänge, die das Leben der Gesellschaft insgesamt bestimmen. Ökonomie ist der Handel mit Werten innerhalb bestimmter Werthierarchien. Dieser Handel ist von allen gefordert, die am gesellschaftlichen Leben teilnehmen wollen. Und die Kultur ist ein Teil davon.« in: Boris Groys: Über das Neue. Versuch einer Kulturökonomie, 3. Auflage, Frankfurt am Main 2004, S. 14; Grundlegend zum Thema der »Privatisierung des kulturellen Gemeinguts«: Jeremy Rifkin: The Age of Access, New York/Frankfurt am Main 2000.

3 Siehe auch Thomas Crow, der vergleichbare Phänomene für den Kunstmarkt zeigt: »Der von der Moderne in Gang gehaltene Austauschzyklus bewegt sich nur in eine Richtung: Aneignung der oppositionellen Praktiken von oben, Rückkehr der sinnentleerten Kulturgüter nach unten. Wenn irgendein Stück der Erfindungen der Avantgarde wieder in die niedere Zone der Massenkultur eintritt, dann in einer Form, die ihrer ursprünglichen Kraft und Unverfälschtheit beraubt ist«, in: Thomas Crow: Moderne und Massenkultur in der bildenden Kunst, in: Texte zur Kunst N1, 1990, S. 79 ff.

the basis of governmental administrative action ever since a legal framework has existed. These systems of enforcement of long-term interests of stable development were shaped predominantly in the 19th century—from building and protection laws to infrastructure and public services: many regulations are still valid today, although they are threatened in their effectiveness and their existence.[4]

In order to discuss disaster prevention for »immovable property« and the cultural consequences of disasters affecting the cultural heritage, we must first consider several issues. The circumstances in which risk conflicts arise must be defined.[5] The question of whether a general survey of potential dangers is possible at all with our current state of knowledge must be addressed. And we must talk about time.

des Bestands zentraler Ressourcen gegen (private und öffentliche) Kurzfristinteressen ist Basis staatlichen Verwaltungshandelns seit es rechtliche Rahmensetzungen gibt. Vor allem das 19. Jahrhundert prägte Systeme der Durchsetzung der Langfristinteressen stabiler Entwicklung – von den Bau- und Schutzgesetzen bis hin zu Infrastruktur und öffentlicher Versorgung: viele Regelwerke sind bis heute gültig, wenn auch in ihrer Wirkungsweise und ihrem Bestand bedroht.[4]

Wenn hier über Katastrophenprävention für die »immobilen Güter« und über kulturelle Konsequenzen von Katastrophen für das Kulturerbe gesprochen werden soll, so ist zunächst der Rahmen abzustecken, in dem Risikokonflikte auftreten[5]*, es ist zu fragen, ob eine Gesamtschau möglicher Gefährdungen mit dem derzeitigen Wissen überhaupt denkbar ist – und es ist über die Zeit zu sprechen.*

Engineers' safety concepts and questions of the sustainability of technical solutions

»Not all known hazards can be rendered harmless by means of action,« writes civil engineer Jörg Schneider at the beginning of his reflections on »accepted risk.« He points out the limitations of possibilities in economics and the necessity for a quantifying definition of »remaining risks« for life and limb in a technical environment as well as the phenomenon of redistribution: »A characteristic of technical activity is that it reduces risks in certain areas to the burden of others, which are in turn saddled

Sicherheitsbegriffe der Ingenieure und Fragen der Nachhaltigkeit technischer Lösungen

»Nicht alle erkannten Gefahren lassen sich durch Maßnahmen unschädlich machen«: so leitet der Bauingenieur Jörg Schneider eine Überlegung zum »Akzeptierten Risiko« ein. Er weist auf Grenzen volkswirtschaftlicher Möglichkeiten, die Notwendigkeit einer quantifizierenden Präzisierung der »Restrisiken« für Leib und Leben von Menschen in einer technischen Umwelt – aber auch auf das Phänomen der Umverteilung: »Es ist ein Merkmal technischer Aktivität,

4 Thomas Volken and Willi Zimmermann point out in their observations on »Institutional Regimes for Natural Resources« that »from the point of view of institutional economics the regulation of property rights, rights of disposal and rights of use [is] a crucial control factor(s) for the efficiency of economic processes.« »The … internalization of the external costs can be attained … through the (re)definition of these legal titles.« See Volken/Zimmermann: Institutionelle Regime für natürliche Ressourcen, in: Ressourcenökonomie III. Institutionelle Aspekte der Ressourcennutzung, Skript ETH Zürich 2003, p. 13. For basics on the subject of the institutional regime for natural resources see Raimund Rodewald/Peter Knoepfel (ed.): Institutionelle Regime für eine nachhaltige Landschaftsentwicklung, Zürich 2005. On the concept of ownership see Daniel W. Bromley: Environment and Economy. Property Rights and Public Policy, Oxford/Cambridge 1991, p. 22: »Property is not an object but rather a social relation that defines the property holder with respect to something of value (the benefit stream) against all others. Property is a triadic social relation involving benefit streams, rights holders and duty bearers.« Also p. 15: »… rights only have an effect when there is some authority system that agrees to defend a rights holder's interest in a particular outcome.« An authority system is a comprehensive coordination mechanism of resource management.

5 Article 5 of the Swiss federal legislation on the protection of nature and the homeland does provide that, for objects of national significance included the federal inventories, »possible hazards« and »goals for protection« are to be listed in addition to the reasons for the object's importance.

4 Thomas Volken und Willi Zimmermann weisen in Ausführungen zu »Institutionellen Regimen für natürliche Ressourcen« darauf hin, dass »aus der Sicht der Institutionenökonomie die Ordnung der Eigentums-, Verfügungs- und Nutzungsrechte zentrale Steuerungsgröße(n) für die Effizienz wirtschaftlicher Prozesse« ist. »Die … Internalisierung der externen Kosten lässt sich … über die (Um-)Definition dieser Rechtstitel erzielen.« Siehe Thomas Volken/Willi Zimmermann: Institutionelle Regime für natürliche Ressourcen, in: Ressourcenökonomie III. Institutionelle Aspekte der Ressourcennutzung, Skript ETH Zürich 2003, S. 13. Zum Thema der Institutionellen Regime für natürliche Ressourcen grundlegend: Raimund Rodewald/Peter Knoepfel (Hg.): Institutionelle Regime für eine nachhaltige Landschaftsentwicklung, Zürich 2005. Zum Eigentumsbegriff siehe Daniel W. Bromley: Environment and Economy. Property Rights and Public Policy, Oxford/Cambridge 1991, S. 22: »Property is not an object but rather a social relation that defines the property holder with respect to something of value (the benefit stream) against all others. Property is a triadic social relation involving benefit streams, rights holders and duty bearers« und S. 15: »… rights only have an effect when there is some authority system that agrees to defend a rights holder's interest in a particular outcome«. Ein Regelsystem ist ein übergreifender Koordinationsmechanismus der Ressourcensteuerung.

5 Das Schweizerische Bundesgesetz über den Natur- und Heimatschutz sieht in Artikel 5 immerhin vor, dass bei Objekten nationaler Bedeutung für die Inventare des Bundes neben der Begründung dieser Bedeutung auch »mögliche Gefahren« bzw. der »anzustrebende Schutz« aufzunehmen sind.

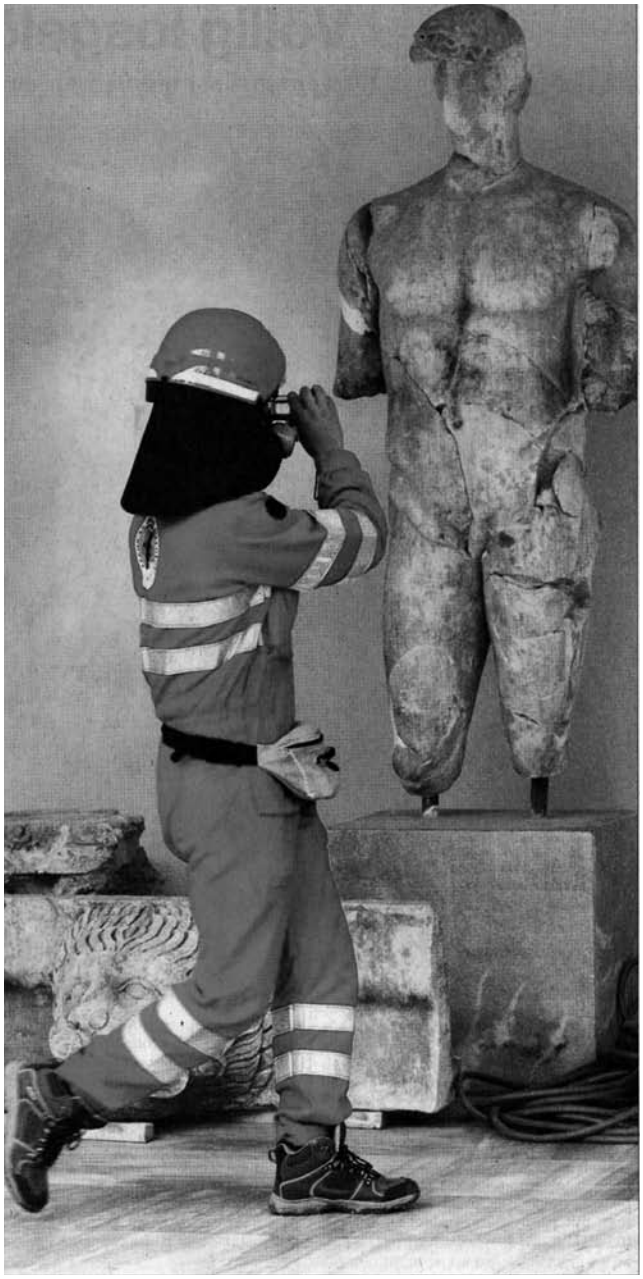

Fig. 1 Forest fires burning out of control in Greece, August 2007—firefighter takes a photo of a statue in Olympia.

Abb. 1 Außer Kontrolle geratene Waldbrände in Griechenland, August 2007 – Feuerwehrmann fotografiert Statue in Olympia

with a higher risk.«[6] Using the example of danger from earthquakes, Schneider explains that danger to life and limb must be accepted for economic reasons because »not every building in Switzerland … can be adjusted for every conceivable earthquake intensity;« but that the negative consequences of conceivable earthquakes could, however, be significantly reduced through intelligent use of resources in other areas: »The contribution to people's

6 Jörg Schneider: Unkonventionelle Überlegungen zum Thema »Sicherheit,« in: Schweizer Ingenieur und Architekt 101, 1983/7, pp. 221–224. On the idea of risk see also Werner Gleißner: Identifikation, Messung und Aggregation von Risiken, in: Günter Meier (ed.): Wertorientiertes Risiko-Management für Industrie und Handel, Wiesbaden 2001, pp. 111–137. On risk investigations in the field of engineering research see also the studies by Michael H. Faber's research group »Risk and Security in Civil Engineering« at the ETH Zurich (http://www.ibk.ethz.ch/fa/research/index).

dass sie Risiken in gegebenen Bereichen reduziert zu Lasten anderer Bereiche, denen ein höheres Risiko aufgebürdet wird."[6] Schneider erklärt mit dem Beispiel der Erdbebengefährdung, dass aus volkswirtschaftlichen Gründen eine Gefährdung für Leib und Leben in Kauf genommen werden muss, weil »nicht jedes Bauwerk der Schweiz (…) auf jede denkbare Erdbeben-Intensität bemessen« werden könne, negative Folgen denkbarer Erdbeben aber erheblich reduziert werden könnten durch intelligenten Mitteleinsatz an anderer Stelle: »Der Beitrag einer auf hohe Erdbeben-Intensitäten ausgelegten Wasserversorgung an die Sicherheit des Menschen in der gebauten Umwelt erhält … eine unerwartete Bedeutung. Die größten Erdbeben-Katastrophen wurden erst durch Feuer zur Katastrophe."[7] Wenn der für die »passive Sicherheit der Bauten« rechnende Ingenieur über die Quantifizierung potentieller Risiken spricht, so denkt er zunächst an das »auf akzeptierbar kleine Werte beschränkte Risiko für Leib und Leben von Menschen« – in der »denkbar größten zeitlichen und räumlichen Ausdehnung unserer Umwelt«. Schneider benennt fünf Möglichkeiten, wie Gefahren technisch, organisatorisch oder verhaltensorientiert beeinflusst werden können:[8]

- *durch das Eliminieren der Entstehung der Gefahr selbst,*
- *das Umgehen durch Ändern des Vorgehens,*
- *Bewältigung durch Überwachung, Kontrolle und Warnsysteme,*
- *Vorhalten von Reserven und*

6 Jörg Schneider: Unkonventionelle Überlegungen zum Thema »Sicherheit«, in: Schweizer Ingenieur und Architekt 101, 1983/7, S. 221–224. Zum Risikobegriff siehe auch Werner Gleißner: Identifikation, Messung und Aggregation von Risiken, in: Günter Meier (Hg.): Wertorientiertes Risiko-Management für Industrie und Handel, Wiesbaden 2001, S. 111–137. Zu Risikountersuchungen im Bereich der Ingenieurforschung siehe auch die Untersuchungen der an der ETH Zürich angesiedelten Forschergruppe »Risiko und Sicherheit im Bauingenieurwesen« um Michael H. Faber (http://www.ibk.ethz.ch/fa/research/index).

7 Schneider (wie Anm. 6), S. 223. Siehe auch die SIA-Publikationen »Erdbebensicherheit bestehender Bauwerke und aktuelle Fragen der Baudynamik«, Dokumentation D 0141, 1997 und Erdbebenvorsorge in der Schweiz – Massnahmen bei neuen und bestehenden Bauwerken. Dokumentation D 0162, 2000; allgemein beispielsweise M. Fazian/H. R. Schalcher/M. H. Faber: Consequence Assessment in Earthquake Risk Management using Indicators. Proceedings of the 8th U. S. National Conferences on Earthquake Engineering, San Francisco 2006. Zu mathematisch basierten Risikomodellen im Bereich der Kulturgütererhaltung siehe Renato Coppi: Methodologie für die Bestimmung von Risikomodellen des Kulturguts (http:www.icr.beniculturali.it).

8 Schneider (wie Anm. 6), S. 223.

safety in the built environment made by a water supply that is planned to withstand high earthquake intensities takes on unexpected significance. The largest earthquake disasters first become catastrophes because of fire.«[7] When the engineer who calculates the »passive security of a building« speaks about quantifying potential risks, he is thinking first of the »risk to life and limb limited to an acceptably small level« – in the »largest imaginable time and spatial extent of our environment.« Jörg Schneider suggests five possibilities for influencing dangers technically, organizationally and behaviourally:[8]

- elimination of development of the danger itself,
- avoidance by changing procedures,
- management through supervision, control and warning systems,
- readiness of reserves, and
- taking on the dangers as an accepted risk.

»Acceptable risks« can be defined in the framework of a social process of opinion formation. They are, for example, incorporated into regulations that establish standards for buildings and infrastructure, which are, in turn, intended to prevent—insofar as possible—events causing damage to life and limb.

In the engineering field—as well as in economically driven societies that try to absorb social and private risks through generalization or insurance[9]—phenomena and problems that call into question the objectification of safety concepts and that highlight conflicts between normative and »subjective« decision making already exist.[10] Not only external factors have a substantial influence on assessments in the planning, inspection, analysis and appraisal of potential risks; social factors also play a major role. Rüdiger Rackwitz[11] has frequently pointed out how

Fig. 2 Earthquake damage in Kobe, Japan, 1995. The fire department had to give up entire blocks and retreat to fire-breaks (in this photo a broad street) in order to fight the flames

Abb. 2 Erdbebenschäden im japanischen Kobe, 1995. Die Feuerwehr musste damals ganze Straßenblocks aufgeben und sich zur Brandbekämpfung bis zu Feuerschneisen, auf diesem Bild eine breitere Straße, zurückziehen.

– *Übernahme der Gefahren als akzeptiertes Risiko.*

Im Rahmen eines gesellschaftlichen Meinungsbildungsprozesses können »akzeptable Risiken« festgelegt werden, sie gehen zum Beispiel in Regelwerke ein, die Standards für Bauten und Infrastruktur festlegen und wiederum Schadensereignisse für Leib und Leben von Menschen soweit wie möglich verhindern sollen.

Nun gibt es bereits im Ingenieurwesen – aber auch bei wirtschaftlich handelnden Gesellschaften, die gesellschaftliche und private Risiken durch Verallgemeinerung beziehungsweise Versicherung abzufedern versuchen[9] – Phänomene und Fragestellungen, die die Objektivierung der Sicherheitsbegriffe infrage stellen und Konflikte zwischen normativer und »subjektiver« Entscheidungsfindung aufzeigen.[10] Nicht nur beeinflussen externe Faktoren bei Planung, Inspektion, Analyse und Einschätzung potentieller Risiken erheblich die Einschätzungen – auch gesellschaftliche Faktoren spielen für die Bewertung eine große Rolle. Rüdiger Rackwitz hat vielfach darauf hingewiesen[11], wie unterschiedlich Gesellschaften auf bekannte und befürchtete Gefahren reagieren und wie verschieden ihre Vorsorge-

7 Schneider (note 6), p. 223. See also the SIA publications Erdbebensicherheit bestehender Bauwerke und aktuelle Fragen der Baudynamik, Dokumentation D 0141, 1997 and Erdbebenvorsorge in der Schweiz – Massnahmen bei neuen und bestehenden Bauwerken. Dokumentation D 0162, 2000; in general see for instance M. Fazian/H. R. Schalcher/M. H. Faber: Consequence Assessment in Earthquake Risk Management using Indicators. Proceedings of the 8th U. S. National Conferences on Earthquake Engineering, San Francisco 2006. On mathematically based risk models in the field of cultural property preservation see Renato Coppi: Methodologie für die Bestimmung von Risikomodellen des Kulturguts (http:www.icr.beniculturali.it).

8 Schneider (note 6), p. 223.

9 See for instance Risiko und Kapital. Überlegungen zu Risikomodellen. Swiss Reinsurance Company, Zürich 2005, for reflections on the possibility of classifying risk models that respond to »individual preferences and restrictions« (p. 15); periodicity, dynamics and questions of determination are discussed as parameters.

10 See for instance Michael H. Faber: On the Treatment of Uncertainties and Probabilities in Engineering Decision Analysis, in: Journal of Offshore Mechanics and Arctic Engineering, Trans. ASME, 127(3), August 2005, pp. 243–248.

11 For the work of Rüdiger Rackwitz see http://www.mb.bv.tum.de/

9 Siehe dazu etwa Risiko und Kapital. Überlegungen zu Risikomodellen. Swiss Reinsurance Company Zürich 2005. Hier finden sich Überlegungen zur Möglichkeit der Klassifizierung von Risikomodellen, die auf »individuelle Präferenzen und Restriktionen« antworten (S. 15), als Charakteristika werden Periodizität, Dynamik und Fragen der Determinierung diskutiert.

10 Siehe etwa Michael H. Faber: On the Treatment of Uncertainties and Probabilities in Engineering Decision Analysis, in: Journal of Offshore Mechanics and Arctic Engineering, Trans. ASME, 127(3), August 2005, S. 243–248.

11 Zu den Arbeiten von Rüdiger Rackwitz siehe http://www.mb.bv.tum.de/index-d/mitarbeiter/rackwitz/public.pdf (geprüft 10. 1. 2008).

differently societies react to known and feared hazards and how varied their investments in precautions are.[12] Certain risks that are in the public mind, that arouse fear and that seem comparatively neither very visible nor »controllable« are attended with considerably more investment than is commensurate with their actual probability of occurrence.

In various ways, economists are carrying on the debate about the extent to which »insuring as such,« for instance in the form of safety standards, indirectly leads to an increase of the risks themselves. There are definitive studies on this topic by Denis Mileti[13] and Ernst Fehr.[14]

Dangers for the stable, long-term development of the building stock

The built environment is a society's greatest physical, social and cultural capital, but also its greatest economic capital. A society's added value is passed down from one generation to the next by means of the existing stock of infrastructure and real estate. For the most part, the added value of the industrialization process of the 19th and early 20th century has been relatively durably fixed in the stock of buildings and infrastructure.[15] Markets and market prices for real estate were traditionally regionally determined, as they still are in the 21st century. On the whole, supply and demand or profit expectations determine exchange values. The existing stock of buildings and infrastructure constitutes seventy to eighty percent of total capital in the industrialized countries.[16] The speed of transforma-

index-d/mitarbeiter/rackwitz/public.pdf (verified on 10/1/2008).

12 See for example the preventive investments concerning traffic deaths or the consequences of asbestos.

13 Denis S. Mileti: Disasters by Design. A Reassessment of Natural Hazards in the United States. Washington, D. C. 1999. For a summary of Mileti's theses see Norbert S. Baer (ed.): Rational Decision-making in the Preservation of Cultural Property, Berlin 2001.

14 Ernst Fehr et. al.: Moral Sentiments and Material Interests, Massachusetts 2005; Ernst Fehr: The Economics of Impatience, in: Nature 415, 17 January 2002, pp. 269–272.

15 See for instance Michael Reidenbach: Zur Kommunalen Investitionstätigkeit im Deutschen Kaiserreich 1871 bis 1918, in: Investitionen der Städte im 19. und 20. Jahrhundert, Städteforschung A 42, Cologne 1997; also, very early, Walter Isard: A Neglected Cycle. The Transport-Building Cycle, in: Review of Economic Statistics, Cambridge, Mass. 1942, pp. 149–158. See also OECD/IEA (International Energy Agency) (ed.): World Energy Outlook 2006, Paris 2006 (http://www.worldenergyoutlook.org/2006.asp, verified on 10/1/2008).

16 Gerhard Meinen/Piet Verbiest/Peter Paul de Wolf: Perpetual Inventory Method, Service Lives, Discard Patterns and Depreciation Methods, Voorburg 1998; also David Pearce: The Social and Economic Value of Construction. The Construction Industry's Contribution to Sustainable Development, London 2003, with reference to different types of capital: »As the building and infrastructure stocks constitute the most important part of wealth of industrialised societies…« with a survey of »Total Wealth 2000.«

investitionen sind.[12] Bestimmte öffentlich in den Blick genommene Risiken, die »angstbesetzt« sind und vergleichsweise wenig sichtbar beziehungsweise »kontrollierbar« erscheinen, werden mit erheblich größeren Investitionen bedient, als es ihrer realen Eintretenswahrscheinlichkeit entspricht.

Die Debatte, inwieweit zudem das »Versichern an sich«, zum Beispiel auch in Form von Sicherheitsnormen, indirekt zu einer Vergrößerung der Risiken selbst führt, wird von Ökonomen in vielfältiger Weise geführt. Grundlegende Studien dazu finden sich bei Denis Mileti[13] oder auch Ernst Fehr.[14]

Gefahren für eine stabile Langfristentwicklung des Bestands

Die gebaute Umwelt ist das größte physische, soziale und kulturelle Kapital einer Gesellschaft, aber auch ihr größtes ökonomisches Kapital. Über Infrastruktur- und Immobilienbestände wird gesellschaftliche Wertschöpfung intergenerationell überliefert. Vor allem die Wertschöpfung des Industrialisierungsprozesses des 19. und frühen 20. Jahrhunderts ist in Bau- und Infrastrukturbeständen vergleichsweise dauerhaft festgelegt worden.[15] Märkte und Marktpreise für Immobilien sind traditionell und noch bis ins 21. Jahrhundert regional bestimmt, Grundstückspreise, Angebot und Nachfrage beziehungsweise Ertragserwartungen bestimmen im Wesentlichen die Tauschwerte. Der Gebäude- und Infrastrukturbestand macht in den Industriestaaten siebzig bis achtzig Prozent des Gesamtkapitals aus.[16] Die Umwandlungsgeschwindigkeiten sind vor

12 Siehe zum Beispiel die Präventionsinvestitionen zu Asbestfolgen oder Verkehrstoten.

13 Denis S. Mileti: Disasters by Design. A Reassessment of Natural Hazards in the United States. Washington D. C. 1999. Zusammenfassung der Thesen Miletis in Norbert S. Baer (Hg.): Rational Decision-making in the Preservation of Cultural Property, Berlin 2001.

14 Ernst Fehr et. al.: Moral Sentiments and Material Interests, Massachusetts 2005 oder Ernst Fehr: The Economics of Impatience, in: Nature 415, 17. Januar 2002, S. 269–272.

15 Siehe etwa Michael Reidenbach: Zur Kommunalen Investitionstätigkeit im Deutschen Kaiserreich 1871 bis 1918, in: Investitionen der Städte im 19. und 20. Jahrhundert, Städteforschung A 42, Köln 1997 und sehr früh Walter Isard: A Neglected Cycle. The Transport-Building Cycle, in: Review of Economic Statistics, Cambridge Mass. 1942, S. 149–158. Siehe auch OECD/IEA (International Energy Agency) (Hg.): World Energy Outlook 2006, Paris 2006 (http://www.worldenergyoutlook.org/2006.asp, geprüft 10. 1. 2008).

16 Gerhard Meinen/Piet Verbiest/Peter Paul de Wolf: Perpetual Inventory Method, Service Lives, Discard Patterns and Depreciation Methods, Voorburg 1998; David Pearce: The Social and Economic Value of Construction. The Construction Industry's Contribution to Sustainable Development, London 2003. Hier der Hinweis auf die unterschiedlichen Kapitalien: »As the building and infrastructure stocks constitute the most important part of wealth of industrialised societies…« mit einer Aufstellung des »Total Wealth 2000«.

tion is still slow, especially in Western Europe;[17] the stock grows about one percent annually, and half-life times for buildings and infrastructure are between 50 and 120 years. However, it is generally true that the probability of an object's survival sinks with decreasing age: thus the younger the stock the more limited are its prospects for survival.[18] Therefore possibilities for influencing the development of the built environment are limited in the short-term, but of great importance in the mid- and long-term. Currently, time planning and institutional regimes reflect the change in the dynamics of the systems very poorly. Development is being determined by the limited time horizons of the political players; privatisation of state institutions without compensation of the traditional long-term policies; and ideas of deregulation and the »withdrawal of government, back to sovereign tasks.« In Switzerland, the debate is dominated by issues of energy use and the »renovation bottleneck.«[19] In Germany there are additional discussions of the phenomenon of shrinking and its consequences. Particularly in the field of building management the time required for decisions is becoming shorter.[20] Depreciation cycles for buildings conform to those of technical installations, which in turn demand ever-greater amounts of investment. The financing of the long-term preservation of the existing building stock is unclear;[21] as are the effects of new methods of assessing investment risks (Basel II)[22] and the interdependence of demography, pension plans, and property ownership. Assessments of the impact of technology are still fragmentary in the construction sector, as typified by the recent debates about risks from building materials and their additives.[23] Expert knowledge regarding the consequences of technical-scientific innovations is frequently

17 Uta Hassler/Niklaus Kohler: The Building Stock as a Research Object, in: Building Research and Information 30, 2002/4, pp. 226–236; Patrick Bradley/Niklaus Kohler: A Methodology for Survival Analysis of Urban Building Stocks. Building Research and Information 35, 2007/35, pp. 529–542.

18 Uta Hassler/Niklaus Kohler: Das Verschwinden der Bauten des Industriezeitalters. Lebenszyklen industrieller Baubestände und Methoden transdisziplinärer Forschung, Tübingen/Berlin 2004, p. 7.

19 Bundesamt für Energie (BFE), Bundesamt für Wohnungswesen (BWO), Bundesamt für Raumentwicklung (ARE) der Schweiz: Neubauen statt Sanieren, Schlussbericht, 2002.

20 See among many others Hans-Peter Braun/Eberhard Oesterle/Peter Haller: Facility Management. Erfolg in der Immobilienbewirtschaftung, 4th edition, Berlin 2004.

21 See for instance Dana J. Vanier: Advanced Asset Management. Tools and Techniques, in: APWA (American Public Works Association) International Public Works Congress: Innovations in Urban Infrastructure 2000, pp. 39–56.

