



ICOMOS Slovenija



MONOGRAPHIC PUBLICATION OF ICOMOS SLOVENIA

04

Resilient Heritage

Dediščina, ki kljubuje

MONOGRAPHIC PUBLICATION OF ICOMOS SLOVENIA

04

Resilient Heritage
Dediščina, ki kljubuje

Resilient Heritage
Dediščina, ki kljubuje

PUBLISHER	<i>Slovenian National Committee of ICOMOS</i> <i>International Council on Monuments and Sites</i> ICOMOS Slovenija – Slovensko nacionalno združenje za spomenike in spomeniška območja <i>www.icomos.si</i>
FOR THE PUBLISHER	© ICOMOS Slovenia Sonja Ifko, president of ICOMOS Slovenia
REVIEWERS	Tatjana Adamič, Dr. Sonja Ifko, Dr. Tanja Hohneč, Dr. Simon Petrovčič, Mag. Miha Tomšič, Dr. Roko Žarnič
EDITOR	Sonja Ifko
ENGLISH PROOFREADING	Sunčan Stone
SLOVENIAN TRANSLATION	Amidas d.o.o.
ENGLISH TRANSLATION	Borut Praper
DESIGN AND PREPRINT	Ajda Bevc
PRINT	Camera d.o.o.
CIRCULATION	200 Ljubljana 2022



The publication presents papers from the 4th International Symposium of ICOMOS Slovenia on the topic Resilient Heritage.

The symposium was held 16–18 September 2021 as a hybrid event. It was organized by ICOMOS Slovenia and the Institute for the Protection of Cultural Heritage of Slovenia with the support of the Ministry of Culture of the Republic of Slovenia and Faculty of Architecture, University of Ljubljana. It was an accompanying event of the Slovenian Presidency of the Council of the EU.

The symposium was held under the honorary patronage of the Slovenian National Commission for UNESCO.



The publishing of this book was financed by the Ministry of Culture of the Republic of Slovenia.



Index

5	SONJA IFKO Introduction
9	ANDREW POTTS <i>Plenary paper</i> Building Resilience: Cultural Heritage and the Planetary Emergency <i>Ustvarjanje odpornosti: kulturna dediščina in svetovna kriza</i>
23	SONJA IFKO <i>Plenary paper</i> Cultural Heritage as a Building Block for Resilience and a Resource for Sustainable Future <i>Kulturna dediščina kot gradnik odpornosti in vir trajnostne prihodnosti</i>
45	TOPIC I The Situation and How Prepared are We <i>Kakšno je stanje in kako smo pripravljeni</i>
47	ANŽE JAPELJ, TATJANA DIZDAREVIČ, GIULIA PESARO, DANIELE CROTTI Action Prioritization when Protecting/Salvaging Cultural Heritage in the Event of Natural Hazards: Development and Testing of the ATTACH Tools within the Alpine Context <i>Prednostna obravnava ukrepov za zaščito/reševanje kulturne dediščine ob naravnih grožnjah: razvoj in preizkušanje orodij ATTACH v alpskem okolju</i>
71	ANDREEA TRIF From Destruction to Sustainability in the Context of Urban Fractures between Historical and Socialist Buildings in Romania <i>Od uničevanja k trajnosti v kontekstu urbanih trenj med historičnimi in socialističnimi stavbami v Romuniji</i>
85	TANJA HOHNEC A Heritage Crusade Against Climate Change <i>Boj dediščine proti podnebnim spremembam</i>

	TOPIC II
107	Key Challenges <i>Ključni izzivi</i>
	ROKO ŽARNIČ, BARBARA VODOPIVEC <i>Topic II introductory paper</i>
109	On the Resilience of Cultural Heritage Assets <i>O odpornosti virov kulturne dediščine</i>
	GAŠPER STEGNAR, STANE MERŠE, SAMO GOSTIČ, MARJANA ŠIJANEC ZAVRL, MIHA TOMŠIČ
123	Balancing Investments in Energy Efficiency Measures with the Conservation of Cultural Heritage Buildings in the Light of Global Warming – A Slovenian Case Study <i>Usklajevanje naložb v ukrepe za doseganje energetske varčnosti in ohranjanja stavb kulturne dediščine v luči globalnega segrevanja – slovenska študija primera</i>
	TOPIC III
141	Cultural Heritage as an Example: Experiences and Case Studies <i>Kulturna dediščina kot zgled: izkušnje in primeri</i>
	PILAR MONTERO VILAR, JORGE GARCÍA GÓMEZ-TEJEDOR
143	Risk Management and Emergency Plan for Collections Case Study: Museo Nacional Centro de Arte Reina Sofía and its PROCOERS Plan <i>Obvladovanje tveganj in načrt za izredne razmere za muzejske zbirke. Študija primera: načrt PROCOERS muzeja Reina Sofía (Museo Nacional Centro de Arte Reina Sofía)</i>
	SIRIWAN SILAPACHARANAN
161	Cultural Heritage Resilience of the Mae Klong River Basin, Thailand <i>Odpornost kulturne dediščine v povodju reke Mae Klong na Tajskem</i>
	NINA UGLJEN ADEMOVIĆ, ELŠA TURKUŠIĆ JURIĆ
175	Reshaping the City through a Cultural Memorial Site: The Revitalisation of Sarajevo’s Medieval Bastion Bijela Tabija <i>Preoblikovanje mesta s pomočjo spominskega obeležja: oživitev sarajevske srednjeveške trdnjave Bijela tabija</i>
191	Authors

SONJA IFKO

Introduction

The 4th ICOMOS Slovenia International Scientific Symposium, held in September 2021, focused on questions related to increasing the resilience of cultural heritage. This is a topic encountered practically at every turn in the current cultural heritage protection practice. The current situation calls for immediate action in the field of cultural heritage, nature, built environment, and lifestyle – in short, in all areas of our lives.

The monograph at hand presents the contributions from the symposium, addressing various themes that are directly or indirectly related to the improvement of the state of cultural heritage in the circumstances of the increasingly intense impacts of climate change and conflicts with a broad range of backgrounds. In this context, we are also confronted with the frequently overlooked contribution of cultural heritage to the Sustainable Development Goals and people’s well-being – both, of individuals and various communities. This was experienced by all during the Covid-19 pandemic.

Thematically, the monograph is divided into three sections and an introductory plenary section, which highlights the comprehensive and multifaceted role of cultural heritage in ensuring greater resilience of the planet and quality of life for everyone. The transcript of the lecture by Andrew Potts, one of the world’s leading experts on cultural heritage and climate change, highlights the global climate situation and the role of cultural heritage in addressing it. It also focuses on the European Cultural Heritage Green Paper.

The first section, titled “What Is the Situation and How Prepared Are We”, presents the contributions that focus on analysing and listing threats to the individual heritage areas and sites due to climate change, inappropriate land use, and politically-driven urban development, as described by Andrea Triff. Tanja Hohnec’s contribution sums up the Slovenian experience in dealing with climate change in the field of cultural heritage, describing the results of the international CHEERS project. It is vital that the experience with organising interdisciplinary cooperation is presented.

The second section presents the key challenges. Here, the authors focus on the various approaches to increasing the resilience of heritage and, on the other hand, balancing the investments in energy efficiency measures, which is one of the society’s fundamental priorities in the current crisis.

The third section, titled Cultural Heritage as an Example, presents the experience and examples of successful implementations and projects that increase the resilience of heritage and thus its contribution to sustainable development. The authors from Madrid outline the PROCOERS Plan of protecting the collections kept in the Museo Nacional Centro de Arte Reina Sofía. The article on the development of heritage resilience in the Mae Klong river basin presents lessons learned in Thailand, while the contribution on the revitalisation of the medieval fortress of Bijela Tabija describes the efforts of the experts from Bosnia and Herzegovina.

SONJA IFKO

Uvodnik

Četrty mednarodni znanstveni simpozij ICOMOS Slovenija, ki je potekal septembra 2021, smo posvetili iskanju odgovorov na vprašanja, povezana s povečanjem odpornosti kulturne dediščine. Gre za temo, s katero se v aktualni praksi varstva kulturne dediščine srečujemo praktično na vsakem koraku. Razmere, ki smo jim priča v zadnjem času, namreč narekujejo takojšnje ukrepanje tako na področju kulturne dediščine kot tudi narave, grajenega okolja in načina življenja, skratka, na vseh področjih našega življenja.

V monografiji so zbrani prispevki s simpozija, ki obravnavajo različne teme, neposredno in posredno povezane z izboljšanjem stanja kulturne dediščine v razmerah vedno bolj intenzivnih vplivov podnebnih sprememb in konfliktnih situacij z najrazličnejšimi ozadji. Ob tem se soočamo tudi z velikokrat spregledanim prispevkom kulturne dediščine za uresničevanje ciljev trajnostnega razvoja in za dobrobit ljudi – tako posameznikov kot različnih skupnosti. O pomenu tega prispevka smo se vsi prepričali v času pandemije covid-19.

Vsebinsko je monografija razdeljena na tri tematske sklope in uvodni plenarni del, kjer je izpostavljena celovita in večplastna vloga kulturne dediščine pri zagotavljanju večje odpornosti planeta in kakovosti življenja za vse. Predavanje Andrewa Pottsja, enega vodilnih svetovnih strokovnjakov na področju kulturne dediščine in podnebnih sprememb, izpostavlja svetovne podnebne razmere in vlogo kulturne dediščine pri reševanju tega problema. Osredotoča se na Evropski zeleni dokument kulturne dediščine (European Cultural Heritage Green Paper).

V prvem sklopu, z naslovom Kakšno je stanje in kako smo pripravljene, so predstavljeni prispevki, ki se osredotočajo na analizo in evidentiranje ogroženosti posameznih območij in enot dediščine. Gre tako za ogroženost zaradi podnebnih sprememb in neustrezne rabe prostora kot tudi zaradi politično usmerjanega urbanega razvoja, kot stanje opisuje Andreea Trif. V prispevku Tanje Hohnec so povzete slovenske izkušnje pri soočanju z obvladovanjem podnebnih sprememb na področju kulturne dediščine; predstavljeni so rezultati mednarodnega projekta CHEERS. Pomembna je predstavitev izkušenj pri organizaciji interdisciplinarnega sodelovanja.

V drugem sklopu so predstavljeni ključni izzivi. Avtorji se osredotočajo na različne pristope za povečanje odpornosti dediščine in po drugi strani na uravnoteženje vlaganj v ukrepe za doseganje energetske učinkovitosti, kar je v trenutnih kriznih razmerah ena od temeljnih družbenih prioritet.

V tretjem sklopu, naslovljenem Kulturna dediščina kot zgled, so predstavljene izkušnje in primeri uspešnih realizacij in projektov za povečanje odpornosti dediščine ter s tem prispevek dediščine k trajnostnemu razvoju. Avtorji iz Madrida predstavljajo načrt PROCOERS za zbirke, ki jih hrani Museo Nacional Centro de Arte Reina Sofía. Prispevek o gradnji odpornosti dediščine v porečju reke Mae Klong prinaša izkušnje s Tajske, primer revitalizacije srednjeveške trdnjave Bijela tabija pa predstavlja prizadevanja strokovnjakov iz Bosne in Hercegovine.



Photo: Andrej Matič

ANDREW POTTS

Plenary paper

Building Resilience: Cultural Heritage and the Planetary Emergency

SUMMARY

In recent years, ICOMOS has voted to declare a Climate and Ecological Emergency and the European Union has launched the European Green Deal. But what is the nature of this emergency and what is the role of cultural heritage in helping address it?

“Planetary Emergency” refers to the twin threats of climate change and biodiversity loss. These threats share common causes including rapid urbanization, wealth inequality, globalization, insensitive development, and unsustainable consumption and production. Together, they are imperilling the well-being of human communities and all life on earth. Mitigating them requires rapid, far-reaching, and sometimes disruptive green transition.

Cultural heritage can play a valuable role in responding to this emergency by helping communities build resilience. Resilience in this sense can be understood as the capacity to transform, persist, and adapt. This includes transitioning to societies that live in harmony with nature in order to mitigate future climate change, while responding to the changes we have already caused.

Cultural heritage can help (or hinder) people in these processes. It offers enormous potential, for example, when promoting a diversity of social networks and knowledge systems, inter-cultural understanding balanced with local self-sufficiency, equitable and inclusive communities, and adaptive learning. These aims are already embedded in conventional heritage practice but must be urgently prioritised in order to safeguard the heritage of people and the planet in the face of Planetary Emergency.

Ustvarjanje odpornosti: kulturna dediščina in svetovna kriza

POVZETEK

V zadnjih letih je ICOMOS predlagal razglasitev podnebnih in ekoloških izrednih razmer, Evropska unija pa predstavila Evropski zeleni dogovor. Kakšna pa je narava te krizo in kakšno vlogo ima kulturna dediščina v njenem naslavljanju?

Pojem »svetovna kriza« se nanaša na dvojno nevarnost, ki jo predstavljajo podnebne spremembe in izguba bioraznolikosti. Obe nevarnosti imata skupne vzroke, ki vključujejo hitro urbanizacijo, neenakomerno razporeditev bogastva, globalizacijo, nepremišljen razvoj in netrajnostno porabo in proizvodnjo. Skrupaj ogrožajo dobrobit človeških skupnosti in življenje na Zemlji. Obvladovanje teh vzrokov zahteva hiter, obsežen in mestoma disruptiven zelen prehod.

Kulturna dediščina lahko ima pomembno vlogo v odzivu na krizo, saj lahko skupnostim pomaga razviti odpornost. Odpornost tu pomeni sposobnost preobrazbe, vztrajnosti in prilagajanja, kar vključuje prehod v družbe, ki živijo v sožitju z naravo in tako obvladajo prihajajoče podnebne spremembe, hkrati pa se odzivajo na spremembe, do katerih je že prišlo.

Kulturna dediščina lahko pomaga (ali ovira) ljudi v teh procesih. Ima neverjeten potencial, ko na primer spodbuja raznolikost družbenih omrežij in sistemov znanja, medkulturno razumevanje v sožitju z lokalno samozadostnostjo, enake in inkluzivne skupnosti ter adaptivno učenje. Čeprav so ti cilji že vključeni v običajne prakse kulturne dediščine, jih je treba obravnavati prioritarno, da lahko ohranimo dediščino in planet kljub soočanju s svetovno krizo.

Transcription of the lecture, held 16 September 2022.

I am speaking to you today from Mudanya, Turkey. Normally I would be in the United States, in New York, where I live, but I have been in Turkey all past week for meetings on the role of cultural heritage in climate resilience sustainable development and so, today's topic has been very much on my mind these days. By the way, I have had a good introduction to the iconic historic wood architecture in Mudanya and the role it can play in regeneration, and I think you can see a little of that famous architecture behind me.

I have been asked to speak about the topic: building resilience, cultural heritage and the planetary emergency. This is a big topic and I want to be honest with you, I certainly do not feel I have all the answers to this question. With my talk today, what I hope to do is put on the table some concepts that we can wrestle with together in terms of what resilience means in the face of the planetary emergency and how does cultural heritage intersect with this topic.

Just to help orient you in my talk, let me give you the basic organisation I will follow. In the first half of my talk, I will try to provide some context, in other words, what do we mean by the term planetary emergency, what do I mean when I use the word resilience and what are some of the ways that cultural heritage can contribute to building resilience in the face of the planetary emergency. For the second part of my talk, I will try to give you some concrete examples of the role of cultural heritage in building resilience in the face of the climate emergency, the planetary emergency. And for that, I am going to, of course, come to Europe and The European Green Deal. I am going to talk about how cultural heritage can contribute to the ecological transition for Europe within the framework of The European Green Deal, how can cultural heritage contribute to a more just, resilient and sustainable Europe.

However, before I do this, I will give you a slight introduction about myself. For the past couple of years, I have been the coordinator of the Climate Change and Heritage Work Group within ICOMOS. This work group was formed in 2017 to help support and prioritise the development of ICOMOS's climate change policies and engagements. In 2020, under the leadership of our work group, ICOMOS declared a climate and ecological emergency and I think it is important in terms of giving you the sense of the seriousness, the gravity with which we, at ICOMOS, view these issues, it is an emergency. I have had the pleasure of working with this dynamic group for four years now, but my mandate came to an end just 2 weeks ago and I want to quickly mention that my successor, doctor Will McGarry from Ireland, is a fantastic leader, a truly visionary leader on issues of climate change in cultural heritage and I hope that each of you, both within ICOMOS and within our partner organizations as well as colleagues elsewhere will have a chance to work with Will. In addition to my work for ICOMOS, I have had the privilege of coordinating the Secretariat of the Climate Heritage Network, also known as

CHN. CHN was launched in 2019 with the goal of foregrounding the cultural dimensions of climate change, scaling-up culture-based climate solutions and mobilizing arts, culture and heritage for climate action. It is a diverse network comprised of units of government, cultural organizations, businesses, universities, civil society, and each of your organisations would be welcome to consider joining us. You can learn more at climateheritage.org.

With that introduction I want to move to the topic of the day: building resilience, cultural heritage and the planetary emergency. To start with I think it is worthwhile to provide a definition to what I mean when I use the term planetary emergency. What I am referring to here is the combination of threats which are impairing the well-being of human communities and of all life on Earth. These threats are the result of a series of related stresses, rapid urbanization, wealth inequality, globalization, insensitive development and unsustainable consumption and production patterns. One of the results of these stresses, a critical threat I want to talk about today, is of course the climate emergency. Increasing concentrations of greenhouse gases in our atmosphere, caused by human activities like the burning of fossil fuels and deforestation, are warming our planet, changing the climate and increasing the hazards that we face through risks such as sea level rise and increase storminess. The situation has come to the point that climate change has become one of the most significant and fastest growing threats to people and our heritage worldwide. At the same time, the ecosystems that underpin our well-being are collapsing. Species are becoming extinct at an unprecedented rate. This is the second-grade threat that makes the planetary emergency. That is the biodiversity crisis, and of course, we see parallels between the two, between the fate of humans and the rest of nature. They are intertwined, or, as we are fond of saying at ICOMOS, nature and culture are linked. At the heart of this emergency is a clash between the immediate needs of humans, versus the long-term impacts on the planet's capacity to support life.

Some of you will have heard about the big report IPCC (Intergovernmental Panel on Climate Change - the world's leading climate science body) released a few weeks ago. The report was entitled *Climate Change 2021* and in it the IPCC shared some important information, some of the key points of which I want to share with you. First, climate scientists reported that they have been able to observe changes in the earth's climate in every region and across the entire climate system, the point being that climate change is a threat today and not merely in the future. In an earlier report, the IPCC found that we have already warmed the planet about 1 degree Celsius since pre-industrial levels, i.e. since the advent of the industrial revolution. The new IPCC report also found that many of the changes they have observed are unprecedented in thousands if not hundreds of thousands of years and lastly, and this is important, they found that some of the changes already set in motion, for example sea level rise, are at this point, irreversible or at least irreversible within the next several hundred years. So, we have already changed the climate. The results of these impacts are already displacing populations and damaging communities and their cultural heritage, thus we have to plan for the climate change we have already caused. We have to adapt. However, that report also found that some of the worst impacts of climate change can still be avoided, but avoiding these impacts will require deep rapid cuts in greenhouse gas emissions thus, and this is critically important to our topic today, we need to focus on greenhouse gas emission reduction. Of course, we, humans, are still emitting net greenhouse gases, we are continuing to warm the planet through these emissions every day.

The Paris Agreement sets out a goal for halting this trend and keeping global warming to well below 2 degrees Celsius. However, we are not on track to meeting this goal. We need to make changes in the way we grow food, use buildings, design cities, so that we emit fewer greenhouse gas emissions, but we're not on track to achieving this so far. What we need is what is sometimes called transformative change.

Why am I focusing on this transformative change, decarbonization, greenhouse gas emissions? I am telling you this because the pace of greenhouse gas reduction is key to reducing the threats of climate change, including threats to cultural heritage. The IPCC report I mentioned a moment ago states that every additional increment of warming is of consequence. While 1.5 degrees of global warming will severely damage natural and cultural heritage, the impacts of 2 degrees of warming will be significantly worse. The report specifically included that heavy precipitation, rain, is projected to be higher at 2 degrees of warming than 1.5, more of the global land area will be flooded at 2 degrees of warming versus 1.5, the risk of low-lying areas to sea level rise is higher at 2 degrees of warming than at 1.5. So, fewer greenhouse gases mean less warming, which means fewer impacts, which in turn means a greater opportunity for adaptation of communities and of heritage sites. More greenhouse gas emissions mean more warming, more impacts. There is a limit to the adaptive capacity of every site, of every system and we know that many places, many sites, many communities, many monuments will not be able to adapt their way out of the impacts caused by 3 degrees or even 2 degrees of warming. For these places, the best resilience strategy, the best adaptation strategy, includes a focus on greenhouse-gas mitigation, so that we hold warming to 1.5 degrees Celsius and reduce the impacts. This is a little bit of the context I want to provide in terms of what I mean by planetary emergency.

The second concept I want to address in this first half of my talk is the concept of resilience. This is obviously a critical topic. It is particularly critical today as it is the title of our symposium. The concept of resilience looms large in the SDGs; it's important in SDG 13, which is the SDG on the UN sustainable development goal on climate action, and it is of course also a key element of SDG 11.4, which is the only UN sustainable development goal that expressly mentions heritage. SDG 11.4 states, and I think you all know this, that strengthening efforts to protect and safeguard the world's cultural and natural heritage can make cities and human settlements more inclusive, safe, sustainable and resilient. So, what does this word resilience mean, what does it mean specifically in the context of the planetary emergency?

There is a lot of research and science on the concept of resilience and three key aspects are often identified. Resilience relates to the capacity to transform, the capacity to persist, and the capacity to adapt. Often when people are asked to summarize what does resilience mean in one sentence, the answer they provide is that resilience is the ability to live with change. What is the role of cultural heritage in building resilience in the face of the planetary emergency? What is the change that people will need to live with and how can we help with that? Well, of course, there is the need to respond to the impacts of climate change, the changing seasonality, the changing heat, the changing precipitation patterns. But please do not forget that the transformative change we need to mitigate climate change also requires resilience.