22 Bert Engelmann: The Basel II Risk Parameters. Estimation, Validation and Stress Testing, Berlin 2006.

23 On the problems of risk materials in architecture see for instance Niklaus Kohler/Uta Hassler/Herbert Paschen (ed.): Stoffströme und Kosten in den Bereichen Bauen und Wohnen. Studie für die Enquete-Kommission des Deutschen Bundestags »Schutz des Menschen und der Umwelt,« Berlin 1999.

allem in Westeuropa noch immer langsam[17], der Bestand wächst jährlich um rund ein Prozent, Halblebenszeiten von Gebäuden und Infrastruktur bewegen sich zwischen 50 und 120 Jahren. Generell gilt allerdings, dass die Überlebenswahrscheinlichkeit der Objekte mit zunehmendem Alter steigt: je jünger also ein Bestand, desto geringer seine Aussicht auf Überleben.[18] Möglichkeiten, die Entwicklung der gebauten Umwelt zu beeinflussen, sind daher kurzfristig gering. Mittel- und längerfristig sind sie von großer Bedeutung. Planung und institutionelle Regime reflektieren die Veränderung der Dynamik der Systeme gegenwärtig nur sehr ungenügend. Beschränkte Zeithorizonte der politisch Handelnden, Privatisierung staatlicher Institutionen ohne Kompensation der traditionellen Langfristpolitiken, Ideen von Deregulierung und »Rückzug des Staats auf hoheitliche Aufgaben« bestimmen die Entwicklung. Die Debatte wird in der Schweiz dominiert von Fragen des Energieverbrauchs und des »Sanierungsstaus«.[19] In Deutschland kommen Diskussionen über Phänomene der Schrumpfung und deren Konsequenzen hinzu. Vor allem im Bereich der Bewirtschaftung von Gebäuden werden die für Entscheidungen vorausgesetzten Zeithorizonte enger.[20] Abschreibungszyklen für Gebäude passen sich jenen technischer Anlagen an, die ihrerseits immer größere Investitionsvolumina beanspruchen. Die Finanzierung der längerfristigen Erhaltung der vorhandenen Bestände ist unklar[21], auch die Auswirkungen neuer Methoden der Einschätzung von Investitionsrisiken (Basel II)[22], sowie die Abhängigkeiten zwischen Demographie, Altersvorsorge und Immobilieneigentum. Technikfolgenabschätzungen im Bauwesen sind noch immer fragmentarisch, wie etwa die jüngeren Debatten um Risiken aus Baustoffen und deren Zusatzmittel idealtypisch illustrieren.[23] In Fragen der Folgen technisch-wissenschaftlicher Innovation ist

17 Uta Hassler/Niklaus Kohler: The Building Stock as a Research Object, in: Building Research and Information 30, 2002/4, S. 226–236; Patrick Bradley/Niklaus Kohler: A Methodology for Survival Analysis of Urban Building Stocks. Building Research and Information 35, 2007/35, S. 529–542.

18 Uta Hassler/Niklaus Kohler: Das Verschwinden der Bauten des Industriezeitalters. Lebenszyklen industrieller Baubestände und Methoden transdisziplinärer Forschung, Tübingen/Berlin 2004, S. 7.

19 Bundesamt für Energie (BFE), Bundesamt für Wohnungswesen (BWO), Bundesamt für Raumentwicklung (ARE) der Schweiz: Neubauen statt Sanieren, Schlussbericht, 2002.

20 Siehe unter vielen anderen Hans-Peter Braun/Eberhard Oesterle/Peter Haller: Facility Management. Erfolg in der Immobilienbewirtschaftung, 4. Auflage, Berlin 2004.

21 Dazu etwa Dana J. Vanier: Advanced Asset Management. Tools and Techniques, in: APWA (American Public Works Association) International Public Works Congress: Innovations in Urban Infrastructure 2000, S. 39–56.

22 Bert Engelmann: The Basel II Risk Parameters. Estimation, Validation and Stress Testing, Berlin 2006.

23 Zu den Problemen von Risikostoffen im Bauwesen siehe beispielsweise Niklaus Kohler/Uta Hassler/Herbert Paschen (Hg.): Stoffströme und Kosten in den Bereichen Bauen und Wohnen. Studie für die Enquete-Kommission des Deutschen Bundestags »Schutz des Menschen und der Umwelt«, Berlin u.a. 1999.

disputed and is considered to be incomplete, hypothetical and subject to revision. Moreover, risk research has shown that increased knowledge is not necessarily to be equated with greater certainty in decision making. Every gain in knowledge simultaneously makes clear how uncertain the basis of the existing knowledge is.[24]

Presently, two circumstances make construction a field of growing risks:

- the combination of long-term cyclical processes with the »late visibility« of risk consequences, which generate destabilization in case of bad management,[25] and
- the practice of use discounting as consistently applied to the building sector.[26]

Discounting in an economic sense has two aspects: on the one hand it reflects the individual or social time expectation, and on the other hand it includes a risk assessment. The assessment of possible risk consequences occurs as a function of time: the later the consequences are expected, the lower is the assessment of the current value of possible consequences. However in this context, from the point of view of sustainable development, it would be crucial that the »capital stock«[27] not be reduced at will, that possibilities for substitution are considered thoroughly, and that principles of preserving the fabric are observed. Economists such as David Pearce and a group working with him for the World Bank have impressively demonstrated that the principles of »discounting« that are valid in the globalised economy are not in harmony with the principles and theories of sustainable management: »Discounting appears to be inconsistent with the rhetoric and spirit of ›sustainable development‹—economic and social development paths that treat future generations with far greater sensitivity than has hitherto been the case.«[28]

Expertenwissen häufig umstritten und gilt als revidierbar, unvollständig und hypothetisch. Zudem hat die Risikoforschung gezeigt, dass vermehrtes Wissen nicht zwingend mit größerer Sicherheit bei Entscheidungen gleichzusetzen ist. Jeder Wissenszuwachs verdeutlicht zugleich, wie unsicher die Basis des vorhandenen Wissens ist.[24]

Zwei Umstände machen das Bauwesen gegenwärtig zu einem Feld wachsender Risiken:

- *die Kombination langfristiger zyklischer Prozesse mit der »späten Sichtbarkeit« von Risikofolgen, die bei Fehlsteuerungen eine Destabilisierung erzeugen*[25]
- *und die Praxis der Nutzungs-Diskontierung in konsequenter Anwendung für das Bauwesen.*[26]

Diskontierung im ökonomischen Sinn beinhaltet zwei Aspekte: Einerseits spiegelt sie die individuelle oder gesellschaftliche Zeiterwartung, andererseits enthält sie eine Risikoabschätzung. Die Bewertung möglicher Risikofolgen erfolgt in Abhängigkeit von der Zeit: Je später Folgen erwartet werden, desto geringer wird der heutige Wert möglicher Konsequenzen veranschlagt. Unter dem Aspekt nachhaltiger Entwicklung wäre in diesem Zusammenhang allerdings zentral, dass der »Kapitalstock«[27] *nicht beliebig reduziert, Substitutionsmöglichkeiten gründlich überlegt werden und Prinzipien der Substanzerhaltung gelten. Ökonomen wie David Pearce und eine mit ihm für die Weltbank tätige Gruppe haben eindrucksvoll gezeigt, dass die in der globalisierten Wirtschaft gültigen Prinzipien des »Discounting« mit den Prinzipien und Theorien nachhaltigen Wirtschaftens nicht in Übereinstimmung sind: »Discounting appears to be inconsistent with the rhetoric and spirit of ›sustainable development‹ – economic and social development paths that treat future generations with far greater sensitivity than has hitherto been the case.“*[28] *Im Beitrag »Valuing the*

24 Gotthard Bechmann: Neue Wissenschaft? Einige einführende Bemerkungen und Kommentare zum Thema »Problemorientierte Forschung,« in: TA-Datenbank-Nachrichten 8, December 1999/3–4, pp. 3–12.

25 On issues of system stability, resilience and adaptability of »social-ecological systems« see Brian Walker/Lance Gunderson/Ann Kinzig et. al.: A Handful of Heuristics and Some Propositions for Understanding Resilience in Social-Ecological Systems, in: Ecology and Society 11 (1), 2006/13, p. 2: »Resilience is the capacity of a system to experience shocks while retaining essentially the same function, structure, feedbacks, and therefore identity. It follows Holling's … notion of resilience as the amount of disturbance a system can absorb without shifting into an alternative regime.« Characteristic features discussed here include: adaptive cycle, panarchy, resilience, adaptability und transformability.

26 Definitive on this topic: Douglas North: Institutionen, institutioneller Wandel und Wirtschaftsleistung, Tübingen 1992.

27 A good summary of the history of the term is found in Hans-Georg Bächtold: Nachhaltigkeit, Herkunft und Definition eines komplexen Begriffs, in: Schweizer Ingenieur und Architekt 116, 26 March 1998/13, pp. 194–197.

28 David Pearce/Ben Groom/Cameron Hepburn/Phoebe Koundouri: Valuing the Future, in: World Economics 4, 2003/2, p. 124. Early and

24 Gotthard Bechmann: Neue Wissenschaft? Einige einführende Bemerkungen und Kommentare zum Thema »Problemorientierte Forschung«, in: TA-Datenbank-Nachrichten 8, Dezember 1999/3–4, S. 3–12.

25 Zu Fragen von Systemstabilität, Resilienz und Anpassungsfähigkeit »Sozial-ökologischer Systeme« siehe Brian Walker/Lance Gunderson/Ann Kinzig et. al.: A Handful of Heuristics and some Propositions for Understanding Resilience in Social-Ecological Systems, in: Ecology and Society 11 (1), 2006/13, S. 2: »Resilience is the capacity of a system to experience shocks while retaining essentially the same function, structure, feedbacks, and therefore identity. It follows Holling's … notion of resilience as the amount of disturbance a system can absorb without shifting into an alternative regime.« Als Charakteristiken werden hier diskutiert: Adaptive Cycle, Panarchy, Resilience, Adaptability und Transformability.

26 Grundlegend Douglas North: Institutionen, institutioneller Wandel und Wirtschaftsleistung, Tübingen 1992.

27 Eine gute Zusammenfassung der Begriffsgeschichte gibt Hans-Georg Bächtold: Nachhaltigkeit, Herkunft und Definition eines komplexen Begriffs, in: Schweizer Ingenieur und Architekt 116, 26. März 1998/13, S. 194–197.

28 David Pearce/Ben Groom/Cameron Hepburn/Phoebe Koundouri: Valuing the Future, in: World Economics 4, 2003/2, S. 124. Früh und grundlegend zu diesem Thema auch David Pearce: Economics, Equity

In their article »Valuing the Future« the authors show how spatial and time preferences of the people involved influence the processes of discounting. Pearce makes it clear that the implicit assumption that the given discount rate will remain constant over a long period cannot be proved empirically. A crucial problem is the uncertainty about future development,[29] and the further in the future for which the prediction is made, the greater the uncertainty. Therefore variable-discounting rates could be employed. This leads, however, to other problems: »… chief among them is ›time-inconsistency‹.«[30] For historians »time-inconsistency,« or incongruence of development, is a phenomenon that is a self-evident part of history. It concerns not only the situation in which a generation chooses plans and policies, which will be revised by another generation, but also the complex interaction of plans as revisions or corrections of a given development and socio-economic, and therefore cultural, conditions. Conflicts between state action for future preparedness and private interests, which sometimes foresightedly counteract »policies«, are numerous. Using the building sector as an example, a brief review can show that systems and plans that are designed for the long term prove to be more broadly useful and to contribute to the stability of systems.

Nevertheless some economists accept[31] that even flexible discounting approaches (time-varying discount rates) do not offer suitable models for very long-term goods such as buildings and in particular for very long time periods: »It is worth looking … at the way the discount rate is established. An important component is ›rising wealth‹: assets that are highly valued now will be valued less in the future when society is wealthier. However, this process does not apply for the architectural heritage inherited from previous generations, so will probably not apply to the architectural heritage that we leave to future generations. … The rising wealth hypothesis does not seem to be

Future« zeigen die Autoren, wie räumliche und zeitliche Präferenzen der Handelnden die Prozesse der Diskontierung beeinflussen. Pearce macht deutlich, dass die stillschweigende Annahme, die angenommene Diskontierungsrate (discount rate) sei über längere Zeit konstant, empirisch nicht nachzuweisen ist. Ein zentraler Problempunkt liegt in der Unsicherheit über die künftige Entwicklung[29], die – je längere Vorausschau gefragt sei – umso unsicherer erscheine, weshalb variable Diskontierraten angenommen werden könnten. Allerdings handelt man sich damit wiederum andere Probleme ein: »… time-varying discount rates have their own problems and chief among them is ›time-inconsistency‹.«[30] »Time-inconsistency«, Inkongruenz der Entwicklung, ist für Historiker ein Phänomen, das zur Geschichte gehört, eine Selbstverständlichkeit. Es betrifft nicht nur die Situation, in der eine Generation Planungen und Politiken wählt, die von einer anderen Generation revidiert werden, sondern die komplexe Interaktion von Planung als Revision beziehungsweise Korrektur einer gegebenen Entwicklung und sozial-ökonomischen, mithin kulturellen Bedingungen. Konflikte zwischen staatlichem Handeln zur Zukunftsvorsorge und privaten Interessen, die »Politiken« zum Teil auch vorausschauend konterkarieren, sind vielfältig. Am Bauwesen kann durch einen kurzen Rückblick gezeigt werden, dass auf lange Dauer ausgelegte Systeme und Planungen sich in der Breite als tauglicher erweisen und zur Systemstabilität beitragen.

Immerhin wird von einigen Ökonomen akzeptiert[31], dass selbst flexible Diskontierungs-Ansätze (time-varying discount rates) für die sehr langfristigen Güter wie Gebäude und im Besonderen für sehr lange Zeiträume keine geeigneten Modellansätze bieten: »It is worth looking … at the way the discount rate is established. An important component is ›rising wealth‹: assets that are highly valued now will be valued less in the future when society is wealthier. However, this process does not apply for the architectural heritage inherited from previous generations, so will probably not

basic to the topic: David Pearce: Economics, Equity and Sustainable Development, in: Paul Ekins (ed.): Real-Life Economics. Understanding Wealth Creation, London 1992; also R. Kerry Turner: Sustainability, Resource Conservation and Pollution Control. An Overview, in: R. Kerry Turner (ed.): Sustainable Environmental Management. Principles and Practice, London 1988.

29 Note 28, p. 128, with a reference to the ideas of M. Weitzmann: »… how that might conceivably force a revision in how we conceptualize the problem of the very long run.« Also p. 131: »However, these observations are insufficient for the result to hold when the risk of recession is introduced. Indeed, the conditions on individual preferences required for the economy to exhibit discount rates which decline with time become increasingly complex, unintuitive, and empirically difficult to test.« Here also the reference to the important contribution by C. Z. Li/K. G. Lofgren: Renewable Resources and Economic Sustainability: a dynamic analysis with heterogeneous time preferences, in: Journal of Environmental Economics and Management 40, 2000/3, pp. 236–250.

30 Pearce (note 28), p. 132.

31 Ian Ellingham/William Fawcett: New Generation whole-life Costing. Property and construction decision-making under uncertainty, New York/Glasgow 2006.

and Sustainable Development, in: Paul Ekins (Hg.): Real-Life Economics. Understanding Wealth Creation, London 1992, und R. Kerry Turner: Sustainability, Resource Conservation and Pollution Control. An Overview, in: R. Kerry Turner (Hg.): Sustainable Environmental Management. Principles and Practice, London 1988.

29 Pearce et. al. (wie Anm. 28), S. 128, mit dem Hinweis auf Konzepte M. Weitzmanns: »… how that might conceivably force a revision in how we conceptualize the problem of the very long run«, S. 131: »However, these observations are insufficient for the result to hold when the risk of recession is introduced. Indeed, the conditions on individual preferences required for the economy to exhibit discount rates which decline with time become increasingly complex, unintuitive, and empirically difficult to test.« Hier auch der Verweis auf den wichtigen Beitrag von C. Z. Li/K. G. Lofgren: Renewable Resources and Economic Sustainability: a dynamic analysis with heterogenous time preferences, in: Journal of Environmental Economics and Management 40, 2000/3, S. 236–250.

30 Pearce et. al. (wie Anm. 28), S. 132.

31 Ian Ellingham/William Fawcett: New Generation whole-life Costing. Property and construction decision-making under uncertainty, New York/Glasgow 2006.

valid for architectural heritage, so discounting which is based on the rising wealth hypothesis is suspect.«[32] Thus the principle of discounting, which is predominant today in all fields of economics and is also becoming more and more important in construction, has aspects that have to be differentiated once more in our discussion. It is inappropriate for application to »very long term perspectives,« which we generally consider desirable for the imaginary archive of the architectural heritage. The principle of discounting does, however, take into consideration that every generation must be prepared to invest in preserving a diversity of options, such as continued use, alteration, repair or the relinquishing of an object. A special type of option is represented by »quasi option values,« which are defined as »the value of the future information made available through the preservation of a resource.«[33]

It is worth noting that in the economic debate, periods of time in excess of 50 years are now referred to as »long-term perspectives,« whereas the building industry, despite its transformation into a field of shrinking life expectancy, on an average still reckons with considerably longer time constants.[34] In the planning process, consideration of long-term development traditionally took place within technical-economical decision making processes involving planners, practitioners and clients who implicitly cooperated in a long-term perspective. The 20th century brought about a departure from the ideal of long-term management—ideologically, technically and in terms of the dynamics of development:

- ideologically, through a conscious abdication of intergenerational perspectives,[35]
- technically, through procedures and processes that are designed for shorter and shorter durability and an acceleration of product cycles,[36] and

apply to the architectural heritage that we leave to future generations. … The rising wealth hypothesis does not seem to be valid for architectural heritage, so discounting which is based on the rising wealth hypothesis is suspect."[32] Das gegenwärtig in allen Wirtschaftsbereichen vorherrschende und auch im Bauwesen immer wichtiger werdende Prinzip der Diskontierung hat also Aspekte, die in unserer Betrachtung nochmals zu differenzieren sind. Es ist ungeeignet in der Anwendung auf »Perspektiven sehr langer Dauer«, die wir für das imaginäre Archiv des architektonischen Erbes generell für wünschenswert halten. Es berücksichtigt aber den Umstand, dass jede Generation bereit sein muss, in die Erhaltung der Vielfalt der Optionen die Wahlmöglichkeit über Weiternutzung, Umbau, Reparatur oder Aufgabe der Objekte zu investieren. Eine besondere Art der Option stellen dabei die »Quasi-Optionvalues« dar. Sie werden definiert als »the value of the future information made available through the preservation of a resource."[33]

Bemerkenswert ist, dass in der ökonomischen Debatte Zeitspannen, die über 50 Jahre hinaus gehen, bereits als »Langzeitperspektiven« diskutiert werden, während das Bauwesen, trotz seiner Wandlung zu einem Bereich schrumpfender Lebenserwartungen, im Durchschnitt noch immer mit erheblich längeren Zeitkonstanten rechnet.[34] Die Berücksichtigung der langfristigen Entwicklung geschah in der Planung traditionell innerhalb von technisch-ökonomischen Entscheidungsvorgängen, an denen Planer, Ausführende und Bauherren beteiligt waren, die implizit in einer Langfristperspektive kooperierten. Das 20. Jahrhundert brachte ideologisch, technisch und im Hinblick auf die Dynamik der Entwicklung eine Abkehr von den Idealen langfristigen Wirtschaftens:

- *ideologisch durch den bewussten Verzicht auf intergenerationelle Perspektiven[35],*
- *technisch durch auf immer kürzere Haltbarkeiten und Beschleunigung der Produktzyklen angelegte Verfahren und Prozesse[36],*

32 Note 31, p. 171. Interesting here is SIA-Merkblatt Nr. 2017: Erhaltungswert von Bauwerken, in which »immaterial values« are also discussed.

33 European Community Biodiversity Clearing House Mechanisms in http://biodiversity-chm.eea.europa.eu (verified on 10/1/2008).

34 See for example James L. Meikle/John N. Connaughton: How long should housing last? Some implications of the age and probable life of housing in England, in: Construction Management and Economics 12, 1994, pp. 315–321 und Patrick le Galès: European Societies, Social Conflicts and Governance, Oxford 2002, especially pp. 68 ff.: The Longevity of the Urban System and the Myth of the European City.

35 A programmatic idea of the Modern Movement is, for example, »a house for every generation.« See Uta Hassler: Wachstum, Sterblichkeit und langfristige Dynamik, in: Uta Hassler/Niklaus Kohler/Wilfried Wang (ed.): Umbau. Tübingen/Berlin 1999, pp. 39–59.

36 See also Markus Hesse: Zeitkoordination im Rahmen der modernen Logistik – mehr als nur ein Impulsgeber für die räumliche Entwicklung, in: Dietrich Henckel/Matthias Eberling (ed.): Raumzeitpolitik, Opladen 2002, pp. 107–126; also in the same publication Michael Wegener/Klaus Spiekermann: Beschleunigung und Raumgerechtigkeit, pp. 127–131.

32 Ebd., S. 171. Interessant hier das SIA-Merkblatt Nr. 2017: Erhaltungswert von Bauwerken, in dem auch von »immateriellen Werten« gesprochen wird.

33 European Community Biodiversity Clearing House Mechanisms in http://biodiversity-chm.eea.europa.eu (geprüft 10. 1. 2008).

34 Siehe z. B. James L. Meikle/John N. Connaughton: How long should housing last? Some implications of the age and probable life of housing in England, in: Construction Management and Economics 12, 1994, S. 315–321 und Patrick le Galès: European Societies, Social Conflicts and Governance, Oxford 2002, dort insbesondere S. 68 ff.: The Longevity of the Urban System and the Myth of the European City.

35 Ein Programm der Moderne lautet z. B. »Jeder Generation ihr Haus«, siehe Uta Hassler: Wachstum, Sterblichkeit und langfristige Dynamik, in: Uta Hassler/Niklaus Kohler/Wilfried Wang (Hg.): Umbau. Tübingen/Berlin 1999, S. 39–59.

36 Dazu auch Markus Hesse: Zeitkoordination im Rahmen der modernen Logistik – mehr als nur ein Impulsgeber für die räumliche Entwicklung, in: Dietrich Henckel/Matthias Eberling (Hg.): Raumzeitpolitik, Opladen

– with an ultimately destabilizing effect resulting from the doubling of the stock during the boom years.[37]

The real estate economy, which as part of business economics increasingly dominates decision making, is based on a constant discounting rate in its theoretical foundations and its daily practice. Risks are essentially understood as risks of deficient profits, and time expectations are oriented to the profits of alternative investment possibilities, for example on the market of the derivatives. The effects of these developments are not yet visible to their full extent. However, the consequences of discounting already include transfer of the costs for maintaining and preserving the existing stock onto future generations. Qualitatively new risks resulting in particular from decisions made during the second half of the 20th century could also arise from the following:

– long-term effects of pollutants, including their spreading into the existing stock
– effects of currently valid norms on the methods and practices of preservation of the overall stock and of valuable objects, for example, heat insulation regulations instead of energy saving goals
– consequences of short-term profit optimisation strategies on prominent stock, such as »cultural goods devoid of their meaning« and the rapid consumption of »prominent objects«
– consequences of »sector-based profit optimisation strategies,« for instance, logistical plans and changed location dynamics for businesses
– loss of professional knowledge and professional abilities, also in skilled trades
– results of poor decisions in management and in the investment field
– consequences of the optimisation of »fast processes« for the production of buildings and building products such as glues, fitting foams, additives, etc.
– internationalisation of planning, projects and real estate markets, and of credit risks.[38]

– *destabilisierend wirkte schließlich auch die Verdopplung der Bestände in den Boomjahren.*[37]

Die heute bei der Entscheidungsfindung zunehmend dominierende Immobilienökonomie als Teil der Betriebswirtschaftslehre beruht in ihren theoretischen Grundlagen und ihrer täglichen Praxis auf einer konstanten Diskontierungsrate. Risiken werden essentiell als Risiken fehlender Erträge begriffen und die Zeiterwartungen orientieren sich an denjenigen alternativer Investitionsmöglichkeiten, zum Beispiel auf dem Markt der Derivate. Die Effekte dieser Entwicklungen sind in der Breite noch nicht sichtbar. Folgen der Diskontierung sind aber bereits die Verlagerung der Kostenfolgen der Pflege und Erhaltung des Bestands auf künftige Generationen. Neue Risikoqualitäten, die sich aus den Entscheidungen vor allem der zweiten Hälfte des 20. Jahrhunderts ergeben, können aber auch beispielsweise entstehen durch:

– *die nachhaltige Wirkung von Schadstoffen, dabei auch durch Verschleppung im Bestand*
– *Auswirkungen geltender Normen auf die Praktiken und die Praxis der Erhaltung des Gesamtbestands und von wertvollen Objekten, wie Wärme-Dämmvorschriften anstelle von Energieeinsparzielen*
– *Folgen kurzfristiger Gewinnoptimierungsstrategien an prominenten Beständen, wie »sinnentleerte Kulturgüter« und schneller Verbrauch »prominenter Objekte«*
– *Folgen »sektoraler Gewinnoptimierungsstrategien«, beispielsweise Logistikkonzepte und veränderte Standortdynamik von Unternehmen*
– *Verlust professionellen Wissens und professioneller Fähigkeiten, auch im Handwerk*
– *Folgen von Fehlentscheidungen in der Bewirtschaftung und im investiven Bereich*
– *Konsequenzen der Optimierung auf »schnelle Prozesse« bei der Herstellung von Bauten und Bauprodukten, beispielsweise Kleber, Montageschäume, Additive etc.*
– *Internationalisierung der Planungen, Projekte und Immobilienmärkte, wie Kreditrisiken.*[38]

37 Uta Hassler/Niklaus Kohler: Umbau. Die Zukunft des Bestands, in: Baumeister 95, 1998/4, pp. 34–41.

38 Briefly on this subject: Peter S. Heller: Who will pay?, in: Finance & Development 40, September 2003/3, pp. 36–39. Reference is given there to United States General Accounting Office: Fiscal Exposures, Washington, D. C. 2003: Improving the Budgetary Focus on Long-Term Costs and Uncertainties.

2002, S. 107–126, darin auch Michael Wegener/Klaus Spiekermann: Beschleunigung und Raumgerechtigkeit, S. 127–131.

37 Uta Hassler/Niklaus Kohler: Umbau. Die Zukunft des Bestands, in: Baumeister 95, 1998/4, S. 34–41.

38 Kurz dazu Peter S. Heller: Who will pay?, in: Finance & Development 40, September 2003/3, S. 36–39. Dort unter anderem der Hinweis auf United States General Accounting Office: Fiscal Exposures, Washington D. C. 2003: Improving the Budgetary Focus on Long-Term Costs and Uncertainties.

Dynamics and their consequences

In most scientific disciplines there is a coexistence of short-term considerations oriented to the »new« and an interest in longer periods of time. Examples include Kondratieff's theories of long cycles,[39] the work of the historian Fernand Braudel concerning the development of the Mediterranean area in the 16th century,[40] and Paul Kennedy's studies of the rise and fall of the great powers.[41] Based on the work of the Club of Rome (Meadows Report), long-term examinations of the limits of growth in the fields of ecology, economics and climate research and the development of the built environment have been carried out and continue to be the subject of research.[42] The studies are in part complementary and are based on the following:

- models of material and energy flows that are founded on the principles of system ecology and are often coupled with questions concerning the load-carrying capacity of ecological systems. The models essentially use flow/time/load-capacity parameters. The »parnarchy« or »resilience models« are highly differentiated examples;[43]
- models for preservation of capital (resources) that proceed from different forms of capital (natural capital, man-made capital, human capital, social capital, cultural capital) and that differ above all in conceptions of the extent to which various types of capital can be substituted for one another. Well-known models include for instance Hermann Daly's »steady-state-

39 Nicolai D. Kondratieff: Die langen Wellen der Konjunktur. In: Archiv für Sozialwissenschaft und Sozialpolitik 56, 1926, pp. 573–609. See also Norbert Reuter: Ökonomik der langen Frist. Zur Evolution von Wachstumsgrundlagen in Industriegesellschaften, Marburg 2000.

40 Fernand Braudel's habilitation thesis »La Méditerranée (et le monde méditeranéen à l'epoque de Philippe II.)« was published in 1949. The term »longue durée« was first developed there, meaning slow cycles of history and the social, economic and political structures, which can encompass a time span of one or two centuries.

41 Paul Kennedy: The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500–2000, New York 1987.

42 Although the scenarios of the Club of Rome have not so far become reality, the report did set off a number of research activities which brought about important discussions.

43 Lance H. Gunderson, Crawford S. Holling: Panarchy. Understanding transformations in human and natural systems. Washington, D. C. 2001. See also Crawford S. Holling: Understanding the Complexity of Economic, Ecological, and Social Systems, in: Ecosystems 4, 2001/5, pp. 390–405, here p. 390: »The panarchy describes how a healthy system can invent and experiment, benefiting from inventions that create opportunity while being kept safe from those that destabilize because of their nature or excessive exuberance.«

Die Dynamik und ihre Folgen

In den meisten wissenschaftlichen Disziplinen gibt es ein Nebeneinander von kurzfristigen auf das »Neue« ausgerichteten Betrachtungen und dem Interesse für längere Zeiträume. Beispielhaft sind die Theorien von Kondratieff über lange Zyklen[39], die Arbeiten des Historikers Fernand Braudel über die Entwicklung des Mittelmeerraums im 16. Jahrhundert[40] oder auch die von Paul Kennedy durchgeführten Untersuchungen über den Aufstieg und Fall von Großmächten.[41] Ausgehend von den Arbeiten des Club of Rome (Meadows Report) sind langfristige Betrachtungen zu den Grenzen des Wachstums in den Bereichen der Ökologie, der Ökonomie, der Klimaforschung und zur Entwicklung der gebauten Umwelt durchgeführt worden und sind weiterhin Forschungsgegenstand.[42] Die Studien sind zum Teil komplementär und basieren auf:

- *Stoffstrom- und Energiestrommodellen, die auf den Grundlagen der Systemökologie beruhen und oft mit Fragen der Tragfähigkeit der Ökosysteme gekoppelt sind. Die Modelle verwenden im Wesentlichen Fluss-Zeit-Tragfähigkeits-Parameter. Als sehr differenziertes Beispiel können die »Panarchy-« oder »Resilience-Modelle« (Gunderson und Holling) gelten[43],*
- *Kapital (Ressourcen-) Erhaltungsmodellen, die von verschiedenen Kapitalformen ausgehen (natürliches Kapital, »Man-made«-Kapital, »human capital«, soziales Kapital, kulturelles Kapital) und sich vor allem durch Konzepte der Substituierbarkeit der unterschiedlichen Kapitalien unterscheiden. Bekannte Modelle sind etwa die »Steady-State-Economics« von Hermann Daly[44]*

39 Nicolai D. Kondratieff: Die langen Wellen der Konjunktur. In: Archiv für Sozialwissenschaft und Sozialpolitik 56, 1926, S. 573–609. Siehe auch Norbert Reuter: Ökonomik der langen Frist. Zur Evolution von Wachstumsgrundlagen in Industriegesellschaften, Marburg 2000.

40 Fernand Braudels Habilitationsschrift »La Méditerranée (et le monde méditeranéen à l'epoque de Philippe II.)« erschien 1949. Hier wird erstmals der Begriff der »longue durée« entwickelt. Gemeint sind die in langsamen Zyklen verlaufende Geschichte und die sozialen, ökonomischen und politischen Strukturen, die einen Zeitraum von ein oder zwei Jahrhunderten umfassen können.

41 Paul Kennedy: Aufstieg und Fall der großen Mächte. Ökonomischer Wandel und militärischer Konflikt von 1500 bis 2000. Erstausgabe 1987, Frankfurt am Main 2000.

42 Obwohl die Szenarien des Club of Rome bisher nicht Realität wurden, hat der Report doch eine Reihe von Forschungsaktivitäten angestoßen, die wichtige Diskussionen brachten.

43 Lance H. Gunderson, Crawford S. Holling: Panarchy. Understanding transformations in human and natural systems. Washington D. C. 2001. Siehe auch Crawford S. Holling: Understanding the Complexity of Economic, Ecological, and Social Systems, in: Ecosystems 4, 2001/5, S. 390–405, hier S. 390: »The panarchy describes how a healthy system can invent and experiment, benefiting from inventions that create opportunity while being kept safe from those that destabilize because of their nature or excessive exuberance.«

44 Herman E. Daly: Steady-State-Economics, 2. Auflage, London 1992. Siehe auch Herman E. Daly: The Economic Growth Debate. What Some

economics«[44] or the previously mentioned World Bank models by Pearce and Turner;[45]
– risk assessments in the fields of climate research, for example, financial prognoses, peace research and epidemiology.[46]

All the models combine flow and/or capital approaches and take time horizons into consideration. There is a predominance of ignorance and fuzzy knowledge.[47] With long-term horizons the transitions between economic, ecological and socio-cultural priorities become blurred. Preferences of valuation are not (or cannot be) clearly demonstrated.

The complex interaction of planning and resource economical foresight and its translation into policies were anchored as »cultural technique« in the European tradition and implicitly shaped an overall view. Today's sector-based models can no longer claim to serve as models for the development of the overall system. Control becomes more difficult with the increasing complexity of the systems. Thus the destabilization of the social consensus initially becomes visible indirectly and is only tangible by means of indicators. The discrepancy between publicly expressed goals (»sustainability«) and the »hidden preferences« of the acting parties is, however, evident in many fields. Preservation issues in general and questions about cultural property protection in particular are for example »global aims« and worldwide-accepted intentions. On the other hand the constant shortening of time horizons and of the survival rate of the overall stock leads to an acceleration of the system—hitherto unknown in building

oder die schon genannten Modelle der Weltbank nach Pearce und Turner[45],
– *Risikoabschätzungen zum Beispiel im Bereich der Klimaforschung, der Finanzprognosen, der Friedensforschung und der Epidemiologie.[46]*

Alle Modelle kombinieren Fluss- und/oder Kapitalansätze und berücksichtigen Zeithorizonte. Dominierend sind Nichtwissen und unscharfes Wissen.[47] Bei langfristigen Horizonten verwischen sich die Übergänge zwischen ökonomischen, ökologischen und sozial-kulturellen Prioritäten. Präferenzen der Wertung werden (oder können) nicht eindeutig aufgezeigt (werden).

Die komplexe Interaktion planerischer und ressourcenökonomischer Vorausschau und ihre Umsetzung in Politiken waren in der europäischen Tradition als »Kulturtechnik« implizit als Gesamtschau verankert. Heutige sektorale Modelle können nicht mehr beanspruchen, als Leitbilder für die Entwicklung des Gesamtsystems zu dienen. Eine Steuerung wird bei zunehmender Komplexität der Systeme schwieriger. Die Destabilisierung des gesellschaftlichen Konsenses wird daher zuerst indirekt sichtbar und ist nur über Indikatoren greifbar. Die Diskrepanz zwischen öffentlich geäußerten Zielen (»Nachhaltigkeit«) und den »hidden preferences« der Akteure ist freilich in vielen Feldern spürbar. Erhaltungsfragen generell und Fragen des Kulturgüterschutzes im Besonderen sind beispielsweise »globalisierte Ziele« und weltweit akzeptierter Wille. Andererseits führt die stetige Verkürzung von Zeithorizonten und Überlebensraten im Gesamtbestand zu einer in der Geschichte des Bauens bisher nicht gekannten Beschleunigung des Systems, die in der Breite die Erhaltungsbemühungen konterkariert.[48] Die

44 Herman E. Daly: Steady-State-Economics, 2nd edition, London 1992. See also Herman E. Daly: The Economic Growth Debate. What Some Economists Have Learned But Many Have Not, in: Journal of Environmental Economics and Management 14, 1987, pp. 323–336.

45 David Pearce/R. Kerry Turner: Economics of Natural Resources and the Environment. Baltimore 1990. See also: David N. Barton: Economic Factors and Valuation of Tropical Coastal Resources, Bergen 1994.

46 Representative for the individual themes: Hellmuth Lange/M. Haarmann/A. Wiesner-Steiner/E. Vossen: Küstenschutz zwischen Klimawandel und Politik: Politisch-administrative Steuerungsprozesse unter Unsicherheit. Teilprojekt 4 des Projekts Klimawandel und präventives Risiko- und Küstenschutzmanagement an der deutschen Nordseeküste, gefördert vom BMBF im Rahmen von DEKLIM, Abschlussbericht, Bremen 2005; Gunther Tichy: Die Risikogesellschaft – ein vernachlässigtes Konzept in der europäischen Stagnationsdiskussion, Institut für Technikfolgen-Abschätzung (Vienna) 11, 2003 (http://epub.oeaw.ac.at/ita/ita-manuscript/ita_03_02.pdf, verified on 10/1/2008); Marcel Gerber: Dynamisierung in einem wechselhaften internationalen Umfeld. Schweizer Rüstungskontrollpolitik nach dem Kalten Krieg (Studien zur Zeitgeschichte und Sicherheitspolitik 15), Bern 2006; Lorenz Erdmann et. al.: Nachhaltige Bestandsbewirtschaftung nicht erneuerbarer knapper Ressourcen, Institut für Zukunftsstudien und Technologiebewertung, Berlin 2004.

47 See Kuei-Hsien Lu: Die Erzeugung von Wissen und Nichtwissen im Risikodiskurs. Dissertation Universität Bielefeld, Fakultät für Soziologie, April 2000; Klaus P. Japp: Die Unterscheidung von Nichtwissen, in: TA-Datenbank-Nachrichten 8, December 1999/3–4, pp. 25–32.

Economists Have Learned But Many Have Not, in: Journal of Environmental Economics and Management 14, 1987, S. 323–336.

45 David Pearce/R. Kerry Turner: Economics of Natural Resources and the Environment. Baltimore 1990. Siehe auch: David N. Barton: Economic Factors and Valuation of Tropical Coastal Resources, Bergen 1994.

46 Stellvertretend zu den einzelnen Themen Hellmuth Lange/M. Haarmann/A. Wiesner-Steiner/E. Vossen: Küstenschutz zwischen Klimawandel und Politik: Politisch-administrative Steuerungsprozesse unter Unsicherheit. Teilprojekt 4 des Projekts Klimawandel und präventives Risiko- und Küstenschutzmanagement an der deutschen Nordseeküste, gefördert vom BMBF im Rahmen von DEKLIM, Abschlussbericht, Bremen 2005, und Gunther Tichy: Die Risikogesellschaft – ein vernachlässigtes Konzept in der europäischen Stagnationsdiskussion, Institut für Technikfolgen-Abschätzung (Wien) 11, 2003 (http://epub.oeaw.ac.at/ita/ita-manuscript/ita_03_02.pdf, geprüft 10. 1. 2008); Marcel Gerber: Dynamisierung in einem wechselhaften internationalen Umfeld. Schweizer Rüstungskontrollpolitik nach dem Kalten Krieg (Studien zur Zeitgeschichte und Sicherheitspolitik 15), Bern 2006; Lorenz Erdmann et. al.: Nachhaltige Bestandsbewirtschaftung nicht erneuerbarer knapper Ressourcen, Institut für Zukunftsstudien und Technologiebewertung, Berlin 2004.

47 Siehe dazu Kuei-Hsien Lu: Die Erzeugung von Wissen und Nichtwissen im Risikodiskurs. Dissertation Universität Bielefeld, Fakultät für Soziologie, April 2000; Klaus P. Japp: Die Unterscheidung von Nichtwissen, in: TA-Datenbank-Nachrichten 8, Dezember 1999/3–4, S. 25–32.

48 Zum Sinn einer »intergenerationellen Nutzendiskontierung« siehe Ulrich Hampicke: Ökologische Ökonomie. Individuum und Natur in der

history—that broadly counteracts preservation efforts.[48] Time expectations became greatly differentiated toward the end of the 20th century: for facility management and operations, time expectations are three to five years; for project development such as shopping centers, five to eight years. In real estate economics there is talk generally of five to 15 years; managers of public institutions in existing building stock think in terms of 25 to 30 years, private sector managers of 20 to 50 years.[49] Interesting in this context are the normative efforts to define the »service life« of buildings, for example 50 years in »ISO 15686—Service life planning of buildings and constructed assets.« Thus it is not the »technical risk« that is qualitatively new but rather the successful shortening of the time horizon in the building sector as a whole and the implicit relinquishment of inter-generational perspectives: a »technical and cultural discounting« which possibly has much greater consequences in its entirety than short-term threats to the »archive of cultural objects« and its components.

Culture and nature: Nature as pre-condition for the development of civilization

Heritage conservation and nature conservation have a common history that dates back almost two hundred years. Prior to that, there were similar basic concerns on the part of scientific disciplines that were classifying living organisms, plants and animals or materials and artefacts. Whether it was Carl von Linné founding a botanical and zoological taxonomy, Alexander von Humboldt gathering the world's mountains in imaginary collections, or John Ruskin and Viollet-le-Duc publishing on historic architecture: in all these fields categories were established that were to last more than two hundred years. The courage to develop a coherent overall view—the ordering of ideas in a virtual deductive structure—arose from Enlightenment thinking. Visible evidence of this intellectual world includes great 19th century projects such as natural history museums, history museums and polytechnic institutes, as well as the topographies that describe regional monuments of historic architecture. Architecture and art history develop theories on the creation, development and transmission of western architecture and new rules for categorizing and assessing this history. An awareness of

48 On the idea of »intergenerational use discounting« see Ulrich Hampicke: Ökologische Ökonomie. Individuum und Natur in der Neoklassik (Natur in der ökonomischen Theorie Teil 4), Opladen 1992, especially pp. 283 ff.; on this subject in general see Uta Hassler/Niklaus Kohler: Cultural and Environmental Long-term Strategies for the Built Environment, in: Baer (note 13), pp. 146–257.

49 Helga Novotny: Time. The modern and the postmodern experience, Cambridge UK 1994.

Zeiterwartungen haben sich zum Ende des 20. Jahrhunderts stark differenziert: Für Facility Management und Betrieb gibt es Zeiterwartungen von drei bis fünf Jahren, für Projektentwicklungen, zum Beispiel für Einkaufszentren, fünf bis acht Jahre. Die Immobilienökonomie spricht in der Regel über fünf bis 15 Jahre, öffentliche institutionelle Verwalter von Beständen über 25 bis 30 Jahre, private über 20 bis 50 Jahre.[49] Interessant sind in diesem Zusammenhang normative Bestrebungen zur Festlegung des »service life« von Gebäuden, beispielsweise auf 50 Jahre in der ISO 15686 – service life planning of buildings and constructed assets. Qualitativ neu ist also nicht das »Technikrisiko«, sondern die erfolgreiche Verengung der Zeithorizonte im Bauwesen in seiner Gesamtheit und die implizite Aufgabe intergenerationeller Perspektiven: Eine »technische und kulturelle Diskontierung«, die womöglich in ihrer Gesamtheit weit größere Folgewirkungen hat als kurzfristige Bedrohungen des »Archivs der Kultobjekte« und seiner Teile.

Kultur und Natur: die Natur als Rahmenbedingung zivilisatorischer Entwicklung

Denkmalpflege und Naturschutz besitzen eine gemeinsame Geschichte, die nun bald zwei Jahrhunderte zurückreicht. Schon zuvor hatten wissenschaftliche Fächer, die Klassifizierungsanstrengungen für Lebewesen, Pflanzen und Tier und für Materialien und Artefakte vorangetrieben haben, ähnliche Grundanliegen. Ob Carl von Linné eine botanische und zoologische Systematik begründet, Alexander von Humboldt die Berge der Welt in imaginären Sammlungen zusammen trägt, ob John Ruskin oder Viollet-le-Duc historische Architektur publizieren: In allen Feldern werden Kategorien geschaffen, die mehr als zwei Jahrhunderte überdauern sollten. Aus dem Denken der Aufklärung entsteht der Mut zu einer kohärenten Gesamtschau, zu einer Ordnung der Begriffe in einem virtuellen deduktiven Gebäude. Sichtbare Zeugnisse jener Gedankenwelt sind Großprojekte des 19. Jahrhunderts: Naturkundemuseen, Historische Museen, Polytechnische Anstalten, aber auch die Topographien, die Monumente historischer Architektur regional beschreiben. Architektur und Kunstwissenschaft entwickeln Theorien zu Entstehung, Entwicklung und Überlieferung abendländischer Baukunst wie auch neue Codices zur Kategorisierung und Bewertung dieser Geschichte. In der Naturgeschichte bildet sich das Bewusstsein der »Arten« und eine Vorstellung der Evolution.

Neoklassik (Natur in der ökonomischen Theorie Teil 4), Opladen 1992, besonders S. 283 ff.; allgemein zum Thema siehe Uta Hassler/Niklaus Kohler: Cultural and Environmental Long-term Strategies for the Built Environment, in: Baer (wie Anm. 13), S. 146–257.

49 Helga Novotny: Time. The modern and the postmodern experience, Cambridge UK 1994.

»species« develops in natural history, as does the idea of evolution.

In the great historical accounts, however, the connection between natural and cultural history plays only a marginal role, in regard to the climatic shifts at the end of the warmer age in the High Middle Ages. Extremely cold winters and the spreading of the forests at the time of the Thirty Years War or the frequency of floods around 1800, for example, are barely discussed in architectural history. Nevertheless natural phenomena are reflected in building traditions and culture: in certain wooden and stone building forms; construction methods for walls, roofs and their drainage; forms of heating and windows; and bridges—not to mention cultivated plants and their development, including practices in agriculture and cattle raising that are in turn manifested in building traditions for farmhouses and barns. Traditional architectural histories in particular acknowledge explanations based on regional (and thus climatic) differences, which naturally led to construction methods such as lower pitched roofs in the Alpine foothills. The great cyclical phenomena of significant climatic changes in the course of familiar architectural history remain mostly unrecognised or unmentioned, even though many significant sites since antiquity can only be understood in that context, as for instance the remnants of a large urban complex in what is now a desert area such as Palmyra or Carthage with their once-rich agrarian culture. In his superbly complex and detailed study »A Short Natural History of the Last Millennium«[50] from 2007, Josef Reichholf has pointed out how nature and its changes can be seen »as the framework for historic processes«—and he has shown how diverse processes of our cultural history are connected with these changes. With reference to the biologist Evelyn Hutchinson, Reichholf talks about evolution as the »continuous play of life on the ever-changing stages of time.«[51] He says that a reasonable goal of a development should not be equilibrium but a »survival-capable disequilibrium«—and he calls for »precaution«: »Man mastered the difficulties of the past, including centuries-long vicissitudes of weather and climate. … The prognosticated environmental changes can be better assessed on the basis of long-term historical developments than from brief fragments of the most recent past. … Whoever … wants to assess changes in nature has to orient himself on the time scale that is relevant for developments in nature. Three or four decades are much too short, no matter whether it is a question of the present climatic warming or of other natural processes. For a tree half a century hardly represents more

50 Josef H. Reichholf: Eine kurze Naturgeschichte des letzten Jahrtausends, Frankfurt am Main 2007.

51 Note 50, p. 14.

In den großen Geschichtserzählungen spielt freilich der Zusammenhang von Natur- und Kulturgeschichte nur am Rande eine Rolle, etwa die Klimaverschiebungen am Ende der Warmzeit im Hochmittelalter. Extrem kalte Winter und die Ausbreitung der Wälder in der Zeit des dreißigjährigen Kriegs oder die Hochwasserhäufigkeit um 1800 werden beispielsweise kaum in einer Baugeschichte diskutiert. Dennoch spiegeln sich die Naturphänomene in der Bautradition und -kultur: In der Form jeweiligen Holzbaus und von Steinbauten, der Bauweise der Wände, der Dächer und Wasserführungen, der Brücken, der Form der Heizung und der Fenster, gar nicht zu sprechen von den Kulturpflanzen und ihrer Entwicklung – bis hin zu Praktiken des Landbaus und der Viehzucht, die sich wiederum in Konstruktionstraditionen von Bauernhäusern und Wirtschaftsgebäuden manifestieren. Traditionelle Baugeschichten kennen vor allem die Erklärungen nach regionalen und damit regionalklimatischen Unterschieden, die freilich auch Konstruktionsweisen bedingen, wie zum Beispiel flacher geneigte Dächer im Voralpenraum. Die großen zyklischen Phänomene signifikanter Klimaveränderungen im Verlauf der bekannten Baugeschichte bleiben meist unerkannt oder unkommentiert, wenngleich viele der bedeutenden Stätten seit der Antike nur so verstanden werden können, wie zum Beispiel Reste großer Stadtanlagen in heutigen Wüstengebieten wie etwa Palmyra oder Karthago mit ihrer einst reichen agrarischen Kultur.

Josef Reichholf hat mit seiner »kurze(n) Naturgeschichte des letzten Jahrtausends«[50] in einer großartig differenzierten Betrachtung gezeigt, wie die Natur und ihre Veränderung »als Rahmenbedingung historischer Prozesse« gesehen werden können – und er hat gezeigt, wie vielfältige Prozesse unserer Kulturgeschichte mit diesen Veränderungen zusammenhängen. Mit Bezug auf die Biologin Evelyn Hutchinson spricht Reichholf von der Evolution als dem »fortdauernden Spiel des Lebens auf sich immer wieder wandelnden Bühnen der Zeit«.[51] Er spricht davon, dass ein vernünftiges Ziel einer Entwicklung nicht ein Gleichgewicht sein solle, sondern ein »überlebensfähiges Ungleichgewicht« – und er mahnt »Vorsorge« an: »Die Schwierigkeiten der Vergangenheit, die Jahrhunderte langen Wechselfälle von Wetter und Klima mit eingerechnet, haben die Menschen bewältigt. … Die prognostizierten Umweltveränderungen lassen sich eher auf der Basis längerfristiger historischer Entwicklungen als ausgehend vom kurzen Teilstück der jüngsten Vergangenheit bemessen. … Wer … Änderungen in der Natur bewerten will, muss sich … an den Zeitskalen orientieren, die für Abläufe in der Natur relevant sind. Drei oder vier Jahrzehnte sind dafür viel zu kurz gegriffen, gleichgültig, ob es sich um die gegenwärtige Erwärmung des Klimas oder um andere Naturvorgänge handelt. Ein halbes Jahrhundert stellt für

50 Josef H. Reichholf: Eine kurze Naturgeschichte des letzten Jahrtausends, Frankfurt am Main 2007.

51 Ebd., S. 14.

than a compact youth. Tree generations are counted in the hundreds, changes in forests in thousands of years. The increase and disappearance of glaciers accord with short-term effects in comparison to the post-Ice Age changes that formed our landscape.«[52]

From this perspective we must ask ourselves: how endangered are the artefacts, this evidence of our architectural heritage? Surprisingly enough, they have indeed witnessed and survived at least a few of the »cycles of natural history« in not such limited numbers, and they provide evidence of how different the conditions of the past centuries were.[53] How endangered is the older and the more recent building stock by a new change in nature?[54] Are the surviving techniques of a building tradition that evolved over centuries still appropriate for mastering the newest changes? Can we tie into this experience at all, given the ever-faster developing technical world? And are the hazards posed by nature not themselves negligibly small in comparison to the »inherent risks of the system« with its trend toward the short-term?

einen Baum kaum mehr als eine gedrängte Jugendzeit dar. Baumgenerationen zählen nach Jahrhunderten, Veränderungen von Wäldern nach Jahrtausenden. Das Wachsen und Schwinden von Gletschern entspricht Kurzzeiteffekten, verglichen mit den nacheiszeitlichen Veränderungen, die unsere Landschaft geformt haben.«[52]

Wie gefährdet, haben wir uns zu fragen, sind aus dieser Perspektive die Artefakte, Zeugnisse des architektonischen Erbes? Sie haben ja überraschenderweise in nicht ganz so geringer Zahl als Zeugen zumindest einige der »Zyklen der Naturgeschichte« überlebt und geben Zeugnis davon, wie unterschiedlich die Bedingungen der vergangenen Jahrhunderte waren.[53] Wie gefährdet sind die älteren und die jüngeren Bestände durch eine erneute Veränderung der Natur?[54] Sind die überlebenden Techniken einer in langen Jahrhunderten gewachsenen Bautradition noch geeignet für die Beherrschung der neuesten Veränderungen? Kann an Erfahrungen überhaupt angeknüpft werden in Anbetracht der sich immer schneller entwickelnden technischen Welt? Und sind die Gefahren durch die Natur selbst nicht vernachlässigbar gering im Vergleich zu den »inhärenten Risiken des Systems« mit seinem Trend zur Kurzfristigkeit?

Uncertainty and complexity

A look at the various areas covered in discussions of risk shows how different the time expectations are in which system reactions occur and how variable the time constants are for which planning and action options are culturally weighed. The building industry traditionally reacts slowly to the still more slowly changing, sometimes cyclical circumstances of natural history, but particularly over the course of the last century it has been more strongly influenced by new exogenous factors such as industrialization and internationalisation than by »evolutionary patterns.« Planning in the sense of a very long-term look ahead and an attempt to manage development was given

Unsicherheit und Komplexität

Ein Blick auf die unterschiedlichen Bereiche der Risikodiskussion zeigt, wie unterschiedlich die Zeiterwartungen sind, in denen Systemreaktionen auftreten und wie verschieden die Zeitkonstanten sind, für die Planungs- und Handlungsoptionen kulturell abgewogen werden. Das Bauwesen reagiert traditionell langsam auf die sich noch langsamer verändernden partiell auch zyklischen Bedingungen der Naturgeschichte, ist aber vor allem im Verlauf des vergangenen Jahrhunderts stärker von neuen exogenen Faktoren wie Industrialisierung und Internationalisierung beeinflusst als von »evolutionären Mustern«. Planung im Sinne einer sehr langfristigen Vorausschau und eines Versuchs der Steuerung

52 Note 50, p. 320.

53 Examples that Josef Reichholf illustrates include among many others the comparatively limited heating possibilities for buildings in the High Middle Ages that coincide with a corresponding period of warmth; the changing borders for viticulture through history; the clearing of the forests as a result of the colder winters during the so-called »Little Ice Age« in the 16th and 17th centuries; and the increasing frequency of severe winter floods between 1500 and 1900, the consequences of which were of course different than now, in a time before the hydraulic engineering work of the 19th and 20th centuries with its regulations, dams and dikes. For a synopsis of historical and »spatial« developments see Karl Schlögel: Im Raume lesen wir die Zeit. Über Zivilisationsgeschichte und Geopolitik, Frankfurt am Main 2006, p. 13.

54 On quality and change as a consequence of disasters see among others Kenneth Hewitt: Regions of Risk. A Geographical Introduction to Disasters, Edinburgh 1997, in particular chapter 7, Active Perspectives: Responses to Disaster and Adjustments to Risk, pp. 169 ff.

52 Ebd., S. 320.

53 Beispiele, die Josef Reichholf illustriert, sind unter vielen anderen die vergleichsweise geringen Heizmöglichkeiten der hochmittelalterlichen Bauten, die mit der entsprechenden Warmzeit zusammenfallen und die sich verändernden Grenzen des Weinanbaus in der Geschichte, aber auch Waldrodungen infolge kälterer Winter in der so genannten »kleinen Eiszeit« im 16. und 17. Jahrhundert und die Häufung schwerer Winterhochwasser zwischen 1500 und 1900, deren Auswirkungen freilich vor den Wasserbaumaßnahmen des 19. und 20. Jahrhunderts mit den Begradigungen, Dämmen und Deichen andere waren als heute. Zur Zusammenschau geschichtlicher und »räumlicher« Entwicklungen siehe Karl Schlögel: Im Raume lesen wir die Zeit. Über Zivilisationsgeschichte und Geopolitik, Frankfurt am Main 2006, S. 13.

54 Zu Qualität und Veränderung von Katastrophenfolgen unter anderen Kenneth Hewitt: Regions of Risk. A Geographical Introduction to Disasters, Edinburgh 1997.Dort vor allem Kapitel 7, Active Perspectives: Responses to Disaster and Adjustments to Risk, S. 169 ff.

up on the one hand in favour of short-term, private economic considerations of profit; on the other hand, with the growing complexity of systems, long-term planning decisions are increasingly difficult to justify through rational considerations. It is therefore not surprising that »cost-use considerations« as simplification strategies prevail more and more successfully even for planning decisions. However, they are only relevant in the »short-term realm«—and moreover, they only function if there are no external uncertainties that could substantially influence the processes.[55] With regard to risks, it is crucial that, in addition to the anticipated size of the damage, the time of possible occurrence and the probability of the hazard be weighed: studies on the »vulnerability« of the systems should therefore be the basis for all considerations. Only then can alternative channels for damage minimization be weighed as comprehensively as possible.

Many phenomena that are currently coming into focus are the results of older management decisions that in some cases took place more than 50 years ago. Examples include:

- inadequate maintenance of the infrastructure in the last generation; large amounts of infrastructure stock from the boom years that may not be repairable,
- unknown and unsolved problems in dismantling nuclear power stations and the storage of radioactive waste,
- possible connections between building methods and long-term health risks,
- long-term shortage of resources (energy, metals),
- water problems in mega cities,
- high state expenditures, pension burdens and attempts at correction through deregulation and privatisation of sovereign tasks,
- effects of probable climate changes,
- vulnerability of technical infrastructures (tunnels, bridges, etc.),
- centralization of business locations according to logistic considerations, reduction in the diversity of products; rejection of substitution possibilities,
- undesirable long-term consequences of centralized technical solutions, for instance computer software.