Holding warming to 1.5 degrees Celsius is going to be incredibly difficult, for not only do we need far-reaching ecological change, but also a green transition in the way we build cities, grow food, travel, etc. These changes are needed rapidly, like in this decade, because the window of opportunity to hold warming to 1.5 degrees Celsius is closing. This system's transition on a nearly unprecedented scale will be disruptive, it will be messy, it will create conflict. The cultural dimensions of these shifts will also be huge, so this is another dimension of change that requires resilience. We see that for purposes of discussing resilience we are really implicating both, the concept of adaptation, i.e. resilience in the face of the impacts of climate change we have already caused, as well as mitigation, i.e. resilience in the face of the transformative change. We need to reduce future climate change. Climate adaptation and climate mitigation both merge in the concept of resilience, we need resilience in the face of both.

Resilience science suggests some key characteristics of resilient systems and here we see the inter linkages of culture and the rest of nature, because we find common patterns between resilient human systems and resilient natural systems. There are many ways to describe resilient systems, but I want to highlight a few of the recurring elements, elements that are brought up over and over again. The first is sometimes called redundancy. This is a strange word, even for a native English speaker, but what it essentially means is having a multiplicity of pathways, having multiple options and it can be applied in a lot of different contexts, but in particular in terms of social networks, having a multitude of social networks that support you and your community.

The second key aspect of resilience is diversity, diversity of knowledge systems, livelihoods, diversity in terms of biodiversity. The third key concept, it has another kind of strange word in English at least, modularity. This is basically a measure of a system's, on the one hand, interconnectedness, i.e. how interconnected is it to other systems, but on the other hand, how well does it function alone. This is where we begin to see issues of local self-sufficiency. The fourth key dimension of resilience is how we balance the interconnectedness with the world with the self-sufficiency of the community. The fifth, equity and justice, which includes how widely the capabilities and opportunities are distributed within a society and finally adaptive learning, the ability to adapt and learn and this starts to implicate creativity and inspiration. The gravity of the planetary emergency invites us to begin examining every aspect of cultural heritage practice, to see if these things do indeed help us manage and deal with change. How does heritage contribute to resilience?

Using the elements of resilience I have just listed, we could ask ourselves: What aspects of cultural heritage promote the multiplicity of social networks? What aspects of our work promote the diversity of knowledge systems? What aspects of heritage promotes interconnectedness and intercultural dialogue on the one hand, and local self-sufficiency on the other? How do we support equity within communities and promote adaptive learning? Hopefully, in your own work, you are starting to see connections between these elements of resilience. Cultural heritage, documentary heritage, libraries, archives, traditional wisdom, traditional knowledge, heritage sites, all of these offer immense potential to support transformative action and just transitions by communities towards climate resilient futures. At the Climate Heritage Network, we sometimes say that anthropogenic problems need human solutions and what is cultural heritage if not a great accumulation of human experience and human solutions.

Guiding transformative change requires understanding how humans relate to places and things, it benefits from knowing how humans have responded to past social and environmental change. Addressing climate change calls for planning with a multi-generational time horizon, an intergenerational approach that is almost uniquely at the core of cultural heritage planning. Climate change work demands circular economy approaches that promote the reuse and conservation of resources. Tackling climate change demands knowledge, information, creativity, you could call it cultural capital. It also requires social cohesion, a shared love of the place, inclusive approaches, all of which are prerequisites to the common action that is needed for transformative climate action. These are all things we are good at in cultural heritage, so the point I am trying to make is that the things we are good at in cultural heritage are also good for climate action. What this means is that there is a climate action mission and purpose for every cultural heritage actor.

The status quo is a choice, doing things the way we have always done, is a choice, and doing things the way we have always done them is what has led us to the planetary emergency, thus we need to reach the decision to leave behind business-as-usual and engage ourselves in the transformative change that is necessary to tackle the planetary emergency. How do we make this shift? How do we emphasize the resilience-building dimension of our work? What does this path look like? How do we increase the ambition of the cultural heritage world to contribute to the work of addressing climate change and building resilience? How do we convince others, such as the people in the Ministry of Environment or the Ministry of Climate Change, of the relevance of culture and heritage to their climate action work? How do we convince climate scientists to take a look at social science, the humanities and cultural heritage information?

What does cultural heritage look like when we reject business as usual and orient our work to be a part of the solution to climate change, to focus on building resilience for communities? To answer that question, I want to shift gears and move into the second half of my talk.

I want to take up the question of The European Green Deal and use some of the examples from The European Green Deal to try to illustrate the roles of cultural heritage in climate action and resilience building that I had just referenced. In order to achieve this, I want to introduce you to a paper that was issued a few months ago. It is called The European Cultural Heritage Green Paper, you can find it online, by searching European Cultural Heritage Green Paper. My goal is to take the abstract concepts of resilience, diversity of knowledge systems, local self-sufficiency and provide some concrete examples of how cultural heritage can support communities in making, achieving and surviving the ecological transition.

I am going to spend less time talking about physical interventions in monuments and sites, interventions to help them adapt to more heat or sea level rise, not because that is not important, but because I think my good friend will speak about this in his key note tomorrow. Suffice to say though, that safeguarding the conservation of monuments is inextricably linked to all the functions of cultural heritage and resilience that I have just mentioned. That physical fabric, those attributes it is carrying, the identity, the value, the knowledge, the information, all of which are key to the role of cultural heritage in resilience, and if we lose

that fabric, those attributes, what will happen to the knowledge, the identity, the values that are so important? I think and hope you will find my talk and that of my colleague complementary.

A little background on The European Cultural Heritage Green Paper itself. The paper was produced by Europa Nostra in cooperation with ICOMOS and The Climate Heritage Network with the input of members of The European Heritage Alliance and the support of The European Investment Bank Institute and Creative Europe. Some of the key concepts of the Green Paper were developed in 2019, within the framework of the Croatian presidency of the Council of the EU, so it is a real pleasure to be able to advance this conversation today, in 2021, during the Slovene presidency.

The European Green Deal itself, the plan from the European Commission, aims to chart the EU's course to net zero emissions by launching a set of policies that will transform the economy, industry, production, consumption, buildings, infrastructure, transport, food and agriculture production, taxation and social benefits for Europe. It aims to address the biodiversity crisis as well as aspires to be a new growth strategy for Europe, in which environmental, economic and social sustainability go hand-in-hand. Some people think it is too ambitious, some people think it is not ambitious enough, but I believe it is fair to say that it is arguably the most ambitious climate plan in the world. Despite this, despite the comprehensive nature of The European Green Deal, despite the fact that it promises to launch an all society effort, as it was initially released, as originally written in 2019, The European Green Deal envisioned no role for culture or heritage at all in its transformative agenda.

This discovery was a wake-up call for many of us working in cultural heritage, an urgent reminder of the need to clearly articulate the cultural dimensions of transformative climate action, the role of cultural heritage in climate resilience to our colleagues in other sectors. We had performed great work on these topics amongst ourselves, but apparently that message did not reach far enough. Our exclusion from The European Green Deal as originally written was a real wake-up call for us in the cultural heritage sector. The Green Paper was our response to that wake-up call. The Green Paper was undertaken in the spirit of cultural heritage, not as a bystander to ecological transition, to green transformation, but with the idea that we, in cultural heritage, are convinced actors in this process, we are convinced that The European Green Deal is fundamental, in fact intrinsic to our work in cultural heritage. The European Green Deal puts Europe and indeed the planet on the path to holding warming to well below 2 degrees Celsius, which is, as I have said before, key to reducing threats including threats to cultural heritage. This is why anyone who cares about safeguarding the planet and its cultural heritage must want The European Green Deal to succeed. At the same time, we approached The European Green Deal firm in the conviction that cultural heritage is essential to the success of The Green Deal, something that the authors of The Green Deal themselves have not quite realized yet. You have heard many of the reasons for this so far, cultural heritage offers an immense potential to drive climate action, to influence consumption patterns, to support transition towards a healthier, greener, fairer society and economy. Cultural heritage can be a catalyst for positive change, it has the power to connect people to places, it encourages a sense of belonging and fosters social inclusion, all of which are essential to collective climate action.

I would argue that no industrialized society and certainly no society in Europe can achieve a system's transition on a nearly unprecedented scale, on a radical scale, contemplated by The European Green Deal, without paying attention to the cultural dimensions of these shifts and without capturing the hearts and minds of the residents. What we tried to do with The European Green Deal is make these points in a positive way, readily understandable by those working in climate and environmental policy. We wrote The Green Paper, we wrote about climate change for a cultural audience, yes, but equally importantly we wrote about culture for a climate audience. So, now I want to walk you through some concrete examples from The Green Deal and the role of cultural heritage in achieving The Green Deal's ambitions, but before I do this, I want to mention one of the overarching themes of The Green Paper and that is conflict, or perhaps better to say, how do we minimize conflict between cultural heritage safeguarding and climate action. Simply put, measures that are viewed in the environmental and climate change world as building resilience, may actually damage cultural heritage - at least in the sense it is traditionally understood. So, there is this potential for a conflict between heritage safeguarding and climate action.

The European Green Deal itself says that careful attention will have to be paid to potential trade-offs between environmental and social objectives, trade-offs between strategies that build resilience in a certain frame of mind, versus strategies that safeguard cultural heritage, which of course itself contributes to the resilience. This is to be expected in an effort of this magnitude and we should not be surprised that there are real and perceived tensions between climate action and any other type of activity in any sector, including conservation of heritage values.

In The Green Paper we attempted to be direct about these potential tensions, we talked about wind farms in cultural landscapes, insensitive retrofitting of historic buildings for energy efficiency, the phasing out of traditional livelihoods, multi-generational livelihoods rooted in the carbon-based economy, such as the cultural heritage of coal miners and the problem of greenhouse gas intensive forms of cultural tourism. To be honest, I regret that the discussion on cultural heritage and climate action often begins and even ends with the topic of conflict. With hundreds of positive ways cultural heritage contributes to climate action, why should this be so? Indeed, I would say, that the aims of cultural heritage, rooted in circular economy, in reuse, in conservation, are inherently more aligned with green action than in almost any sector, but this doesn't mean the potential trade-offs are not real. Maladaptive climate action that impairs the co-benefits associated with cultural resources, cultural rights and heritage values can ultimately undermine the environmental objectives. Advocates on all sides must seek to maximize the win-win outcomes that advance climate action, build resilience and safeguard cultural resources. Following this introduction to The Green Paper, I now want to address a sectoral analysis.

The European Green Deal is made of a series of green transition plans that address many of the major sectors of the European economy. The Green Paper analyses how the core competencies of cultural heritage correlate to nine of these: energy, circular economy, buildings and renovation, mobility and transport, food systems, green finance and just transition, research and innovation, education and training and EU external relations, the so-called green deal diplomacy. I do not have time to talk about all of these, but I want to highlight a few of them and as I talk I invite you to consider how you and the organizations and agencies you

work with can do more to engage in the types of activities that we talked about in The Green Paper. How do the things you are good at, how does your agenda, how do your priorities intersect with these aims?

The first thing I want to talk about is energy, which may sound like a funny thing to be talking about in a cultural heritage meeting, but please bear with me. The Green Paper begins with energy, because The Green Deal begins with energy, with supplying clean, affordable and secure energy. The production and use of energy accounts for more than 75% of EU's greenhouse gas emissions. These are the emissions that are causing seas to rise, storms to be worse, precipitation patterns to change. Decarbonizing the energy system is thus crucial to achieving climate neutrality by 2050 and mitigating the impacts of climate change. The Green Paper lays out the constructive role that cultural heritage can play in the green transition of Europe's Energy Systems. Perhaps the most critical thing here is that the EU's new strategy for energy system integration places energy efficiency first, so before we talk about how to make more green energy, let's talk about all of us using less energy in the first place. Why is this critical for us in this heritage meeting? Because energy efficiency reduces the need for energy infrastructure, literally greater efficiency can mean fewer wind farms, fewer transmission corridors and thus lower impact on the biodiversity and cultural resources. Achieving energy efficiency is a path to win-win outcomes and supporting energy efficiency goals should be a cultural heritage priority.

How? We can start by taking every opportunity to message our ministries of culture, our UNESCO commissions, our cultural heritage organizations, our universities to connect The Green Deal and its energy efficiency aims to the ethics of reusing resources, conservation and the stewardship on which cultural heritage is based. Of course, we can fully electrify and improve the efficiency of the historic built environment. Even with greater efficiency, the transition to climate neutrality in Europe will still require additional renewable energy infrastructure. This can and should be attained while also protecting biodiversity and heritage. On the EU level a new platform is urgently needed to stimulate a constructive dialogue between heritage bodies and the renewables industry. Increasing the capacity of heritage authorities to proactively participate in the design and citing of wind farms and other renewable energy infrastructure will help. These measures would ultimately expedite and improve the citing of the energy infrastructure in ways that minimize the negative impacts. Cultural heritage can help increase the supply of green power in other ways, for example by emphasising the traditional knowledge associated with community scale hydro and geothermal energy and by helping every historic district in Europe to become a positive energy district. These things I am talking about, do they sound strange to you, are you surprised that I am making these points in a heritage meeting? I am talking about the electrification of old buildings, traditional knowledge on hydropower, how to cite wind turbines, for these are the steps that are required to respond to change, these are the steps that build local self-sufficiency, that create multiple systems, that reduce greenhouse gases and thus reduce the climate impacts, that support biodiversity. This is resilience, this is what resilience means in the face of planetary emergency and the points I am making are some of the ways in which cultural heritage builds resilience.

I am going to talk about just two more areas. I would normally talk a lot about buildings in this discussion, how to improve the energy performance of build-

ings, how to come up with strategies that do this while respecting the heritage values... I think this will come up at other times at this conference, I just want to note that I believe there are numerous strategies that allow for improvements in the energy efficiency of historic buildings while safeguarding their values. I believe many historic buildings already have inherently sustainable features that simply need to be valued. I believe there are a lot of win-win situations in this context. I might also mention that the key EU policy, The Green Deal policy on this topic, called the renovation wave, envisions millions and millions of existing buildings retrofitted for Energy Efficiency in Europe.

So, one question revolves around skills and knowledge. Do we have enough skilled trade people, do we have enough carpenters that can assist in sensitively retrofitting tens of thousands, hundreds of thousands of older buildings in Europe? This I think is another priority for our sector and the last thing I want to say is that the renovation wave which, as I have already mentioned, is The Green Deal's main chapter on the built environment, is really silent as regards the co-benefits of the built environment. It does not really address how benefits for society beyond energy efficiency can be achieved while retrofitting existing buildings for energy efficiency. So, this is a sort of a gap, and the cultural heritage sector can be of enormous help here, suggesting participatory and neighbourhood-based approaches to renovation, as well as delivering co-benefits such as social cohesion, well-being, creativity, tourism and intercultural dialogue. Let us also not forget how traditional building knowledge can help adapt buildings to climate change impacts, because while we are worrying about the energy footprint of buildings, we also have to worry about how they perform in the face of increasing heat or more rain and traditional knowledge has a lot to say on this topic.

I could also mention the agricultural policy, where I think there is a tremendous opportunity for us to contribute to resilience through traditional European agricultural knowledge and craft know-how, helping to sustain sustainable food production in Europe and elsewhere, traditional diets and their role in the green transition, but for my final topic I want to skip to the topic of just transition. Just transition is a buzzword in climate policy.

Europe's green transition must be just and inclusive, it has to pay attention to the regions, industries and workers who will face the greatest challenges. The cornerstone of these efforts in The European Green Deal is the EU's new just transition mechanism and, in my opinion, this is an area where cultural heritage can play an extremely important role. Including culture, heritage, creative industries, craft and the knowledge of local communities in just transition measures will help assure community-led processes, as well as broaden the acceptance of change and lead to more durable and effective outcomes. As we ask communities dependent on coal mining to cease engaging in coal mining, as we ask communities dependent on greenhouse-gas intensive tourism to diversify and have less tourism or at least less greenhouse gas intensive tourism, what role can cultural heritage play in these transitions, in supporting communities, and in addressing the conflict and controversy that will inevitably accompany such dramatic changes?

The Council of Europe's Faro Convention can be used to route just transition planning in the European values of cultural diversity, human rights and participatory democracy. Craft and heritage trades can aid reskilling, just to give a few

examples. We see this in Ireland, for example, where peat bogs played a historic role in the Irish economy and culture and where cultural heritage-based strategies are now being used to help achieve a just transition for peat reliant regions amidst a phase-out of peat and peat cutting as a part of greening the energy sector. So, here we have a cultural tradition of peat cutting to produce energy. This is incredibly destructive in terms of greenhouse gas emissions and it has been phased out throughout the world. So, what is the cultural heritage response to a cultural tradition, a multi-generational tradition, such as peat cutting, being discontinued? It has not been to push against this, it has not been to insist that community continued to be powered by cut peat, rather it has been to document and memorialize the customs and traditions of peat cutting, to take the stories of the families of the workers involved in peat cutting, to valorise their contributions to the trajectory of success of their communities, for they helped power their communities for centuries, to valorise and celebrate this even while we use cultural heritage based strategies to diversify economies in those local communities as peat cutters move to other occupations. This is what I am talking about when I talk about tensions and conflicts between climate action and cultural heritage safeguarding, looking for the win-wins.

Every cultural heritage organization and institution in Europe can and should play a role in securing a just ecological transition and I think the connection between a just transition and resilient communities should be evident. So, in this little overview I have given you of The European Green Deal and the role of cultural heritage, I tried to make it clear, that in the face of rapid and far-reaching ecological transition, coupled with growing impacts from climate such as extreme weather, resilience becomes very multifaceted. Helping communities decarbonise, helping communities deal with the measures to achieve decarbonization, helping communities deal with climate impacts such as rain and sea level rise, these things are all bound together in the environmental emergency and the role of cultural heritage in supporting resilience in the face of them is equally multi-dimensional.

In conclusion, I have mentioned before that last year, the ICOMOS Triennial General Assembly voted to declare a climate and ecological emergency, it called upon other culture and heritage organizations to do the same. You can find the text of the resolution online¹ and your organization might consider this approach.

In the context of the Declaration of Emergency that ICOMOS General Assembly has called upon, the cultural heritage community needs to implement heritage responses to climate change that seek to realize the potential of cultural heritage, including both tangible and intangible heritage, as well as the knowledge and practices of the local communities that could contribute to transformative change to help drive greenhouse gas reduction, support climate adaptation and deliver climate-resilient developmental pathways that strengthen sustainable development. Yes, we want to live through climate change, we want to endure ecological transition, but is it possible for us to thrive, can these things help make our communities more prosperous, can they help us thrive? This is what we mean by climate resilient sustainable development. The future of our past

¹ https://www.icomos.org/images/DOCUMENTS/Secretariat/2020/Cultural_Heritage_and_the_Climate_Emergency-Resolution_20GA_15_.pdf

report supports this work by outlining ways in which the cultural heritage community can address both the causes of climate change and its effects. This document is a global document, The European Cultural Heritage Green Paper tailors these concepts to the European context, it provides a benchmark against which heritage actors and operators can measure their own engagement with the planetary emergency.

In the forward to the future of our past the past president of ICOMOS Toshiyuki Kono wrote the following: “It would be foolish to imagine the practice of Heritage remaining static, while the world goes through the rapid and far-reaching transitions discussed in the IPCC recent Special Report. Responding requires adjustments in the aims and methodologies of heritage practice, achieving the ambitions of the Paris Agreement, on the other hand, requires dismantling the barriers to the full recognition of the cultural dimensions of climate action.” We, in cultural heritage, need to do a better job of taking on board the imperatives of the climate emergency and those in the climate action environmental world need to do a better job in recognizing the cultural dimensions of their work.

According to the 2020 UN Environment Emission Report, the world is on course, not for just 1.5 degrees of warming, not for 2 degrees of warming, but for 3 degrees of global warming. The result of 3 degrees of global warming is catastrophic, the effects are catastrophic, there is no Venice at 3 degrees of global warming, sites cannot adapt to 3 degrees of global warming, we cannot allow the world to warm for 3 degrees. So much work has already been done to tackle the climate emergency. The planet, the people of the planet, had been working on the climate change problem for 30-40 years now, and yet we’re continually going in the wrong direction. What have we not tried, who has been missing from the climate action team, who is not at the table of designing climate action plans? Culture and heritage, we have been missing or at least we have not been fully tapped.

Our skills are useful, we have a lot to contribute to climate action, to building a resilient future for the world. Let us, in cultural heritage, make holding global warming to below 1.5 degrees an explicit goal of our work. Let us demand a seat at the climate action table. When it comes to building resilience and tackling the climate emergency, I hope that we can all agree the world should count the cultural heritage sector in.

SONJA IFKO

Plenary paper

Cultural Heritage as a Building Block for Resilience and a Resource for Sustainable Future

SUMMARY

To ensure quality of life and a just future for everyone, we all need to contribute to greater resilience and the implementation of sustainable development principles. Therefore, as heritage professionals, we are currently vigorously seeking answers to the questions of how to utilise heritage in the complex circumstances of extreme climate changes, the post-pandemic crisis, and various conflicts. Above all, we have to focus on how to protect heritage – as one of the foundations for the quality of life and identities of all communities and individuals – from the consequences of all of the above, especially in the face of the unpredictable and increasingly widespread negative impacts that directly and indirectly endanger it. One of the key starting points is the newly developed knowledge and the international documents that form the basis for planning regional, national, and, above all, local policies aimed at implementing the activities.

The Conservation 3.0 – Adaptive reuse concept, focusing on adaptive reuse and based on the contribution of heritage to increasing the economic competitiveness of regional environments, represents a starting point that can also be used to substantiate the contribution of heritage to increasing general resilience. This demonstrates the universality of the concept, which underpins the developmental importance of heritage conservation and brings a new, broader understanding of the role of cultural heritage. It also calls for significant changes within the conservation sector itself.

Building on the Conservation 3.0 paradigm, this paper presents two examples that focus on safeguarding the long-term resilience of local communities and areas by conserving the cultural heritage and ensuring its integration into the development process. The first example is the industrial heritage site in the coalmining town of Velenje in northeast Slovenia, while the second one is related to the cultural landscape of Kras and the local drywall construction as an element of functional landscape design. Both examples show that the most successful approach to increasing the resilience of cultural heritage is to conserve it holistically, as it represents an essential source of knowledge for ensuring comprehensive sustainability that takes into account all four of its aspects: environmental, economic, cultural, and social.



Kulturna dediščina kot gradnik odpornosti in vir trajnostne prihodnosti

POVZETEK

Da bomo lahko zagotovili kakovostno življenje in pravično prihodnost za vse, moramo k zagotavljanju večje odpornosti in uresničevanju trajnostnih načel razvoja prispevati vsi. Strokovnjaki s področja varovanja kulturne dediščine zato trenutno intenzivno iščemo odgovore na vprašanje, kaj lahko v kompleksnih razmerah intenzivnih podnebnih sprememb, (post)pandemične krize in različnih konfliktov prispeva dediščina. In predvsem, kako dediščino kot enega od temeljev kakovosti življenja in identitet vseh skupnosti in posameznikov obvarovati pred posledicami vsega naštetega, še posebej ker gre za nepredvidljive in vedno bolj obsežne negativne vplive, ki dediščino neposredno in posredno ogrožajo. Pomembno izhodišče so novorazvita znanja in mednarodni dokumenti, ki so podlaga za načrtovanje regionalnih, nacionalnih in predvsem lokalnih politik, kjer moramo aktivnosti implementirati.

Konservatorstvo 3.0 – prilagojena nova raba je koncept, ki je bil utemeljen skozi prispevek dediščine k povečanju gospodarske konkurenčnosti regionalnih okolij in pomeni izhodišče, s pomočjo katerega lahko utemeljimo tudi prispevek dediščine k večanju splošne odpornosti. To kaže njegova univerzalnost, saj koncept utemeljuje razvojni pomen ohranjanja dediščine in prinaša novo, širše razumevanje vloge kulturne dediščine. Terja pa tudi pomembne spremembe znotraj samega sektorja konservatorstva. V prispevku sta na podlagi omenjene paradigme predstavljena dva primera, ki se osredotočata na zagotavljanje dolgoročne odpornosti lokalnih skupnosti in prostora s pomočjo ohranjanja kulturne dediščine ter njenega vključevanja v razvoj. Prvi se navezuje na urbani oziroma suburbani prostor z industrijsko tradicijo na obrobju rudarskega mesta Velenje v severovzhodni Sloveniji, drugi pa na kulturno krajino Krasa in suhozidno gradnjo kot funkcionalno-oblikovni krajinski element. Oba primera kažeta, da je najuspešnejši pristop k povečanju odpornosti kulturne dediščine njeno celostno ohranjanje, saj je pomemben vir znanj za zagotavljanje celostne trajnosti, kjer so upoštevani vsi štirje njeni vidiki: okoljski, ekonomski, kulturni in družbeni.

1 Introduction

Intensive development accompanied by the over-exploitation of natural resources and uncontrolled emissions of greenhouse gases has led to widespread and increasingly unmanageable climate change consequences for which we are by no means adequately prepared. Changes – not only in production but also in the way of life – are therefore unavoidable. The fact that finding ways of successfully tackling climate change is crucial for the future of humanity is attested to almost daily by natural disasters on an ever-increasing scale. Hence, the number of climate migrants worldwide is on the rise. Their living space is being destroyed not only by severe droughts, hurricanes, floods, and rising sea levels but also by the mining industry involved in the pursuit of raw materials that are supposed to allow for climate neutrality on the other side of the world. Understanding the importance of equitable action in all local environments is essential to ensure global change and just development. This was already highlighted in the report of the World Commission on Environment and Development (WCED), the so-called Brundtland Commission, released in 1987. Unfortunately, however, these findings are still largely ignored due to the specific interests, mainly those of the wealthiest countries. Understanding local actions is a fundamental starting point that needs to be emphasised repeatedly, as the seriousness of the situation is still generally underestimated. To make the efforts to mitigate climate change possible and effective, it is essential to ensure that the appropriate regulatory, legal, and developmental economic frameworks are in place. The principle of sustainable development must be embedded at all levels of development and in our very way of life, as this is the only manner of contributing to the struggle against the effects of climate change.

Scientists became aware of this fact decades ago and started to sound warnings. In the 1980s, the first attempts were made, in cooperation with aware politicians, to set out appropriate measures calling for implementation at the global level. In 1988, the UN established the Intergovernmental Panel on Climate Change (IPCC)¹ to provide policymakers with regular scientific assessments on the current state of knowledge about climate change.

After a series of more or less unsuccessful international conferences at the highest political levels and agreements that followed, the Paris Agreement was adopted at the United Nations Sustainable Development Summit in 2015,² clearly outlining the Sustainable Development Goals (SDG 2030) and the measures

1 <https://www.ipcc.ch>

2 <https://sdgs.un.org/goals>

required to achieve the 17 global goals by the year 2030 to the extent where by 2050, the average temperature increases would not exceed the pre-industrial levels by more than two degrees Celsius. 193 countries signed it. Unfortunately, the current situation shows that we will not be able to achieve these goals, despite the broad initial political support. This is also the subject of the 2022 report on achieving the SDG 2030 goals.³ The additional crises resulting from the Covid-19 pandemic and the new war on European soil in Ukraine, which has exacerbated the energy and food crisis on the global scale, are pushing the envisioned target even further away. By all means, the situation calls not only for the use of renewable energy sources but also for the reduction in the use of energy and natural resources.

1.1 Cultural heritage and climate change

Even when we discuss the climate change impacts, heritage is still generally perceived as requiring additional conservation measures and special treatment that is specific, more costly, and more complex. Consequently, this also places it in the category of problems/challenges rather than solutions/resources that can contribute to a more sustainable and resilient future. Despite the increasing amounts of concrete evidence of the positive role of heritage in addressing the climate crisis and other emergencies we are facing more and more often, it is unfortunate that its role as a sustainable resource for crisis resolution remains largely overlooked and understood only by a small circle of experts. As the Heritage Counts for Europe study⁴ (Europa Nostra, 2014) has shown very clearly, cultural heritage makes a balanced contribution to all four aspects of sustainability: environmental, economic, social, and cultural.

In accordance with the United Nations Millennium Development Goals of 2000,⁵ the early stages of sustainable development focused almost entirely on the environmental dimension and, in its context, also the economic dimension. Cultural heritage has usually been considered in the context of ensuring lower energy consumption for the heating and functioning of buildings, where cladding the façades with an additional layer of thermal insulation turned out to be the simplest and quickest solution. However, in the case of heritage, this is most often not possible. This is precisely what has highlighted cultural heritage as a challenge/problem rather than a solution to the climate crisis. Consequently, new research and studies have been carried out. Over the last decade, many international documents, recommendations, and studies have also been produced, highlighting the role of culture and cultural heritage in achieving sustainable development. The circumstances of the Covid-19 pandemic have further confirmed the importance of heritage for ensuring quality and balanced life for individuals and communities, especially regarding the social and cultural aspects, even if their effects are difficult or almost impossible to quantify. However, we can all see the resulting benefits.

³ <https://unstats.un.org/sdgs/report/2022/>

⁴ <http://blogs.encatc.org/culturalheritagecountsforeurope/outcomes/>

⁵ <https://www.ndi.org/sites/default/files/Handout%207%20-%20Millennium%20Development%20Goals.pdf>

1.2 Crucial international documents focusing on the role of culture and cultural heritage in the struggle against climate change

Among the documents that have contributed to promoting the role of cultural heritage in sustainable development, it is necessary to first mention at least two that have importantly underlined not only the social dimension but also culture and, by extension, cultural heritage. The first document is the Hangzhou Declaration: Placing Culture at the Heart of Sustainable Development Policies, adopted in 2013 at the UNESCO conference with the same title. The second is the abovementioned report of the Europa Nostra project titled Cultural Heritage Counts for Europe from 2015,⁶ which highlights cultural heritage as a cornerstone of sustainable and balanced development, with synergistic effects for all aspects of sustainability.

The Hangzhou Declaration is important because it represents the foundation for the current 2030 Agenda for Sustainable Development (SDG 2030).⁷ It highlights the following objectives regarding the implementation of culture as a vital aspect of sustainable development: integrating culture into all development policies and programmes; mobilising culture and mutual understanding for peace-building and reconciliation; using culture to promote poverty reduction and inclusive economic development; using culture to promote environmental sustainability; strengthening the resilience against natural disasters and the struggle against climate change through culture; respecting, safeguarding, and transmitting culture to future generations; harnessing culture for the development of innovative and sustainable models of cooperation.

The New Urban Agenda (Habitat III)⁸ is a document that integrates the importance of culture and its heritage into contemporary urban development at the global level. It was adopted at the United Nations Conference on Housing and Sustainable Urban Development in Quito, Ecuador, in October 2016. It considers culture and cultural heritage as one of the foundations for quality of life, highlights its role in promoting economic development and sustainability, and advocates heritage at the heart of urban planning. The influence of cultural heritage on the struggle against climate change is addressed indirectly in the context of its contribution to sustainable development. However, in this document, the direct impact of cultural heritage as a resource in combating climate change has certainly been under-emphasised. Something similar occurred during the preparation of the European Green Deal (EGD),⁹ a programme for Europe's recovery after the pandemic, which was therefore complemented by the work of the Open Method of Coordination Group of Member State experts on strengthening cultural heritage resilience for climate change,¹⁰ established in accordance with the EU Work Plan for Culture 2019–2022. An additional document on the topic – the European Cultural Heritage Green Paper¹¹ – was prepared by Europa Nostra in cooperation with ICOMOS, the Climate Heritage

⁶ <http://blogs.encatc.org/culturalheritagecountsforeurope/outcomes/>

⁷ <https://sdgs.un.org/goals>

⁸ <https://habitat3.org/the-new-urban-agenda/>

⁹ https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

¹⁰ https://ec.europa.eu/commission/presscorner/detail/en/IP_22_5353

¹¹ <https://www.europanostra.org/our-work/policy/european-cultural-heritage-green-paper/>

Network, and other members of the European Heritage Alliance and supported by the European Investment Bank Institute and the Creative Europe Programme. The Green Paper highlights the role of cultural heritage in achieving all the programme objectives and gives concrete proposals that are underlined when discussing the protection of cultural heritage and achievement of the EGD commitments. The presentation of The Green Paper stresses the crucial role of the New European Bauhaus as one of the key initiatives that can help promote cultural heritage in the implementation of the EGD and, of course, as a resource in the struggle against climate change.

In 2017, ICOMOS adopted Resolution 19 GA 2017/30, “Mobilising ICOMOS and the Cultural Heritage Community to Help Meet the Challenge of Climate Change”, highlighting the importance of adapting to climate change while simultaneously working towards the development of appropriate regulatory frameworks in this field. The resolution underlines three fundamental starting points that define the role of cultural heritage and steer the activities in the field of cultural heritage in relation to climate change:

- (i) cultural heritage is both impacted by climate change and a source of resilience for communities;
- (ii) heritage sites as well as local communities’ intangible heritage, knowledge and practices constitute an invaluable repository of information and strategies to address climate change, even while those resources are themselves at risk from climate impacts;
- (iii) the value of cultural heritage-based solutions to climate change mitigation and adaptation.

In 2019, ICOMOS published a manual and guidebook titled *The Future of Our Pasts: Engaging Cultural Heritage in Climate Action*,¹² which allows for actions aimed at adapting the heritage and heritage sector to climate change.

1.3 The twofold position of cultural heritage: constant endangerment by the effects of climate change and a resource for building resilience

As already summarised in the ICOMOS Resolution 19 /GA2017, the effects of climate change represent a growing threat to cultural heritage. At the same time, cultural heritage is an element that can contribute to the struggle against climate change. Together with the knowledge developed over time, it makes for an essential source of experience for tackling climate change and a source of knowledge for building and living sustainably. Its constant use contributes to reducing the exploitation of natural resources for new buildings. Thus, it must be encouraged and suitably adapted to modern life. In this sense, the heritage that remains without a purpose can play an important role, as it provides opportunities to be adapted to new uses through adaptive reuse, thus avoiding new construction.

12 Wilson, H.(ed.) 2019. *The Future of Our Pasts: Engaging cultural heritage in climate action*. ICOMOS. Paris. Link: <https://indd.adobe.com/view/a9a551e3-3b23-4127-99fd-a7a80d91a29e>

1.3.1 Threat mitigation and prevention

It is clear that the situation calls for immediate action to mitigate the consequences when it comes to tackling climate change and related crises. Exposure to the increasingly aggressive and frequent effects of climate change requires the rapid development of new knowledge and approaches that can immediately increase the resilience of heritage, prevent its destruction, and effectively guide its management in the face of emergencies brought about by natural and other disasters. The circumstances are indeed complex, increasingly extreme, and all-encompassing. Therefore, new solutions are needed for mitigating risks, managing heritage, and ensuring an adequate response to situations that keep surprising us. All of this requires interdisciplinary skills, bringing together various fields to come up with appropriate transdisciplinary solutions.

Implementing new knowledge and approaches necessarily involves the development of appropriate systemic solutions, which all countries need to integrate into their systems at all levels. International agreements, recommendations, and development documents are crucial starting points that can prove helpful.

Of course, the specific nature of heritage calls for particular solutions, of course. In this regard, the involvement of heritage conservation experts in all groups working on climate change mitigation measures and approaches is crucial. Due to inexperience in this field, urgent rehabilitation or preventive measures often turn out to be unintentionally harmful and inappropriate for heritage. The monograph presents various case studies, shedding light on this problem through new research and practices for the implementation of appropriate solutions. As this contribution is being written, Slovenia is facing the aftermath of a catastrophic summer fire that has completely transformed the cultural landscape of the Karst region in south-western Slovenia in just a few days. At the same time, we are also preoccupied with ensuring that the cultural landscape as a part of the outstanding spatial heritage can be properly restored and preserved in line with the emerging rehabilitation plans.

1.3.2 Cultural heritage as a resource

In addition to the abovementioned urgent actions aimed at increasing the resilience of cultural heritage and protecting it, the significance of heritage as a resource in the struggle against climate change needs to be highlighted more broadly, as cultural heritage can contribute on various levels and exhibit synergistic effects. The resilience of the society depends on the resilience of the cultural heritage and vice versa. First and foremost, empowering heritage in this sense also calls for a shift from the traditional understanding of its role, both in the general public and especially within the professional community involved in heritage protection. This requires both a change in the position from which heritage is viewed and, above all, intensive interdisciplinary cooperation with the various experts working in the field of climate change, as expert solutions need to be developed and coordinated across an increasing range of aspects and ultimately also interests that affect heritage. These are the necessary starting points.

Alongside the economic and social goals, the European Commission's 2015 report *Getting Cultural Heritage to Work for Europe*¹³ also highlights the environmental goal and sets out the activities much more objectively than before. In this document, heritage is already highlighted as a resource for achieving sustainability and greater resilience – not only in the context of directly reducing the energy needed for its operation but also in terms of innovative and sustainable use of cultural heritage to enable it to realise its full potential contributing to the sustainable development of European cultural landscapes and environments. This should certainly be upgraded with examples that define the role of cultural heritage as a source of resilience. New tools should also be developed that allow for direct implementations in the local environments.

2 Methodology: Conservation 3.0 – Adaptive Reuse

One of the fundamental starting points for empowering the heritage sector, also in the field of ensuring heritage resilience, is the immediate implementation of the emerging new role of cultural heritage in the contemporary world. In this regard, the implementation of the values-led approach and people-centred participatory governance, as the study *The Future of our Pasts* also underlines, is of crucial importance.¹⁴ To this end, cultural heritage must be perceived as a process of change or as a social practice and development resource.¹⁵ In this context, it is vital that the historical dimensions of heritage, manifested through both tangible and intangible aspects, are respected. In his 2019 study, based on extensive research and taking into account the recent cultural heritage development trends, C. Gustafsson¹⁶ named this approach (otherwise defined in the context of the assertion of cultural heritage as an important co-creator of the regional and local development and, above all, a catalyst for economic growth) Conservation 3.0 – Adaptive Reuse.

Gustafsson based his work on a study in the context of the European Expert Network on Culture, developed for the field of culture in 2011 by Pier Luigi Sacco, who named it *Culture 3.0: New Perspective* for the EU 2014–2020 structural funds programming. The study established the theoretical framework for the role of culture in an advanced knowledge-based economy, as found in Europe.¹⁷ It highlighted the multifaceted importance of culture in Europe's future economic development and represented the basis for successfully steering the financial policy in this area. During the last financial period, these efforts have successfully translated into concrete results and job creation for all types of professions rather than just those with the highest qualifications, as was the case in the cultural sector in the past. In the

13 European Commission, 2015. *Getting Cultural Heritage to Work for Europe*. Report of the Horizon 2020 Expert Group on Cultural Heritage. Link: <https://op.europa.eu/en/publication-detail/-/publication/b01a0d0a-2a4f-4de0-88f7-85bf2dc6e004>

14 *ibid.*

15 Gustafsson, C. 2019. *Conservation 3.0 – Cultural Heritage as a Driver for Regional Growth*, SCIRE-IT, vol. 9, Issue 1, p. 21–32.

16 *ibid.*

17 Sacco, P. L. (2011). *Culture 3.0: A new perspective for the EU 2014–2020 structural funds programming*. Retrieved from <http://www.interarts.net/descargas/interarts2577.pdf>

economic development terms, Sacco identified Culture 1.0 as a pre-industrial economy that does not produce any economic value but merely absorbs what is produced in other sectors. He associated Culture 2.0 with the profound changes comparable to the industrial and political revolution. At this stage, the relationship between cultural production and economic value gradually evolved, as indicated by the expansion of the cultural and creative industries in recent years. Meanwhile, Culture 3.0 is still in its early stages of development and is only just emerging. It is characterised by innovations that increase demand opportunities and create new production possibilities. The economic and social value is not only created through content value but, above all, through generic participation. Culture is gradually becoming a prerequisite for generating all kinds of economic value, and we can speak about the culturalisation of the economy. This more extensive explanation of the Culture 3.0 concept is included because it illustrates how the new concept is being implemented in practice. Today, the cultural and creative industries are one of the fastest growing sectors in Europe and represent the foundations for the culturalisation of the economy. Such an approach also entails ensuring a more resilient society and is a prerequisite for a sustainable and just future for everyone at all levels, which, in turn, is the foundation for developing a more resilient society.

Gustafsson used the same analogy to define the development of conservation – a sector within culture that is facing urgent developmental changes to preserve heritage and simultaneously ensure its integration into sustainable development as one of society's fundamental essences and values. He defined the foundations for development as Conservation 1.0 – the phase of identifying heritage values, ensuring its legal protection, and integrating heritage conservation into the spatial planning processes. This phase took place in the 1960s. Meanwhile, Conservation 2.0 began in the 1990s. It was related to the development of technologies and natural sciences that enabled the implementation of appropriate conservation approaches to preserve heritage. During this phase, interdisciplinary approaches to successful heritage management were developed, education in the field was strengthened, and the conditions were created for understanding conservation as a proponent of change, whose primary goal was to prevent the deterioration of heritage. Finally, Conservation 3.0 – Adaptive Reuse, which defines heritage as a process of change and a development resource, is only just asserting itself. It allows for a holistic approach to heritage in line with the values it represents for all those associated with it and involves the principle of the values-lead approach in the process of change management. Among other things, such understanding contributes to increasing resilience, reducing environmental problems, and ensuring the sustainable development of local environments, thereby also increasing property values, as the author points out.¹⁸ Thus, heritage as a source of development has multi-dimensional effects and ensures sustainability, which is the foundation of its own resilience and that of the community it is a part of.

18 *ibid.*

3 Research

The concept of reusing abandoned buildings and sites is not new in architecture. However, it is the starting point that is innovative: understanding heritage as an inclusive social process that actively contributes to designing a sustainable and more equitable future and increases the resilience of local communities in the circumstances increasingly dictated by various crises. Throughout history, up until intensive industrialisation, adapting to the new requirements of the buildings and areas that had lost their primary function was a common practice. It was dictated by rational behaviour and the courageous decisions of those who valued past creativity. Even nowadays, we all still admire Michelangelo Buonarroti's decision to build inside the ruined frigidarium of the Roman baths of Diocletian and incorporate the ruins into the design of the Basilica of St Mary of the Angels and the Martyrs – or the urbanism of the small Tuscan town of Luca, whose development right up to the present day has been shaped by it growing on the remains of a Roman amphitheatre. Intense industrialisation has mostly put an end to this type of approach. However, in the context of limiting the intense climate change, the approach is re-emerging as an important way of rationally exploiting the embedded energy contained in what has already been built. Adaptive reuse projects are increasingly contributing to preserving heritage and protecting both its tangible and intangible elements. Through a values-led management approach, adaptive reuse therefore represents an important starting point, which is still being implemented too slowly, at least in Slovenia.

In the continuation, two examples that demonstrate, at very different scales, the potentials of heritage for increasing the resilience of the local environments through inclusive reuse projects will be presented. First, we will analyse the abandoned industrial heritage case of the derelict coal crushing and separation plant *Klasirnica* in the mining town of Velenje in north-eastern Slovenia, while the second case study analyses the potentials of the spontaneously developed adaptive reuse of Karst cultural landscape in the south-western end of the country.

Why industrial heritage? The abandonment of intensive industrialisation and the concern to preserve at least the most important production facilities that characterised this period has re-established the reuse of the existing buildings as one of the more prominent planning approaches. In this regard, the conservation sector has made a significant contribution by arguing for the importance of industrial heritage and steering its transformation in a way that preserves historical values while allowing for new uses of buildings that normally cover large areas and volumes. The increasing awareness of the harmful consequences of reckless development has undoubtedly contributed significantly to the decisions to reuse what already exists. Carlo Elefante's statement, "The greenest building is the one that already exists", best illustrates the changes that the built environment faces today. Unfortunately, reusing what already exists is not always the most economical in the short-term financial sense, although it supports all four aspects of sustainability, including the long-term economic aspect. However, financially, the latter is not always what investors want in the short term. In the local environments, especially smaller ones, we face many challenges related to managing and financing such projects.

Why Karst drywall construction? Typically, we talk about the adaptive reuse of buildings and related spaces. However, the Slovenian Karst region and its landscape is an example of how it is possible – through participatory integration and management for the purposes of heritage conservation – to simultaneously allow for the development of a new use: the function of space as a starting point for new development opportunities associated with tourism, sustainable agriculture, viticulture, and cultural offers. This enables everyone to be involved in the development. In this sense, the heritage of dry stone walling and, through it, the preservation of the cultural landscape as a driving force of the new economy of the region is revealed. At the same time, preserving drywall construction also contributes to maintaining its environmental resilience, protecting the area from the spread of fires and soil erosion, which is crucial in the face of increasingly intense winds. The importance of well-maintained dry stone walls was also demonstrated during this year's catastrophic fire.