Any development can be very differently assessed for various fields. Nature protection's first concern may be the diversity of species, the toxicologist is concerned about

55 On the subject of market mechanism limits in regard to the long-term effects of climatic change see Charles Weiss Jr.: Can Market Mechanisms Ameliorate the Effects of Long-term Climate Change?, in: Climatic Change 15, 1989/1–2, pp. 299–307, here p. 299: »On the other hand, the pervasive influence of discount rates on investment decisions makes it unlikely that the market will give satisfactory guidance to investments that must be undertaken long before the appearance of the climatic effect they are intended to mitigate.«

der Entwicklung wurde einerseits aufgegeben zugunsten kurzfristiger, privatökonomischer Renditeüberlegungen, andererseits sind mit zunehmender Komplexität der Systeme langfristige Planungsentscheide immer schwieriger durch rationale Abwägungen zu begründen. Es ist deshalb nicht verwunderlich, dass sich »Kosten-Nutzen-Überlegungen« als Vereinfachungsstrategien immer erfolgreicher auch für Planungsentscheide durchsetzen, allerdings sind sie nur im »Kurzfristbereich« relevant – und sie funktionieren auch nur, wenn es keine externen Unsicherheiten gibt, die die Prozesse erheblich beeinflussen können.[55] Unter Risikogesichtspunkten ist zentral, dass neben der zu erwartenden Schadensgröße der Zeitpunkt möglichen Eintretens und die Wahrscheinlichkeit der Gefährdung abzuwägen sind: Studien zur »Verletzbarkeit« der Systeme sollten daher Basis aller Überlegungen sein. Denn nur so können alternative Korridore einer Schadensminimierung möglichst ganzheitlich abgewogen werden.

Viele Phänomene, die gegenwärtig ins Blickfeld rücken, resultieren aus älteren, zum Teil mehr als 50 Jahre zurückliegenden Steuerungsentscheiden. Es sind dies beispielsweise:

- *ungenügender Unterhalt der Infrastrukturen in der letzten Generation, große Infrastrukturbestände aus den Boomjahren mit zweifelhafter Reparaturfähigkeit,*
- *unbekannte und ungelöste Probleme des Rückbaus von Kernkraftwerken und der Lagerung von radioaktiven Abfällen,*
- *mögliche Zusammenhänge zwischen Bauweisen und langfristigen Gesundheitsrisiken,*
- *langfristige Verknappung von Ressourcen (Energie, Metalle),*
- *Wasserprobleme in den Megacities*
- *hohe Staatsquoten, Pensionslasten und Versuche einer Gegensteuerung durch Deregulierung und Privatisierung hoheitlicher Aufgaben,*
- *Auswirkungen von wahrscheinlichen Klimaänderungen,*
- *Verletzbarkeit technischer Infrastruktur (Tunnel, Brücken etc.),*
- *Zentralisierung von Standorten nach Logistiküberlegungen, Reduktion der Produktvielfalt, Verzicht auf Substitutionsmöglichkeiten,*
- *ungewollte Langfristfolgen zentralistischer technischer Lösungen, zum Beispiel EDV-Programme.*

Eine Entwicklung kann für unterschiedliche Bereiche sehr

55 Zum Thema der Grenzen der Marktmechanismen im Hinblick auf Langfristfolgen des Klimawechsels siehe Charles Weiss Jr.: Can Market Mechanisms Ameliorate the Effects of Long-term Climate Change?, in: Climatic Change 15, 1989/1–2, S. 299–307, hier S. 299: »On the other hand, the pervasive influence of discount rates on investment decisions makes it unlikely that the market will give satisfactory guidance to investments that must be undertaken long before the appearance of the climatic effect they are intended to mitigate«.

the dissemination of poisons and their effects on people and the environment, the engineer with preservation of the »usability« of buildings, the preservationist with the loss or the »rapid consumption« of important objects. Moreover, stability, robustness and the systems' ability to adapt to changes are very different in various fields, and terms are used differently in different disciplines. It is therefore very difficult to weigh possible strategies of prevention and competing »protection goals.« From the perspective of prophylactic fire protection, for instance, flame-proofing substances might be acceptable, whereas the dissemination of mutagenic materials in buildings is not an acceptable risk in regard to its consequences for health. Even »primary protection efforts« can have very different effects. For example, the phenomenon of risk concentration by »insuring the risk« is comparable to concepts of cultural property protection at a »global level«: international attention increases the probability of fast consumption, or wearing out, of the objects, and the risk of conscious destruction in an armed conflict is increased. »World Heritage: Shield or Target« is the title of an essay by Dario Gamboni, who reflects critically on how strongly ideas and processes of selection are still anchored in the ideas of the European Enlightenment and how urgently the eurocentric visions of the »imaginary museum of world architecture,« which André Malraux had called for in the 1950s, should be re-anchored in a »world culture context« and thus stabilized.[56] The use of resources for damage prevention is subjected worldwide to the principle of competing interests for limited resources, and regionally to a very complex process of balancing sometimes competing protective goals.[57] Risk management demands readiness to take on responsibility, flexible structures, readiness to expose preferences, distribution of information and knowledge, a new culture of »redundance« and »resilient solutions,«[58] and also a willingness to deal with surprises.[59]

56 Dario Gamboni: World Heritage: Shield or Target?, in: Conservation. The Getty Conservation Institute Newsletter 16, 2001/2, pp. 5–11. Gamboni gives examples of war destruction of important cultural properties, ranging from antiquity to destruction of the bridge in Mostar and the damaged Buddha sculptures in Bamiyan.

57 On this see for example Michael C. Henry: Preventive Conservation, Sustainability, and Environmental Management, in: Conservation. The Getty Conservation Institute Newsletter 22, 2007/1, pp. 4–9 and the report by English Heritage/The Centre for Sustainable Heritage at University College London (ed.): Climate Change and the Historic Environment, London 2005. On the question of »willingness to pay« in general, see Anna Alberini/Alberto Longo: Valuing the Cultural Monuments of Armenia. Bayesian Updating of Prior Beliefs in Contingent Valuation, Milan, April 2007.

58 See Lance H. Gunderson/Lowell Pritchard: Resilience and the Behavior of Large-Scale Systems, Washington, D. C. 2002; also Sebastian Moffatt/Stuart Farson/Mike Hollinshead et. al.: Planning in the Face of Increasing Uncertainty. Resiliency as a Foundation for Long Term Urban Planning, Vancouver 2002.

59 In this context »classic risks« are events such as fires. Precautionary

unterschiedlich bewertet werden. Der Naturschutz sorgt sich womöglich zuerst um die Vielfalt der Arten, der Toxikologe um die Verbreitung von Giften und deren Auswirklungen auf Mensch und Umwelt, der Ingenieur um Erhaltung der »Gebrauchstauglichkeit« der Bauten, der Denkmalpfleger um Verlust oder »schnellen Verbrauch« wichtiger Objekte. Stabilität, Robustheit und Anpassungsfähigkeit der Systeme an Veränderungen sind zudem in verschiedenen Bereichen sehr unterschiedlich, auch die Begriffe werden von verschiedenen Disziplinen unterschiedlich gebraucht. Sehr schwierig ist daher die Abwägung möglicher Strategien zur Prävention und konkurrierender »Schutzziele«. Aus der Sicht des vorbeugenden Brandschutzes beispielsweise sind Flammschutzmittel womöglich akzeptabel, die Verbreitung mutagener Stoffe im Bauwesen ist dagegen als Risikofolge im Hinblick auf Gesundheitsrisiken nicht hinnehmbar.

Selbst »primäre Schutzbemühungen« können sehr unterschiedliche Auswirkungen haben. Vergleichbar mit dem Phänomen der Risikokonzentration durch »Versicherung des Risikos« sind beispielsweise Konzepte des Kulturgüterschutzes auf »Weltebene«: Internationale Aufmerksamkeit erhöht die Wahrscheinlichkeit schnellen Verbrauchs der Objekte, zugleich steigt das Risiko einer bewussten Zerstörung in Kriegskonflikten. »World Heritage: Shield or target« heißt ein Aufsatz von Dario Gamboni, der kritisch reflektiert, wie stark Ideen und Prozesse der Auswahl noch immer im Gedankengut der europäischen Aufklärung verankert sind, und wie dringlich die eurozentrischen Visionen des »imaginären Museums der Weltarchitektur«, wie es André Malraux in den 50er Jahren des 20. Jahrhunderts forderte, in einem »Welt-Kultur-Kontext« neu zu verankern und damit zu stabilisieren wären.[56] Der Mitteleinsatz zur Schadensprävention unterliegt weltweit dem Prinzip konkurrierender Interessen für knappe Ressourcen, regional einem sehr komplexen Abwägungsprozess gegebenenfalls auch konkurrierender Schutzziele.[57] Risikobeherrschung erfordert Verantwortungsbereitschaft, flexible Strukturen, Bereitschaft zur Aufdeckung der Präferenzen, Teilung von Information und Wissen, eine neue

56 Dario Gamboni: World Heritage: Shield or Target?, in: Conservation. The Getty Conservation Institute Newsletter 16, 2001/2, S. 5–11. Gamboni gibt Beispiele für Kriegszerstörungen wichtiger Kulturgüter von antiker Zeit bis hin zur Brücke von Mostar und den zerstörten Buddafiguren in Bamiyan.

57 Hierzu beispielsweise Michael C. Henry: Preventive Conservation, Sustainability, and Environmental Management, in: Conservation. The Getty Conservation Institute Newsletter 22, 2007/1, S. 4–9, und der Report English Heritage/The Centre for Sustainable Heritage at University College London (Hg.): Climate Change and the Historic Environment, London 2005. Allgemein zu Fragen der »Willingness to pay« siehe Anna Alberini/Alberto Longo: Valuing the Cultural Monuments of Armenia. Bayesian Updating of Prior Beliefs in Contingent Valuation, Mailand, April 2007.

Necessity of a long-term concept of value

The shift to short-term perspectives is an attempt at simplification, but like all sector-based optimizations it is also a resignation in the face of the complexity of the systems and perhaps also an admission of the failure of longer-term planning efforts. Many of the ideas of modernity could be assessed from this perspective as »escape attempts«—flights from developments that have been recognized as uncontrollable. In the context of ideological »modernization utopias,« it is not surprising that conservation-related virtues and goals, which are indeed inconceivable without long-term perspectives, are implicitly threatened, at least in regard to their institutional representation. Making reference to the state heritage authorities' self-evident task and willingness to preserve evidence of modernity's acceleration efforts will not get us anywhere; at best this serves as a sedative, as a symbolic action. Of crucial importance, however, is the question of structures that make the long-term preservation efforts socially possible on a broad basis.[60] The possibility of technical retrofitting of cult objects is therefore not primarily a question of the safety and feasibility of retrofitting or of possible undesirable side effects to protected property, but rather a question of the allocation of resources—and of the space and time perspectives for the preservation and perpetuation of the »archive.« From a risk perspective, focusing on the individual object is problematic because the individual object always appears endangered.[61] However, the concentration of prevention strategies on protected objects increases the overall dangers and, by being limited to »prestige objects« of tourism and public interest, could lead to symbolic political effects. More problematic than

measures on objects (»structural fire protection«) as well as »indirect prevention,« training of specialists, alarm systems and finally also measures to reduce damage are indispensable in this field. See for example: The Fire Protection Association (ed.): Heritage under Fire. A Guide to the Protection of Historic Buildings, London 1991, including estimates of annual rates of loss and checklists for prevention.

60 Current political interests work against one another; for example the loans for preservation of listed objects in Switzerland have been cut in half. A moratorium on new applications is planned in 2008—the federal government is planning a reorientation to »global contributions« in the field of »cultural support«: investment interests, for example to support films, would then compete with the budget necessary for preserving the value of the building stock—short-term politically visible investments competing with investments with a long-term effect.

61 For public preservation authorities references to »buildings at risk« are among the obvious, repeated admonitions; see for example English Heritage's Buildings at Risk Survey, which has been reporting on threatened landmarks at regular intervals since the 1980s. See for instance Vanessa Brand: Buildings at Risk. The Results Analysed, in: English Heritage Conservation Bulletin 16, February 1992, with its estimates that »7% or nearly 37,000 listed buildings in England are at risk from neglect and that twice that number are in danger of falling into the same state.« According to that study, redundant building types are particularly endangered.

Kultur der »Redundanz« und »resilienter Lösungen«[58] wie die Bereitschaft, mit Überraschungen umgehen zu wollen.[59]

Notwendigkeit eines langfristig orientierten Wertbegriffs

Der Wechsel zu Kurzfristperspektiven ist ein Versuch der Vereinfachung, wie alle sektoralen Optimierungen aber auch eine Resignation vor der Komplexität der Systeme und vielleicht auch Eingeständnis des Scheiterns längerfristiger Planungsbemühungen. Viele der Ideen der Moderne könnten unter diesem Blickwinkel als »Ausbruchsversuch« gewertet werden – Flucht aus einer als unbeherrschbar erkannten Entwicklung. Es ist nicht verwunderlich, dass konservatorische Tugenden und Ziele, die ja ohne Langfristperspektive nicht denkbar sind, im Umfeld ideologischer »Modernisierungsutopien« zumindest im Hinblick auf ihre institutionelle Repräsentation implizit bedroht sind. Der Hinweis auf die eigentlich selbstverständliche Aufgabe und Bereitschaft staatlicher Denkmalpflege, Zeugnisse der Beschleunigungsbemühungen der Moderne zu erhalten, führt hier nicht weiter, dient höchstens als Sedativum, als symbolische Handlung. Zentral ist dagegen die Frage nach Strukturen, die langfristige Erhaltungsbemühungen in der Breite gesellschaftlich möglich machen.[60] Die Möglichkeit technischer Aufrüstung der Kultobjekte ist daher nicht primär eine Frage von Sicherheit und Machbarkeit technischer Ertüchtigung oder möglicher unerwünschter Nebenwirkungen auf die Schutzgüter, sondern der Ressourcenallokation – und der räumlich-zeitlichen Perspektiven für die Erhaltung und Fortschreibung des »Archivs«.

Fokussierung auf das Einzelobjekt ist unter Risikogesichtspunkten problematisch, denn das Einzelobjekt

58 Dazu Lance H. Gunderson/Lowell Pritchard: Resilience and the Behavior of Large-Scale Systems, Washington D. C. 2002 und Sebastian Moffatt/Stuart Farson/Mike Hollinshead et. al.: Planning in the Face of Increasing Uncertainty. Resiliency as a Foundation for Long Term Urban Planning, Vancouver 2002.

59 »Klassische Risiken« sind in diesem Zusammenhang Ereignisse wie Feuerkatastrophen. In diesem Bereich sind sowohl Vorsorgemaßnahmen an den Objekten (»Structural fire protection«) unabdingbar wie auch »indirekte Prävention«, Training von Spezialisten, Alarmsysteme und schließlich auch Maßnahmen zur Schadensverringerung. Siehe dazu beispielsweise: The Fire Protection Association (Hg.): Heritage under Fire. A Guide to the Protection of Historic Buildings, London 1991, hier auch Schätzungen jährlicher Verlustraten und Checklisten zur Prävention.

60 Gegenwärtige Politikinteressen handeln gegenläufig, so wurden zum Beispiel die Kredite zur Erhaltung schützenswerter Objekte in der Schweiz um die Hälfte gekürzt. Ein Moratorium für neue Gesuche ist ab 2008 geplant – der Bund sieht eine Umstellung auf »Globalbeiträge« im Schwerpunkt »Kulturförderung« vor: Investitionsinteressen, z. B. für die Filmförderung, würden dann mit den für die Werterhaltung des Bestands notwendigen Budgets konkurrieren – also kurzfristig politisch sichtbare mit langfristig wirksamen Investitionen.

the risks of the loss of individual objects, however, may be the risk of a break in historic continuity: a condition of »no-longer-being-able-to-understand« history. A prerequisite for being able to understand is the preservation of information in depth (historic objects with their »layers of time«) and in breadth (building stock in its diversity and age span).

In economics, discussion of the problem of the uncertainty of future development has included the idea of two categories of value: option values (a risk premium for »risk averse consumers«) and »quasi option values.« The »quasi option value« takes into account the expected benefit of additional information and the risk of its potential loss. It should be acknowledged that »irreversible information crucial for future decisions« must be passed on so that learning remains possible in the future and that information derived from the existence of environmental goods will perhaps be indispensable in the future.[62] Critical for the preservation of the aforementioned »option values,« as a chance for long-term stabilization, is therefore not only the values that are today categorized as material (in the language of conservators: »the fabric«), but also those connections between material and immaterial information which can be described as »cultural capital.« In regard to economic capital, the wealth of the western societies largely consists of the value of the building stock, but the »intangible capital« cannot be separated from the stock in its material and historic dimension and its quality.[63] To this effect preservation of the building stock's resource value in a comprehensive sense—as »human capital,« as social and cultural capital—requires widespread preservation of quality.[64] Therefore the sum of the risks for the preservation of the value of the building stock is directly connected to society's allocation of resources for preservation. However, in the field of cultural property protection the issue of the substitution of capital resources is posed in a particularly precarious form: trade involving certificates, as is possible for instance with »pollution rights,« can hardly be modelled according to the relationship among capital values because of the »non-reproducibility« and the diversity of the aged stock. Nevertheless a consideration of the investment necessities for »preservation of capital« could make clear what losses would in fact have to be accepted if the trend

62 Hansjörg Blöchliger: Der Preis des Bewahrens, Chur/Zürich 1992, pp. 23 ff.

63 David Pearce: The Social and Economic Value of Construction. The Construction Industry's Contribution to Sustainable Development. A Report for Crisp, the Construction Industry Research and Innovation Strategy Panel, London 2003. Around 80 percent of the value of »intangible capital« consists in turn of »human capital, social capital and cultural capital.«

64 And not only the one to three percent of the stock that in general is »protected through listing« in western societies.

erscheint immer gefährdet.[61] *Die Konzentration von Präventionsstrategien auf Maßnahmen an Schutzobjekten verstärkt allerdings in der Gesamtheit die Gefährdungen und könnte durch die Beschränkung auf die im Interesse von Tourismus und Öffentlichkeit stehenden »Prestige-Objekte« zu Effekten symbolischer Politik führen. Problematischer als die Risiken des Verlusts von Einzelobjekten könnte hingegen das Risiko eines Bruchs historischer Kontinuität sein: das »Nicht-mehr-nachvollziehen-Können« von Geschichte. Bedingung von Nachvollziehbarkeit ist die Erhaltung von Information in der Tiefe (historische Objekte mit ihren »Zeitschichten«) und in der Breite (Bestand in seiner Diversität und Altersspreizung).*

Die Ökonomie hat das Problem der Unsicherheit künftiger Entwicklung unter anderem mit der Idee zweier Wertkategorien diskutiert: zum einen der Optionswerte (einer Risikoprämie für »risikoaverse Konsumenten«) und den »Quasi-Optionswerten«. Der »Quasi-Optionswert« berücksichtigt den erwarteten Nutzen zusätzlicher Informationen und das Risiko ihrer potentiellen Verluste. Der Umstand, dass »irreversible entscheidungszukünftige Informationen« überliefert werden müssen, damit Lernen künftig noch möglich sein kann, Informationen aus der Existenz von Umweltgütern künftig also vielleicht unverzichtbar sind, geht in die Abwägung ein.[62] *Zentral für die Erhaltung der genannten »Optionswerte« als Chance langfristiger Stabilisierung ist daher der Erhalt von Informationen: nicht nur der heute bereits als materiell kategorisierten Werte (in der Sprache der Konservatoren: »der Substanz«), sondern auch jener Verknüpfungen materiell-immaterieller Informationen, die als »kulturelle Kapitalien« beschrieben werden können. Der Reichtum der westlichen Gesellschaften besteht zwar im Hinblick auf das ökonomische Kapital zum großen Teil aus dem Wert der Bestände, das »intangible capital« ist aber nicht zu trennen von den Beständen in ihrer materiellen und historischen Dimension und ihrer Qualität.*[63] *In diesem Sinn fordert die Erhaltung des Ressourcenwerts des Bestands in umfassendem Sinn als »human capital«, als soziales und kulturelles Kapital den Erhalt der Qualität in der Breite.*[64] *Die*

61 Der Hinweis auf »Buildings at Risk« gehört für die staatliche Denkmalpflege zu selbstverständlich wiederholten Mahnungen, siehe zum Beispiel den Buildings at Risk Survey des English Heritage, der in regelmäßigen Abständen seit den 1980er Jahren über bedrohte Einzelobjekte berichtet. Dazu beispielsweise Vanessa Brand: Buildings at Risk. The Results Analysed, in: English Heritage Conservation Bulletin 16, Februar 1992. Ergebnis der damaligen Studie ist die Einschätzung, »that 7% or nearly 37.000 listed buildings in England are at risk from neglect and that twice that number are in danger of falling into the same state.« Besonders bedroht sind nach damaliger Einschätzung »redundant building types«.

62 Hansjörg Blöchliger: Der Preis des Bewahrens, Chur/Zürich 1992, S. 23 ff.

63 David Pearce: The Social and Economic Value of Construction. The Construction Industry's Contribution to Sustainable Development. A Report for Crisp, the Construction Industry Research and Innovation Strategy Panel, London 2003. Rund 80 Prozent der Werte des »Intangible Capitals« bestehen wiederum aus »human capital, social capital and cultural capital«.

64 Und eben nicht nur der in der Regel in den westlichen Gesellschaften

continues.[65] Risk considerations can help sensitise, so that new institutional constraints are oriented toward long-term protection of capital, and cultural production is no longer seen only as the guiding sector of the chain of economic values.[66]

The program of the conference »Cultural Heritage and Natural Disasters« was devoted to traditional disaster risks and those that are to be feared from climatic changes, whereas this article has examined in particular that field of future development which is characterized by uncertainty. It is characteristic of heritage conservation to preserve options for the next generation—this implies not static thinking that desires to continue the status quo »free of change« but rather thinking that is based on allowing the coming generation as much room for maneuver as possible, with as many alternatives for action and decisions as possible. The »open passing-on« of options accords with a systemic idea and goes beyond consideration of the individual object. Considering the feared increase in natural disasters, it would be sensible to ask how widespread losses could be diminished in the next generation and how structures could be created that would make widespread loss less likely. The stock of institutional rules is subject to a political dynamic, state management becomes unavoidable.[67] Of course for the preservation of »information,« of density and of complexity, accompanying measures on the level of the object may also be reasonable: educational work, constant attention, training of experts, investment in »redundant systems« and preservation of decentralized systems, such as the preservation of old crossings over the Alps. What seems necessary is a political theory that reflects the »non-reproducibility of all our heritage,« that makes possible the preservation of the value of the building stock, and that establishes new categories of value. We could reflect on, for example, potential long-term and in part immaterial services that the building stock could render for society.[68] A utopia of long-term

65 In a conference on the theme »Bauwerk Schweiz« in 2005 the Swiss Association of Engineers and Architects (SIA) identified substantial investment deficits for preserving the value of Swiss architecture and warned against the consequences of further delay of repair and maintenance work.

66 Rifkin (note 2), p. 230: »Cultural marketing: … Common cultural property is searched with marketing methods for meanings that promise added value and therefore can be transformed through the arts into commodity-like, purchasable experiences.« Rifkin points out the transformation of the »user« into the »consumer of culture« and the commodity-like nature of culture, p. 234.

67 Volken/Zimmermann (note 4) point out (p. 33) that state management will become more important »because the demands will become more heterogeneous and the self-organization as a form of problem-solving can be insufficient.« See also Ingrid Kissling-Näf/Thomas Volken/Kurt Bisang: Common Property and Natural Resources in the Alps: the Decay of Management Structures?, in: Forest Policy and Economics 4, June 2002/2, pp. 135–147.

68 See for example Stefano Pagiola: Economic Analysis of Investments

Summe der Risiken für die Werterhaltung des Bestands steht daher in einem direkten Zusammenhang zur gesellschaftlichen Allokation der Ressourcen zur Erhaltung. Die Frage der Substituierbarkeit von Kapitalien stellt sich im Bereich des Kulturgüterschutzes allerdings in einer besonders prekären Form: Ein Handel von Zertifikaten wie er beispielsweise bei »Verschmutzungsrechten« in Betracht kommt, erscheint wegen der »Nicht-Reproduzierbarkeit« und Vielschichtigkeit des gealterten Bestands kaum als Kapitalrelation modellierbar. Immerhin könnte eine Abwägung der Investitionsnotwendigkeiten zur »Erhaltung der Kapitalien« bereits deutlich machen, welche Verluste bei einer Trendfortschreibung faktisch in Kauf genommen werden.[65] Risikobetrachtungen können dafür sensibilisieren, neue gesellschaftliche Rahmenbedingungen (»institutionelle constraints«) auf langfristige Sicherung der Kapitalien auszurichten und nicht mehr nur die »kulturelle Produktion als Leitsektor der ökonomischen Wertkette« zu sehen.[66]

Die Tagung »Kulturerbe und Naturkatastrophen« wandte sich mit ihrem Programm herkömmlichen Katastrophenrisiken zu und solchen, die durch den Klimawandel befürchtet werden. In diesem Beitrag wurde dagegen jener Bereich künftiger Entwicklung besonders in den Blick genommen, der durch Unsicherheiten geprägt ist. Ein Charakteristikum denkmalpflegerischen Handelns ist das Erhalten der Optionen für die nächste Generation – nicht statisches Denken, das den Status Quo »veränderungsfrei« weiterführen möchte, sondern ein Denken, das davon ausgeht, der kommenden Generation möglichst große Handlungsspielräume weiterzugeben, möglichst viele Handlungsalternativen und Entscheidungsmöglichkeiten. Die »offene Weitergabe« der Optionen entspricht einem Systemgedanken und geht über die Betrachtung des Einzelobjekts hinaus. Unter dem Blickwinkel der zu befürchtenden Vermehrung von Naturkatastrophen wäre es also sinnvoll zu fragen, wie Breitenverluste in der nächsten Generation verringert und wie Strukturen geschaffen werden können, die Breitenverluste weniger wahrscheinlich machen. Der Bestand institutioneller Regeln unterliegt einer politischen Dynamik, staatliche Steuerung wird unausweichlich.[67] Für die Erhaltung der »Informa-

»unter Schutz stehenden« ein bis drei Prozent des Bestands.

65 Der Schweizerische Ingenieur- und Architektenverein (SIA) hat in einer Tagung zum Thema »Bauwerk Schweiz« im Jahr 2005 erhebliche Investitionsdefizite für die Werterhaltung des »Bauwerks Schweiz« festgestellt und vor den Folgen weiterer Verzögerung von Reparatur- und Instandhaltungsmaßnahmen gewarnt.

66 Rifkin (wie Anm. 2), S. 230: »Kulturvermarktung: … Mit Methoden des Marketing wird der kulturelle Gemeinbesitz nach Bedeutungen durchsucht, die Wertschöpfung versprechen und darum durch die Künste in warenförmige, käufliche Erfahrungen verwandelt werden kann.« Rifkin weist auf den Wandel des »Verbrauchers« zum »Konsumenten von Kultur« und den Warencharakter der Kultur hin, S. 234.

67 Volken/Zimmermann (wie Anm. 4), weisen auf S. 33 darauf hin, dass staatliche Steuerung deshalb wichtiger wird, »weil die Ansprüche heterogener werden und Selbstorganisation als Problemlösungsform unzureichend sein kann.« Siehe dazu auch Ingrid Kissling-Näf/Thomas Volken/

codes and artefacts would offer tolerance also for the fleeting, the playful, for simulations and for the »intangible alternative world« that recalls the past as echo or evocation of lost reality.

tion«, von Dichte und Komplexität können freilich auch auf der Objektebene begleitende Maßnahmen vernünftig sein: Aufklärung, stetige Aufmerksamkeit, Training von Experten, Investition in »redundante Systeme« und Erhaltung dezentraler Systeme, wie zum Beispiel das Erhalten alter Alpenübergänge. Notwendig erscheint auch eine politische Theorie, die die »Nicht-Wiederholbarkeit des gesamten Erbes« reflektiert, die Werterhaltung des Bestands möglich macht und neue Wertkategorien etabliert. So könnte zum Beispiel über langfristige und zum Teil auch immaterielle Dienstleistungen nachgedacht werden, die der Bestand an die Gesellschaft leistet.[68] Eine Utopie langfristiger Codices und Artefakte böte Toleranz auch für das Flüchtige, Spielerische, für Simulationen und die »ortlosen Ersatzwelten«, die als Echo oder Evokation verlorener Wirklichkeit an die Vergänglichkeit erinnern.

in Cultural Heritage. Insights from Environmental Economics. Environment Department of the World Bank, June 1996.