3.1 *Klasirnica* – the abandoned coal separation plant in Velenje

The first example presents the challenge of exploiting, through adaptive reuse, the potential of the abandoned coal crushing plant *Klasirnica* in the mining town of Velenje with a population of just under 25,000. Due to the development of coal mining in the second half of the 20th century, Velenje, which nowadays faces major coal industry restructuring problems, developed from a small medieval town into one of the energy supply centres of the former socialist Yugoslavia and later independent Slovenia. Constructed next to the local coal mine in 1956 and expanded with Unit 6 in 2014, the Šoštanj Thermal Power Plant now generates about one third of Slovenia's electricity.¹⁹ In line with the implementation of the CTR 2030 and the energy restructuring of Europe, the coal mine and the power plant are supposed to close down by 2032.

The *Klasirnica* complex with its central building, erected in 1987, represents a significant development potential whose realisation cannot be the sole responsibility of the local community. The latter started seeking solutions for the new use of the site, in particular the coal crushing plant building, immediately after the plant ceased its operations in 2004. The InduPik Project, financed under the European Regional Development Fund – the Community Initiative INTERREG IIIA Slovenia-Austria 2000–2006, produced extensive analyses of the heritage area²⁰ and concept studies of various programme options.²¹ However, the project did not develop further because the local community could not ensure its financing and development by itself.

Today, as the city and the region face the imminent closure of the coal mine and the final restructuring of the region is urgent, *Klasirnica* is one of the projects that need to be dealt with yet again, although, in the meantime, its demolition has already been foreseen. In any case, given the commitment to

19 https://sl.wikipedia.org/wiki/Termoelektrarna_Šoštanj

20 Ifko, S. (ed.) 2005. Analiza kulturnovarstvenih značilnosti obravnavanih objektov in območij: končno poročilo I: projekt Indu.pik. Modeli revitalizacije objektov industrijske kulturne dediščine. Ljubljana: Mestna občina Velenje.

21 Ojstršek, A., Črnič, A. (ed.) 2006. Modeli revitalizacije objektov industrijske kulturne dediščine: idejna študija. Velenje. Mestna občina Velenje.



Fig. 1: A view of the Klasirnica coal preparation plant. At fifty-three metres tall, this is the highest building in the Šaleška dolina valley. Source: Mestna občina Velenje.

sustainable development and energy restructuring, demolition is not an option, especially as Velenje requires new commercial spaces. Demolition would result in the loss of 11,000 m² of available usable space and the generation of more than 38,000 tonnes of construction waste. These are two pieces of information telling enough to do everything to integrate the building's potential into the local development.

The need for preservation is also supported by the fact that the site represents an important heritage asset, even though it is still largely misunderstood by the general public because of its appearance. In the spring of 2022, the Institute for the Protection of Cultural Heritage of Slovenia already proposed that *Klasirnica* be declared a monument of local importance, which will have a significant impact on the possibility of acquiring additional funds for its conservation and integration into the future development of the city and the region. Conservation also means contributing to all aspects of sustainability and increasing the resilience of the entire region, which is on the threshold of major development challenges. The crucial problem is that no vision and development programmes exist to revitalise the building and the area.

As a part of the study research, the Faculty of Architecture of the University of Ljubljana has prepared a conceptual design and a test of the potential new uses of the area under the new circumstances, and the considerable potentials that can be implemented gradually in the framework of different scenarios have become evident.

The site's heritage value was already demonstrated with the studies carried out in 2005 and considered while testing the new adapted use. Unfortunately, vir-

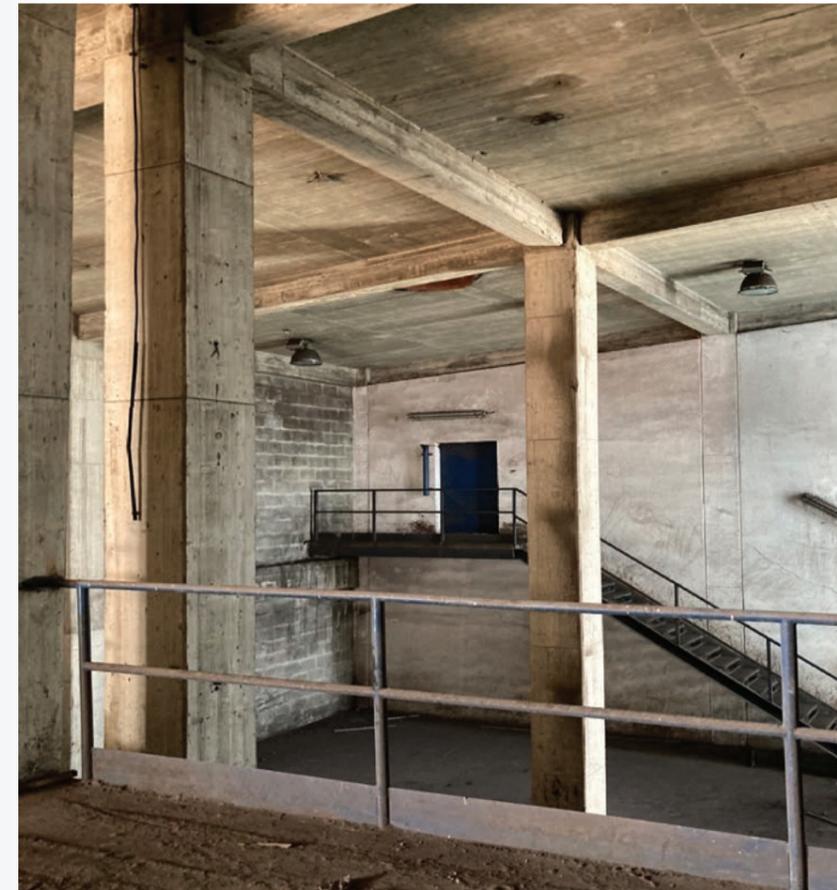
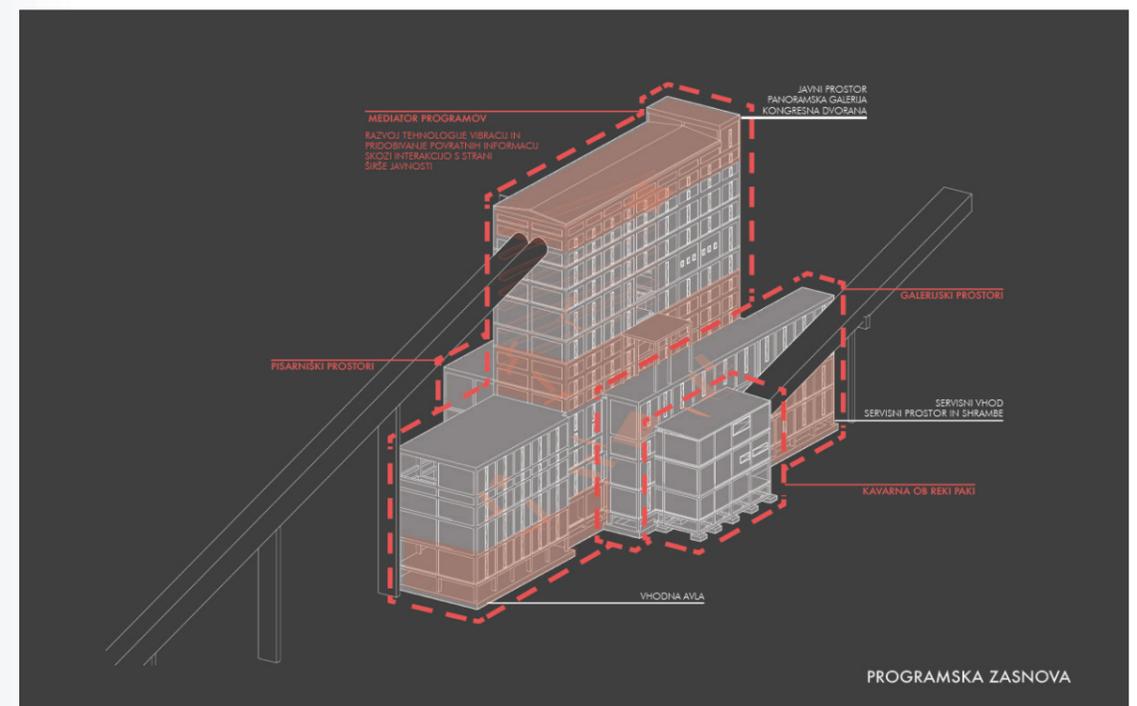


Fig. 2: The interior has the potential to accommodate a variety of programmes. Photo: Sonja Ifko.

Fig. 3: The starting point of the design is the creation of communication cores and then the gradual revitalisation of the individual parts in all parts of the building, in accordance with the needs and possibilities. Source: a study project, Faculty of Architecture, University of Ljubljana, mentored by Assoc. Prof. Dr. Sonja Ifko, students: Vita Kocjan, Isidora Marinković, Gaja Žgank.



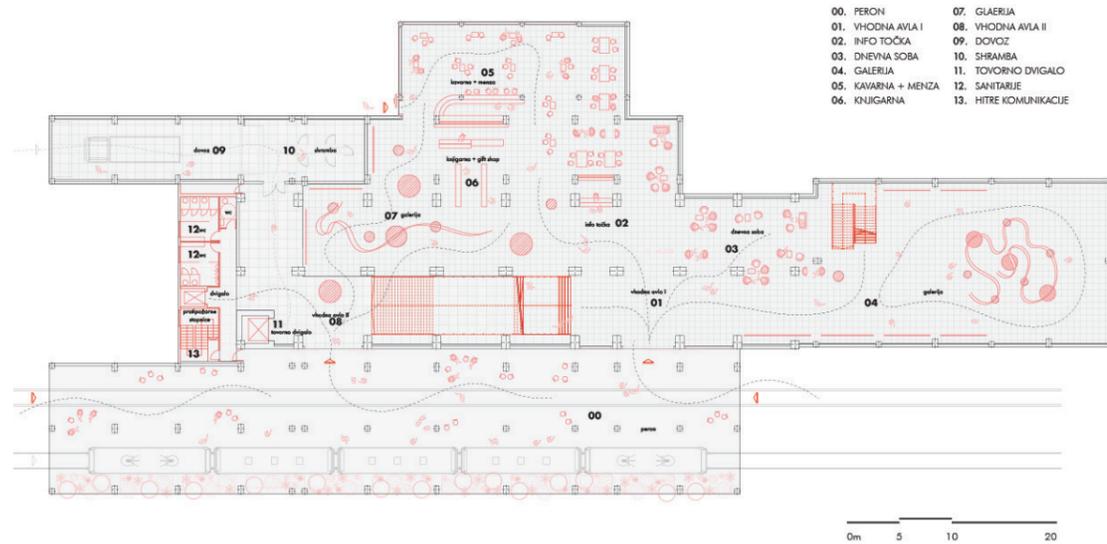


Fig. 4: The test of potentially reconfiguring the building's ground floor reveals it could accommodate several programme cores, which brings latitude to the programme adaptation and thus more flexibility for the project, which is crucial in the initial phases. Source: a study project, Faculty of Architecture, University of Ljubljana, mentored by Assoc. Prof. Dr. Sonja Ifko, students: Vita Kocjan, Isidora Marinkovič, Gaja Žgank.

tually all of the hardware has recently been removed in line with the intention to demolish the building. At this stage, it is therefore crucial to reverse the local community's decision to demolish the building and refocus its attention in cooperation with experts, the local NGOs, the public heritage protection service, and all other parties concerned to find appropriate solutions for the site's revitalisation. As the local community and the region are committed to restructuring to ensure a green sustainable transformation, good opportunities exist for appropriate reuse that also takes into account the values of this important heritage building. However, integration is needed to ensure inclusive project management. Furthermore, the sheer scale of the project makes it necessary to seek financial support and development orientations at the national level or more broadly, in the framework of the European energy industry restructuring initiatives in which the region will be involved. With its green and renewable energy-based development, the region's restructuring provides an important basis for new research and renewable energy development programmes.

If we use the project study to look at the opportunities for reusing the *Klasirnica* plant while ensuring long-term resilience – which calls for equal consideration of all four aspects of sustainability – we can see the potential for all of these aspects to be realised.

When we talk about environmental sustainability, the following parameters are highlighted:

- preserving the embodied energy of a building with 11,000 m² of existing surfaces for the new development of the town and region;
- the building's demolition would generate over 38,000 tonnes of non-recyclable reinforced concrete construction waste. Demolition is therefore unacceptable in the context of the existing circumstances of sustainable restructuring;
- the development of the newly planned commercial area, which extends right up to the floodplain of the river Paka, is replaced by a "vertical" business zone, thus also maintaining resilience in the event of natural disasters and flooding.

The implementation of the cultural sustainability aspect supports the following:

- the preservation of the vital heritage that testifies to the local history and mining identity and underpins the town's role in the region and the country today;
- the identity that is crucially linked to the urban life culture, which developed in the newly planned modernist city during the second half of the 20th century;
- the coal mining tradition associated with the identity of many individuals, including those who do not yet understand the newer industrial heritage structures in light of the heritage identity meanings.

From the social sustainability perspective, we are talking about:

- an important potential for strengthening the community, especially at a time of profound negative economic and social impacts brought about by the coal mine closure;
- existing facilities that enable the development of community resilience in uncertain circumstances;
- providing people who will be out of work after the restructuring has been completed with new development opportunities related to the increasing importance of the activities of individuals as members of the urban community.

The economic aspect is associated with:

- opportunities to provide new jobs. In this regard, we must take into account the need for jobs that require both higher and lower education;
- the project for the adaptive reuse of the *Klasirnica* plant, which has the potential to create opportunities and security for new business start-ups and represents an environment for launching new career opportunities for local residents.
- The flexibility of the existing premises allows for swift adaptation to various needs at minimum cost;
- the opportunities for development breakthroughs in renewable energy research and implementation. Appropriate programming in line with the national and broader context, which must be open and flexible, is of crucial importance at this point;
- the creation of the conditions for public-private partnerships in the development field;
- the creation of new opportunities for domestic and foreign investors.

Therefore, the realisation of coherent future development is crucially linked to appropriate interdisciplinary project cooperation and participation of the local population. While this is also a management-intensive process, it represents the foundations for sustainable solutions that are resilient in the long term.

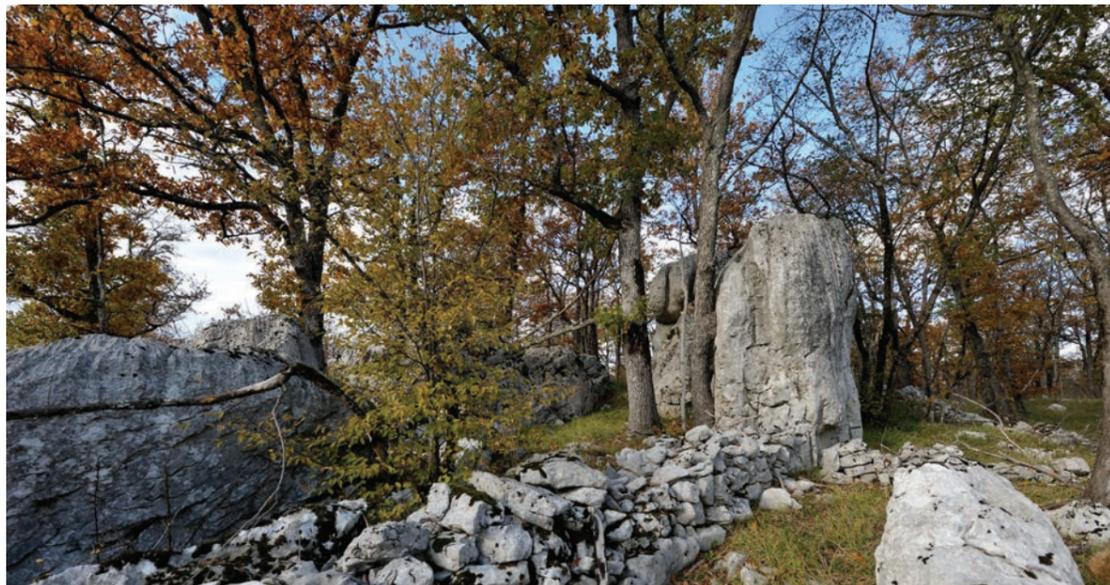
3.2 Dry stone walling in the Karst region

In the Slovenian Karst region, the preservation of dry stone walling has resulted in the creation of heritage communities, which represent important active

co-creators of the modern development protection of the entire region. Drywall construction is not only present in the Karst but also elsewhere in Slovenia and the world. It is one of the fundamental identity elements of all the areas where it is found, as it is one of the oldest human activities that transform space. As a masonry skill of building walls without binders, using the locally available materials obtained from land clearing and development, it is included in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity.²² The following is stated in the explanation: “They play a vital role in preventing landslides, floods and avalanches, and in combating erosion and desertification of the land, enhancing biodiversity and creating adequate microclimatic conditions for agriculture. The bearers and practitioners include the rural communities where the element is deeply rooted, as well as professionals in the construction business. Dry stone structures are always made in perfect harmony with the environment, and the technique exemplifies a harmonious relationship between human beings and nature. The practice is passed down primarily through practical application adapted to the particular conditions of each place.”²³

In the Karst region, dry stone walls have been created over millennia based on fundamental functional premises of clearing land for agriculture, demarcating it in terms of ownership, and protecting the fertile but scarce soil of the Karst landscape. Today, they represent an element of the cultural landscape that has begun to disappear and become overgrown due to the changes in the way people live and work. The visual role of dry stone walls and, in some cases, their physical presence in the landscape started to fade during the second half of the twentieth century.

Fig. 5: Dry stone walling is one of the crucial elements of the Karst landscape. Source: Slovenia.info, Borut Lozej.



22 Jerin, A., Židov, N. 2021. Register nesovne kulturne dediščine Slovenije (2008–2021). Ljubljana. Slovenski etnografski muzej.

23 <https://ich.unesco.org/en/RL/art-of-dry-stone-walling-knowledge-and-techniques-01393>

on a number of projects, both in Europe and Slovenia. Over the last twenty years, active heritage communities have gradually emerged that notably contribute to the preservation of traditions and knowledge in their environments – that is to say, to the conservation of intangible elements and, by restoring drywall structures, also material remains, which contribute to the preservation of the cultural landscape. During this time, many valuable studies and manuals have been produced,²⁴ representing an important basis for conservation. This successful work has also resulted in the establishment of an important network of local heritage communities, which nowadays operate under the auspices of *Partnerstvo za kraško suhozidno gradnjo (Partnership for Karst Dry Stone Walling)*. Their primary role is to preserve and disseminate knowledge and practices. However, as the President of the Partnership Danilo Antoni²⁵ said at the Complex Pasts: Diverse Futures consultation, which ICOMOS Slovenia organised in 2021, the heritage communities gathered around the Partnership also represent the core of the networking in the local communities. This is most directly summed up in his statement that the Partnership’s activities over the years have proved that “when we build a dry stone wall, we build a community”. The notion reflects the role of heritage in ensuring social and cultural sustainability. These processes can only take place through the synergy of all stakeholders. At the same time, it is essential that everyone else also gets actively involved: politics, business, and, of course, the professional public heritage protection service because heritage communities cannot function as the main drivers of development through voluntary work alone. However, they can make an outstanding contribution to organising the local community and raising awareness of the importance of heritage among the local population. Thus, they can create the conditions for the better assertion of heritage and its integration into the development projects and cultural tourism offers of the entire region, all of which is crucial for strengthening heritage resilience.



Fig. 6: A Partnership for Karst Dry Stone Walling work campaign. Photo: Nataša Kolenc.

24 An example of a manual created in the framework of an international territorial integration project in 2014: https://www.zvkds.si/sites/www.zvkds.si/files/uploads/files/publication/slo_001.pdf

25 <https://www.youtube.com/watch?v=sl35fKrHfGk&t=2956s>

With regard to achieving coherent sustainable development, the benefits of preserving drywall construction can be identified through all four aspects of sustainability.

As a contribution to environmental sustainability, the following should be emphasised:

- well-maintained dry stone walls function as important barriers and prevent the spread of fires;
- dry stone walls protect the soil in the event of extreme winds, which are already frequent in the area but becoming even more common and intense due to climate change.

Cultural sustainability is expressed as:

- protecting the cultural landscape;
- shaping heritage communities;
- preserving the intangible and material elements of dry stone walling;
- the direct and indirect impact on the conservation of other cultural heritage;
- the impact on the preservation of the natural values of the environment.

The social sustainability of maintaining drywall construction is reflected as the following:

- a vital contribution to bringing people together in the local communities;
- while motivated by heritage protection, heritage communities are becoming one of the most crucial vehicles for organising the inhabitants not only locally but also on the regional level;
- immigration of both Slovenians and foreigners to the area.

The economic aspect is expressed through:

- the realisation of a broad range of business opportunities in the tourism sector;
- increased interest in the development of culture and related activities, which contribute to the visibility of the Karst region as a tourist destination and a place of quality nature-based living;
- increased property value;
- the establishment of public-private partnerships in cultural tourism;
- increased investments from private investors;
- the successful acquisition of resources from the European development funds intended for the preservation of cultural heritage.

The continuation of the successful cooperation for the preservation of dry stone walling and its already established integration into the region's development was crucially jeopardised by this summer's catastrophic fire, which changed the cultural landscape beyond recognition in some places. Century-old forests burned down, many emergency logging operations were carried out due to prevention, and dry stone walls were destroyed during the interventions in such a manner that their network, which is directly connected to the network of footpaths, was significantly damaged. On the other hand, the fire exposed many overgrown walls, further emphasising their presence and importance in the area.



The new circumstances pose challenges for cooperation in post-fire rehabilitation and during the preparation of appropriate rehabilitation projects to ensure fire safety in the future. Those responsible rushed to prepare the necessary documents, which is encouraging. Now the responsibility of all stakeholders, not only the heritage communities gathered around the Partnership, is being put to an important test, as the rehabilitation and integrated conservation of the heritage and cultural landscape values must be included in the planning process. As I am concluding this article, a draft Recovery Plan for the forests damaged during the Goriški Kras fire²⁶ has been published, and the first reactions are already coming in. Irena Hlada published the following on the website of the Miren-Kostanjevica municipality,²⁷ eloquently testifying to the citizens' preoccupation with the fate of the heritage during the recovery process: "... Throughout the millennia, people have laboured tirelessly to leave us a priceless legacy of creations made from the material that was all around them in immeasurable quantities. With the structures they created, they have transformed this magical landscape, lacing it with dry stone walls and dotting it with stone houses whose brilliant white colour contributes to the harmony of colours and structures.

And it is this very stone, which is virtually everything that Karst has to offer, that is now being almost completely ignored. Everyone talks about forests, fire-breaks, roads... But no one has said a word about the heritage that has been fatally wounded!"

Fig. 7: Fire in the Karst in July 2022.

²⁶ http://www.zgs.si/aktualno/novice/news_article/izdelan_predlog_nacrta_sanacije_za_gozdove_poskodovane_v_pozaru_goriski_kras_891/index.html

²⁷ <https://www.mojaobcina.si/miren-kostanjevica/novice/ekologija/kaj-rabi-kras.html>



Fig. 7: Drywalls had to be demolished in order to provide access to firefighters during the July fire. However, due to the planned expansion of the access routes, which would ensure better accessibility to the areas in the future, they are also at risk in the future. Here are the key challenges for which it is necessary to find coordinated solutions as soon as possible. Photo: Nataša Kolenc.

The statement expressively highlights the problems that have arisen while planning the recovery. During the preparation and implementation of the recovery interventions, it is vital to ensure that interdisciplinary teams of experts and the values of all stakeholders are taken into account, which is difficult to do or can even be forgotten precisely because of the necessity to take immediate action. Therefore, all those responsible must ensure that a model of participatory management of the rehabilitation interventions is put in place to prevent the recovery efforts from further damaging and destroying the area's heritage potentials, which have proven to be crucial for development over the last few decades and on which the quality of life in the area hinges. Experience has shown that haste, which is otherwise essential for fire risk reduction, as well as ignorance can lead to unintentional destruction of heritage. This was also highlighted in the above-mentioned study of the OMC group of Member States' experts on strengthening cultural heritage resilience to climate change.²⁸

4

Discussion and conclusions

Both examples under consideration show that cultural heritage can significantly contribute to ensuring long-term resilience in local environments. Its comprehensive conservation contributes to all four aspects of sustainability. It has been confirmed that perceiving heritage as a process of change or as a social practice and resource for development represents a crucial starting point, proven to contribute to developing resilience. It is vital to present this approach to all decision-makers and the broader public, especially when they do not realise the full benefits of heritage conservation. One such example is the industrial heritage of the Klasirnica coal washery, erected in the last quarter of the 20th century. Its planned demolition is in complete contradiction with all sustainable development objectives, and it is therefore imperative to present the multifaceted implications of its conservation to the local community leaders as the key decision-makers on the future of the heritage. In such cases, the entire heritage sector is put to a crit-

28 Ibid.

ical test, calling for interdisciplinary expertise and cross-sectoral cooperation at the decision-making levels. This goes beyond the way things are currently done in Slovenia and therefore requires additional attention. As soon as possible, we need to do everything to make sure that cooperation takes hold because more and more often, we must face the unforeseen consequences of climate change. In the future, the public heritage protection services will need to take over some of the activities in this area. In Slovenia, it appears that the entire construction sector will need to be restructured. Moreover, the strict implementation of the Construction Act provision stating that renovation and thus adaptive reuse shall take precedence over new construction must be ensured.

As the Conservation 3.0 model establishes and as the analysis of the two cases shows, heritage, in its new role, is one of the crucial drivers of sustainable development. The example of the organisation in the Partnership for Karst Dry Stone Walling shows how a well-informed public can contribute, in cooperation with all stakeholders, to preserving heritage and strengthening resilience in the local and even broader regional area.

In summary, it is crucial to ensure interdisciplinary cooperation and raise awareness of the role of heritage as a building block for local development and thus an essential agent in the struggle against the effects of climate change. The experts must focus on this issue in a much more organised manner and use concrete examples to educate and inform all stakeholders in the local environments. Thus, we can contribute to transforming public opinion and improving the understanding of heritage, as well as more easily steer the development to ensure better results in developing resilience, which will result in a better and more equitable life for everyone.

TOPIC I

***The Situation and
How Prepared are We***

*Kakšno je stanje in
kako smo pripravljeni*



Photo: Idrija Mercury Heritage Management Centre.

ANŽE JAPELJ, TATJANA DIZDAREVIĆ, GIULIA PESARO, DANIELE CROTTI

Action Prioritization when Protecting/Salvaging Cultural Heritage in the Event of Natural Hazards: Development and Testing of the ATTACH Tools within the Alpine Context

SUMMARY

The Alps are a particular environment, in which long-lasting human presence had garnered prominent traces of cultural heritage. Apart from this, the mountainous terrain, the diverse altitudes and changing climate make the alpine environment especially vulnerable to an increase in numbers and intensity of natural hazard events. In combination with the great importance of tourism, which is a source of income for local businesses, this creates one of the key challenges for the future development of the Alps. Natural disasters can cause irreversible damage not only to the infrastructure and housing, but also to cultural heritage. Such events could jeopardize sections of the tourist sector that rely heavily on the assets of cultural heritage, and in order to secure as many jobs as possible, the negative consequences of the natural hazards need to be mitigated as much as possible.

One way of doing this is to improve our readiness for times of emergency. A clear action protocol, with smart allocation of human and material resources to either prevent or at least minimize damage on cultural heritage seems an important element of cultural heritage management. The CHEERS (Interregional ALPINE SPACE) project has developed ATTACH, a practical tool that sets the priorities in terms of which cultural heritage assets need to be protected / salvaged in the event of various types of natural hazards. ATTACH builds on previous know-how and additional innovative elements, and is conditional on setting values on individual cultural heritage assets. The higher the value, the higher the priority to protect / salvage. The process of setting the value comprises of five steps, which are to be completed through desk-work and involvement of various key stakeholders in a participatory atmosphere. All phases are practically implemented in a spreadsheet format that enables a clear and transparent flow of work, and which, in the end, provides a set of priorities for an arbitrary group of cultural heritage assets.

The ATTACH tool was practically tested on the case of the underground Mercury Mine Museum in the town of Idrija (Western Slovenia), with a fire event simulation that would put eight cultural heritage assets at risk, all of them key elements of Anthony's main mine road, a UNESCO work heritage site and an important tourist attraction visited by many people. The museum is managed by the public institute Idrija Mercury Heritage Management Centre (CUDHg Idrija). Several outcomes of the testing indicate ATTACH's potential to be implemented in a natural disaster protection system, focusing on cultural heritage. Suggestions for future improvements were also provided by the attendees of the valuation exercise.

Prednostna obravnava ukrepov za zaščito/reševanje kulturne dediščine ob naravnih grožnjah: razvoj in preizkušanje orodij ATTACH v alpskem okolju

POVZETEK

Alpe so posebno okolje, v katerem je dolgotrajna prisotnost človeka pustila jasne sledi v obliki kulturne dediščine. Poleg človeškega vpliva so Alpe zaradi gorskega okolja, velikih razlik v nadmorski višini in spreminjajočega se podnebja še posebno občutljive na vse pogostejše in intenzivnejše naravne grožnje. Turizem je vse pomembnejši vir prihodka za lokalna podjetja v alpskih regijah in v povezavi z vse večjo ranljivostjo Alp to predstavlja enega ključnih izzivov za prihodnji razvoj Alp. Naravne nesreče lahko nepopravljivo poškodujejo infrastrukturo in bivališča, pa tudi kulturno dediščino. Takšni dogodki lahko ogrozijo dele turističnega sektorja, ki je močno odvisen od bogastev kulturne dediščine, zato je treba čim bolj preprečiti negativne posledice naravnih nesreč, če želimo zaščititi delovna mesta.

Ena od rešitev je boljša pripravljenost na izredne razmere. Pomemben del celovitega upravljanja kulturne dediščine je jasen protokol ukrepov, v katerem so človeški in materialni viri smotno razporejeni, s čimer se prepreči ali vsaj omili škoda, ki lahko nastane na kulturni dediščini. V okviru projekta CHEERS (Interreg ALPINE SPACE) so razvili praktično orodje ATTACH, ki se uporablja pri prednostnem določanju virov kulturne dediščine, ki jih je treba ob različnih naravnih grožnjah zaščititi/rešiti najprej. Orodje ATTACH se opira na obstoječe strokovno znanje in dodatne inovativne elemente, bistveno za uporabo tega orodja pa je, da je virom kulturne dediščine pripisana vrednost. Čim večjo vrednost ima kulturna dediščina, tem višje bo na prednostni lestvici in prej bo zaščiten/rešen. Postopek vrednotenja se opravi v pisarni, sestavljen je iz petih korakov, vključiti pa je treba tudi različne ključne deležnike in jih spodbuditi k sodelovanju. V vseh fazah postopka se uporabljajo preglednice, ki zagotavljajo jasen in pregleden potek dela, končni rezultat pa je seznam prednostnih nalog za poljubne skupine virov kulturne dediščine.

Orodje ATTACH je bilo preizkušeno v praksi v idrijskem rudniku živega srebra (na zahodu Slovenije), v katerem je zdaj podzemni muzej. V rudniku so izvedli simulacijo požara, ki bi ogrozil osem virov kulturne dediščine – ti sodijo med bistvene elemente Antonijevega rova, ki je vpisan na seznam Unescove svetovne dediščine, poleg tega pa je tudi ena od pomembnih turističnih znamenitosti, ki jo obiščejo množice obiskovalcev. Muzej upravlja javni inštitut Center za upravljanje z dediščino živega srebra Idrija (CUDHg Idrija). Različni rezultati preizkušanja kažejo, da bi orodje ATTACH lahko uporabili v sistemu zaščite pred naravnimi nesrečami, osredotočenem na kulturno dediščino. Pri evalvaciji orodja so sodelujoči pripravili tudi predloge za prihodnje izboljšave.

1 Introduction

1.1 The Alps and their cultural heritage

Despite the harsh conditions, the Alps have been populated for over a millennium and are currently home to over 14 million people. According to the areal boundaries defined by the Alpine Convention, they cover almost 200,000 km² and span across eight countries. Through time, the close co-habitation of man and nature shaped the Alps into a biodiversity-rich environment hosting approximately 13,000 plant and 30,000 animal species, which makes the Alps a regionally important area for nature conservation as well as an attractive tourist destination. This is related to the fact that over 20% of the Alps is covered by National parks and Natura 2000 sites. On the other hand, as little as 4% of the population are still active farmers.

The population drain from the Alpine area varies according to location. Some parts of the Alps experienced a substantial growth (e.g. some parts in France and Italy), whereas some were subjected to significant depopulation (e.g. some parts in Austria). People have mainly moved to larger cities because of employment possibilities, but the trend is not as negative as it was in the past due to seasonal residents. New work opportunities are emerging, especially in tourism and ecological farming. A clear pattern can be observed as the population in the vicinity of tourist centres is predominantly on the increase, which depicts the growing importance of tourism on the income.

Climate change and its effects also have an important impact on the Alps. The alpine area is facing an exceptionally high rise in average temperatures, more than twice as much as the rest of the northern hemisphere. On the other hand, the trend in precipitation is not as unambiguous. As the northern part of the Alps is to receive more precipitation in the future, the Southern Alps could become drier.¹ The increase in the frequency and intensity of natural disaster events is one of the aftereffects of climate change and since the Alps are extremely vulnerable to the shifting climate,² natural hazards play a crucial role. In addition to the losses of winter tourism due to the decrease in snow cover, OECD has identified increasing exposure of settlements and infrastructure as a

1 Zhongming, Z., L. Linong, Y. Xiaona, Z. Wangqiang and L. Wei. 2009. Regional Climate Change and Adaptation—The Alps Facing the Challenge of Changing Water Resources. EEA report 8/2009: 143 p.

2 EC. 2009. Adapting to Climate Change: Towards a European Framework for Action. White paper. COM(2009), 147/4 final.

leading cause of vulnerability.³ This was showcased by extreme flooding across the Alps in 1999, 2002, 2005, 2007 and 2010 and an exceptional avalanche episode in the winter of 1999. It is therefore important to establish effective safeguarding of the Alpine population, so that people will be able to enjoy minimum risks. In this way the local population will feel safer and will not seek their homes or work elsewhere.

For centuries the Alps have been interchangeably a place of both, rapid development and quick abandonment, which meant that the inhabitants and their culture had changed several times. Farming, mining, forestry, and lately tourism have brought changes to the landscape and led to the development of the cultural landscape. At this we do not have in mind merely built elements such as churches, castles, bridges, mine shafts, built waterways, etc., but also other artefacts, which are commonly associated as those that make the cultural heritage of the Alps unique and worthy of preserving. Visiting museums, monasteries, and old village centres are a key part of the tourist arrangements that make cultural heritage crucial for sustaining a part of the locals' wellbeing. Thus, it makes sense to safeguard cultural heritage in order to preserve a part of the Alpine economy, making the Alps more attractive to live in and sustain the local society. Cultural heritage in the Alps is in a unique position as, in addition to being a source of local identity, it also represents one of its main development factors.⁴ It can fit into all categories, such as material resources, intangible resources, activities and territory.

However, there is another unique element that was pinpointed in the previous section of this chapter – the high probability of natural risks, which are becoming amplified by climate change. In combination with the vulnerable and fragile objects of cultural heritage, this presents a major risk not only to the existence of the local communities, but to their economic and social development as well. Thus, there is a pragmatical need to develop and implement sound solutions for either preventing damage due to natural hazards or for mitigating the long-lasting negative effects if such events occur. Surely, complete prevention would be the best alternative, but effective preparation for emergencies that cannot be avoided is also important. Planning salvaging and rescue actions is a crucial part of being prepared to act effectively when necessary. As shown by several regional assessments, even though cultural heritage in the Alps is subject to general local protection, the specific safeguard from natural hazards during emergency and recovery phases still lacks proper regulatory settings, operational abilities and widely-shared knowledge of the socio-economic value embodied into the assets at stake. Thus, an innovative operational tool for prioritizing rescue and salvage efforts (ATTACH – **evAluation Tool for Alpine Cultural Heritage**) in the context of Alpine cultural heritage and natural disasters has been developed and tested within the CHEERS project. It is based on both, previously generated know-how, as well as knowledge consolidated within the project.

³ OECD. 2007. Climate Change in the European Alps. Adapting Winter Tourism and Natural Hazards Management.

⁴ Pesaro G. 2012. Distretti culturali nelle Alpi tra omogeneità e specificità: le determinanti di esiti diversi in due casi lombardi, Acta XXXIII Italian Conference of Regional Science, Rome, September 13-15 2012

1.2 The need to act in case of natural emergencies

In cases of emergencies in which cultural heritage assets are likely to be endangered or even damaged, a team of cultural heritage experts, civil protection personnel and other actors in charge of the crisis on a local and regional level need to organize themselves and reach a decision as to where, when and to what extent do they need to intervene. The organisation of both protection and salvage operations needs to be grounded on the available human, financial and material resources and usually need to be performed swiftly. The fact that cultural heritage assets are frequently vulnerable due to their age and means of protection might be limited by their format/size, so maintaining the asset's characteristics might prove important when acting swiftly.

Thus, a rapid response tool is needed to provide a system of priorities. These include many elements, such as level vulnerability and likelihood of hazard and are to provide a clear indication of which cultural heritage assets should be saved first. The key element upon which priority can be defined is the asset's value, which can be an integral part of its vulnerability assessment. The higher the value that can be lost during an emergency, the more vulnerable the cultural heritage asset is, which means it needs to be addressed with a higher priority.

In order to pinpoint the value, we need to consider the asset's characteristics, which include unicity/rarity, age, material, historical and artistic relevance and the importance for the local communities. The availability of this information for each cultural heritage asset would therefore enable one to contextualize the salvage operation and support the in-the-field decision maker to minimize heritage value losses during emergencies.

2 Theoretical framework and development of ATTACH

2.1 Notion of risk

Risk is one of the key concepts ATTACH has been built on, at least in the part where it relates to vulnerability. Risk is commonly defined as a product of the hazard (physical and statistical characteristics in a specific environment) and vulnerability of an exposed asset,^{5, 6, 7} although alternative views (figure below) exist as some define risk with a triangle in which hazard, exposure and vulnerability contribute independently.⁸

⁵ Wisner B, Blaikie PM, Cannon T, Davis I. 2004. At Risk: Natural Hazards, People's Vulnerability and Disasters. Routledge; 471 p.

⁶ Apel H, Aronica GT, Kreibich H, Thieken AH. 2009. Flood Risk Analyses—How Detailed Do We Need to Be? Natural Hazards 49: 79-98.

⁷ Vojinovic Z, Hammond M, Golub D, Hirunsalee S, Weesakul S, Meesuk V, Medina N, Sanchez A, Kumara S, Abbott M. 2016. Holistic Approach to Flood Risk Assessment in Areas with Cultural Heritage: A Practical Application in Ayutthaya, Thailand. Natural Hazards 81: 589-616.

⁸ Dewan A. 2013. Floods in a Megacity: Geospatial Techniques in Assessing Hazards, Risk and Vulnerability. Springer: 199 p.

Fig. 1: The risk triangle
(Crichton 2002)



Hazards are determined upon the probability of past events and are commonly represented by hazard maps. Hazard maps have a fundamental role in the design and dimensioning of mitigation structures and land planning as well as in the definition of risk and hazard management policies.⁹ Hazard maps allow both, the recognition of areas affected by the hazard with different levels of intensity, and the establishment of the presence of hazard hot spots.

Vulnerability refers to the conditions and capacity to make an asset susceptible to harm as an effect of a hazard (Vojinovic et al. 2016). It is based on human-nature interaction and is viewed as an outcome of the hazard which is determined by exposure, sensitivity and the potential consequences of a hazard⁸. Consequences result in damage due to physical, social, institutional, economic and environmental effects.

There are a few types of causal structures of vulnerability, which can be 'parameterized' by either qualitative or quantitative indicators, which suggest the extent of potential damage. For example,¹⁰ there are three suggested factors upon which vulnerability depends: exposure (location relative to hazard), resistance (livelihood), and resilience (adjustments, preparations), while¹¹ defines vulnerability as a function of exposure, sensitivity (likely effect of the hazard) and adaptive capacity (ability to cope).

9 Lari S, Frattini P, Crosta GB. 2014. A Probabilistic Approach for Landslide Hazard Analysis. *Engineering Geology* 182: 3-14.

10 Pelling M. 2012. *The Vulnerability of Cities: Natural Disasters and Social Resilience*. Routledge: 212 p.

11 McCarthy JJ, Canziani OF, Leary NA, Dokken DJ, White KS. 2001. *Climate Change 2001: Impacts, Adaptation, and Vulnerability: Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.

Parallel to the causal structure, there are various ways to assess vulnerability (Dewan 2013), which usually differ in terms of the scale used in the study.^{12, 13, 14} However, in general, two basic approaches exist – biophysical and social.¹⁵ According to the first one, vulnerability is conceptualised as a pre-existing condition, which is determined by exposure and sensitivity to the hazard, and is similar to risk, but differs in the absence of probability as a function. In the second one, vulnerability depends upon social, political and economic factors, which determine the resistance and recovery – i.e. adaptive capacity. Several authors combine both aspects, and one of the exemplary cases¹⁶ suggests the use of an alternative six-step protocol to estimate vulnerability, where the first one is to define the value of the cultural heritage, which is the aim of the ATTACH approach presented in this paper.

Types of cultural heritage value

The value of cultural heritage is captured through a system of different types of values, which are to some extent adopted from the ABC method¹⁷ on cultural heritage assessment, and to some degree adjusted to fit the specific social and ecological circumstances of the Alps. This adjustment is obvious from the list of different types of values, which is to comprehensively outline the total value of the cultural heritage asset. It consists of seven types of values, which are presented in the table below.

Table 1: Types of values used in the ATTACH approach.

Type of value	Definition
Evidential value	Potential of the cultural heritage unit to yield evidence of past human activity (physical remains, written records, archaeological deposits, etc.).
Historic value	Relates to the ways in which past people, events and aspects of life can be connected through the cultural heritage unit to the present. This type covers several aspects such as an illustrative dimension indicating whether it illustrates something particular or distinctive, associative meaning referring to whether the asset relates to a notable family, person, event or movement, and historical importance depicting the historical period which it originates from.
Aesthetic/artistic value	Relates to ways in which people draw sensory and intellectual stimulation from cultural heritage assets either as a result of conscious design or the seemingly fortuitous outcome of the way in which cultural heritage has evolved and has been used over time.

12 Adger WN. 2006. Vulnerability. *Global Environmental Change* 16: 268-281.

13 Eakin H, Luers AL. 2006. Assessing the Vulnerability of Social-Environmental Systems. *Annual Review of Environment and Resources* 31: 365-394.

14 Birkmann J. 2007. Risk and Vulnerability Indicators at Different Scales: Applicability, Usefulness and Policy Implications. *Environmental Hazards* 7: 20-31.

15 Ford JD, Smit B. 2004. A Framework for Assessing the Vulnerability of Communities in the Canadian Arctic to Risks Associated with Climate Change. *Arctic* 57: 389-400.

16 Daly C. 2014. A Framework for Assessing the Vulnerability of Archaeological Sites to Climate Change: Theory, Development, and Application. *Conservation and Management of Archaeological Sites* 16: 268-282.

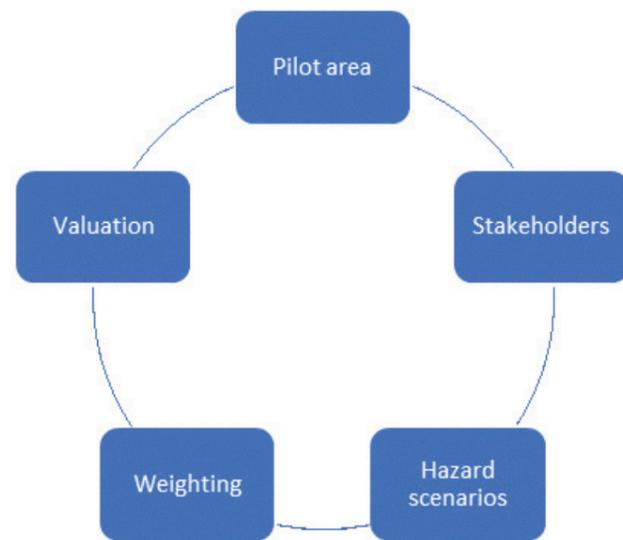
17 Michalski S, Pedersoli JL. 2016. *The ABC Method: A Risk Management Approach to the Preservation of Cultural Heritage*. Ottawa, Canada: Canadian Conservation Institute. 163 p.