Kurt Bisang: Common Property and Natural Resources in the Alps: the Decay of Management Structures?, in: Forest Policy and Economics 4, Juni 2002/2, S. 135–147.

68 Dazu beispielsweise Stefano Pagiola: Economic Analysis of Investments in Cultural Heritage. Insights from Environmental Economics. Environment Department der Weltbank, Juni 1996.

Dinu Bumbaru

Initiatives of ICOMOS to Improve the Protection and Conservation of Heritage Sites Facing Natural Disasters and Climate Change

The organisation of this symposium by ICOMOS Germany with the help of the Faculty of Architecture at the Technical University of Dresden in the context of a vast international event like Denkmal 2006 is a noteworthy initiative. It provides a valuable opportunity to address the pressing subject of natural disasters and cultural heritage by bringing together a diversity of conservation, restoration and heritage management professionals as well as academics and enterprises. Indeed, one of the great needs in our field is the development and better use of a diversity of skills, knowledge, experience, technologies and other resources to accomplish the goals of conservation. Whether they are defined by international conventions like the 1972 World Heritage Convention of UNESCO, national legislation like the ones in most countries or the will of a local community or volunteer organisations, these goals are set to ensure a better future for cultural heritage.

Today's world presents many specific threats to the historic monuments and buildings of all ages, to archaeological sites or to heritage ensembles like cities or landscapes. Many of these threats result from the development models adopted by societies over the last few decades. In Europe and now in Asia, atmospheric pollution dissolved in a few years the stone and painted masterworks that had survived over centuries of iconoclasm and war. Massive infrastructure projects destroyed vast areas of century–old landscapes and thousands of irreplaceable archaeological sites. Urban renewal turned into »urban removal« as thousands of monuments, neighbourhoods, houses or streetscapes were demolished, paving the way for the great homogenization of European, American or Asian cities, erasing their distinctive character. Disappearance of skills and the culture of maintenance lead to the decay and eventual loss of thousands of historic vernacular buildings and structures. Other important damage and losses are caused by looters, vandals, rioters or various militias or warring factions. The ICOMOS Heritage at Risk Reports, published since 2000 with the essential support of ICOMOS Germany and its partners, offer a vast sampling of such man-made disasters. For these, human societies can identify the sources of the destruction within themselves and, hopefully, also the means to bring change through some sustainable development policies, legislation or reconciliation processes.

Yet, a large number of historic monuments or heritage structures, sites or areas are also lost every year to natural events such as lightning, windstorms, floods, hurricanes, bush fires, landslides or earthquakes. These are not »disasters as such« but as a result of their impacts on human societies and individuals. On 26 December 2004, the international community was shocked by the earthquake and resulting tsunami that caused close to 300 000 casualties across the Indian Ocean, affecting over 40 countries or their population, including a significant number of foreign tourists. In a way, it was the first world-wide natural disaster for its magnitude and reach. Less mediatised are the many smaller earthquakes, fires or meteorological phenomena that cause damage all over and are often recorded by scientists or managers but remain unknown to the general public and the international community.

The global impact of these events on cultural heritage remains largely non-documented and it is not yet possible to provide regular statistics on losses of cultural heritage to natural phenomena, as is possible for the natural heritage thanks to scientific networks and infrastructures developed over recent decades. Facing this, ICOMOS is developing an International Observatory on Monuments and Sites to take better advantage of its professional and institutional networks and strategic partnerships. But, the objectives entrusted to our organisation by its founders and members require that we go beyond the mere documentation of the effects of the problems and have a more proactive approach. Human societies have little capacity in the current state of science to prevent natural events such as a storm or an earthquake, and our responsibility is to limit their possible impact through prevention, preparedness and adequate response.

In many countries, cultural heritage is considered as a non-essential by civil defence or emergency planners and authorities. Thus, the challenge is double: to be adequately acknowledged and then, to be well prepared for disaster and treated in case of emergency. For institutions and professionals in the field of cultural heritage, natural disasters raise three main challenges:

- make prevention a part of standard protection and conservation practice;
- address damage of variable and often paramount large scale and intensity;
- reinforce interdisciplinary and international cooperation before, during and after.

The purpose of this paper is to give some background

on the work and initiatives of ICOMOS on the general subject of natural disasters and cultural heritage and on these three themes in particular. It will also examine current threats, in particular more global ones such as climate change which are of concern to the international community. Finally, it provides some concluding remarks and observations with recommendations for actions that can be initiated at the local, national and international levels.

Natural disasters and the mission of ICOMOS

ICOMOS was founded in 1965 in Krakow (Poland) following a resolution proposed by UNESCO and adopted at the 2nd Congress of Architects and Specialists of Historic Buildings held in Venice in 1964. Article 4 of its statutes identifies its aims as follows: *ICOMOS shall be the international organisation concerned with furthering the conservation, protection, rehabilitation and enhancement of monuments, groups of buildings and sites, on the international level (Statutes of ICOMOS, 1978).* It is an international network of some 9000 professionals and institutions active in some 150 National and International Committees, including the International Committee on Risk Preparedness (ICORP) whose establishment was authorised in 1997. ICOMOS is governed by a General Assembly which meets every three years and delegates its authority to an elected Executive Committee. Heads of the National and International Committees form an Advisory Committee that meets annually.

ICOMOS promotes international and interdisciplinary cooperation to improve the effectiveness of protection and excellence in practice of conservation of immoveable cultural heritage. Through its committees, it develops and disseminates doctrinal texts, charters and other forms of guidelines and reference material applicable to specific heritage types or disciplinary fields. Its role is not to protect directly cultural heritage but rather to help those who have that authority to use it in an appropriate and effective way, as inspired by a collegial and international sharing of experience and knowledge. ICOMOS is also identified in the 1972 World Heritage Convention as an »Advisory Body« to assist the World Heritage Committee in the implementation of the Convention.

The primary doctrinal text of ICOMOS is the 1964 International Charter for the Conservation and Restoration of Monuments and Sites (also known as »*The Venice Charter*«) adopted at the 2nd Congress in Venice and the founding General Assembly of ICOMOS in 1965. It provides guidance on conservation, restoration, maintenance and use of historic buildings, and the excavation and conservation of archaeological sites, referring to the importance of authenticity, integrity, setting or documentation. It doesn't refer specifically to any form of disaster, including natural forces and their potentially devastating impact. Yet, the lack of such formal reference did not prevent ICOMOS members and committees from developing activities, publications and cooperation to enhance prevention or adapting broad conservation principles to the reality of heritage sites located in risk areas. For example, in 1977, ICOMOS met with UNESCO on conservation practices and issues in seismic areas and, in 1980, held a symposium-cum-training in Antigua Guatemala (Guatemala) on the subject. In 1992 and 1994, ICOMOS Canada intervened with the successive Prime Ministers of Canada and contributed greatly to Canada's ratification of the 1954 Convention for the Protection of Cultural Property in the Event of Armed Conflict (Canada later became the first G8 country to ratify the Convention and its two Protocols). A full catalogue of all these initiatives remains to be made.

In 1992, following the dramatic bombing of the heritage city of Dubrovnik in December 1991 and subsequent experts missions by UNESCO, ICOMOS launched an initiative to bring together various international organisations concerned with cultural heritage facing events of catastrophic impact. This initiative was set up by then Director of the ICOMOS Secretariat, Leo Van Nispen, in cooperation with the Secretary General, Herb Stovel, who invited representatives of UNESCO, ICOM, ICCROM, the Association for Preservation Technology and Patrimoine sans Frontières among others. An Inter-Agency Task Force (IATF) was created and operated with the active support and participation of Dr. Hideo Noguchi of UNESCO's Cultural Heritage Division.

Between 1992 and 1996, the IATF offered a platform of coordination between existing organisations. It prepared a review of UNESCO programmes to assess how they took into consideration risk preparedness for cultural heritage. It examined case studies like the Medina of Tunis and developed risk preparedness guidelines for types of World Heritage sites (buildings, archaeological sites, ensembles/landscapes). It also articulated a five-point structure for future developments at the local, national and international levels: the Risk Preparedness Scheme composed of the following items:

- Documentation of heritage sites and their access, and risks
- Manuals and training for conservation or civil defence (e.g. the Risk Preparedness manual jointly published by ICCROM, UNESCO, ICOMOS and the World Heritage Center in 1998)
- Public awareness campaigns, publications, activities for various groups in society like schoolchildren, chambers of commerce, elders, artisans.
- Emergency Funds to support early response and sta-

bilisation missions, equipment and works as well as research in the field
- Response Teams of volunteer specialists and citizens trained to provide help to specific monuments or sites or ready to be sent on emergency response missions elsewhere.

The International Committee of the Blue Shield

One major output of the work of the IATF was the founding, in 1996, of the International Committee of the Blue Shield (ICBS). Rather than a large new organisation which would compete and contradict existing organisations, the ICBS was created as a partnership agreement to ensure contact and coordination between the major existing world-wide organisations in the field of cultural heritage. Its founders are ICOMOS, ICOM (International Council of Museums), ICA (International Council of Archives) and IFLA (International Federation of Library Associations) and were later joined by CCAAA (Co-ordinating Council of Audiovisual Archives Associations). The involvement of ICA derived from a regional meeting of the South Asia Association for Regional Cooperation organised in June 1995 in Colombo (Sri Lanka) on the theme of risk preparedness for cultural heritage.

ICOMOS is the first and only one of the partner organisations to have its General Assembly adopt the goals of the ICBS, which were originally adopted as follows:

a. to provide advice for the protection of cultural heritage in the case of identified threats or of emergencies created by natural or human causes, particularly in the case of armed conflicts;
b. to facilitate international response to threats or emergencies through co-operation between the participating organisations and national organisations;
c. to act in an advisory capacity in cases arising under the Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict (1954);
d. to encourage safeguarding and respect for cultural property and particularly to promote higher standards of risk preparedness;
e. to consult and co-operate with other bodies with appropriate expertise or interest including (but not excluding others): UNESCO; ICCROM; the International Committee of the Red Cross (ICRC);
f. to facilitate professional action at national and regional level to prevent, control and recover from disasters.

The name of the ICBS derives from the emblem of the Convention for the Protection of Cultural Property in the Event of Armed Conflict (1954), better known in the field as *»The Hague Convention.«* The Gulf War of 1990 and the tragic collapse of Yugoslavia had brought additional attention to that convention in the international community and among conservation institutions and organisations like ICOMOS, ICOM and ICCROM. A review of the Convention was also initiated under UNESCO in 1991 and led to the adoption of a 2nd Protocol in March 1999. The 2nd Protocol covers such issues as conflicts that are not of an international character, such as the one in former-Yugoslavia, the granting of enhanced protection status, and the establishment of a *Committee for the Protection of Cultural Property in the Event of Armed Conflict* which can cooperate with the ICBS.

The ICBS first met in Paris in July 1996. Among its first acts was to address letters to the Prime Minister of Canada and the Premier of the Province of Québec, expressing concern and offering help in the context of the Saguenay floods which were just occurring in the city of Chicoutimi, affecting historic buildings, museums, archives and landscapes. Many such appeals were to follow, as the ICBS expressed concern at the fate of cultural heritage in areas stricken by various forms of disasters of natural or human origin. The main activity of the ICBS is to coordinate its member organisations through regular meetings of their heads with the Secretariat. It undertook various activities such as a training session in Radenci (Slovenia) in 1998, participated actively in the meetings organised to prepare the text of the 2nd Protocol to the Hague Convention. It cooperates closely with UNESCO, ICCROM and other organisations.

The field action of the ICBS requires the establishment of National Committees which are to reproduce, at the national level, the formula of the agreement of the ICBS with corresponding national committees or organisations of the five member international organisations. In 2004 and 2006, ICBS assembled existing National Committees in Torino (Italy) and The Hague (Netherlands) to recall the founding principles and reinforce them as common to the whole organisation so as to improve cooperation and consistency. A Future Plan of ICBS, adopted by the partner organisations in 2006, shares work and responsibility as follows:

The International Committee of the Blue Shield

- Deals with accreditation or de-accreditation of National Committees
- Works on the Hague Convention to promote its ratification, takes part in 2nd Protocol Committee meetings and maintains contact with other advisory bodies (ICCROM, ICRC)
- Provides advice to International Courts and other international organisations.

The National Committees of the Blue Shield

- Develop projects, activities and networks in relation to National groups of the International members organisations and relevant to National priorities
- Promote ratification of Hague Convention.

The Association of the National Committees of the Blue Shield

- Works on communications, archives and website
- Prepares information, technical and training material for the Committees
- Promotes awareness and preparedness to decision-makers and funding organisations and develops training activities (e. g. for peacekeepers)
- Cooperates with ICBS on database of specialists for UNESCO.

Overall, the ICBS initiative raises a lot of interest among organisations and professionals. Yet, even after these years, it remains in the early days and is slowly developing a framework that will allow for it to carry more preventive than reactive action. One of the great benefits of the existence of the ICBS has been to allow professionals from the various branches of the cultural heritage system to meet at the national and international levels to develop a sense of common goals. It also gives a platform for the conservation community to develop very important relations with such non-heritage organisations as civil defence, the military and emergency response authorities. Its great challenge remains to remember its founding goals and the very concept of a true partnership rather than create a separate organisation which will compete with its member organisations and reduce their commitment towards heritage before, during and after disasters.

Learning from local experiences

Like the development of trauma medicine with accidents, law with jurisprudence or civil engineering with structural collapses, conservation should »benefit« from disasters to enhance its knowledge of their impacts on cultural heritage and improve methods of prevention. In a way, this is happening as conservators learn from disasters they and their organisations live through. Also, the increase in the number of professional meetings and symposiums which give those colleagues the opportunity to share their experience is an encouraging indicator of a growing awareness amongst institutions, practitioners and decision-makers.

For the moment, this remains an activity that relies on the initiatives of organisations like universities, National Committees of ICOMOS or individual institutions. One could hope for a slightly more systematic approach to recording and disseminating such valuable empirical knowledge. In a way, this is one of the main purposes behind ICOMOS's establishment of its International Committee on Risk Preparedness (ICORP) or its publication of the regular Heritage @ Risk Report by collecting reports from its whole membership.[1] But this has yet to shift attitude and build resources and momentum to move from anecdotic to systematic documentation of disasters in the field of conservation. The organisation is currently working on developing an ICOMOS International Observatory which could enhance its capacity to capitalise on experiences of individual disasters, whether they are sudden like an earthquake, a fire or a storm followed by floods, or spread over years like what is seen with climate change or the transformation of the urban fabric. This will require developing a common and unified format for collecting information so that it can help other institutions and colleagues to access and apply the lessons from other disasters. Even adopting a common standard for documenting the degrees of damage for issuing statistics would be an improvement.

There are some interesting examples of how some natural disasters have led to a conscious effort to improve applicable knowledge, not only in terms of recovery but also in terms of drawing lessons, so as to improve preparedness and preventive conservation. Interesting cases are the Great Hanshin-Awaji earthquake that struck Kobe on 17 January 1995, claiming over 6400 lives and causing great disruptions to the city and the global economy, and the ice storm which covered eastern Ontario and southern Quebec in Canada and parts of New England in the USA in January 1998, causing only a few casualties overall but putting millions of people in chaotic situations in the cold of winter. In both cases, conscious and organised efforts were made to draw lessons from the events and capitalise them into preventive actions.

In the case of the 1995 Kobe earthquake, Japanese authorities organised an international symposium held in Kobe and Tokyo on 19–25 January 1997. This acted as a major debriefing session on the impact of the natural disaster on the historic monuments, archaeological sites and museums of Kobe and the surrounding areas. It also opened a structured and multidisciplinary discussion on risk preparedness for cultural properties, resulting in the adoption of a series of guidelines on risk preparedness for buildings, archaeological sites, historic cities and landscapes but also museums and archives. This review was carried by the academic and conservation institutions. Civil defence and emergency planning organisations are highly sophisticated in Japan but were partly involved in this exercise. The examination of the sequence of events

1 See www.icomos.org

in the immediate aftermath of the earthquake showed potential for improving the relation between the disaster management agencies and the conservation authorities to prevent further losses of heritage, not so much for individually labelled monuments as for neighbourhoods or ensembles of traditional architecture which confer so much character to modern cities but are so easily (and falsely) demonised as sources of casualties.

With the 1998 ice storm in eastern North America, the nature, the context and the territorial extent and lasting impacts of the natural disaster were quite different. Unusual weather patterns set in the St. Lawrence Valley caused repeated episodes of freezing rain from 5–9 January that built up to 10 cm of ice on a vast area spanning over hundreds of kilometres, from west of Ottawa to Maine. Combined with winds, the exceptional ice loads (up to 18 kg/m on power lines) caused hundreds of electric pylons to collapse and a major disruption of the power grid at Montreal, which almost had to be evacuated, and in the surrounding rural areas of Montérégie, leaving over 1 million people without electricity in January and forcing the largest peacetime mobilisation of armed forces in the history of Canada. The crisis was highly visible as Montreal is one of the main cities in Canada and, with Ottawa, a place with a concentration of media. Heritage was affected in different and unexpected ways as it suffered first the weight of the ice, the falling of trees, the power cuts which lasted up to 6 weeks in some areas, and, finally, the water and humidity damage resulting from thawing ice or broken pipes.

In Montreal, thousands of trees lining neighbourhood streets and shaping designed landscapes like Frederick Law Olmsted's Mount Royal Park, arboretums and cemeteries were severely wounded or lost. Churches suffered damage when heavy slabs of ice fell from their spires through their roofs or when their heating systems stopped. Many traditional homes had severe roof damage. Some museums and archives were affected. And, as the police had closed downtown and Old Montreal for security reasons (ice sheets were falling from buildings), staff from the Ministry of Culture were forbidden access to their offices and thus could not coordinate in carrying on their conservation duties, something which would have led to major losses had the disaster been more destructive (e. g. fire or earthquake). In such circumstances, a lot of the heritage advice and monitoring was done by volunteer associations like Héritage Montréal.

Such ice storms are not uncommon in that part of the world and were even reported by the Jesuit missionaries in their 17th c. diaries. Yet, the duration of the phenomenon—five days of freezing rain, possibly attributable to global change in climate patterns—had disastrous impacts. The scale of disruption brought the Government of Quebec to create a special public enquiry Commission whose report—*Pour affronter l'imprévisible*—and its recommendations make reference to cultural heritage (landscape, trees, historic buildings) as part of the storm's social impacts. It also notes the value of initiatives taken by heritage and community organisations like Héritage Montréal which organised emergency heritage conservation clinics in most affected neighbourhoods with volunteer architects, engineers, roofers and trees specialists, or Les Amis de la montagne's successful fund-raising campaign to restore Mount Royal Park by planting trees or supporting scientific research on the natural recovery process (see www.lemontroyal.qc.ca). An interesting note can be taken of the spontaneous and generous interest of the public for iconic public parks damaged by storms (e. g. at Versailles after the 26 December 1999 windstorm and in Vancouver when Stanley Park and its giant trees were severely affected by storms on 15 December 2006.)

The usefulness of a National Summit on heritage and emergency

In conservation, one can observe that there are three levels of intervention. The international level includes *inspiration* provided by sharing common goals like those set forth by the ICOMOS Charters and Documents or the World Heritage Convention, in particular in its preamble, and also *solidarity* and *cooperation*. The national level focuses on *organisation*, with goals being carried out through and under the protective powers of a State, centralised or federal, and its legislation, policies and institutions as mentioned in Article 5 of the World Heritage Convention and with the benefit of civil society—e. g. ICOMOS Committees and other volunteer organisations generating reference documents such as national charters or guidelines, academia and, increasingly, the private sector. At the local level is *action*, since monuments, sites, cities or landscapes are by definition or principle immoveable and need to be cared for, protected and conserved where they stand.

The reaction of the heritage groups in this 1998 ice storm in Montreal (local) benefited from ICOMOS initiatives like the IATF (international) and the spirit of cooperation generated at the Quebec Summit on Heritage and Risk Preparedness in Canada (national). The Summit was organised in September 1996 by ICOMOS and ICOMOS Canada in cooperation with UNESCO and museums and archives associations in Canada. It brought together experienced colleagues from Canada, USA, Japan, the Netherlands, Switzerland, Macedonia and representatives from UNESCO and civil defence authorities in Canada, Quebec and Montreal. Participants also had a possibility to examine on site the damage caused to the city of Chicoutimi, its historic core (Quartier du Bassin) and the old paper mill (La Pulperie) by the torrential floods of the Saguenay River in July 1996.

The Summit focused on connecting conservation and emergency agencies rather than on technical solutions for structural upgrading or fire prevention in historic buildings. It adopted a Quebec Declaration (see Appendix A following this article) that identifies six key principles:

- Challenges: vulnerability; lack of preparedness
- Opportunities: public interest; leadership; experience
- Awareness: identify heritage; media; local
- Collaboration: in heritage field; with fire department and civil defence
- Local Capacity: roles; personnel; manuals
- Enabling Framework: legal obligations; early warning

Although these may sound too general and impractical to some colleagues, these words were rather innovative for Canada and helped build new and more effective approaches. On that basis and simple common language, new cooperation links were established between the heritage and civil defence systems, mainly in Montreal where it spurred a host of follow up activities and the further inclusion of cultural heritage and its protection as part of the overall development and management policies for the city.

The concept of such a National Summit was not invented in Canada. On 1 December 1994 in Washington, DC, the US Federal Emergency Management Agency (FEMA), the Getty Conservation Institute and the National Institute for the Conservation of Cultural Property had hosted a National Summit on Emergency Response at the American Institute of Architects, with the participation of the Directors of FEMA and the National Park Service. This led to the creation of a National Task Force on Emergency Response that includes US/ICOMOS and continues its activity to »promote preparedness and mitigation and provide expert information on response and salvage to institutions and the public.«[2]

Considering the natural inertia in complex and segmented administrative systems, the success of events like these National Summits relies on momentum given by some leaders or circumstances. Sadly, tragic heritage losses that could have been avoided often act as this trigger for improvement. Another opportunity is given by the World Heritage Convention, now signed by over 180 countries. Although a lot of attention is given to the care of the sites inscribed on the World Heritage List, the Convention is fundamentally a tool to enhance the quality of conservation and presentation of the whole cultural and natural heritage of a country. Its Article 5 engages governments to adopt policies »to give the cultural and natural heritage a function in the life of the community and to integrate the protection of that heritage into comprehensive planning programmes.« On such a basis, a lot can be accomplished to include acknowledgement and adequate consideration of the cultural heritage in emergency response and preparedness plans, often developed and carried out without due consideration for heritage and the institutions in charge of its care and protection. Appendix B (following this article) offers a series of notes on how Article 5 could serve as a basis to argue in favour of conservation activities and preventive measures related to natural disasters or the impact of climate change.

Climate change: a »natural« disaster of global scale

The relationship between human activities and the climate or seasons is the source of a lot of heritage structures, landscapes or even the way many human settlements or buildings are laid out, shaped and maintained or the way they relate to each other. Agriculture, hunting or fisheries and their heritage of sites, buildings, landscapes or even specific rituals are examples of this. So are the trade winds and the maritime routes they allowed. Architecture illustrates the ingenuity of various people to adapt to the weather, whether it's with the igloos in the north or the wind towers that provide natural cooling in ancient Iranian cities. It offers another illustration of the generic phrase »*the combined work of man and nature*« mainly used to describe adaptation to land. It could be the theme of a specific documentation exercise to catalogue the cultural heritage structures, sites and areas that illustrate the traditional knowledge or other inventions developed by humans to deal with the climate. Such documentation would be useful to further understand and anticipate the impacts of changing climate on cultural heritage—tangible and intangible—at the local, national or international level since it would give a clearer identification of the link between the two.

From a conservation perspective, the main question would be to understand the impact of climate change on the physical attributes and features as well as the significance, value and meaningful use of that heritage. Constantly, monuments, sites, ensembles and other forms of heritage places are exposed to threats falling under six broad categories:

- natural decay;
- natural disasters;
- human violence;
- inappropriate use or development;
- demeaning transformations or demolition;
- obsolescence and oblivion.

2 See http://www.heritagepreservtion.org/PROGRAMS/taskfer.htm

Of those, climate change currently observed by the scientific community world-wide would affect or enhance directly three: natural decay; natural disasters and inappropriate use or development. One could also argue that climate change could generate abandonment or force inappropriate interventions that would destroy heritage or reduce greatly its significance or authenticity. Also, increased concerns are expressed by governments like the United Kingdom that identify climate change as a national security issue that could trigger major tensions between nations, peoples and societies and, consequently, violence and conflicts.

The documentation of possible impacts in particular to designed appropriate adaptation and other preventive measures relates to the type of immovable cultural heritage and their related objects, archives or even intangible aspects or associated rites or traditions. For individual historic buildings or structures, impacts might relate to changing patterns of decay for their material and constructive systems, to infestation by insects or new types of biological agents benefiting from new temperatures, or to increased structural stress caused by wind, sea waves or thawing permafrost. For archaeological sites, it could come from changes in ground humidity and chemistry, from soil erosion or from increased root systems from plants. For heritage areas or »cultural ecosystems« like vernacular settlements, historic cities or landscapes, climate change would likely affect the livelihood and thus not only the heritage-defining features but also the heritage-defining human activities such as agriculture, fisheries, forest harvesting, seasonal activities and migrations, rituals, and also the land patterns, roads and links, transhumance or tourism, even the general economy of basic maintenance of the traditional built environment. The 2005 report on Climate Change and the Historic Environment prepared by Professor May Cassar of University College of London makes a substantial contribution to structuring the documentation effort for buildings, archaeology, parks and gardens.[3]

Climate change and World Heritage

Despite valuable work like that of Professor Cassar at the UCL Center for Sustainable Heritage, the field remains relatively largely unexplored. Possible explanations of that situation may be found in the general focus of conservation professionals on the needs of restoration and its theory rather than preventive action, as ICOMOS Director Leo Van Nispen observed in proposing the formation of ICORP in 1987. Also, there is definitely a more mediatised focus on natural heritage and the guilt of human societies and their economy. Another possible explanation may be found in the reality of conservation as it operates mostly on traditional, professional and empirical knowledge rather than the scientific knowledge generated by modern climatology and other disciplines.

Once again, the World Heritage Convention provides opportunity and a fertile context to engage the discussion on cultural heritage and climate change as demonstrated in the 2007 publication of Case Studies on Climate Change and World Heritage by UNESCO's World Heritage Center, which offers a panoramic sampling of issues relating to glaciers, marine and terrestrial biodiversity, archaeological sites and historic towns and settlements.[4] Another illustration of this opportunity is the integration of a specific climate change impact component in the risk assessment which is done by States Parties and by ICOMOS as part of the nomination dossier and the evaluation of cultural properties submitted for inscription on the World Heritage List.

The discussions and decisions of the World Heritage Committee offer another expression of that growing concern. In 2005, at its 29th Session in Durban (South Africa), the Committee called for the preparation of a strategy to address climate change and improve the adaptation of World Heritage Sites. Consequently, the Center organised an experts meeting at UNESCO in March 2006 with the support of the United Kingdom. The Committee further examined and decided on the issue at its 30th and 31st Sessions in Vilnius (Lithuania) and Christchurch (New Zealand), adopting a strategy of preventive and corrective actions of local adaptation as well as regional strategies, and sharing knowledge rooted in the following considerations:

- climate change is one among many factors impacting the conservation of World Heritage sites;
- the World Heritage Convention needs to be better linked to other conventions relative to climate change; e. g. through reporting mechanisms, integrated strategies and institutional networks;
- research should be pursued on the physical, cultural and social impacts of climate change on World Heritage.

ICOMOS actions on climate change

As an independent, non-governmental international organisation as well as an Advisory Body to the World Heritage Committee, ICOMOS has committed to action on climate change. Our International Committee on Polar

3 See http://eprints.ucl.ac.uk/archive/00002082/01/Published_Climate_Change_Report_05.pdf

4 See http://whc.unesco.org/documents/publi_climatechange.pdf

Heritage identified specific cases of threats and damage to heritage sites in the ICOMOS Heritage @ Risk Report 2004/2005 (e. g. Herschel Island in the Yukon Territories, Canada). Our Advisory Committee raised the issue at its meeting in Bergen (Norway) in 2004. Resolution 37 adopted by the 15th Session of the General Assembly held in Xi'an (China) in 2005, engages ICOMOS to

- *communicate to the organisers of and participants to the Montreal Conference on Climatic Change* [i. e. the 11th Session of the Parties to the UN Framework Convention on Climate Change and first meeting of the Parties to the Kyoto Protocol] *the strong concern of ICOMOS for the impact of climatic changes on tangible and intangible cultural heritage in its full diversity of types, cultural and historical origins and the need to ensure it is specifically included in the items discussed at the Conference, in its conclusions and its following actions;*
- *express its will to fully cooperate through its National and International Committees (including ICORP) with UNESCO and other relevant organisations to document the impact of climatic change on cultural heritage and develop preventive measures.*

ICOMOS is interested in engaging its members, committees and partners to ensure that monuments, historic buildings or settlements, archaeological sites and heritage landscapes are duly taken into consideration in the context of the paramount global discussions and negotiations. We also look forward to developing tools so that climate changes are adequately understood and integrated in conservation practices, projects and policies.