Communal value	Derives from the meanings of the cultural heritage asset for those who relate to it or for whom it figures in their collective experience or memory. Communal value refers to three aspects such as the symbolic meaning of a place for those drawing their identity from it or having emotional links to it, social importance of places people perceive as a source of identity, distinctiveness, social interaction and coherence, and spiritual value, which emanates from the beliefs and teachings of an organised religion or reflect the past or present-day perceptions of the spirit of the place.
Economic value	Derives from the potential of the cultural heritage asset to produce financial dividends for society as a result of direct or indirect economic activities connected to the use and function of the cultural heritage asset.
In-use/fruition value	Relates to the fact that an asset is accessible/open to the community and used rather freely.
Scientific/educational value	Derives from the asset having information or data that (might) contribute significantly to scientific research and academic studies.

2.2 The ATTACH approach

The ATTACH (evAluaTion Tool for Alpine Cultural Heritage) methodology is designed as a five-step process, in which the first three steps frame the valuation context and the last two involve the actual valuation of the cultural heritage asset. To a certain extent it relates to the concept of the ABC method (Michalski & Pedersoli 2016), however it also includes several new aspects. All steps are practically implemented in a spreadsheet format which involves populating the pre-defined forms with data (Annex 1). This data is collected either by desk-research or in a participatory manner by involving stakeholders in focus groups, workshops or interviews. Each step is illustratively described below.

Fig. 2: An outline of the five-step process of the ATTACH approach



Location of cultural heritage (pilot area)

The first step of the ATTACH approach is to come up with a general description of the area containing the locations of the cultural heritage assets. Having information on past events, terrain features and the size of the population might bring a broader general understanding of the area’s local character and a wider consideration of the context in which the valuation is to be performed. Of course, the size of the pilot area depends on the overall aim of the valuation and the bundle of cultural heritage assets we wish to consider – from the size of a small settlement or even a single building, up to a region of several hundred square kilometres.

Involving stakeholders

Including people from different professional backgrounds such as curators, civil protection personnel, representatives of local communities, and owners of the cultural heritage assets is a key element when implementing ATTACH. One of the innovative aspects is that a variety of stakeholders take part in the valuation process so that a wide representation of opinions and knowledge is blended and finally consolidated in a common set of values. This also increases the validity of the valuation outcomes and makes it more likely for them to be used by the decision-makers.

Selecting who to involve is a critical step in managing stakeholders and needs to be planned carefully. Thus, ATTACH offers a template to map stakeholders according to their perceived interest in the valuation of cultural heritage, their power in implementing either valuation outcomes in practice or introducing changes into the existing valuation system according to the lessons-learned through the valuation exercise, and their attitude towards the valuation of cultural heritage. Approaching stakeholders depends on this characterization, which is illustratively represented in the image below.

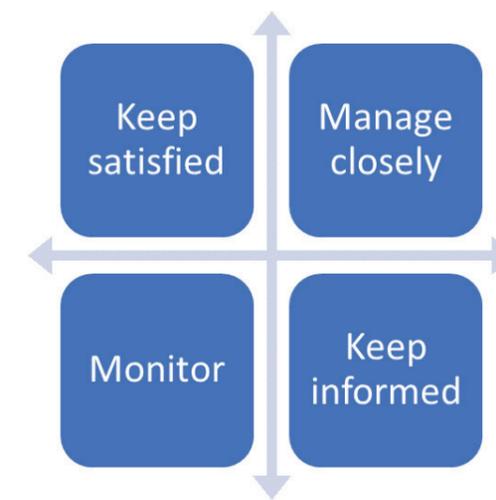


Fig. 3: The concept of mapping stakeholders according to their power and interest.¹⁸

¹⁸ Bourne L. 2009. Stakeholder Relationship Management: A Maturity Model for Organisational Implementation, Routledge: 246 p.

The aim of this step is to define the stakeholders that need to be focused on most intensively, i.e. those with high levels of motivation and power – key players that have the capacity to introduce changes and make a valuation either a success or a failure. However, others should not be neglected. Stakeholders with high interest but low power (residents, some NGOs, etc.) also need to be involved, as one of the key assumptions for developing the ATTACH valuation tool is to broaden the group of stakeholders as having only professionals or officials might produce biased valuation outcomes.

A special section of the spreadsheet tool is devoted to documenting all information related to the stakeholders as this eases the selection process so that one implementing the ATTACH tool is able to argue why each stakeholder was selected and involved in the valuation and why some were omitted. In addition to the aspects of interest and power, five more elements, which might be valuable to furthermore describe the individual stakeholder are integrated – stakeholder's (1) attitude, (2) role in valuation (attendee, coordinator, animator, ...), (3) significance to the project as in how can one contribute to the success of ATTACH, stakeholder's (4) requirement from the ATTACH, and (5) some additional issues and comments one might rise during the implementation of ATTACH and might help in the fine tuning of the tool.

Designing hazard scenarios

When alternative hazard scenarios are defined it is possible to pinpoint cultural heritage assets that might potentially be exposed to different natural hazards. This step is case-specific and depends on the pilot area characteristics, the relevant types of natural hazards and the cultural heritage asset under assessment. It is also related to the available data and the analytical approach of designing hazard scenarios. They usually combine information on the possible extent and intensity of the natural hazard event and relate this with the probability of the event. The expression of the extent of the event depends upon the type of natural hazard being assessed and is exhibited by the e.g. flooded area, size of the landslide etc., whereas the intensity (severity) is related to the depth of inundation, the kinetic energy of rockfall, fire intensity and so on. Probability is commonly expressed by return periods of events of various magnitudes. Combining this data provides the information on the level of the hazard.

A section of the ATTACH tool allocated to this part allows to simply input relevant information describing the extent and intensity of the natural hazard scenario it is depicting. Both aspects are to be described in a narrative format so that anyone can retrieve the information at a later stage. The number of scenarios described, and possibly implemented is unlimited and one can actualize numerous different sequences of natural hazard events. Additionally, there is a column in which cultural heritage assets exposed to a natural hazard according to a specific scenario can be listed. In this way the actual list of the assets relevant for the valuation is defined.

Weighting types of values

All types of values are not equally present in different socioeconomic and environmental settings, thus ATTACH introduces a system of value weighting. This

step enables one to fine-tune the relative significance of each value type by having key stakeholders (locals, decision-makers, cultural heritage managers, asset owners, civil protection personnel, etc.) assign the relative weights to all seven types of value according to the best of their knowledge and expert judgment. This is to be done via a participatory involvement of the stakeholders which is highlighted as important in the previous step of 'involving stakeholders', where they are mapped according to their interest, power, attitude, role, significance and requirements.

Methodologically, weighting is performed with the Analytic Hierarchy Process¹⁹ in which one makes a set of pairwise comparisons of relative importance for each possible combination of types of values. For each comparison one assesses how much more important one type of value is compared to another by selecting a mark from 1 (indicating that both types are equally important), 2 (indicating that one type is slightly more important than the other one), with marks progressing towards the highest mark of 9 (indicating that one type yields significantly more importance than the other one). Mathematically, the method aggregating all comparisons is based on the Eigen value problem, where the solution of the problem provides the ratio scale (weighting) for each factor under assessment. Using AHP brings several benefits, such as getting a better insight into the complexity of preferences in terms of valuating cultural heritage and by making it possible to assess the overall inconsistencies of comparisons to review individual valuations and to consolidate different stakeholders' opinions. It also helps make the valuation more rational and bolster its transparency, which leads to a higher level of democracy.

ATTACH enables us to document the relative weights of individual types of values in the same section as the value score is recorded. It assumes one set of weights for each case study, thus the weighting process needs to be achieved within a group of stakeholders and consolidated into a single unique set.

In order to do this, several tools (not a part of ATTACH) that support the AHP process can be used. Some even enable simultaneous input from many actors and subsequent aggregation of weighting on a group level. Weights gathered within ATTACH are already integrated into a system of underlying equations related to the actual score of values by individuals, which in turn calculates the overall weighted value for each cultural heritage asset being assessed in the case study – as described in the following sub-section.

Valuation

The pinnacle of the process implemented in ATTACH is the actual value scores. These are performed individually by each stakeholder for each cultural heritage asset under assessment and depict individual point-of-views on the value of a specific cultural heritage asset. This step is especially useful for multi-stakeholder engagement and ensures a participatory format when defining priorities for salvaging operations in case of emergency.

19 Saaty TL. 1980. *The Analytic Hierarchy Process*. New York, McGraw-Hill: 287 p.

Scoring is performed on a geometric scale, which shows exponential growth as opposed to linear growth, is exceptionally suitable and accommodates the high values by keeping the ratio between neighbouring points on an equal scale throughout the scale. This is also beneficial for the valuation, in cases when some assets/items have extremely high values. The scale has seven scores (points) from 0 to 243 (see the table below). Practically, each stakeholder selects one of the seven scores for each type of value for each cultural heritage asset. These scores are inserted into the tab (4)-section of the ATTACH spreadsheet where a system of pre-defined equations automatically generates a value estimate for each asset. These estimates are weighted by a previously defined set of relative weights.

Table 1: Types of values used in the ATTACH approach.

Score on a geometric scale	Definition of the score
0	The item does not possess a contributing value.
1	The occurrence of this contributing value in the item is very small.
3	The occurrence of this contributing value in the item is small (of the order of 3 times greater than that corresponding to score "1").
9	The occurrence of this contributing value in the item is medium (of the order of 9 times greater than that corresponding to score "1").
27	The occurrence of this contributing value in the item is large (of the order of 27 times greater than that corresponding to score "1").
81	The occurrence of this contributing value in the item is very large (of the order of 81 times greater than that corresponding to score "1").
243	The occurrence of this contributing value in the item is exceptional (of the order of 243 times greater than that corresponding to score "1"). This score indicates the maximum intensity of the occurrence of this feature throughout all components of the heritage asset.

Estimates from the stakeholders can be used individually or can be aggregated to provide a joint estimate – depending on the goals of the valuation. There are also different ways of aggregating, either by calculating the mean or mode.

3 Testing ATTACH on the Idrija Mercury Mine Pilot Case

ATTACH was consistently tested according to all 5 steps outlined above on the case of the tourist mine in the town of Idrija, which is located in the mountainous part of western Slovenia. The testing process was performed by two Slovenian CHEERS project partners, namely CUDHg Idrija (Idrija Mercury Heritage Management Centre) and SFI (Slovenian Forestry Institute).

3.1 Area of the pilot case

Due to its rich history in mercury mining, the municipality of Idrija is covered with numerous monuments and cultural heritage assets. This has profoundly shaped the community and the environment. From the beginning of the 16th century onwards, mining has been a key economic activity involving miners who started arriving in the formerly unsettled Idrija valley and later a large share of the local population. It has provided a living to many and in the course of development garnered several impressive manmade constructions such as the main mine entrance, Anthony's Main Road (from the beginning of the 16th century) and artefacts of predominantly technical/engineering origin. The latter refer mostly to mining tools and didactic objects aimed to present the different aspects of mercury mining. There are indeed other objects/buildings related to the mining history of Idrija such as water dams, artificial water canals, a smelting plant, a water pump. etc, however the mine represents the central element.

After the closing of the mine in 2008 (due to economic reasons and the growing environmental awareness), a part of the mine and some of its auxiliary technical infrastructure were gradually transformed into a museum. The entrance into the mine in Šelštev was redesigned with a welcome desk, a presentation room with an educational video as a paramount element that introduces the visitors to the history of the mine, and a mercury display, which is a down-scaled model representation of the amount of mercury that had been extracted during the active period of the mine. Apart from the historic and evidential importance of the mine there are also economic aspects, which cannot be ignored. Guided tours into the underground mine museum bring a substantial number of tourists to Idrija and its surroundings, thus creating income opportunities for local business.

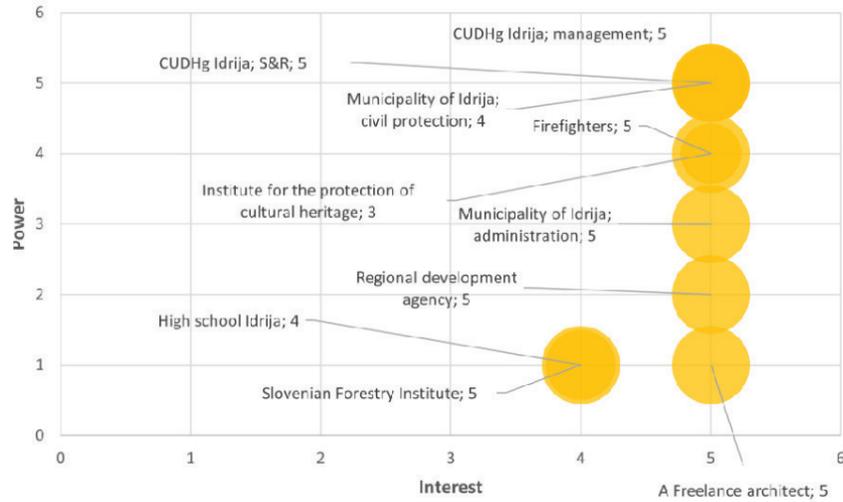
Thus, the mine is extremely important for the local community that is likely to put substantial effort into safeguarding it against various threats, which include natural hazards. Earthquakes, floods, landslides and fire are noteworthy in the area due to several reasons. Steep terrains with considerable heterogeneity in elevation, relatively deep soil, abundant precipitation and a well-spread network of mine tunnels and shafts create an environment ripe for the first three types of hazards. In addition, fires are typical for mines, where naturally occurring flammable gases are common. The combination of all these threats presents a great risk which is to be minimized as much as possible. Additionally, the hazard protection plan of the mine has merely a limited focus devoted to protecting and/or salvaging cultural heritage in cases of emergency. They do not have a detailed and fully developed plan of actions for such events, but only general guidelines which might not suffice.

This makes the Idrija mercury mine museum a perfect example to test the ATTACH approach and highlight the potential benefits of introducing such a tool into cultural heritage management and/or protection system. Anthony's road is a part of the mine and is a key touristic attraction with abundant cultural heritage assets. As such, it was selected as a case study within the pilot area.

3.2 Stakeholders

Identifying the relevant stakeholders that are to be involved in the valuation was the first step, carried out in late 2019. Initially, a draft list of all potentially relevant stakeholders was created, and then all individuals on that list were pre-mapped according to their power, interest and attitude towards innovative valuation approaches (Figure 4). Based on this, those with very low levels of power and low interest were omitted, while the rest were mapped with additional indices such as their role in the valuation, significance to the project, and their requirements from the pilot case testing.

Fig. 4: Graphical representation of the stakeholders' mapping according to their interest in the topic of cultural heritage and natural disasters (x-axis), power to implement changes to the current cultural heritage evaluation system (y-axis), and their attitude towards introducing innovative evaluation approaches in cultural heritage management (the larger the circle, the higher the support – the value is on the right-hand side beside the indication of the organization).



3.3 The fire hazard scenarios

The decision on which type of hazard the test should be grounded upon was reached following a thorough review of the past hazard events in the mercury mine and a consultation with the safety and protection staff in the mine. The fire hazard seemed to be the most relevant, particularly in terms of how many cultural heritage assets it would jeopardize and how likely it is to happen. Two possible fire hazard scenarios were drafted, one describing the possible development in the upper part of the mine (the entrance building and the first mine level), while the second covers a fire event in the lower levels of the mine. Considering the fact that most cultural heritage assets are located in the upper section of the mine, it was decided to focus only on the first scenario. This scenario predicts a break out of a fire due to the ignition of flammable gases in the upper level of the mine, which gradually progresses upwards, passes the cast iron entrance doors and captures the entrance building. A simple plan of the mine is given below.

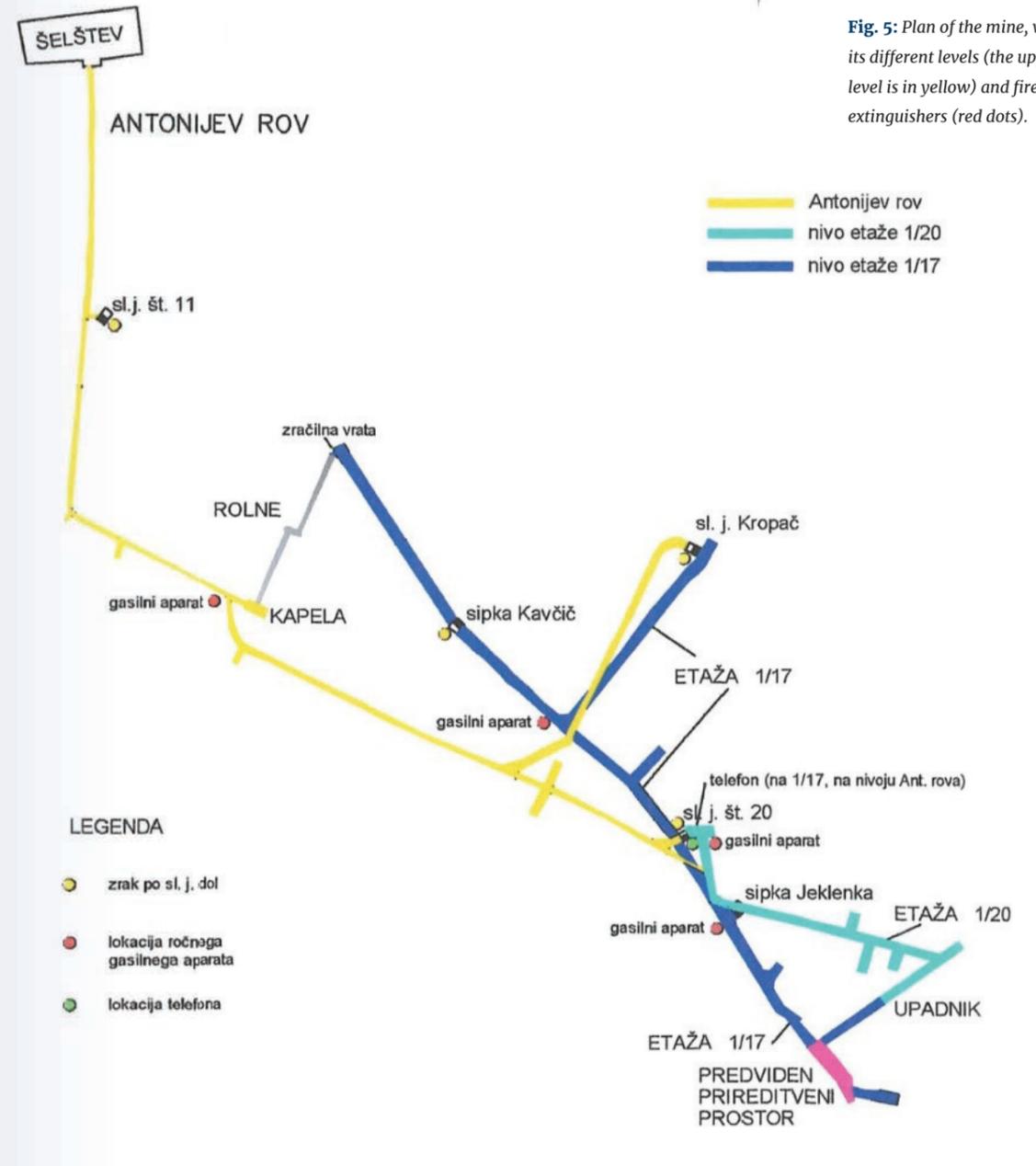


Fig. 5: Plan of the mine, with its different levels (the upper level is in yellow) and fire extinguishers (red dots).

In addition to the scenario design, an analysis of the cultural heritage exposure was performed in order to define the assets that would be potentially at risk if a fire occurred. The list of the eight assets is given in the table below and all were included in the ATTACH test.

The name of the asset	Description	Indication of vulnerability
The call room 'Šelštev' (entrance building, 18 th Century)	The call room on the right side is nowadays used as a lecture room, projection room and visitors' collection point before entering the pit.	The wooden parts, which make most of the call room, would probably be completely destroyed.
Mercury model, 20 th Century	The modern sculpture (author: Marko Pirih) symbolises the discovery of mercury. According to the legend, mercury was discovered in Idrija in approximately 1490 by a tub maker while soaking a wooden bucket in the stream. An unknown, glittery substance found its way into his bucket, and this substance turned out to be mercury.	The electronic system of the sculpture would be destroyed, mercury would evaporate into the environment.
Ore cart, beginning of the 19 th Century	The ore transport mine cart "trugca" has been preserved, secured and presented as an important monument of Idrija's mining technical heritage with exceptional universal values. It is a part of the CUDHg Idrija mining collection. Visitors can view it within the permanent museum display on Anthony's Main Road. It is a part of the presentation that represents the entire story of mining in the Idrija Mercury Mine.	The wooden part of the cart would probably be completely destroyed, while the iron frame and the wheels might be slightly smeared but not severely damaged.
Mining phone, middle of the 20 th Century	The medium-size, metal pit telephone is vertically mounted and consists of five parts. The housing consists of three parts. There is a circuit in the largest bottom part. There is a dynamo for signal generation in the middle part and a rotating handle connected to the dynamo on the opposite side of the receiver. The upper part is a protective cover. The other two parts are a telephone cord and a receiver.	The plastic part of the pit telephone would probably be completely destroyed, while the iron frame and other iron parts might be slightly smeared but not severely damaged.
Mining detonator (ignition), middle of the 20 th Century	The electric detonator is composed of a square metal housing and a cover. The electric mechanism is mounted in the housing. Buttons for triggering the explosion are on the cover (pressing the button will generate electricity, which runs to the clamps or the conductor). On the side of the housing, two conductors are mounted, to which the conductive mining wire is attached, which connects the detonator with the explosives in the mining field.	The plastic part of the electric detonator and additional wires would probably be completely destroyed, while the iron frame and other iron parts might be slightly smeared but not severely damaged.