ICOMOS's objective is not to challenge the various theories developed by scientific or political organisations to explain the origin of the situation. ICOMOS works locally, regionally, nationally and internationally to achieve the fundamental goals of conservation so that current and future generations can benefit from their heritage as a prime expression of global cultural diversity and an irreplaceable testimony to the great human endeavour. This work is organised in a special work programme of the organisation, in particular of its Scientific Council which constitutes an internal forum for the International (thematic) Committees of ICOMOS.

Currently, ICOMOS has engaged in a mobilisation of its network to collect illustrations and compare observations of the impacts of climate change on cultural heritage sites. The 2007/2008 Heritage at Risk report includes a special chapter on the subject and a series of events are organised to connect with the base of our membership and committees. National Committees included sessions on the subject as part of their regular meetings (e. g. ICOMOS Germany session in Leipzig, Australian ICOMOS annual conference in Cairns, ICOMOS Canada annual meeting). Workshops and lectures have been organised (e. g. in Ushuaia, Argentina) to stimulate local monitoring and knowledge to be assembled and shared. On 8 October 2007, the ICOMOS Scientific Council organised a special symposium on the subject in Pretoria (South Africa) where cases from various geographical contexts or heritage types were compared. In addition, ICOMOS coordinates and cooperates with major partners like the World Monuments Fund which dedicated part of its 2007 World Monuments Watch to the subject and held a special workshop on it in St. Paul, Minnesota, at the George Wright Society conference.

A major initiative on the subject was taken when the ICOMOS International Committee on Risk Preparedness, with the support of Dr Rohit Jigyasu, organised a first ICOMOS International Conference on the subject in New Delhi in cooperation with the National Institute for Disaster Management of India, ICOMOS India and the regional office of UNESCO. The concluding resolution (see the appendix of this publication) provides guiding principles for a multidisciplinary approach to research, document, and assess risks to cultural heritage due to climate change (e. g. glacial melts and potential floods, sea level rises, desertification, extreme meteorological events, saline water ingress or infestation). It suggests such assessments be done both at the macro/regional/thematic level and micro/local/site level to provide an overview that supports mid/long-term monitoring as well as applicable knowledge to protect the heritage itself. Participants also noted the frequent disconnection between heritage and disaster management, and recommended that this be resolved through institutional processes, protocols and policies for disaster reduction, and that adequate resources to ensure intents turn into actions.

In preparation for the 16th General Assembly in Québec (Canada) in September 2008, ICOMOS is planning further meetings. In particular, an ICOMOS experts meeting will take place in Montreal (Canada) in May 2008 to develop a methodology and related protocols for the correlation of traditional and professional knowledge and site management records with scientific data. This will not only help close the knowledge gap in terms of observing the impact of climate change on cultural heritage over the past decade but also set up a monitoring system linking a series of reference heritage sites to collect comparable data through regular maintenance and management or conservation works. Case studies are being developed in preparation for the meeting according to various heritage types: historic monuments and buildings; archaeological sites; parks and gardens; complexes; urban ensembles; heritage landscapes, and monuments of nature.

As the host of this meeting, Montreal will develop a case study on the impact of climate change on the heritage of its metropolitan core. Vulnerability factors, legal obligations, institutional cooperation and community awareness will be examined. The presence of a diverse architectural,

archaeological, landscape and natural heritage benefiting from over a century of public debate, conservation effort, and scientific and institutional development will provide opportunity for the development of the ICOMOS protocol on climate change impact documentation and adaptation. The recent signing of an agreement between the National Geographic Society, Héritage Montréal, Tourism Montréal, the UN World Tourism Organisation's Center of Excellence of Destination and the City of Montreal making Montreal the first urban destination acknowledged as part of the Society's Sustainable Tourism programme, also supports this ICOMOS initiative.

Some closing remarks

In the process of developing the 1997 Kobe-Tokyo international conference on risk preparedness, we imagined with Dr. Hideo Noguchi and Leo Van Nispen the concept of *bosaido* or the »way of preparedness,« using Japan as an inspiring source of the word itself. Now that spirit is shared more than ever as our societies are more sensitive to their heritage, even if they often keep on with development models that generate more threats and increase vulnerability.

Our times are very challenging with complexity of new dimensions. Health is another pressing issue facing humans all over the world. It offers a useful analogy to those of us in cultural heritage. It has to engage individual people themselves by enhancing awareness and basic knowledge so they can do more themselves. There are needs for regular check-ups and making the right choices in terms of way of life, for emergency or specialised care, for monitoring the spread of disease and long-term research to improve the scientific basis of medicine and improve the praxis of clinical or community medicine.

Through the work of world-wide organisations like ICOMOS, ICCROM or UNESCO, often operating in close and collegial partnerships, or regional organisations like those in place among countries in Europe, Asia or the Caribbean, solidarity has grown and knowledge has been developed. National models like Japan are better known and connected internationally through efforts of institutions such as the Ritsumeikan University in Kyoto or the Nara National Research Institute on Cultural Heritage which are engaging in mid-term cooperation, research and training programmes on cultural heritage and risk preparedness. The United Kingdom is leading the way on the pressing theme of climate change with efforts in documenting the issue, disseminating knowledge and improving the capacity of conservation institutions, in the complexity of their mandates and organisations, to carry on their mission facing these new challenges. Cities and metropolises are more sensitive to heritage as a distinctive asset.

This should reinforce our resolve that prevention is not synonymous with procrastination nor an excuse not to carry on, immediately, conservation work. This should reinforce and renew our commitment to protect and conserve heritage sites as the prime expressions of the human endeavour.

Appendix A: Québec Declaration on Heritage and Risk Preparedness

Summit on Heritage and Risk Preparedness in Canada
Québec City (Canada), 16–17 September 1996

The Québec Declaration on Heritage and Risk Preparedness

Given the following Challenges

The ever present and increasing vulnerability of Canadian and world heritage in the face of disasters and other events threatening the continuing life of that heritage;

The generally poor state of preparedness for the protection of Canadian cultural heritage in times of emergency;

The administrative obstacles limiting effective coordination among authorities responsible both for cultural heritage and for emergency response at federal, provincial and municipal levels.

Opportunities

Existing emergency response infrastructure and mechanisms in Canada capable of integrating concern for cultural heritage, and the evident interest shown by officials responsible for emergency response to respond to concern for increasing care and attention given to cultural heritage;

The leadership of some Canadian institutions (e.g. National Archives of Canada) in developing preparedness models of value and interest for other groups and institutions;

The focus offered by the existing international Blue Shield initiative for improving the situation in Canada, given:

- The key role played by Canadians in the international movement (that is in the Inter-Agency Task Force Round Tables on the subject initiated by ICOMOS in 1992, and held regularly in Paris since then);
- The interest of UNESCO and ICOMOS in developing a "Canadian model" of risk preparedness;
- The potential offered by the creation of the International Committee of the Blue Shield whose first act was to respond to the Saguenay floods.

Therefore, we the participants of the First National Summit on Heritage and Risk Preparedness in Canada held at the Musée de la Civilisation in Québec, on September 16-17, 1996 , agree to pursue objectives in the following areas:

Awareness

Increase appreciation of the nature and value of cultural heritage among those responsible for heritage and emergency response, and increase knowledge and understanding of potential risks and associated impacts of disasters of natural, technological and social origin threatening the heritage.

Increase mutual awareness of emergency response management concerns and cultural heritage management concerns:

- Affirm importance of cultural heritage for those threatened by loss;
- Recognize strong link between effective heritage protection and clear identification of heritage values in the built environment;
- Better continuing appreciation of the concerns of the public, the youth and the media;
- Improve understanding of local authorities of concerns for cultural heritage protection.

Collaboration

Establish permanent structural links among all those involved with cultural heritage conservation (archives, libraries, museums, built environment) and with emergency response authorities (civil security [and protection], emergency response, public security, defence):

- Identification of potential partners (governments, institutions, corporations and individuals) and their interests;
- Developing network(s) for exchange among those concerned with these issues at local, national and international levels;
- Ensuring effective communication among network members (e.g. electronic mail, newslists);
- Providing occasional forums for exchange among network members, including follow-up to this Summit meeting;
- Developing Task Force/Working group to guide collaboration following the summit.

Building local capacity

Clarify roles and responsibilities of local authorities in heritage protection (decision-making structures in times of emergency; policies for territorial environmental planning and management).

Improve capacity of local authorities, services and local institutions to improve care for cultural heritage threatened by disasters.

– Integrate concern for cultural heritage in existing structures for risk management and emergency response (for example, in methods of risk assessment, intervention planning and implementation);
– Improved knowledge of appropriate "models" in other contexts;
– Improved training for responsible officials and managers;
– Increased opportunities for volunteer participation.

Strengthening enabling framework for heritage protection

At local, regional, provincial, national and international levels:

– Develop and install early warning detection and surveillance systems;
– Improved databases of experiences and success models for consultation and improve accessibility to databases;
– Ensure commitment of authorities concerned to mobilization of appropriate professional experience in times of disaster;
– Develop emergency response mobilization plans.

In Québec, on September 17, 1996.

Note: *Canada is governed on a confederation model with three levels of authority in a back up scheme, the local calling upon the provincial which, in turn, can call on the federal resources in case of emergency. This Declaration gives a canvas of principles and key principles to assess, at the national level, the connection between organised preparedness, prevention and response to natural disasters, and the cultural heritage. It can be used as a reference but needs to be adapted to other national contexts, ideally through a multidisciplinary exercise like the National Summit that generated it.*

In terms of impact, the Summit gave birth to initiatives in Ottawa and Montreal and the Declaration was promoted at various heritage and civil security conference and meetings since 1996. In Ottawa, the main heritage institutions – National Archives, National Library, National Museum, Parks Canada, National Capital Commission, etc. – established a cooperating agreement for mutual support in case of emergency and cooperated with the municipal emergency response departments.

In Montreal, annual meetings of owners of heritage buildings (e.g. religious properties), heritage institutions and volunteer organisations and civil security organisations raised awareness of the issues and provided opportunities for mayors and other decision-makers to take public stands on heritage matters. In one of the Montréal meetings, the director of the Metropolitan Centre de Sécurité civile and chair of the Canadian Safeguard Network, Jean-Bernard Guindon, declared that this exercise had convinced him and his institution that cultural heritage and historic buildings needed to be treated in a higher priority in times of emergency, second only to saving human lives, since they are human creations and elements of strong community and identity value. Another initiative in Montreal was taken by Nathalie Martin, urban planner and Université de Montréal Masters in Conservation student, who developed manuals and maps informing fire stations personnel of the heritage in the neighbourhoods under their responsibility.

Appendix B: World Heritage Convention – Article 5 (UNESCO, 1972)

Article 5: To ensure that effective and active measures are taken for the protection, conservation and presentation of the cultural and natural heritage situated on its territory, each State to this Convention shall endeavour, in so far as possible, and as appropriate for each country:

a. to adopt a general policy which aims to give the cultural and natural heritage a function in the life of the community and to integrate the protection of that heritage into comprehensive planning programmes;

b. to set up within its territories, where such services do not exist, one or more services for the protection, conservation and presentation of the cultural and natural heritage with an appropriate staff and possessing the means to discharge their function;

c. to develop the scientific and technical studies and research and to work out such operational methods as will make the State capable of counteracting the dangers that threaten its cultural and natural heritage;

d. to take the appropriate legal, scientific, technical, administrative and financial measures necessary for the identification, protection, conservation, presentation and rehabilitation of this heritage; and

e. to foster the establishment or development of national or regional centres for training in the protection, conservation and presentation of the cultural and natural heritage and to encourage scientific research in this field.

Note: Article 5 of the World Heritage Convention offers opportunities to address, in a broader way, the issues of natural disasters and climate change in relation to the protection and conservation of cultural heritage. These opportunities are to be found in exploring the potential of each of the article's five paragraphs, taking into account that the article covers more than the exclusive selection of sites inscribed on the World Heritage List but encourages States Parties to improve their performance as the sovereign authority responsible for the protection of a country's historic buildings or cities, archaeological sites, or heritage landscapes in their full diversity. For example:

- *Paragraph a. refers to "general policies" and "comprehensive planning programmes" which can be invoked to effectively integrate cultural heritage into disaster reduction plans at the local, regional, national or international levels. It can help ensure that representatives from heritage departments or institutions in charge of conservation are included in the committees responsible for the implementation and ongoing improvement of these plans. It could also help improve planning so that it reduces risks to cultural heritage from human activities.*

- *Paragraph b. refers to institutional structure and responsibilities and mentions specifically the need for "appropriate staff" and means to carry out their work, which nowadays needs to include disaster reduction and climate change adaptation.*

- *Paragraph c. is essentially focused on reducing or preventing threats and should support risk mapping, monitoring of climate change impacts on cultural heritage sites or research in a sustained way.*

- *Paragraph d. encourages development of tools and operational measures which could include preventive conservation or retrofitting of heritage sites or their adaptation in the context of expected climate change impacts.*

- *Paragraph e. supports the development or strengthening of relations and cooperation between the public sector, academia, scientific research organisations, and the keepers, owners and users of heritage sites at the national but also the regional or local/municipal levels, thus echoing the structure generally in place for civil defence or heritage management.*

Appendix

Anhang

International Charters and Recommendations

Internationale Resolutionen und Empfehlungen

Council of Europe, Committee of Ministers, Recommendation No. R (93) 9 of the Committee of Ministers to Member States on the Protection of the Architectural Heritage against Natural Disasters, adopted by the Committee of Ministers on 23 November 1993 at the 503rd meeting of the Ministers' Deputies.

The Radenci Declaration, Blue Shield Seminar on the Protection of Cultural Heritage in Emergencies and Exceptional Situations, Radenci, Slovenia, 12–16 November 1998, www.ifla.org/VI/4/admin/emergcy.htm (14 January 2008).

Kyoto Declaration 2005 on Protection of Cultural Properties, Historic Areas and their Settings from Loss in Disasters (adopted at the Kyoto International Symposium 2005 «Towards the Protection of Cultural Properties and Historic Urban Areas from Disaster« held at the Kyoto Kaikan on 16 January 2005), www.international.icomos.org/xian2005/kyoto-declaration.pdf (14 January 2008).

United Nations Educational, Scientific and Cultural Organization, Convention concerning the Protection of the World Cultural and Natural Heritage, World Heritage Committee, Thirtieth Session, Vilnius, Lithuania, 8–16 July 2006, Paris 2006, whc.unesco.org/download.cfm?id_document=6525

Declaration on the Impact of Climate Change on Cultural Heritage, International Workshop on Impact of Climate Change on Cultural Heritage, New Delhi (India), 22 May 2007.

Council of Europe

Commitee of Ministers

RECOMMENDATION NO. R (93) 9

OF THE COMMITTEE OF MINISTERS TO MEMBER STATES ON THE PROTECTION OF THE ARCHITECTURAL HERITAGE AGAINST NATURAL DISASTERS

(Adopted by the Committee of Ministers on 23 November 1993
at the 503rd meeting of the Ministers' Deputies)

The Committee of Ministers, under the terms of Article 15.b of the Statute of the Council of Europe,

Considering that the aim of the Council of Europe is to achieve a greater unity between its members;

Having regard to the European Cultural Convention signed in Paris on 19 December 1954;

Having regard to the Convention for the Protection of the Architectural Heritage of Europe signed in Granada on 3 October 1985;

Having regard to the European Convention (revised) on the Protection of the Archaeological Heritage signed in Valletta (Malta) on 16 January 1992;

Having regard to the Unesco Convention for the Protection of Cultural Property in the Event of Armed Conflict adopted at The Hague on 14 May 1954;

Having regard to Recommendation 1042 (1986) of the Parliamentary Assembly of the Council of Europe on protecting the cultural heritage against disasters;

Having regard to Resolution (87) 2 setting up a co-operation group for the prevention of, protection against, and organisation of relief in major natural and technological disasters;

Having regard to its previous recommendations:
- on the specialised training of architects, town planners, civil engineers and landscape designers (No. R(80) 16);
- on the promotion of the crafts trades involved in the conservation of the architectural heritage (No. R(86) 15);
- on control of physical deterioration of the architectural heritage accelerated by pollution (No. R(88) 5);
- on measures likely to promote the funding of the conservation of the architectural heritage (No. R(91) 6);

Recognising that the architectural heritage constitutes an irreplaceable expression of the richness and diversity of Europe's cultural heritage;

Emphasising that the lack of specific legislation and measures for protection of the architectural heritage against the effects of natural disasters would lead to irreparable losses of Europe's heritage;

Stressing that in this field human life and its quality always takes priority;

Convinced that strategies for the protection of the architectural heritage can also protect human life;

Bearing in mind the work of other international organisations, especially Unesco, in this field;

Stressing the importance of international co-operation,

Recommends that the governments of the member states adopt all legislative, administrative, financial, educational and other appropriate measures, with reference to the principles set out in the appendix to this recommendation, as part of their general policy for conserving the architectural heritage;

Instructs the Secretary General to transmit the text of the present recommendation to the nonmember states party to the European Cultural Convention and/or the Convention for the Protection of the Architectural Heritage of Europe and of the European Convention on the Protection of the Archaeological Heritage (revised), and to members of the

Open Partial Agreement on the prevention of, protection against, and organisation of relief in major natural and technological disasters.

Appendix to Recommendation No. R(93)9
Principles and measures

I. Scope and definitions[1]

1. »Architectural heritage« comprises monuments, groups of buildings and sites as defined by Article 1 of the Granada Convention, as well as movable objects having particular historical or aesthetic association with the protected buildings.
2. »Natural disaster« means the occurrence of a natural phenomenon which causes extensive loss of, and damage to, the architectural heritage.
3. »Hazard« means the probability of occurrence, within a specific period of time of a natural phenomenon which could damage buildings or objects; these hazards are: seismic activity, volcanic activity, tsunami, flooding, land, earth and mud slides and avalanches, storms, fires and explosions. (Secondary hazards are often created as the result of the occurrence of a primary disaster.)
4. »Vulnerability« means the degree of damage or loss to a given element at risk or a set of such elements resulting from the occurrence of a natural phenomenon (or fire).
5. »Risk« means the expected damage to, or loss of, the architectural heritage due to a particular natural phenomenon or combination of phenomena, and is consequently the product of »hazard« and »vulnerability«.

II. Legal and administrative framework for disaster protection

1. Each state should establish and complete the compilation of lists of the buildings, objects and monuments of interest. Copies of the lists should be deposited with all the appropriate authorities.
2. In recognition of the variety and extent of the architectural heritage, priority should be given to those buildings and objects of greatest importance and to those most at risk.
3. All items on the lists should be registered, and inventories, as detailed as possible, should be produced.
4. Owners of items on the lists should maintain their property in good condition, by means of structural surveys and by the implementation of regular schedules of maintenance and repair and of risk assessment studies.
5. Authorities responsible for the architectural heritage should be empowered to ensure that the necessary surveys, maintenance and repair work are undertaken.
6. Authorities should be empowered to enforce measures to reduce risks which jeopardise the building.
7. If an owner cannot be traced, or is unwilling to undertake the work, the authorities should have the right to undertake the work, at the expense of the owner, or to effect the compulsory purchase of the property.
8. The issue of risks should be a material consideration in the assessment of town planning and land use proposals. Proposals to alter or extend historic buildings, which are likely to increase the risks, should be refused.
9. Authorities responsible for the architectural heritage should be responsible for disaster prevention and mitigation in their field of competency. They should employ trained staff to: produce and maintain records; monitor disaster activity and produce protection strategies; implement salvage, recording and emergency work; provide educational and technical assistance and guidance; and plan and implement restoration projects after the disaster.
10. Authorities should be empowered to raise, or be provided with, the resources to undertake the functions required for disaster prevention and mitigation.
11. Prescriptive building and safety codes should not automatically apply to the architectural heritage. Safety measures and standards should be attained by the application of performance requirements which employ an optimum and flexible choice of organisational, technical and structural measures.

1 Definitions 2,3,4 and 5 are based on the terms used by the Office of the United Nations Disaster Relief Co-ordinator (UNDRO).

III. Financial and insurance measures

1. Financing disaster prevention and mitigation
   Adequate and quickly accessible resources should be established both for planned maintenance, upgrading and preventive work and for contingency funding in the event of a disaster, for instance by setting up national and local funds.
2. Insurance
   i. States should remove any legal obstacles and facilitate the insurance of buildings and objects, which comprise the architectural heritage, against loss and damage caused by disasters and against theft and arson.
   ii. All steps to encourage, support and facilitate full and appropriate insurance cover should be taken.
   iii. Policies should ensure that the sums insured shall represent the full cost to be incurred at the time of the loss or damage, in order to repair, restore or reinstate the buildings or objects to their condition before the disaster, using materials, workmanship and techniques according to best conservation practice. If a policy stipulates an excess or co-insurance, the insured should prove that he has the means to cover such sums out of his own funds.
   iv. The buildings and objects should be inspected regularly by experts and insurers and the conditions and warranties stipulated in connection with such inspections should be binding.
   v. Efforts should be made to ensure full co-operation and the exchange of information and expertise between the authorities and the insurance companies.

IV. Education and training

In order to improve risk awareness, education should be promoted at different levels: to the general public through informed media coverage and in the school systems as part of the curriculum; to the professionals and technicians through general training and in specialist courses; and, to owners and occupiers of the architectural heritage by the provision of guidance.

1. Education and training should be given a high priority and be provided with an adequate level of resources.
2. Training, at a professional and technical level, must take into account the following considerations:
   i. only specially qualified and experienced teachers should be used to provide the specialist knowledge and training required;
   ii. all professionals should be taught general principles and practice at pre-qualification or undergraduate level and specialist post-graduate courses should be undertaken by those who wish to, or have to, specialise or practice in this field;
   iii. the general principles must stress the importance of:
      – the determination of the probability of an event;
      – the evaluation of vulnerability;
      – the assessment of risks;
      – preventive and protective actions and measures to minimise or eliminate vulnerability and/or risks;
      – conservation repair and maintenance methods and techniques;
   iv. all courses should be multi-disciplinary;
   v. all practitioners should undertake continuous professional training in order to keep abreast of new events and developments;
   vi. the fire brigade, civil defence and all other public emergency services, including the military, should be made aware of the importance of the architectural heritage in their region;
   vii. other interested parties such as insurance companies should be offered specialist training;
   viii. the international and regional exchange of teaching staff and circulation of ideas and information should be encouraged;
   ix. specialist research programmes should be initiated.

V. Risk assessment

1. Risk assessment should be adopted and implemented as part of the maintenance of property, at a series of management levels, by all owners, occupiers and authorities responsible for the architectural heritage.

2. Fire risk assessment and prevention/mitigation strategies should essentially be undertaken at local level by the owners and occupants of the architectural heritage.
3. The role of the authorities should be to decide on statutory matters, to co-ordinate, to provide advice and education, to provide technical and financial assistance and to provide emergency support
4. For hazards other than fire, the authorities should undertake co-ordinated research and the publication of advice at regional, national and international levels.
5. For each of the natural hazards, it is essential to quantify and assess the probability of occurrence, notably through the production of distribution studies and zoning maps, according to time and space.
6. Information should also be held on computer and be subject to constant monitoring and updating.

VI. Disaster prevention and mitigation strategies

1. Disaster prevention and mitigation strategies should be developed for the architectural heritage. All parties involved must be made responsible for the strategies but the degree and extent of involvement and responsibility will vary according to the type of hazard and disaster.
2. There are two approaches to the mitigation of risks, neither of which is exclusive:
   – to reduce the hazard or prevent the occurrence of the disaster; or
   – to minimise the loss or damage which will result from the disaster.
3. Risks are reduced by the planned application of a choice of organisational, management, technical and structural measures which must be developed on a case-by-case basis for each building, according to each disaster.
4. Guidelines and checklists for disaster prevention and mitigation strategies are described in the accompanying appendices.

Technical appendices

Appendix I

Disaster prevention and mitigation strategies

Organisational measures—General

1. Disaster prevention and mitigation strategies require preparation and planning and the implementation of technical and physical measures, in order to prevent or reduce loss or damage, both in the event of disaster and in the aftermath. It is recognised that it is impossible to prevent or to predict the occurrence of some disasters. Nevertheless, in all cases, probability studies and a thorough understanding of the risks are vital for the formulation of a strategy.
2. The success of a strategy depends on the effectiveness of regional/national/international co-operation and co-ordinated policy, as well as on the vigilance and good housekeeping/maintenance by the owners and occupiers of historic buildings. It is important that bodies responsible for the architectural heritage should adopt a major role and establish disaster protection units. »Disaster plans« should be developed and implemented immediately. They must include an evaluation of the risks, based on a thorough knowledge of the hazard, and an assessment of the vulnerability of the historic buildings. To date, risk assessment for buildings has concentrated on codes for new structures and there has been little attention paid to the collection and analysis of information specific to historic buildings.
3. The local or regional authority dealing with the architectural heritage:, the civil defence or other emergency services, in consultation with the representatives of the central architectural heritage authority, should identify and train staff to deal with disaster prevention and mitigation planning and with disaster assistance. These staff should be present during or immediately after the disaster, in order to supervise salvage and recording operations (the use of photogrammetric surveying is particularly useful) and they should be involved in any decisions on demolition and/or in the control of emergency repairs and making safe or good. According to local law and practice, staff should liaise and co-operate with contingency planning, civil defence, and emergency services in the establishment of plans and priorities and in the publication of guidelines and advice on all aspects of disaster planning.
4. The fire, civil defence and emergency planning services, as appropriate, should be trained and made aware of the

importance of the architectural and cultural heritage in their region. They should be provided with the following information:

i. full lists of buildings and objects which comprise the architectural heritage, including details of contents;
ii. copies of salvage plans and priorities concerning objects of particular interest;
iii. plans of the buildings which indicate means of escape routes, the: location of access points, fire-fighting equipment, power points and other services, and of hazardous or fragile materials;
iv. advice on the likely effect of the various extinguishing agents (water and gas) on delicate or fragile historic fabric, structure and materials—wall paintings, panelling and so on.

Appendix II

Fire organisational measures

1. For each historic building a named member of staff or of the household, with deputies, must be made responsible for fire safety. This fire safety manager, who might also be responsible for security and health, should initiate and oversee all aspects of the fire prevention or mitigation strategy or plan, in liaison with the fire brigade staff and with professional advisors (architects, surveyors, engineers, planners, specialists on historic buildings) and representatives from the insurance companies. The strategy should be subject to constant rehearsal and review, and records of all activities should be made.
2. The main objective is to reduce the risk by undertaking systematic fire prevention. A balanced series, or optimum choice, of organisational, technical and physical measures should be employed. Specifically, the strategy will seek:
   i. to assess the risk of outbreak of fire, to minimise that risk and to prepare a plan of action in the event of a fire;
   ii. to ensure safe and orderly means of escape for all occupants;
   iii. to protect the historic structure and to prevent the fire from spreading;
   iv. to establish a staff structure with clearly defined responsibilities in the event of a fire;
   v. to train and educate staff in fire-fighting and evacuation procedures, and in the implementation of salvage priorities and plans, including regular and monitored practice drills;
   vi. to prepare and maintain documentation on the layout of the premises, including detailed plans which indicate the location of fire-fighting facilities, of means of escape routes, and of fragile, important and valuable structures and fittings;
   vii. to ensure that the uses of the building are consistent with safety requirements;
   viii. to encourage good housekeeping and maintenance standards in order to reduce the risk of ignition;
   ix. to ensure that fire safety systems are correctly maintained and operational;
   x. to ensure that the building and its curtilage are not subject to either arson or vandalism;
   xi. to keep records of protection activities and to evaluate the effectiveness of the strategy.
3. The nature of fire prevention and mitigation strategy can neither be fixed nor prescribed by rigid codes of practice. It must be flexible and in each case fire safety measures should be implemented which guarantee the necessary means of escape, whilst at the same time not impairing the character and value of, or inflicting damage upon, the historic building. Individual strategies will vary but in each case the emphasis will be on prevention, preparation and vigilance rather than on provisions requiring structural alterations.
4. All structural alterations and the installation of mechanical, electrical or other systems associated with prevention, detection and fire-fighting must be agreed with the authorities responsible for the architectural heritage. The aim is to minimise the amount and effect of »passive«, physical, structural or preventive works in the interest of the historic building or artefact. A systematic approach which treats each case and building on its merits and which employs a flexible package of organisational and technical measures will reduce the need for major physical works, while, at the same time, meeting the safety legislation and requirements. Essentially, this represents a strategy of vigilance and prevention, coupled with early detection and the orderly application of evacuation and fire-fighting procedures.