Drilling machine CRAELIUS XC 42, middle of the 20 th Century	The Craelius drilling set served for research drilling and detection of mineralisation areas in the main levels of the Idrija ore deposit. Obtaining the core during research drilling was particularly challenging in the rocky conditions characteristically found in Idrija.	The drilling set is made of iron and a fire would not cause any severe damage.
Theodolite on a wooden stand, middle of the 20 th Century	The theodolite consists of a wooden base with a triangular stand. Under the stand, there are foot screws and a horizontal circle with an angular division, which allows measurements of horizontal angles of 0° or 360°. The top part consists of a binocular with a bracket and a supporting axle. This part also contains a vertical circle with an angular division, which allows measurements of vertical angles from -90° or 90° or zenith distances from 0° to 180°.	The wooden, glass and plastic parts of the theodolite would probably be completely destroyed, while the iron frame and other iron parts might be slightly smeared but not severely damaged.
Clay mannequins of miners (models), end of the 20 th Century	All clay mannequins of miners are the work of the academic sculptor Boni Čeh and represent the different types of mining work through the years.	All mannequins of miners are made of clay and dressed in original miner's dresses (hats, helmets, shirts, trousers, boots) and equipped with original self-protective devices and therefore would be completely destroyed in a fire.

3.4 The evaluation workshop

The process of assigning weights to value types and scoring values of all 8 cultural heritage assets was performed during two separate workshops in the premises of the Cerkljanska development agency in the town of Idrija: on 7th December 2019 (10 attendees and two presenters/instructors); on 11th December 2019 (5 attendees and two presenters/instructors). All assets were presented to the attendees of both workshops in a standard way by indicating:

- location of the asset in the mine,
- state they are in in terms of being original, refurbished or replicated,
- management regime in terms of maintenance and monitoring,
- vulnerability aspect by illustrating the potential damage on the asset.

Given 7 types of value of the cultural heritage asset each workshop attendee had to make 21 pair-wise comparisons and thus implicitly scale the importance of each type of value relative to all other types of value on a 1-9 Saaty scale, commonly used within the AHP process. Individual comparisons were aggregated via a n-balanced approach and are provided in the table below. A freely available online AHP application system was used for weighting the types of values (<https://bpmmsg.com/ahp/>).

Table 3: The list of cultural heritage assets included in the test of the ATTACH evaluation tool with a short description of each asset and the general indication of vulnerability of each asset in the event of a fire.

Table 4: Results of the weighting of individual types of values performed by the attendees of both workshops.

Type of value	Relative weight [%]
Evidential	26.9
Historic	22.5
Aesthetic and artistic	6.7
Communal	12.9
Economic	3.0
In-use/fruition	9.0
Scientific/educational	7.5

Evidential and historic values have both been assigned by far the highest weights, followed by communal, while the economic value yielded the lowest value. However, the distribution of values is secondary in the test as the main goal was to assess the performance of ATTACH. Several issues were highlighted by the attendees during the test:

- evidential and historic value overlap in their definitions and it was hard for the attendees to distinguish between them,
- making 21 pair-wise comparisons can be quite demanding and might require several attempts to achieve the desirable consistency,
- knowing the object/asset being evaluated can have a significant effect on the weighting process and this needs to be acknowledged,
- coming from different sectors might also affect the results, as those being closely related to the conservation and management of cultural heritage tend to put higher weights to historical, evidential and communal values.

One of the suggestions made by the attendees was to integrate the weighting application into the spreadsheet file so that they would not need to switch from one application to the other.

In the second phase, the actual scoring of the individual value type was performed for each cultural heritage asset. Each attendee created a unique score, which was weighted by a common set of weights. The overall score was calculated for the entire group of attendees as the arithmetic mean of the individual scores. The results are presented in the graph below (Figure 6).

The scores clearly indicate that the entrance building has the highest value and would thus, in line with the ATTACH approach, have the highest priority in case of emergency. In terms of decreasing values, the entrance building would be followed by the trolley, the drilling machine and the mine phone, which are all relatively close in their scores. Ignition, theodolite and the miners' models are again very close in priorities, whereas the mercury model received the lowest overall score, which is also significantly lower than its score-wise closest assets

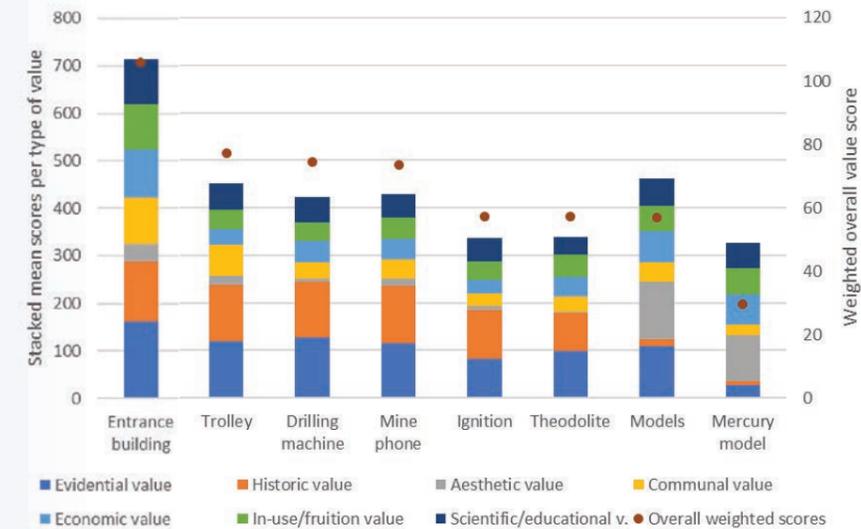


Fig. 6: Distribution of the value scores for eight cultural assets of the Idrija Mine in two-fold representation; mean score for individual types of values (left axis; stacked bars), and weighted overall score (right axis; dots).

A clear distribution pattern of the scores was observed. Evidential and historic values garner high scores with the first six assets, while high aesthetic value was attributed to the miner's models and the mercury model. Both scored very low in historic value. High scores for evidential value are also characteristic for the models. Relating to the specific evaluation outcome of the models, a relatively high sum of mean scores and low overall weighted score is a result of their high score on aesthetic value, which has a low weight and that lowers the overall score. Following the issue of aesthetic value, it scored by far the lowest among all types of values for the first six assets. However, the models were given relatively high scores on economic value, which was weighted very low in general. Thus, the two assets seem to be important for the potential of generating income.

The attendees also gave some clear observations on the valuation process:

- the 7-level geometric progression-based scoring scale is non-intuitive and hard to comprehend – a linear scale would be more appropriate,
- the initial presentation of individual assets can have a significant effect on their scores, especially if the presenter highlighted the specific attributes more in case of some assets and less for others,
- the overall design of the evaluation approach seems to be reasonable and well grounded.

4 Conclusion

Following the test valuation, a simple SWOT analysis was performed in order to provide a consistent assessment of the ATTACH approach. The assessment was performed immediately after the valuation through an open, but guided, discussion. The synthesis was performed by the CHEERS project partners who coordinated the workshop. The outcomes are presented below.

SWOT analysis

		Positive	Negative
	Internal	Strengths	Weaknesses
		<ul style="list-style-type: none"> → professionally and scientifically grounded methodological approach → very easy to adapt to larger/smaller sets of assets under assessment and/or a different scoring scale → 'open-source' format makes it easy to refit it to different analytical settings → relatively easy to comprehend by end-users (quick learning process) → it is user friendly (expressed by the attendees of the workshop) → does not require extensive human or material resources to be implemented 	<ul style="list-style-type: none"> → the user needs to switch between the AHP web tool and the score spreadsheet file → not the most comprehensible geometric progression-based score scale → potential for biases in both weighting and scoring as a result of people's previous knowledge/preferences, etc. → a pre-defined set of seven value types can affect the evaluation → the predetermined weighting and scoring system omits the possible additional aspects of the evaluation which might be important in some cases
	External	Opportunities	Threats
		<ul style="list-style-type: none"> → as tourism is a very lucrative sector in the Alps and much of it depends on cultural heritage, its protection seems reasonable; in combination with climate change and the increasing threat of natural disasters this urgency is even more critical → the need for innovative evaluation approaches was pinpointed also by the relevant national experts from the Institute for the Protection of Cultural Heritage of Slovenia → CHEERS consortium offers a network of experts with rich experience needed to further develop the tool as well as connections with relevant professionals who can distribute information as regards the tool 	<ul style="list-style-type: none"> → there might be a reluctance to purely quantitative evaluation approaches over mixed qualitative/quantitative approaches → the limited duration of CHEERS might not secure sufficient time to refine the tool to the extent where it would provide a competitive advantage over other already available tools → the tool was designed (theoretical underpinnings endorsed from the already available approaches and then adjusted to the needs of the Alpine space) by an organisation not previously involved in cultural heritage management, which might hamper the chances of being widely accepted → we are uncertain as to how receptive civil protection systems are to accommodating this tool within the current arrangement

Table 5: The outcomes of the SWOT assessment of the AT-TACH testing in the context of the Idrija mercury mine cultural heritage

ANNEX 1: Graphical representation of individual tabs within the ATTACH tool

Tab (1) Pilot area

General Information	Information on cultural assets**	Description of CH	Vulnerability*
Name of the pilot area	name	asset #1	
Size (km ²)	xx, xxx	asset #2	
Population (n)	xx, xxx	asset #3	
		asset #4	
		asset #5	
Past events	(Please provide a narrative description of significant past events of natural hazards, which are important for the prediction of the possible outcomes of future events and indicate the main aspects of vulnerability)	*	please provide which of the CH asset are vulnerable and in what way. Refer only to physical vulnerability.
Terrain specific	(please provide information on the terrain and other geologic specifics of the pilot area, which significantly affect the occurrence of relevant natural hazards)	**	please list the assets you plan to assess in the valuation
Governance aspects	(please provide information on who is managing (conservation, protection in events of natural hazards, commercialisation) cultural heritage in the pilot area, what is the role of the local residents, who owns the heritage assets, who provides technical guidance on managements and who provides the funds)		

Tab (2) Stakeholders

Name	Role	Significance to project	Requires from project	Issues & Comments	Interest	Power	Attitude
stakeholder #1							
stakeholder #2							
stakeholder #3							
stakeholder #4							
stakeholder #5							
stakeholder #6							
stakeholder #7							
stakeholder #8							
stakeholder #9							
stakeholder #10							
stakeholder #11							
stakeholder #12							
stakeholder #13							
stakeholder #14							
stakeholder #15							
stakeholder #16							
stakeholder #17							
stakeholder #18							
stakeholder #19							
stakeholder #20							

Tab (3) Hazard scenarios

Type of natural hazard	Who designed the scenario	How was it designed	Extent	Intensity	Cultural heritage assets
scenario #1	(please provide a narrative description of who designed the scenarios - professionals, wider groups of stakeholders, etc.)	(please provide a narrative description on the methodological aspects of design; reliability check is also relevant)	(please provide a narrative description of the extent of the NH event in terms of affected area/ percentage of the pilot area; the number of CH assets being affected)	(please provide a narrative description of intensity of the NH event; depth of inundation, kinetic energy of rockfall, fire intensity, etc.)	(list all cultural heritage assets that are exposed to the natural hazard according to the scenario)
scenario #2					
scenario #3					
scenario #4					
scenario #5					

Tab (4) Weights and scores

		Cultural heritage assets (individual scoring)								Weights*
Stakeholder #1		asset #1	asset #2	asset #3	asset #4	asset #5	asset #6	asset #7	asset #8	
Types of values	Evidential									
	Historic									
	Aesthetic/artistic									
	Communal									
	Economic									
	In-use/fruition									
	Scientific/educational									
		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0
										(either up to 1 or 100)
Stakeholder #2		asset #1	asset #2	asset #3	asset #4	asset #5	asset #6	asset #7	asset #8	
Types of values	Evidential									
	Historic									
	Aesthetic/artistic									
	Communal									
	Economic									
	In-use/fruition									
	Scientific/educational									
		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

(Add as many stakeholders and assets as needed)

*Those are to be generated by an AHP implementation tool such as (link below), using a n-balanced aggregation method

<https://bpmsg.com/ahp/>

Score Definition of the score

- 0 The item does not possess a contributing value
- 1 The occurrence of this contributing value in the item is very small
- 3 The occurrence of this contributing value in the item is small (of the order of 3 times greater than that corresponding to score "1")
- 9 The occurrence of this contributing value in the item is medium (of the order of 9 times greater than that corresponding to score "1")
- 27 The occurrence of this contributing value in the item is large (of the order of 27 times greater than that corresponding to score "1")
- 81 The occurrence of this contributing value in the item is very large (of the order of 81 times greater than that corresponding to score "1")
- 243 The occurrence of this contributing value in the item is exceptional (of the order of 243 times greater than that corresponding to score "1"). This score indicates the maximum intensity of the occurrence of this feature throughout all components of the heritage asset.



ANDREEA TRIF

From Destruction to Sustainability in the Context of Urban Fractures between Historical and Socialist Buildings in Romania

SUMMARY

Bucharest, 1981. 272.074 square meters of historic buildings were demolished. 2955 families (7278 individuals) were evacuated. These numbers represent merely one statistic of a phenomenon that has generated deep fractures between the historical urban texture and the socialist urban planning of the city. Marginalization was a political decision that generated a conflicting urban relation that cannot be exceeded using existing planning tools. The socialist texture was designed with the idea of completely replacing the historical architecture. Thus, the historical buildings were disconnected from the rest of the city, bordered off by screens of socialist architecture.

As the years passed and we witnessed major political and economic changes, we have to ask ourselves whether the relations between the two types of urban tissues adapted and started functioning as a whole or are they dominated by mutual rejection? In this article, we will seek answers from three aspects:

- a) the correlations between the cultural values and the real estate values in the context of sustainability
- b) the marginal status added to the historical texture in relation to its intrinsic historical value and its character of representativeness for the local identity
- c) the cultural effects generated by the past marginalization in the people's perception – how open are investors to the idea of restoration?

In order to understand the dysfunctions of these urban fractures, the relations between the two urban textures are divided into basic elements as we try to establish the cultural changes along the historical moments that travelled from destruction and marginalization to restoration and sustainability.

Od uničevanja k trajnosti v kontekstu v kontekstu urbanih trenj med historičnimi in socialističnimi stavbami v Romuniji

POVZETEK

Bukarešta, 1981. Uničenih je bilo 272.074 kvadratnih metrov zgodovinskih stavb. Evakuiranih je bilo 2955 družin (7278 posameznikov). Navedene številke predstavljajo le en statistični vidik pojava, ki je povzročil globok razkol med zgodovinsko sestavo mesta in socialističnim urbanim načrtovanjem.

Marginalizacija je bila posledica politične odločitve, privedla pa je do neskladnih urbanih odnosov, ki jih ni mogoče odpraviti z obstoječimi orodji načrtovanja. S socialistično zasnovo mesta so poskušali povsem nadomestiti zgodovinsko arhitekturo. Zgodovinske stavbe so zato ločili od preostanka mesta, tako da so jih zakrili z zasloni socialistične arhitekture.

Od tedaj je minila že vrsta let in priča smo bili velikim političnim in gospodarskim spremembam, zato je zdaj napočil trenutek, ko se moramo vprašati, ali sta se obe vrsti mestne tkanine prilagodili in začeli delovati kot celota ali druga drugo zavračata. V članku bomo preučili tri vidike:

- a) povezave med kulturnimi vrednotami in vrednostjo nepremičnin v okviru trajnostnosti;
- b) marginalni status, ki je bil pripisan zgodovinskemu delu mesta, glede na njegovo imanentno zgodovinsko vrednost in reprezentativnost za lokalno identiteto;
- c) kulturni učinki, ki jih je pretekla marginalizacija imela na dožemanje ljudi – ali so vlagatelji odprti za obnovo?

Odnose med zadevnima mestnima zasnovama smo predstavili glede na osnovne elemente, da bi boljše razumeli neskladja, ki obstajajo med različnimi deli mesta. Obenem poskušamo opredeliti tudi kulturne razlike, ki so nastale ob različnih zgodovinskih trenutkih, ko po časovnici potujemo od uničenja in marginalizacije do obnove in trajnostnosti.

1 Introduction

The socialist doctrine imposed the construction of architectural objects with “a triumphalist monumentality, appreciated as indispensable for reflecting the successor in the construction of socialism, including the dignified and happy life of workers in a society without the exploiting class”,¹ buildings that are rejected or considered as unrepresentative by residents. On the other hand, forced industrialization during the communist period generated the most intense and dramatic urbanization process,² with immediate effects in the construction of large and monotonous residential ensembles, unrelated to the context of their location.

The main urban planning activities during socialism were based on the nationalization of properties and businesses in historic centres, and the introduction of fixed and imposed prices on the real estate market. Historic centres have ceased to evolve and have been allowed to decay.³

Within the historical centres, civic ensembles with administrative functions were built, as were platforms for public gatherings, collective housing, often combined with commercial spaces and various cultural functions on the ground floor.⁴ Most of the residential housing within these cities was built during the socialist period. As they were inserted either outside or on the traditional centre ring, the collective dwellings will have a long use value, but are unable to generate identity.

In post-socialism, these cities have removed their rigid and gloomy masks and replaced them with a thousand others,⁵ however, certain locations continue to promote the pain of the rejected and unassumed past. This is because, in general, society creates emblematic urban landscapes in which certain components are preserved and promoted due to the need to connect the present to the past, with the desire to strengthen the local identity and provide a harmonious evolution.⁶

These premises led to uncontrolled resuscitation actions, and the lack of a clear vision led to uneven developments. The lack of coherent development strate-

1 Panaitescu, A. (2012), *From Casa Scânteii to Casa Poporului. Four Decades of Architecture in Bucharest, 1945-1989*, București, Editura Simetria, p.23

2 Hamilton, I., Andrews, A., Pichler-Milanovic, N. (2004), *Transformation of Cities in Central and Eastern Europe*. Tokyo, New-York, Paris: United Nations University Press p.29

3 Hamilton, I., Andrews, A., Pichler-Milanovic, N. (2004), *Transformation of Cities in Central and Eastern Europe*. Tokyo, New-York, Paris: United Nations University Press p.25

4 Răuță, A. (2013), *Negocierea centrului civic*. București: Editura Universitară Ion Minicu, p. 186

5 Light, D., Young, C. (2010), „Reconfiguring Social Urban Landscapes: The Left-over Spaces of State-Socialism in Bucharest” in *Human Geographies*, No. 4.1, p. 6.

6 Lowenthal, D. (1998). “Fabricating Heritage” in *History and Memory*, Vol.10, No. 1, p. 13.

gies has led to commercial suffocation, the allocation of vacant land within the historic centres to random functions, which in turn generated a major conflict between commercial and cultural interests. In addition, as a result of the environmental discontinuity and legal conflicts over property rights, the connecting areas between the historical architecture with cultural value and the one conceived in the socialist period are among the most vulnerable.⁷

Our main objective was to research the process that was needed to move from concepts of destruction to those of conservation in Romania. The architectural heritage of our country was strongly affected by the demolitions that took place in the historical centres during Ceausescu's regime. Thus, we believed we need to understand the evolution of concepts and ideas, with which we hoped to capture the attitudes in the present. We also believe that the concepts of sustainability are less promoted than the ones of the cultural value of architectural heritage. Therefore, understanding the importance of cultural heritage represents the first stage of development, while the ones addressing the ecological value of conservation would derive from them.

2 The Evolution of Architectural Heritage from Destruction to Conservation

2.1 The socialist period

Initially, the communist regime in Romania focused on creating out-of-centre neighbourhoods, similar to other socialist countries. Forced industrialization was one of the characteristics of the entire socialist period, which inevitably led to migration to industrialized centres, urban populations growing dramatically, sometimes doubling or tripling in their population.⁸ Thus, the urban population of Romania increased from 3,487,995 inhabitants (22% of the country's population) in 1948, to 11,540,494 (50.6%) in 1985.⁹ As a result, the number of new homes increased from 66,000 apartments between 1951 and 1960 to 1,700,000 in 1981-1990.

Control of the architecture segment was one of the goals of the communist regime. In 1952, Gheorghiu-Dej set up the State Committee for Architecture and Constructions as well as passed the Decision on the Construction and Reconstruction of Cities, thus starting the organization of activities in the field of architecture which imposed verification of any architectural intervention. All professional activities disappeared, as the experts included in design institutes were governed by the leadership of the party.¹⁰ The process of taking control of the profession was continuous and intensified over time. The process that begun in 1952 was continued during the leadership of Gheorghiu-Dej and was brought to its climax by Ceausescu.

7 Ioan, A., (2007), „The Peculiar History of (Post)Communist Public Places and Spaces: Bucharest as a Case Study” in *The Post-Socialist City*, Springer, Dordrecht, p. 305.

8 Population Census - Demographic Evolution, 2011

9 Zahariade, A. (2011), *The Architecture of Communist Projects. Romania 1944-1989*, Bucharest: Editura Simetria, p.44

10 Idem, p.84

Between 1958 and 1965, Dej focused predominantly on economic efficiency, expressive austerity and the housing sector. The nationalization process created the opportunity to set up buildings with public functions in former residential or commercial buildings. Regarding the historical centres, the interventions during Dej's time focused on areas that had been affected by the bombings.¹¹ In addition, the blocks of flats built at that time, in the historical centres or at their limits, were unitary from a functional point of view, public spaces on the ground floor were not permitted.¹²

Thus, during Gheorghiu-Dej's time, works were carried out in the historical centres of Pitești and Vaslui. In Craiova, Tulcea and Oradea the empty lots of certain central areas were completed, while central markets were redesigned in Galați and Baia Mare.¹³

The socialist ideology viewed architecture as a part of a vision of socialist realism imposed by the Soviets and a unique model of expression in the field of art. Thus, starting with 1948, all forms of artistic manifestation became “means of communist education of the masses and of formation of the socialist consciousness. Hence [...] a permanent war against sophisticated art that exceeds the level of understanding of the party activist”.¹⁴

The socialist city in Romania was to remove any forms of social differentiation, any contrast between the periphery and the centre, any trace of previous societies, historical urban forms being considered obsolete and unrepresentative.¹⁵

The fundamental transformation generated on the occasion of the Third Congress of the Romanian Workers' Party in 1960 resulted in the large-scale takeover of the micro-district model, which, superimposed with the completion of the nationalization process, led the way to free urbanism, without plots, without legal limitations. “The procedure obviously facilitates the new urban composition, taking into account the specific historical evolution of the city, which anyway belonged to an era whose memory had to be liquidated”.¹⁶

The voice of experts was covered by political influence. If, initially, liberation from the yoke of socialist realism might have seemed an opportunity for the development of architects, increasingly aggressive interventions once again led to the disappointment and disarmament of professionals. The intervention sites in the historical centres were significantly crowded in Pitești, Ploiești, Râmnicu Vâlcea, Bacău, Iași Suceava, Piatra Neamț, some of them being quickly identified by the architects as traumatic experiences.¹⁷

11 Răuță, A. (2013). *The Negotiation of Civic Centers*. Bucharest: Editura Universitară Ion Mincu, p.138.

12 Stroe, M. (2015), *Housing between Project and Political Decision. Romania 1954-1966*. Bucharest: Editura Simetria, p. 68.