Technical and practical measures

1. The sources of ignition should be identified and eliminated or minimised.
   i. All parts of the building should be kept clear of waste and rubbish. In particular, attics, basements, stairwells and areas under stairs, cupboards and empty store rooms should be inspected regularly, cleared of unnecessary material and kept clean.
   ii. Cleared strips or zones in grassland, heath or forest areas should be provided, if acceptable in aesthetic terms.
   iii. Electrical installations, circuits and equipment should be regularly tested, properly maintained, utilised and overhauled. Circuits should not be overloaded and faulty equipment and wiring should be replaced. It is advisable that main cable and fuse-boxes are located in a separate fire-proof room or area.
   iv. Naked flames from heat and light sources such as candles, torches, gas lighting and open fires or stoves should be avoided. Where their use is to be permitted, there should be careful monitoring, strict control and the provision of safety guards when unattended. The provision of suitable fire-fighting equipment nearby is essential.
   v. Only trained workmen should be allowed to undertake maintenance, repair and improvement work on historic properties. They should be made aware of the importance of the building or its fittings and should be supervised by a senior and responsible member of staff. Smoking should be banned and hot-work (blowlamps, cutting, welding, etc.) should only be allowed if there is no alternative. Any acceptable hot-work should be subject to a permit which identifies responsible parties, and allows the control on the nature, location and duration of the work and which ensures that combustible materials are removed or protected. In addition, extinguishers and alarm systems must be provided and the work supervised and monitored at all times, with provision for checks for a period after the work is completed.
   vi. Lightning conductors (arresters or rods), properly designed and maintained, should be fitted.
   vii. Chimneys should be swept regularly. All hearths, flues and ducts should be maintained in a sound condition. All cookers, heaters and boilers should be serviced regularly, be kept clear of combustible materials and be provided, where appropriate, with fire and safety guards. Kitchens, plant and boiler rooms should always be provided with suitable fire-fighting equipment and the rooms should not be used for storage.
   viii. Smoking should be discouraged in historic buildings or confined to specific fire-protected rooms or areas, installed with fire-fighting equipment and alarm systems.
   ix. Provisions should be made against arson and, in particular, premises and their curtilages should be secure against unauthorised entry. Temporary staff and visitors should be vetted and supervised, and flammable and waste materials kept out of reach.
2. Fire detection and alarm systems should be installed. The bare minimum should be fire bells or an electrically operated system. Preferably, automatic and active fire detection systems should be installed and connected to an alarm centre and to the local fire brigade. Each individual detector should be identifiable and the systems should be provided with the ability to monitor faults and false alarms. Smoke, heat and flame detectors can be installed and connected to alarm centres either electrically or by radio-link. The casings for the detectors should be unobtrusive, as small as possible and adapted in shape and colour so as not to impair their historic setting. In some cases (thatch or timbercladding, for example) external heat detectors might be recommended. In all cases, detectors and alarms must be properly and regularly maintained and responsible staff trained to understand and handle the systems.
3. Fire-fighting facilities should be provided and maintained.
   i. Fire fighting by staff or occupants should be encouraged with the provision of regular and monitored programmes of awareness and training. Premises should be fitted with fire buckets and hand-held extinguishers which must be suitable for both general and special risks. Extinguishers should be inspected and overhauled on a regular basis.
   ii. Automatic fire-fighting systems should be installed wherever possible if it can be proven that the risk would be reduced, but only where there is likely to be little or no impact on the special interest of the historic buildings. Attics and roofspaces, spires and towers on churches could be possible locations inside buildings. However, the danger of collapse or decay following operation must be carefully assessed. Industrial, commercial, transport and military premises might be capable of greater intervention than domestic properties. The installation of devices on roof ridges (particularly on thatch, grass, reed or straw) and on cornices could be considered. In dense urban areas, dry sprinkler systems in narrow gaps on facades will assist in preventing the spread of fire in urban areas. The use of copper pipes with hidden joints should be encouraged. Modem fast response sprinkler systems, based on zone signalling, should be employed. Regular maintenance, with the identification

and elimination of faults, must be undertaken. The use of sprinkler systems, particularly in areas of fragile construction. containing delicate fabrics, panelling, furniture, works of art, and so on, and in unventilated areas, must be carefully assessed.

iii. Access at all times for the fire brigade is vitally important. Roads and access points should be made and maintained wherever possible. In historic gardens and landscapes the maintenance of »green ways« might suffice. Fast and reliable routes between fire stations and historic buildings and centres should be identified and reported on maps. Water supplies should also be identified, including all mains water sources: wells, reservoirs, storage tanks and water towers, ornamental canals, ponds and lakes, swimming pools and natural sources such as rivers, streams and lakes. If there is no ready and nearby supply, then consideration should be given to the establishment of such or to the provision of an emergency storage tank of adequate capacity, suitably located, hidden or disguised. Immediate access to, and within, the building should always be reviewed and improved, for example by creating roof hatches and by ensuring that doors can be unlocked and opened.

4. In some circumstances, in particular in relation to the provision of a safe and adequate means of escape, physical alterations might prove necessary. These might include:
   i. the enclosure of stairwells, where appropriate, and protection of the means of escape;
   ii. alternative ways of protecting the means of escape, such as air overpressure systems, to prevent the penetration and spread of smoke and flames;
   iii. the installation of smoke vents and hatches, which will also allow improve access for fire-fighting;
   iv. lobbies, with new partitions incorporated around existing features;
   v. adequate fire-resistant doors including self-closers, fire-stops and intumescent strips to doorways;
   vi. the application of intumescent paint and other finishes to panelling or cast iron columns, for example;
   vii. the installation of automatic emergency lighting and signs which are independent of the normal electricity circuit;
   viii. the construction of barriers where they would not detract from the character of the building, for example in undivided roofspaces, and by the reinstatement of missing partitions.

   The approach adopted should begin with a package of »soft«, non-intrusive measures, with the application of »hard«, intrusive measures only where all other measures are obviously inadequate and jeopardise human life and the architectural heritage.
5. After a fire the following action should be taken:
   i. the minimum of making safe in order to allow inventory-taking, salvage and rescue work;
   ii. valuable artefacts and fittings, including those either dislodged or in danger of collapsing, should be recorded in situ and then carefully removed, under the supervision of conservation specialists, to a safe place for urgent conservation measures;
   iii. emergency inventory taking by appropriate means, at least plans and photographs, but photogrammetric surveying is to be encouraged;
   iv. damaged roofs should be covered temporarily, for example, with tarpaulins, and the property secured against unauthorised personnel and theft;
   v. residual water should be removed by mechanical and physical methods (suction pumps, sponges, cloths, etc.) and the building should be thoroughly dried by the maintenance and improvement of ventilation and, where possible, by the use of dehumidifiers;
   vi. investigation, by non-destructive techniques, of hidden structure and fabric must be undertaken and the installation of hygrometers should be considered;
   vii. all alarm systems and fire-fighting equipment should be reinstated;
   viii. any further structural works, including proposals for restoration and repair, or for demolition, must only be undertaken after full consultation with, and the approval of, the authorities for the architectural heritage.

Appendix III

Organisational measures against earthquakes, vulcanism, tsunami, floods, storms, avalanches and landslides or flows

The »disaster plan« should comprise a number of stages:

1. Understanding the hazard including precise data on the probability of occurrence, type, location, zoning, estimation of intensity and return period. This must be undertaken on the basis of present-day and long-term scientific research

into causes and events and their monitoring and, also, of an analysis of documentation on past disasters. Information should be published in map form, with computer archiving. All material should be kept in a safe place.

2. Understanding other geological, hydrological, meteorological and natural processes and factors—water courses and levels, soil characteristics and sub-surface geology, their behaviour in the event of disaster and their effects on the architectural heritage. Microzoning and site effect studies and maps should be produced.
3. Incorporating seismic, meteorological, hydrological and geological data into the administration of the architectural heritage and of town and land use planning in order to:
   i. identify and assess the vulnerability of the architectural heritage to hazard (by means of vulnerability and damage graphs and matrices) and assess the risks and the probable damage or loss;
   ii. minimise the vulnerability by developing and implementing plans for assistance (technical and financial) with the strengthening, repair and maintenance of the architectural heritage;
   iii. control proposed alterations to, and the use or change of use of, historic buildings where the risk is already high or might be increased;
   iv. control proposed alterations to the use of land in the vicinity (local and regional) of major or numerous elements of the architectural heritage, where there is a demonstrable risk created by that land use practice.
4. Training and preparing staff, including those from the civil defence and all other public services in the country, according to local law, in recording, salvage and emergency repair, shoring, propping and emergency protection methods and practice, and in the implementation of security measures to counter theft, arson and other criminal activity. This must include the publication of technical advice, of reconnaissance maps, inventories, surveys and regular practice and exercises.
5. Encouraging and controlling the quality of maintenance and repair of historic buildings by the initiation of action plans, in co-operation with local communities and individual owners/occupiers.
6. Preparing plans and priorities for salvage, removal, storage and emergency conservation work of movable property.
7. Identifying and marking buildings of special interest.
8. Preparing and implementing plans and priorities for full restoration in the aftermath of a disaster.
9. Ensuring that there is an adequate supply of materials for protection, conservation and restoration.
10. Ensuring that emergency teams of specially trained conservation professionals (architects, engineers. surveyors, planners, archaeologists and historians), craftsmen and builders as well as responsible members of the local communities are identified and trained for action.
11. Monitoring, evaluating and improving the »disaster plans«.

Preventive/technical measures

1. Measures for the protection of the architectural heritage against natural disasters should begin with the development of specifications and guidelines for the assessment and upgrading or strengthening of historic buildings. It is imperative that any works intended to improve the resistance of a building do not result in an unacceptable intervention into or loss of the special interest of the building. In order to achieve this goal it is important to ensure complete survey and recording, and detailed inspection and understanding of the historic building, as well as its structural system and constructional materials and techniques, its evolution and history and its conservation.
   Preventive measures fall into two categories:
   i. site specific—maintenance, improvement and emergency works to the historic building or object (the first two are undertaken on a regular or planned basis and the third, although prepared in advance, is undertaken at the time of a disaster);
   ii. site general—local or regional control of, and alteration to, land use patterns and local or regional preventive measures and works (to be planned and implemented as part of a co-ordinated programme to minimise the frequency of specific disasters, such as flooding, avalanches, mudflows and landslides).
2. Good maintenance is the single most effective means of reducing the amount of potential damage or loss. Therefore, it is essential that quality maintenance work, undertaken on a periodic basis after regular inspections (on a cycle of at least five to ten years) and employing traditional and compatible techniques and materials, be advised and specified. The use of mortars and grouting in masonry structures and the issues of tensile resistance, bonding, tying of floors and roofs to walls, and wind and water tightness in all structures, are the paramount considerations.
3. All alterations intended to improve resistance must be agreed by the authorities for the architectural heritage, hich should produce technical guidelines, after undertaking experimental, analytical and comparative research into:

i. the resistance of historic structures and materials;
ii. historic concepts and methods of improving resistance;
iii. the behaviour of different structures and materials—timber-frame, rubble or ashlar masonry, earthstructures, etc.;
iv. the implications and likely behaviour of building defects, both intrinsic and extrinsic, in the event of a disaster;
v. the evaluation of previous »modem« strengthening practice and techniques;
vi. the assessment of different levels of disaster intensity and of the frequency of occurrence.

The criteria and guidelines must specify that:

i. the degree of works proposed should not result in the total or partial impairment of the special interest or integrity of the historic building;
ii. the existing structural systems and materials are retained, respected and enhanced, if necessary;
iii. traditional materials and techniques are preferred;
iv. if new materials and techniques are proposed these should be compatible with the existing ones, durable and reversible, as far as is practicable; where these conditions cannot be met, alternative proposals should be commissioned and evaluated;
v. each building and any proposed works are assessed on their own merits and that works will be undertaken on the basis of performance requirements, not according to a prescribed code, with due consideration given to the possibility of improved and more sensitive methods in the light of technological development;
vi. the proposed works are designed according to realistic probability assessments of disaster occurrence and intensity, and graduated according to different levels of risk.

The opportunity to undertake works to improve resistance should always be investigated and the work implemented before a building is considered for a major programme of repairs or of alteration and extension. Existing inappropriate or unauthorised forms of construction, extension or alteration should be removed, where possible. by the use of legislative and financial measures. All improvements and strengthening work should be fully documented and allowing for long-term review, with the aim of establishing international standards.

4. Preparation for emergency action in the event of a disaster should identify the specific action to be undertaken. It is essential to co-operate with other authorities, both civil and military. Provision should be made for:

i. fire-fighting and protection against water damage;
ii. immediate safety works of shoring and propping;
iii. closure and supervision to ensure protection against land and water flows, air-borne debris, adverse weather and criminal activity;
iv. marking important objects and structures;
v. clearing debris, taking care to record in situ and to recover movable and displaced or fragile objects;
vi. emergency conservation work and removal to a safe place of important, movable, displaced or fragile objects;
vii. full recording, preferably by photogrammetry, of damaged structures;
viii. the reinstatement of fire and safety equipment, the provision of emergency power supplies and adequatetransportation.

For the long term, a full survey and inspection of the damage must be organised in order to plan, develop and implement restoration, repair and conservation of the architectural heritage.

5. Site general work should follow the identification of those elements of the architectural heritage most at risk from preventable disasters, such as flooding, avalanches and landslides. In these cases, prevailing land-use practices agriculture, forestry, communications, industry and general development—should be assessed and remedial measures undertaken in order to minimise the risk. Particular attention should be paid to deforestation, soil abuse and degradation, and the use of, and alterations to, ground and underground water.

In certain circumstances, physical prevention works must be planned and implemented: levees, dykes, dams, tree screens, consolidation of slopes and diversionary barriers.

Checklists

The following checklists are recommended:

A. Earthquakes

1. Seismicity

- geo-tectonic studies and mapping;
- historical earthquake information;
- instrumental recording;
- active and inactive phases (seismic trends);
- seismic gaps;
- seismicity and hazard zoning maps, of suitable sophistication;
- microzoning considering the adverse effects of subsoil.

2. Seismic damage to the architectural heritage

- quality of structural elements (brick, stone, mortar, steel and iron, wood, reinforcement and tiles; concrete);
- quality of non-structural elements (brick, mortar, stone, timber, tiles, all cladding and infill materials, roofing materials, services);
- compatibility and behaviour of various materials;
- ease of repair and availability of materials;
- availability of experienced and qualified professionals, craftsmen and labour;
- supervision and control of essential repair and upgrading work;
- foundation (type, vulnerability, intrinsic safety, differential settlement);
- damping;
- soft or stiff or mixed structures;
- symmetry (plans, elevations, openings, roofs);
- natural period of buildings according to the probable periods of the subsoil;
- emergency shoring and propping; removal of artefacts.

B. Volcanic activity

- characteristics and eruptive history;
- eruption probability;
- instrumentation to record, monitor and to provide early warning;
- proximity of the architectural heritage, according to the assumed magnitude of eruption;
- the possibility of diversions to, and the cooling of, lava flows;
- vulnerability of the architectural heritage to lava flows, bombs, glow avalanches, ash deposits and corrosive gases;
- emergency protection of roofs and of openings; removal of artefacts.

C. Tsunami

- probability of this kind of event in the region or in nearby locations which might affect the region;
- probability of its height and penetration inland; zoning maps showing areas submerged by various run-up heights;
- sensitivity of the architectural heritage to waves of tsunami type;
- the possibility of coastline protection.

D. Flooding

- probability and return periods of flooding, not only on the basis of past events but also in view of changes in land use;
- systematic mapping; publication of torrent and flooding registers;

- reliability and adequacy of records;
- seasonal variations;
- effect of climatic trends and changes in maximum short-term precipitation and floods;
- infiltration (soil, vegetation and sealed areas) and disturbance to infiltration (cropping, deforestation, removal of top-soil, traffic);
- topography of site (distance to watershed, slopes, elevation, probability of ponding);
- effect of water and rain on the architectural heritage, watertightness of buildings, damage to elements and the effects of increased humidity;
- effects of flooding on foundations and lower floors, on structural elements (walls and floors), on non
- structural elements and on fixtures and fittings
- possibility of improved drainage of the area;
- provision of protective dykes, levees, channels, and in an emergency, cofferdams and sandbags as well as pumping and dehumidification equipment; removal of artefacts;
- control of land-use/exploitation.

E. Avalanches, land- and mudslides and flows

- access slope stability, including type and composition of surface layers and the general hazard of the layers to slide (past events);
- existing slope angle in relation to safe angle;
- exposed slopes in case of avalanches;
- obstacles in the path of slides, flows and avalanches;
- extraneous factors such as water saturation, interference by construction works, seismic activity;
- systematic mapping; publication of registers;
- possible protective measures and works to include:
- drainage slopes and reduction of infiltration and percolation of water,
- obstacles, retaining basins, deflectors,
- retaining walls,
- planting;
- research to understand better the function of forests;
- control of land-use/exploitation.

F. Wind-forces and storms

- evaluation of probabilities and maps;
- return periods for given velocities in gusts;
- distribution and prevailing direction of high winds;
- topographic features which protect or expose the architectural heritage;
- effect of other structures, vegetation and other items on the exposed element;
- roofs and supporting structures (strength, fastenings or tiles), cladding;
- towers, spires, pinnacles, cupolas, parapets and other exposed elements (additional anchoring);
- large, laterally unsupported walls;
- windows and openings (shutters and other temporary means of closure against flying debris).

BLUE SHIELD SEMINAR ON THE PROTECTION OF CULTURAL HERITAGE IN EMERGENCIES AND EXCEPTIONAL SITUATIONS

Radenci, Slovenia, November 12–16 1998

The ICBS (International Committee of the Blue Shield) was created in 1996 by the following non-governmental organisations, ICA (International Council on Archives), ICOM (International Council of Museums), ICOMOS (International Council on Monuments and Sites), IFLA (International Federation of Library Associations and Institutions) to collect and disseminate information and to co-ordinate action in emergency situations, its missions being to protect and safeguard cultural heritage according to The Hague Convention of 1954 for the Protection of Cultural Property in the Event of Armed Conflict.

ICBS has participated to various conferences for the revision of The Hague Convention (Paris, Vienne, The Hague) and has organised a meeting on the situation of Afghan cultural heritage.The Radenci Seminar was the first attempt of ICBS to join efforts for the establishment of a common strategy. The seminar organised jointly by ICBS, IIAS (International Institute of Archival Sciences in Maribor, Slovenia) and the Regional Archives of Maribor, with the support of UNESCO, gathered thirty-one participants from ten countries (Belgium, Bosnia Herzegovina, Croatia, France, Hungary, The Netherlands, Poland, Slovenia and Sweden) and took place in Radenci, Slovenia, November 12-16, 1998.

All through the seminar the necessity of taking preventive measures and of having a written disaster plan was underlined, together with the need of a strong cooperation between the different actors of the response and recovery team (including the Army and the Civil Defence).

Some aspects of The Hague Convention were discussed like military necessity and the special protection and the mark up of monuments with the Blue Shield emblem was diversely appreciated by participants.

A declaration on the protection of cultural heritage was approved by the participants at the end of the seminar. The participants in the seminar resolved to:

- adopt the Radenci declaration on the protection of cultural heritage in natural and human made situations;
- take all steps in their power to publicise the declaration and to implement its recommendations in their own countries and institutions;
- further take all necessary steps to raise awareness of the 1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict and other international conventions for the protection, safeguard and respect of cultural heritage adopted under the auspices of UNESCO;
- request the four non-governmental organisations: ICA, ICOM, ICOMOS and IFLA, to communicate the declaration to the Director General of UNESCO and to ensure its wide dissemination.

The Radenci Declaration on the Protection of Cultural Heritage in Emergencies and Exceptional Situations

On the initiative of the International Committee of the Blue Shield (ICBS) with the participation and support of UNESCO, a seminar was held in Radenci, Slovenia, 12-16 November 1998. Representatives of UNESCO, and of the four non-governmental organisations that constitute the ICBS: the International Council on Archives (ICA), the International Council of Museums (ICOM), the International Council of Monuments and Sites (ICOMOS) and the International Federation of Library Associations and Institutions (IFLA) took part, together with delegates from cultural heritage organisations in the following countries: Belgium, Bosnia and Herzegovina, Croatia, France, Hungary, Italy, Netherlands, Poland, Slovenia and Sweden.

The participants, noting the great loss of cultural heritage in recent years due to armed conflicts and natural disasters and international efforts made to prevent such losses, examined experiences of mitigation and response in different countries and contexts, agreed on the following principles:

1. Cultural heritage embraces both moveable and immovable property? Its loss is a concern to all and its protection, safeguard and respect --in normal and exceptional situations-- must be included in policies and programmes at international, national, regional and local levels.
2. All institutions caring for the cultural heritage, and all authorities reponsible for it, should integrate risk preparedness and management within their operations to avoid loss or damage in both normal and exceptional times.
3. The goal is to avoid loss or damage to cultural heritage in the event of emergencies by improving prevention,

preparedness, response and recovery measures. It is achieved by developing, implementing and monitoring strategies which:

- assess and reduce risk
- improve response capacity
- ensure co-operation of all relevant parties in local, national and international emergency management.

Such strategies can be achieved by tactics in the form of general policies and programmes aiming at:

- linking parties to form durable networks;
- establishing and updating emergency plans with clear needs and priorities;
- drawing up programmes for dissemination of information to the general public and to decision makers;
- training personnel and developing their skills.

Specifically, means such as the following can be adapted and implemented to achieve the main goal and realise the main strategies:

- ensuring appropriate funding and other resources;
- establishing collaborative agreements with related institutions covering such areas as personnel, specialised equipment, temporary refuges;
- developing good working relationships with emergency services;
- producing information, such as manuals of emergency procedures and inventories of internal and external resources;
- carrying out regular training sessions including exercises and drills of emergency procedures in association with partners;
- setting up joint liaison committees with partners;
- ensuring adequate inventories and documentation of the institution‘s holdings, including remote back up copies;
- providing adequate safety and specialised emergency equipment and supplies;
- promoting the adoption and implementation of international conventions on cultural heritage;
- developing the skills of people intervening in response to disasters by producing training materials and tools;
- developing voluntary support networks, drawing upon diverse competencies.

4. With regard to the particular case of armed conflicts, the participants recognised the value of the basic principles of safeguard and respect for cultural heritage as embodied in The Hague Convention of 1954 and other conventions for the protection of cultural heritage adopted under the auspices of UNESCO, including precautionary measures such as the preparation of inventories, development and implementation of appropriate technical measures, and the adoption of national legislation and policies.

   The participants, encouraged by the examples of participating countries and others such as Sri Lanka further agreed to continue to share experiences and to co-operate in the context of the International Committee of the Blue Shield to develop national, regional and local initiatives to avoid loss of cultural heritage.

Adopted in Radenci, Slovenia, on 16 November 1998

KYOTO DECLARATION 2005 ON PROTECTION OF CULTURAL PROPERTIES, HISTORIC AREAS AND THEIR SETTINGS FROM LOSS IN DISASTERS

(adopted at the Kyoto International Symposium 2005 »Towards the Protection of Cultural Properties and Historic Urban Areas from Disaster« held at the Kyoto Kaikan on 16 January 2005)

Cultural Properties and Historic areas are irreplaceable cultural and social resources and a yetunder utilized resource for sustainable development for the benefit of mankind, which shouldbe handed down to future generations.

However, catastrophic hazards such as fires and tsunami caused by earthquakes, typhoons,floods and other disasters, pose grave threats, especially in the countries of Asia and Circum-Pacific region.

Through the reports of the participants of »ICOMOS-Japan International Expert meeting onRisk Preparedness for Cultural Heritage in Asia and Circum-Pacific Region« on the culturalheritage at risk and challenges confronting risk preparedness of cultural heritage in eachcountry, and also on the basis of site inspection, with the cooperation of the people of theKiyomizu Temple World Heritage Site and the surrounding Sanneizaka preservation district forGroups of Historic Buildings, we recognize the exceptional values that are embedded in theCultural Properties and Historic Urban Areas, but at the same time also comprehend the risksto World Heritage Sites and the surrounding areas to earthquake, typhoon, flood and otherdisasters and that appropriate actions should be taken to improve their resilience. While considering the probability of consequential fires after earthquakes resulting frominsufficient preparedness, we recognize that such cultural resources are vulnerable to suchhazards; not only in Kyoto but also in the world and that a priority list needs to be developedto focus attention and resources to improve the Historic Built Environment

However, considering the opportunity provided by the UNESCO World Heritage Convention for member states to take positive and effective measures in relation to risk preparedness at World Heritage Sites by undertaking the following activities as stated in Article 5 of the convention text,

- Integrating the protection of cultural heritage into national comprehensive planning programs [according to section (a) of Article 5]
- Developing scientific and technical studies and research and to work out such operating methods as will make the state capable of counteracting the dangers that threaten its cultural heritage [according to section (c) of Article 5], and
- Taking appropriate legislative, scientific, technical, administrative and financial measures [according to section (d) of Article 5]
- And also recognizing the great achievement of the Japanese government in stating a policy for disaster prevention of cultural properties and historic urban areas in »The Guidelines for Earthquake Disaster Prevention of Cultural Heritage and Surrounding Sites« issued by the Cabinet Secretary of Japan in 2004

We the participants of Kyoto Public Forum and ICOMOS-Japan International Expert Meeting on Risk Preparedness for Cultural Heritage in Asia and Circum Pacific Region, recommend that

1. Retrofitting and Community Infrastructure Upgrading needs to be systematically initiated to prevent loss of irreplaceable cultural resources due to disaster.
2. The information base for action programmes needs to be created and expanded to apply existing knowledge and new methods.
3. The past wisdom and experiences in disaster prevention, which were inherent in traditional local communities, and in cultural properties, historic areas and their settings should be preserved and/or recovered.
4. The environment surrounding heritage properties should be considered in the disaster prevention measures.
5. A comprehensive national policy of disaster prevention for cultural properties, historic areas and their settings needs to be formulated by States Parties who have ratified the World Heritage Convention.
6. The need for coordinated action by national and local governments should be emphasized to create an awareness of, and financial resources for addressing Historic Urban Area issues, improvement programmes and their implementation.
7. Outreach programmes in which governance and heritage interests are linked should be established in partnership with local government and universities, NGOs, and heritage entities; financial support from domestic capital markets should be provided to improve risk preparedness strategies in the present cultural heritage management measures; and clear delegation of responsibility and collaboration among various government departments should be promoted in disaster prevention and mitigation measures for cultural heritage.

National and local governments should develop capital investment plans based onsocially, culturally, economically, environmentally and technically viable sustainable riskreduction programmes.

Therefore we, the panelists of the Kyoto international symposium, »Towards the Protection of Cultural Properties and Historic Urban Areas from Disaster« and the participants of the »ICOMOS-Japan International Expert meeting on Risk Preparedness for Cultural Heritage in Asia and Circum-Pacific Region«, hereby declare that

1. Cultural heritage is a priceless and non-renewable human asset and it is our duty to raise awareness and undertake all necessary measures for protection of cultural heritage from disasters.
2. Cultural heritage embodies accumulated knowledge in disaster prevention based on past experiences and traditional practices, together with modern science and technology, which should be researched and integrated into disaster prevention measures.
3. Disaster prevention measures should address cultural heritage comprehensively, rather than in isolation, through the planning process and programmes, and in coordination with various cultural institutions, urban planning and other departments. While undertaking disaster mitigation, it is essential to adopt a coordinated multi-agency approach to cultural heritage management, in which measures for risk preparedness are integrated through effective partnerships and appropriate funding
4. While establishing mitigation measures to protect cultural heritage from disasters, the responsibility of various bodies should be clarified at all levels.
5. Undertake collaboration through international networks, especially in the earthquake prone Asia and Circum-Pacific Region, to establish project development task forces.

And consequently,

We, the participants of these meetings, ask for the improvement of disaster prevention measures in Kyoto as part of national policy and to further establish a global benchmark by setting the standard for cultural heritage disaster prevention.

Furthermore, we strongly urge all the States Parties and the concerned inter-governmental and non-governmental institutions to build an international network among experts and all those concerned with cultural heritage disaster prevention. We also urge regional development banks to support lending programmes through national and local government; to be members of project development teams to build support systems for historic urban areas; and to organize forums for mutual cooperation and information exchange.

The »Kyoto Declaration 2005 on Protection of Cultural Properties, Historic Areas and their Settings from Disaster« (hereinafter the Kyoto Declaration) was adopted at the Kyoto International Symposium 2005 »Towards the Protection of Cultural Properties and Historic Urban Areas from Disaster« held at the Kyoto Kaikan on January 16th, 2005, organized by Japan ICOMOS National Committee; Executive for »10 years Anniversary of World Heritage Registration« (Kyoto City, Preservation Technology Foundation for Cultural Heritage Building; All Japan Preservation Corporation for Roof Building Technique of Shrine and Temple; Kyoto Foundation for University Consortium; Kyoto City Preservation Foundation for Cultural Sightseeing Resources); Ritsumeikan University COE Program; Research Center for Disaster Mitigation of Urban Cultural Heritage Conference for Protection of Cultural Heritage from Earthquake Disaster and the NPO for Protection of Cultural Heritage from Disaster.

The drafting of the Kyoto Declaration began as a discussion in a small working group convened by Mr. Kanefusa Masuda, acting as coordinator of the International Expert meeting on Risk Preparedness for Cultural Heritage in Asia and Circum-Pacific Region 2005. This working group consisted of Prof. Takeyuki Okubo, Prof. Rohit Jigyasu and Prof. Kanefusa Masuda. Under the leadership of Prof. Okubo, the working group discussed elements to be included in the Kyoto Declaration for three months prior to the symposium. The outcomes of the working group's discussion were presented at the meeting of panelists and participants on 16th January, and after discussion the draft of the Kyoto Declaration was produced. The draft Kyoto Declaration was subsequently presented at the Kyoto International Symposium.

The panelists who participated in drafting the »Kyoto Declaration 2005 on Protection of Cultural Properties, Historic Areas and their Settings from Loss in Disasters« are as follows (in alphabetical order).

- Azhar Tyabji (Preservation Planner, HCP Design and Project Management Pvt. Ltd., India)
- Hiroshi Adachi (Professor, Architecture Division, Faculty of Engineering, Kobe University, Japan)
- Damin Wang (Assistant Director, World Heritage Division, State Administration of Cultural Heritage, China)
- Dhammika Priyantha Chandrasekara (Lecturer, Moratuwa University, Sri Lanka)
- Dinu Bumbaru (Secretary General of ICOMOS International)
- Earl Kessler (Deputy Executive Director, Asian Disaster Preparedness Center (ADPC), Asian Institute of Technology (AIT), Thailand)
- George Okello Abungu, (Guest Scholar from Kenya, The Getty Conservation Institute, United States)

- Hae Un Rii, (Vice President of ICOMOS-Korea, Professor, Department of Geography, Dongguk University, Korea)
- Joseph King (Acting Unit Director, Heritage Settlements Unit, ICCROM)
- Kanefusa Masuda (Professor, Research Center for Disaster Mitigation of Urban Cultural Heritage, Ritsumeikan University, Japan)
- Khizer Farooq Omer (Manager Planning, Monitoring and Evaluation, Aga Khan Planning and Building Service, Pakistan)
- Khalid El Harrouni (Professor, Ecole Nationale d'Architecture, ICOMOS Morocco)
- Masami Kobayashi (Professor Dr. Eng., Graduate School of Global Environmental Studies, Kyoto University, Japan)
- Masaru Maeno (President of Japan-ICOMOS, Japan)
- Prem Nath Maskey (Professor, Department of Civil Engineering, Institute of Engineering, Pulchowk Campus, Nepal)
- Randolph Langenbach (Building Conservation Architect, ICORP)
- Robyn Riddett (Associate Director, Allom Lovell and Associates, Conservation Architects, Australia), Secretary, ICORP
- Rohit Jigyasu (Visiting Professor from India, Research Center for Disaster Mitigation of Urban Cultural Heritage, Ritsumeikan University, Kyoto, Japan)
- Mehrdad Hejazi (Associate Professor, University of Isfahan, Iran)
- Soeroso, Director for Archaeology and Museums, Department of Culture and Tourism, Indonesia.
- Takeyuki Okubo (Associate Professor Dr. Eng., Graduate School of Global Environmental Studies, Kyoto University, Japan)

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Item 7 of the Provisional Agenda: Examination of the state of conservation of World Heritage properties 7.2 Issues related to the state of conservation of World Heritage properties: Strategy for reducing risks from disasters at World Heritage properties

(The following excerpt includes only chapters I and II)

I. Introduction to the Strategy for Reducing Risks from Disasters at World Heritage Properties

A. Rational and background to the Strategy

A.1 Introduction

1. World Heritage properties, as with all heritage properties, are exposed to natural and human-made disasters which threaten their integrity and may compromise their values. The loss or deterioration of these outstanding properties would negatively impact the national and local communities, both for their cultural importance as a source of information on the past and identity, and for their socio-economic value.
2. Risks related to disasters within heritage sites are a function of their vulnerability to different potential hazards. The recent natural disasters in Bam, Iran, or in the Old Fort of Galle in Sri Lanka are high profile examples of the vulnerability of cultural heritage worldwide. Natural heritage can also be threatened, in exceptional circumstances, by natural disasters. Hazards, however, may be also human-made, such as fire, explosions etc. Accidental forest fires, conflicts, massive refugee movements, bursting of tailing pond dams as in Doñana (Spain), are certainly a concern to natural WH sites. If natural disasters are difficult to prevent or control, hazards resulting from human activities can be avoided, and the vulnerability of heritage sites to both natural and human-made disasters can be reduced, thus lowering the overall risk threatening a property.
3. Despite this, most World Heritage properties, particularly in developing areas of the world, do not have any established policy, plan of process for managing risks associated with potential disasters. Existing national and local disaster preparedness mechanisms, moreover, usually do not take into account the significance of these sites and do not include heritage expertise in their operations. At the same time, traditional knowledge and sustainable practices that ensured a certain level of protection from the worst effects of natural hazards or human-made disasters are being progressively abandoned. As a result, hundreds of sites are virtually defenceless with respect to potential disasters.
4. Improving the management of risks for properties inscribed in the World Heritage List, therefore, is necessary to prevent and reduce damage from disasters and to preserve their cultural and natural values, thus protecting an essential support for the social and economic well-being of their communities.

A.2 Decision by the Committee

1. In 2003, the Committee had requested an independent evaluation on the Emergency Assistance Programme (Decision **27 COM 11.1**) to examine its overall performance and, more specifically, its relevance, efficiency and outcomes during the period 1998-2003. The evaluation was presented to the Committee at its 28th Session in Suzhou (China, July 2004), in Document *WHC.04/28.COM/10B*.
2. During the debate on this item, members of the Committee indicated, among the desirable improvements to

Emergency Assistance, a clearer definition of »emergency«, a more rigorous use of resources to address emergency situations strictly relating to the conservation of World Heritage Sites, and a more rapid allocation of funds. In addition, the need for strengthened policies and practices for disaster prevention or mitigation at World Heritage sites was also mentioned.

3. Decision **28 COM 10B** accordingly addresses all these points and, in its paragraph 3, invites »*the World Heritage Centre, in co-operation with the States Parties, Advisory Bodies, and other international agencies and non-governmental organizations concerned by emergency interventions, to prepare a risk-preparedness strategy to be presented to the Committee at its 30th session in 2006*«. The elaboration of a »*strategy for risk-preparedness for the regions most exposed to natural disasters*«, on the other hand, was also proposed in paragraph 45 (h) of the recommendations contained in the evaluation document[2].

A.3 Current reference to risks and disasters in the Operational Guidelines

1. Currently, the *Operational Guidelines for the Implementation of the World Heritage Convention* refer to »risks« in their paragraph **118, stating that: »**The Committee recommends that States Parties include risk preparedness as an element in their World Heritage site management plans and training strategies«, as well as in section 4b of the new format for the nomination of a property (Annex 5 of the *Operational Guidelines*), that include an item on »Natural disasters and risk preparedness (earthquakes, floods, fires, etc.)«, requesting States Parties to: »*Itemize those disasters which present a foreseeable threat to the property and what steps have been taken to draw up contingency plans for dealing with them, whether by physical protection measures or staff training*«.
2. Paragraphs 161 and 162, moreover, refer to the procedure for Emergency Nominations, reserved for properties that: »*have suffered damage or face serious and specific dangers from natural events or human activities*«, explaining that in such circumstances the Committee might consider inscription on the List of the World Heritage in Danger. Paragraphs 177 to 191, indeed, concern the procedures for the inscription of a property on the World Heritage List in Danger, which the Committee might consider when a site is »*threatened by serious and specific danger*«, which can be ascertained or potential. Among the possible factors that might endanger a property, no explicit reference is made to disasters.
3. However, paragraph 181 clarifies that: »*the factor or factors which are threatening the integrity of the property must be those which are amenable to correction by human action. In the case of cultural properties, both natural factors and man-made factors may be threatening, while in the case of natural properties, most threats will be man-made and only very rarely a natural factor (such as an epidemic disease) will threaten the integrity of the property*«.
4. Currently (March 2006), the large majority of the 34 properties inscribed on the World Heritage List in Danger (with the exception of Bam and its Cultural Landscape (Iran), and of the five natural heritage properties in Congo, for example) were included on this list due to gradual, cumulative effects, i.e. not as a result of disasters.
5. Risks are also mentioned within the format of the questionnaire for the Periodic Reporting exercise, notably in its Section II.5, Factors affecting the property (Annex 7 of the *Operational Guidelines*). Here, States Parties are requested to »*comment on the degree to which the property is threatened by particular problems and risks*«, including by natural disasters. »*Relevant information on operating methods that will make the State Party capable of counteracting dangers that threaten or may endanger its cultural or natural heritage*« is also required, including earthquakes, floods, and land-slides.
6. Finally, the *Operational Guidelines* make reference to disasters within their policies for the granting of Emergency Assistance Funds, described in paragraph 241.
7. According to this paragraph: »*This assistance may be requested to address ascertained or potential threats facing properties included on the List of World Heritage in Danger and the World Heritage List which have suffered severe damage or are in imminent danger of severe damage due to sudden, unexpected phenomena. Such phenomena may include land subsidence, extensive fires, explosions, flooding or man-made disasters including war. This assistance does not concern cases of damage or deterioration caused by gradual processes of decay, pollution or erosion. It addresses emergency situations strictly relating to the conservation of a World Heritage property (see Decision **28 COM 10B 2.c**). It may be made available, if necessary, to more than one World Heritage property in a single State Party (see Decision **6 EXT. COM 15.2**). The budget ceilings relate to a single World Heritage property. The assistance may be requested to:*
   i. undertake emergency measures for the safeguarding of the property;
   ii. draw up an emergency plan for the property.«

2 Cf. Document WHC.04/28.COM/10B, p. 19.

Point III of this document contains a review of these current policies and suggestions for their implementation. Further guidance on the use of Emergency Assistance should be provided in the future in Annex 9 of the Operational Guidelines (to be completed), entitled »Evaluation criteria by the Advisory Bodies for International Assistance requests«.

A.4 Global disaster reduction policies: the Hyogo Framework for Action 2005-2015 (HFA)

1. Risks from disasters and how to reduce them is a huge field which involves hundreds of organizations and institutions across the world, including a UN Focal Point, i.e. the Secretariat of the International Strategy for Disaster Reduction (ISDR), based in Geneva. While heritage (especially cultural) has so far developed its own policies on risk-preparedness in relative isolation, it is essential that any strategic document on disaster risk reduction adopted in the framework of an Intergovernmental Convention take stock of the global context and its terminology, lest procedures for cultural and natural heritage should be cut off from the mainstream discourse on disaster procedures within the framework of sustainable development.
2. The most recent and important global policy text on risk reduction was adopted at the UN *World Conference on Disaster Reduction* (WCDR), held from 18 to 22 January 2005 in Kobe, Hyogo, Japan, to commemorate the tenth anniversary of the tragic earthquake that struck the region in January 1995. Taking place 11 years after the adoption of the seminal *Yokohama Strategy (1994),* and five years after the end of the *UN International Decade for Natural Disaster Reduction* (IDNDR, 1990-1999), the Conference resulted in the approval of a very important document called the *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters* (also known as HFA)[3].
3. The recommendations contained in the HFA are addressed, among others, to all Organizations of the UN system, including of course UNESCO, which are called upon to implement them »*within their mandates, priorities and resources*« (HFA, page 16). The HFA identifies specific gaps and challenges in the following five main areas:
   iv. Governance: organizational, legal and policy frameworks;
   v. Risk identification, assessment, monitoring and early warning;
   vi. Knowledge management and education;
   vii. Reducing underlying risk factors;
   viii. Preparedness for effective response and recovery.
4. With respect to these main areas, the HFA has adopted five priorities for action and a series of related activities. The five priorities are the following:
   i. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
   ii. Identify, assess and monitor disaster risks and enhance early warning.
   iii. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
   iv. Reduce the underlying risk factors.
   v. Strengthen disaster preparedness for effective response at all levels.

A.5 Current efforts by the heritage sector in the field of disaster preparedness

1. The issue of human-made disasters and their impact on cultural heritage has been initially addressed by UNESCO through the ***Convention for the Protection of Cultural Heritage in Time of Armed Conflict***[4] (The Hague Convention -1954). Drawing from concerns originating after the Second World War and renewed in 1992 because of the high and visible incidence of disasters and armed conflict on television in the early 90s, UNESCO and other partner institutions such as ICCROM, ICOMOS, IUCN, and ICOM have in the past years further developed a number of initiatives aimed at strengthening the capacity of site managers to address risk management for World Heritage cultural and natural properties. Besides a number of international meetings and workshops, these included the preparation of guidelines for integrating risk preparedness in the management of World Cultural Heritage (Stovel, 1998) and more recently the development of *Training Kits on Risk Preparedness* by ICCROM. In parallel, ICOMOS, ICOM, the International Federation of Library Associations and Institutions (IFLA) and the International Council on Archives (ICA) established in 1996 the *International Committee for the Blue Shield*, a partnership and coordinating mechanism among the main international NGOs in the heritage sector.

3 This document is accessible on the web at: http://www.unisdr.org/(March 2006).

4 The text of this Convention is accessible online at www.icomos.org/hague (May 2006).

2. The World Heritage Centre, ICCROM, and the Agency of Cultural Affairs of Japan co-organized a Special Thematic Session on Risk Management for Cultural Heritage during the UN *World Conference on Disaster Reduction,* held in Kobe, Hyogo, Japan in Jan. 2005. This Session, in which representatives of ICOMOS also participated, resulted in an Outcome Document[5] containing some innovative ideas on the subject of risk as related to heritage. Among them was the realization that the field of heritage conservation had to harmonize its terminology and conceptual framework with the broader sector of disaster reduction (as this is called in the wider UN and international context). More importantly, the Document brought forward relatively new perspectives on risks as related to heritage, by shedding light on aspects that had been previously somehow neglected. Where previously emphasis was mostly placed on protecting physical heritage **from** disasters, the Kobe Document recognized that heritage, together with the traditional knowledge that created it, could be a fundamental resource **for** reducing risks from disasters for lives, properties and livelihoods, and therefore could contribute actively to sustainable human development. It was also recognized that heritage, given its prominent place in the community, could be used to make a significant contribution during the response phase of a disaster.
3. If these new approaches to risks for heritage were endorsed by the international community, this would greatly facilitate the integration of concern for heritage into general policies and practices for disaster mitigation, and the consideration of heritage as a legitimate beneficiary of development aid in preparation for or following major disasters. This is unfortunately not the case today, as shown by the Flash Appeal launched in January 2005 by the UN following the tsunami of South Asia[6]. Of the 977 million dollars requested to the international donor community, in fact, not one concerned the rehabilitation of the heritage.
4. While considering the issue of disasters in the context of the state of conservation of World Heritage properties, at its 29th Session in July 2005 (Durban, South Africa), the World Heritage Committee requested therefore the Centre and the Advisory Bodies to »*take into account the recommendations of the Kobe Thematic Session on ›Risk Management for Cultural Heritage‹ in the elaboration of the strategy on risk-preparedness to be examined by the Committee at its 30th session (Vilnius, 2006)*« (Decision **29 COM 7B.b**)

B. Definitions and scope

B.1 Terminology

1. The World Heritage Centre and the Advisory Bodies discussed extensively the possible scope of this Strategy, as different interpretations of the terms »risk« and »risk-preparedness« exist in the field of heritage conservation.
2. For the exclusive purpose of this Strategy, and taking into account the context of the above-mentioned decisions taken by the Committee, it was proposed that risk should be intended as risk arising from disasters, commonly defined within the UN as »*a serious disruption of the functioning of society, causing widespread human, material or environmental losses which exceed the ability of affected society to cope using only its own resources*«[7]. This strategy, therefore, will not cover gradual cumulative processes/factors affecting the state of conservation of a World Heritage property, such as pollution, tourism or urban encroachment. It is recognized, however, that the present strategy should be seen as a part of this larger context. Where possible, useful knowledge developed within this larger context should be incorporated into the actions that come out of this strategy.
3. Moreover, with an aim to conform to the universally accepted terminology, it is suggested to adopt the expression »disaster risk reduction«, rather than »risk-preparedness«. The former is indeed the term widely used by the UN system and international development agencies, to encompass all efforts at different stages to minimize vulnerabilities and disaster risks within the society, and to avoid (prevention) or to limit (mitigation) the adverse impacts of hazards, within the broad context of sustainable development. Accordingly, the present document will make reference to the widely acknowledged distinction between Readiness (before a disaster), Response (during a disaster) and Recovery (post disaster) as the three main phases characterizing all risk reduction strategies.
4. Risk, moreover, is commonly defined as the product of a threat (likelihood of occurrence of hazard) by vulnerability (susceptibility of heritage to deterioration). Reducing risk, therefore, can involve either acting on the threats or the vulnerability or both.

5 Accessible on: www.unisdr.org/wcdr/thematic-sessions/thematic-reports/report-session-3-3.pdf (March 2006).

6 Accessible on: http://ocha.unog.ch/ets/Default.aspx (March 2006).

7 Definition from the UN International Strategy for Disaster Reduction (UN/ISDR) – 2006 - http://www.unisdr.org/(March 2006).

B.2 Disaster Risk Reduction and Climate Change

1. By its Decision **29 COM 7B.a,** the World Heritage Committee requested the »*World Heritage Centre, in collaboration with the Advisory Bodies, interested States Parties and petitioners, to establish a broad working group of experts to: a) review the nature and scale of the risks posed to World Heritage properties arising specifically from climate change; and b) jointly develop a strategy to assist States Parties to implement appropriate management responses*«. The same decision of the Committee requested the Centre to organize an expert meeting and prepare a *joint report on »›Predicting and managing the effects of climate change on World Heritage‹, to be examined by the Committee at its 30th session (Vilnius, 2006)*«. The outcome of this meeting, which took place on 16 and 17 March 2006, is contained in document *WHC-06/30 COM/7.1*.
2. During the meeting, it was recognised that climate change may have both long-term, gradual effects on World Heritage sites, and may also be responsible for the occurence of more frequent or severe disasters. The present strategy does not focus specifically on Climate Change, but should be seen being complementary to the results of the recently concluded working group meeting. Where possible, this strategy will implicitly integrate concern for the possible effects of Climate Change into its provisions.

B.3 Scope of the Strategy

1. With reference to the spirit and letter of Decision **28 COM 10.B**, therefore, the scope of the present Strategy will include both the reduction of risks from disasters at World Heritage properties, and relevant World Heritage policies and procedures, including the use of Emergency Assistance under the World Heritage Fund, State of Conservation Reporting, Periodic Reporting, In-Danger Listing, and the Global Training Strategy.
2. For the purpose of this Strategy, risks are to be understood as risks that affect the cultural or natural heritage values of World Heritage sites or their integrity and/or authenticity, in line with the overall aim of the 1972 *Convention*. In practice, organizations and professionals concerned with heritage will have to work together with those institutions responsible for addressing the broader generic risks to lives and properties within the boundaries of World Heritage sites and attempt to integrate heritage concerns into the larger disaster risk framework.
3. Finally, it is important to underline that the protection from disasters of the Outstanding Universal Value of a World Heritage property may imply the reduction of risks to persons, objects and collections associated with it. In this respect, three types of movable heritage would need to be taken into account:
   i. Holders/carriers/keepers of intangible heritage;
   ii. Items located within the boundaries of a World Heritage property and which form an integral part of its significant physical attributes (such as archaeological collections or original collections or furniture within a historic building);
   iii. Items which are outside of the boundaries of the World Heritage property, but that represent essential original records of its history and value (such as archival documents, historic photographs, etc.).

II. Strategy for Reducing Risks from Disasters At World Heritage Properties[8]

A. Purpose of the strategy

1. The purpose of this Strategy is twofold:
   i. To strengthen the protection of World Heritage and contribute to sustainable development by assisting States Parties to the *Convention* to integrate heritage concerns into national disaster reduction policies and to incorporate concern for disaster reduction within management plans and systems for World Heritage properties in their territories; and
   ii. To provide guidance to States Parties, the World Heritage Committee, the World Heritage Centre, and the Advisory Bodies to integrate disaster risk reduction into World Heritage strategic planning and management, including the allocation and use of Emergency Assistance under the World Heritage Fund.

8 World Heritage properties are cultural and natural heritage sites whose significance »is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity«. A list of World Heritage properties is maintained and up-dated every year by an inter-governmental Committee (also known as the World Heritage Committee) in the framework of the World Heritage Convention, adopted by the general Conference of UNESCO in 1972. More information on the Convention and its List of World Heritage properties can be found on the internet at: http://whc.unesco.org

B. Objectives and recommended actions

B.1 General considerations

1. In determining the appropriate means to achieve the expected purposes of the Strategy, the following key considerations should be made, which are relevant to all of the objectives and actions:
   i. Cultural and natural heritage, with their related technologies, practices, skills, knowledge systems and ecosystem's goods and services can play an important positive role in reducing risks from disasters at all phases of the process (readiness, response and recovery), and hence in contributing to sustainable development in general;
   ii. The key to an effective reduction of risks from disasters is advance planning and the building of a culture of prevention;
   iii. In developing plans for reducing risks at World Heritage properties it is essential to give adequate consideration to cultural diversity, age, vulnerable groups and gender perspective;
   iv. Property occupants and users, and concerned communities in general, should be always involved in planning for disaster risk reduction.
   v. The protection of the Outstanding Universal Value and the integrity and authenticity of World Heritage properties from disasters implies consideration for the associated intangible aspects and movable items that contribute directly to its heritage significance.

B.2 Objectives and priority actions

1. In order to achieve the stated purposes of the Strategy, a series of objectives and related actions have been identified. These have been structured around the five main priorities for action defined by the Hyogo Framework for Action[9], but adapted to reflect the specific concerns and characteristics of World Heritage.
2. The five objectives are the following:
   i. Strengthen support within relevant global, regional, national and local institutions for reducing risks at World Heritage properties;
   ii. Use knowledge, innovation and education to build a culture of disaster prevention at World Heritage properties;
   iii. Identify, assess and monitor disaster risks at World Heritage properties;
   iv. Reduce underlying risk factors at World Heritage properties;
   v. Strengthen disaster preparedness at World Heritage properties for effective response at all levels.
3. These objectives correspond to the spirit of Article 5 of the *World Heritage Convention*[10], requiring States Parties to take all necessary measures to ensure the protection, conservation and presentation of the cultural and natural heritage situated on their territory. They also fit within three of the four Strategic Objectives established by the World Heritage Committee through its *Budapest Declaration*[11], namely Conservation, Capacity-Building and Communication.
4. Objectives and related priority actions of the Strategy are shown in **Table 1** here below, indicating as well the different groups responsible for their implementation. These range from the States Parties to the *Convention* to the World Heritage Centre and Advisory Bodies, extending to concerned inter-governmental and non-governmental organizations at international and regional levels and academic circles. Action points are listed by the relative objective and level of implementation.

9 The most recent and important global policy text on risk reduction is the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters (HFA), adopted at the UN World Conference on Disaster Reduction (WCDR), held from 18 to 22 January 2005 in Kobe, Hyogo, Japan. Taking place 11 years after the adoption of the seminal Yokohama Strategy (1994), and five years after the end of the UN International Decade for Natural Disaster Reduction (IDNDR, 1990-1999), the HFA sets out the UN-wide strategic plan for reducing risks from disasters over the next decade. The HFA is accessible online at: http://www.unisdr.org/(March 2006).

10 Accessible online at: http://whc.unesco.org/en/175/(May 2006).

11 Accessible online at: http://whc.unesco.org/documents/publi_basictexts_en.pdf (May 2006).

Declaration on the Impact of Climate Change on Cultural Heritage International Workshop on Impact of Climate Change on Cultural Heritage New Delhi (India), 22 May 2007

NEW DELHI DECLARATION ON IMPACT OF CLIMATE CHANGE ON CULTURAL HERITAGE

Concerned with the increasing evidence of the unprecedented changes in global climate patterns and the impacts these have on heritage sites, buildings, settlements, landscape, movable objects and the living traditions in various regions of the world;

Considering the assessment reports of the Intergovernmental Panel on Climate Change (IPCC) and the work being undertaken within the framework of the UN Convention on Climate Change (UNFCCC) for climate change mitigation and adaptation;

Recalling the text of the 1972 World Heritage Convention and the decisions of the World Heritage Committee of United Nations Educational, Scientific and Cultural Organisation (UNESCO) in 2005 and 2006 for concerted action in documentation, monitoring, and provision of appropriate adaptation for the impact of climate change on the World Heritage Sites;

Further recalling the Resolution of the 15th General Assembly of International Council of Monuments and Sites (ICOMOS) at Xi'an in October 2005 to fully co-operate with UNESCO and other relevant organisations to document the impact of climate change on cultural heritage and to develop a strategy for reducing the risks to cultural heritage; and

Taking into account the evidence contained in the publication »Case Studies on Climate Change and World Heritage« published in 2007 by the UNESCO World Heritage Centre;

The experts participating in »The International Workshop on the Impact of Climate Change on Cultural Heritage« organized in New Delhi on 22nd May 2007

Acknowledge the immensely complex issue of the impact of climate change on cultural heritage, which would require sustained research, studies and documentation involving collaboration among experts from multiple disciplines;

Recognise the need to assess the risks to cultural heritage due to climate change such as glacial melts and threats of lake outburst and flooding, sea level rises, desertification, storm surges, saline water ingress and increased infestation of pests, etc;

Suggest that such assessments should be done both at the macro level (mapping heritage which would be at risk) and at the micro level (analyzing the impacts on specific heritage sites and suggesting appropriate climate change adaptation strategies);

Recommend that climate change adaptation strategies for cultural heritage should be mainstreamed into the existing methodologies for preservation and conservation of sites, buildings, settlements, landscape, movable objects and the living traditions and that appropriate standards and protocols should be developed for the purpose. Equally cultural heritage needs and concerns should be mainstreamed into institutional processes and policies for disaster reduction;

Request the national governments and international organisations to acknowledge the importance of cultural heritage for national economies, tourism, employment and community bonding and to involve the governmental and non-governmental organisations, academic institutions and individuals concerned with raising awareness, conservation and protection of cultural properties with the national and international protocols for disaster risk reduction and climate change adaptation;

Further request the national governments, inter-governmental, non governmental organisations and the private sector to engage and commit resources for the protection of specific heritage sites from the threats of damage and irretrievable loss;

Encourage scientific, technical, academic, research organisations and individuals to collaborate on specific studies related to the impacts of climate change on cultural heritage; and

Appreciate the efforts made by the National Institute of Disaster Management, New Delhi and India-ICOMOS in collaboration with the Institute of Archaeology in organising the workshop, which for the first time brought together climate change specialists and cultural heritage experts on the same platform facilitating interaction, exchange of views and

cross-fertilization of ideas, and expect these institutions to take the lead in this region of the world to promote such interactions in the future;

Encourage the dissemination of this resolution and the Delhi Recommendations of the ICOMOS International Committee on Risk Preparedness (ICORP) Workshop on Risk Management of Heritage Sites as means to promote further collaboration between professional, scientific and institutional networks.

New Delhi (India), 22 May 2007

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