13 Răuță, A. (2013). *The Negotiation of Civic Centers*. Bucharest: Editura Universitară Ion Mincu, p.138.

14 Panaitescu, A. (2012), *From Casa Scânteii to Casa Poporului. Four Decades of Architecture in Bucharest, 1945-1989*, București, Editura Simetria, p.22

15 Light, D., Young, C. (2010), „Reconfiguring Social Urban Landscapes: The Leftover Spaces of State-Socialism in Bucharest” in *Human Geographies*, No. 4.1, p. 6.

16 Zahariade, A. (2011), *The Architecture of Communist Projects. Romania 1944-1989*, Bucharest: Editura Simetria, p.57

17 Stroe, M. (2015), *Housing between Project and Political Decision. Romania 1954-1966*. Bucharest: Editura Simetria, p.125.

In 1965 power was taken over by Ceausescu. He immediately began to express his ambitions for separating from Russian tutelage, implementing a national style and starting unprecedented economic growth. All these visions involved channelling all decisions in the field of urban development and construction to the president, the self-proclaimed first architect of the country. Ceausescu expressed clearly and in great detail his interests in architecture only in 1970. Based on the socialist ideological vision of economics, the erasure of class differences and those between the periphery and the centre, Ceausescu focused on the technique of massive urban systematization.

The systematization focused on villages, as well as on the historical centres of the cities. The first to be targeted were the centres of county residences that were to receive ensembles of civic centres that were meant to accommodate the representative functions of power, as well as large markets dedicated to speeches and popular assemblies. The passing of the Systematization Law in 1974 and the Law of Streets in 1975 gave free rein to the restructuring of the historical centres.

Following Ceausescu's rise to power, the Union of Architects tried to preserve and defend as many historic centres as possible by setting up a committee the main mission of which was to establish systematization directives to be presented at the 1972 National PCR Conference.¹⁸ Ceausescu vehemently opposed the principles presented by the committee, especially the ideas on "mentioning the historical relevance of settlements, considering the systematization plan as a result of a prospective process and incorporating concerns about the environment [...]. Through his objections, Ceausescu wanted to exclude any kind of professional conditioning of the political will".¹⁹

This debate provided an opportunity to publish specialized articles on the systematization and reconstruction of the historic city centres. Thus, an article written by Virgil Bilciurescu concluded that it was necessary for most to be systematized, with the exception of those that had belonged to the German settlers: Bistrița, Brașov, Sibiu, Cluj, Mediaș and Sighișoara.²⁰ According to the same report, a partial restoration of the centres, with the preservation of certain fragments was recommended for certain cities - Baia Mare, Iași, Sebeș, Alba Iulia, Târgu Mureș, Târgoviște; others had already been massively restructured - Pitești, Vaslui, Suceava. Finally, by 1989, Dinu Giurescu estimated that at least 29 city centres had been restructured and 37 were in the process of being rebuilt.²¹

All these interventions determined the fragmentation of the historical configurations of the cities, generating restructuring that deeply marked the cultural identity, but also the relations between the elements. The interventions frequently failed to take into account the existing infrastructure, proposing total remodelling designed according to a completely new compositional order. Thus, the ruptures and the remaining elements bear the imprint of brutality, both through the image and through the difficulties imprinted on urban and architectural management.

18 Răuță, A. (2013). *The Negotiation of Civic Centers*. Bucharest: Editura Universitară Ion Mincu, p.170.

19 Idem, p.164.

20 Idem, p.180.

21 Oțoiu, D. (2007), *The Report of the Presidential Commission for the Built Heritage, Natural and History Preserved Sites, Bucharest*, p.1.

The problems of managing these interventions have become an ongoing issue ever since these interventions were started. However, the transformations that the country's cities have gone through since 1989 have only accentuated the discord between the tissues. The return of property, economic growth and the shift to a market economy have led to the blockage and overcrowding of these fracture areas.

2.2 The post-socialist period - the marginal status of cultural heritage

Restructuring interventions in city centres led to unbalanced spatial relationships between the elements of historical architecture, of the value of the cultural identity, and the socialist one. The brutal replacement of historical elements has generated forced relations between the elements. The most common types of insertions were "screens", which attempted to hide the local history behind the newly built elements.

The historical centres of Romanian cities are often fractured by socialist insertions. The relations between the elements with cultural value and those built in the socialist period are tensioned and difficult to accept as they are. On many occasions the dysfunctions between the two types of elements are ignored by experts, and rejected by users.

Fig. 1: Spatial relations between historic buildings and socialist insertions



Fig. 2: Close-up of the urban fractures – the deterioration of heritage behind the socialist screens



Due to their strong scale, style and conceptual contrasts the two types of buildings are hard to be perceived as assemblages. Also, the fact that the socialist insertions turn their backs on the historic buildings, generates visibility problems that damage the original substance of the monuments. Therefore, even though many buildings have been restored, the ones that are closer to the socialist insertions are still vulnerable.

This marginal character was amplified by the nationalization process and the inappropriate use of space. The 1948 Nationalization Law allowed the state to confiscate private property and expulse the rightful owners who were considered “the enemies of the people”. Subsequently, the properties were either used as state institutions or were crowded with tenants. Both uses led to a deep degradation of the architectural fund, the state performing few restoration works.

Regarding the concept of historical monuments and the general attitude towards them, the attributions of the experts in the field and the real intentions of the government were in a continuous conflict during the period of socialism. Basically, while experts were striving to promote and safeguard as much as possible, the state sought destruction. Most of the time, the historical centres of the cities were presented as unhealthy spaces, in which chaos and degradation reigned, which was increased by poor maintenance and improper use.

The Commission of Historical Monuments was established in 1892 by a decree signed by King Carol I. Until 1949, the commission was led by prominent Romanian intellectuals. The establishment of the communist regime, the Nationalization Law and the forced implementation of a new ideology led to the disintegration of the practices and responsibilities of the commission, which was finally completely annulled in 1977. The Commission was re-established quickly after the revolution by a decree of 5th February 1990.

However, 50 years of destruction and concealing history have led to serious conceptual shifts, in which the marginal and derisory status of heritage was hard to remove from the consciousness of the individuals. The first list of historical monuments was concluded in 2004, 14 years after the revolution. “The report of the presidential commission of historical monuments” prepared in 2010 signalled the gravity of the continuous threats on the valuable architectural fund.

The main causes identified in this study were: intentional abandonment used as a passive method of destruction, arson, uncertain ownership in which disputes over restitution of property led to decades of conflict, which hindered any intervention, poorly educated communities that were not prepared to perceive the sense of sustainable development supported by cultural heritage and the brutal and destructive interventions by experts.

Unfortunately, the 2013 report signals similar difficulties for heritage support and safeguarding experts. The report, although it points to the improved efficiency of the protection systems and broader support legislation, mentions poor monitoring, implementation and support of works and interventions as a result of corruption and real estate pressure. In addition, the lack of specific education for both the general public and experts is mentioned.

2.3 The post-socialist period – administration fractures

The main source of the problems generated by the urban fractures between the historical and the socialist fabric arises from the impossibility to implement administration protocols through dedicated intervention policies. In order to safeguard valuable historic buildings, it is necessary to implement specific protection policies. However, three situations have been observed at present:

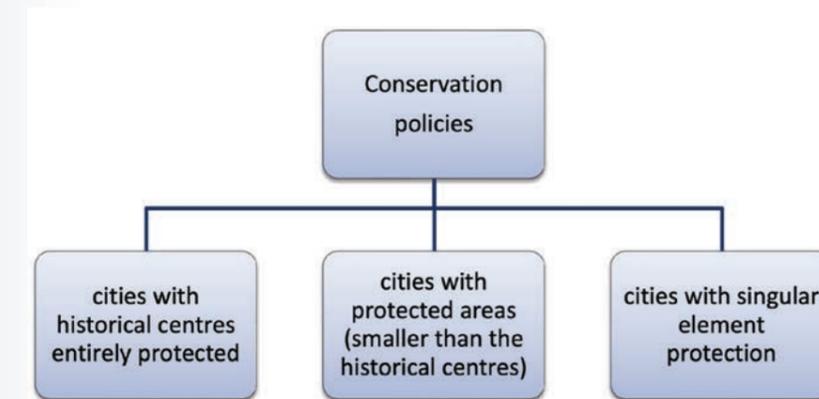


Fig. 3: Types of architectural heritage protection policies

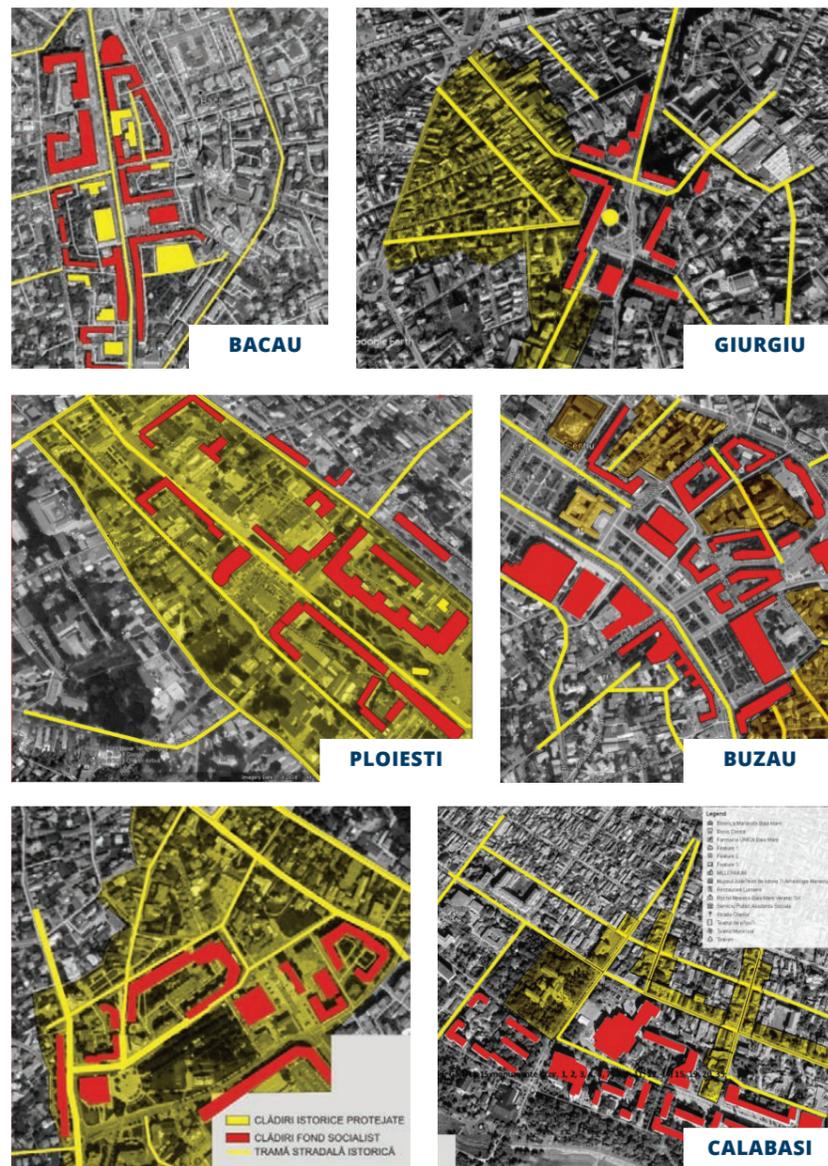
The protected areas defined as such in the list of historical monuments, include fracture zones and socialist-type ensembles. Taking into account the demonstrated physical and cultural differences they become hard to manage. Similarly, situations in which protected urban subassemblies are defined, the protected borders of which pass in the immediate vicinity of specific socialist constructions, the protection of historical values is difficult due to the permanent pressure exerted by the rest of the architectural elements. Where the historical and cultural value is legally established only through a few specific elements, the effects are immediately visible through the loss of the original substance and the current insertions that respect the construction regime of the socialist elements. Thus, the situation is perpetuated, accentuating the deterioration of the elements with architectural value and of the fragments of cultural identity.

Among the studied county residences, only Bucharest, Oradea, Bistrița, Brăila, Drobeta-Turnu Severin and Craiova have the areas of historical centres defined and delimited in the list of historical monuments.

Other cities have defined protected ensembles in the list of historical monuments. In this situation are Constanta, Iași, Deva, Botoșani, Galați, Giurgiu, Miercurea Ciuc, Satu Mare, Suceava, as their fragmentation of the historical centres is recognized in an indirect way.

Pitești, Ploiești, Râmnicu Vâlcea, Zalău, Târgu Jiu, Piatra Neamț, Focșani, Buzău, Bacău are cities that have not defined ensembles or protected areas. In these cases the status of historical monuments has been established merely for individual objects. However, in many of these, we are dealing with category A buildings – buildings of national interest – and many category B monuments.

Fig. 4: Relations between buildings with protected status and the socialist insertions



In order to improve the conservation of architectural heritage it is important to define the strategies and complex areas of protection. In cases where the status of a historical monument is implemented only on individual objects, the urban context and the surrounding architectural objects are often affected by new insertions that deepen the conflicts between the elements.

At the same time, the fractures left by the socialist insertions are difficult to define and the nature of the interventions are hard to regulate. The historical tissues must be protected and restored, while the elements of the socialist fabric must be allowed to develop according to the value of their use. At the same time, the ongoing process needed to transform the people's perception of the historical architectural fund determined by real estate pressure and speculation. The corruption within the administrative structures does not help the conservation and restoration of architectural values. In the transition from destruction to conservation, the administration is not yet mature enough to understand the importance of the cultural value or the ecological value of conservation.

2.4 The post-socialist period – people's perception

We believe that continuous education in the field of cultural heritage could consistently help ameliorate the perception of the citizens. Understanding cultural values as promoters and sustainers of local identity is essential for the participation of the communities. Informed and trained people become “guardians” of the heritage. Therefore, we tried to investigate the citizens' perception as a tool to evaluate their readiness to protect cultural identity.

It is hard to evaluate the evolution of concepts regarding the exigencies of restoration in the consciousness of the citizens, however, the interventions that took place over the last years have sensitized the population and changed their perception. Interventions facilitated by European funds intended to safeguard historic centres have led to extensive projects that restored public spaces and facades. One of the pilot projects took place in 2007 in the city of Sibiu, when it was chosen to represent European culture. Since then, the historic centres of most county cities have been restored.

However, even though the main city centre areas have been restored, the private investors are not always open to the concepts and requirements of conservation. Thus, cases of destruction and replacements still occur. But the main actors of the city are better prepared to safeguard and promote the local historic values as a part of the ecological attitude.

The perception of young people on architectural heritage was evaluated in a specially dedicated study, conducted in 2018 by the National Institute for Cultural Research and Training, and coordinated by Carmen Croitoru and Anda Becuț Marinescu. The conclusions of the study highlighted an inversely proportional relationship between knowing the objectives of cultural heritage and understanding the defining concepts of cultural values. Thus, despite the visits to cultural institutions, young adolescents have proven the need for educational programs dedicated to heritage within the school curriculum. On the other hand, the openness to the concepts of sustainable development, responsibility and respect for culture and cultural identity was significant, with more than two thirds of all respondents willing to be actively involved in safeguarding actions.

In the doctoral thesis, the aim of which was to define, analyse and identify the intervention methods in urban fracture areas between historical buildings valuable for the local identity and socialist insertions, we prepared several community questionnaires, dedicated to two researched case studies – Iasi and Bucharest.

The goal was to evaluate the local's perception of the historical fragments affected by the socialist insertions. The case studies were relevant for urban fractures left behind by the overlapping brought during the socialist period. The total number of answers obtained was 171, 85 in Bucharest and 86 in Iași.

In Bucharest, 93% of the 85 respondents knew the studied area, while 7% saw it for the first time in the presented images. In terms of understanding the urban fabric and the perception of the architectural values of the area, 78% of respondents knew the historical fragments, 19% had not seen them before, and 4% bypassed the area due to insecurity. In addition, 38% of respondents considered the area valuable for the Palace of Parliament as an architectural landmark, while 28% rejected it. Also, 53% of the respondents did not know the Uranus neighbourhood and its history, 4% holding the opinion that it was an ugly and unrepresentative area of Bucharest. 65% did not know and had never visited the churches of Antim, Saint Elijah Rahova or the Schitul Maicilor – all historical monuments within the area.

In Iasi, 42% of all respondents considered the Union Square representative due to its buildings from the socialist period, while 19% considered the area to be ugly and unrepresentative. Regarding the perception of urban structure continuity, 90% of the respondents considered that the fragments of historical architectural fabric of the studied area is important, while 9% considered the relationship between the historical and recent tissue disturbing, and only 1% perceived strictly the area built by systematization. From the point of view of knowing the history of the area, 42% of the respondents knew what the configuration was like before the demolition, and 48% stated that they were not familiar with it, but would like to know more. 88% of the respondents live in Iași and 100% have visited the area. Also, in order to establish the level of perception on the protected historical fabric, it should be mentioned that 40% of the respondents did not know there was a church nearby, in fact there are three churches, all of them historical monuments.

3 Conclusion

The Romanian city structures have been affected by the demolitions of the historic centres during the socialist period. The absurd ambitions of Ceausescu led to losses of large heritage areas, leaving the cities with scars that are hard to be accepted and recognized by urban actors: administration, experts and residents. The initial ideological conflict is still perceivable, as a part of the city's actors tend to embrace the historic buildings while the other part want to demolish and replace them. Thus, the transition from destruction to conservation is an ongoing process that is nowadays much better controlled, but has not been resolved as yet.

For the time being, the conflicts between the historical and socialist tissues have not been addressed directly, an aspect that determines the perpetuation of some conceptual ruptures. However, the multitude of positive interventions have changed the perception of the population to a certain extent. Unfortunately, out-

side of the established protection limits, it remains very difficult to promote and sustain adequate interventions on architectural heritage. Also, real estate speculation continues to cause significant losses of historical tissue.

Romania has 35 cities that are county residences, i.e. cities with an important role for the development and influence of the surrounding areas. In the PhD thesis research process, we have established that 31 of them were affected by large demolitions and replacements with socialist insertions. The administrative status of the heritage protection policies is relatively weak, as only six cities have large areas of safeguarding strategies and regulations. An additional nine cities have smaller parts of the historic centres protected by conservation laws. Yet, more than half protect only individual objects, and this affects more and more of the remaining heritage.

The questionnaires revealed that more than half of the respondents do not understand the history of the urban fractures, and do not perceive the historic buildings as important. However, they are open to receiving information and to accept restructuring that could change the perception in the areas affected by urban discontinuities.

We strongly believe that in the case of Romanian cities it is essential that the administrations and experts accept that we have two types of important buildings in our historic city centres – the heritage before WWII and the one from the socialist area. Even if, the second one is not very representative from the composition and aesthetic point of view, it is still valuable for the users. Therefore, addressing the contrasts, the direct relations between the elements, would make a real impact on the quality of life. And in our special transition from destruction to conservation we could improve our understanding of the ecological value of rehabilitation if we would promote actions that would address the two types of buildings and the public space between them.



Photo: Damjana Pečiček

TANJA HOHNEC

A Heritage Crusade Against Climate Change

ABSTRACT

This article focuses on the recent core activities that have taken place in Slovenia in relation to climate change and cultural heritage and presents several key documents with substantive relevance.

Alongside the constitutionally guaranteed right to cultural heritage – and the constitutional obligation to protect it – the most important document in this field is the Cultural Heritage Strategy 2020–2023, the validity of which was extended to 2029 with the adoption of the National Programme for Culture 2022–2029. This document is based on the principle of integrated heritage conservation. The general aims of the strategy are: the use of cultural heritage to improve the quality of life and integrate society; promote sustainable development; improve society's attitude towards cultural heritage.

In 2021 Slovenia adopted its Long-Term Climate Strategy to 2050, in which it has committed to a vision of Slovenia as a society based on a well-preserved natural environment, a circular economy, renewable and low-carbon energy sources, sustainable mobility and locally produced healthy food. Within the Paris Agreement, cultural heritage remained among the contents defined by the existing legal frameworks, although it is connected, in one way or another, to all areas covered by climate strategy. For this reason, the Ministry of Culture and the Institute for the Protection of Cultural Heritage of Slovenia subsequently prepared a chapter on measures for the field of cultural heritage. ICOMOS Slovenia has also participated in an open discussion and pointed out the insufficient incorporation of cultural heritage in the climate strategy. Slovenia thus became one of the first countries to incorporate cultural heritage into its national strategic document on climate change. It is still one of only a few countries to have done so.

The article offers a broad presentation of the activities of the so-called Open Method of Coordination (OMC) group set up by the EU in 2020. In 2022 the OMC group is preparing a final report with its findings from the field of heritage policies. With the help of numerous examples of good practices, it aims to underline the importance of conserving cultural heritage and strengthening its resilience in the context of climate change. Slovenia is represented by numerous successful cases that relate to a range of thematic areas, including the rebuilding of the Franja Partisan Hospital following a devastating storm and flooding in 2007; the recovery of historic parks, gardens and tree avenues after the ice storm of 2014; the renovation of Hotel Tivoli in 2016 by preserving all historical values with minimum requirements for energy-efficiency, and examples from the field of awareness-raising and education.

The article concludes with a reflection on intersectoral cooperation and de-bureaucratisation and a proposal to establish a national coordination network. It highlights the importance of identifying direct and indirect impacts on cultural heritage, the need for documentation and multidisciplinary research and the importance of raising awareness as regards the need for preventive climate protection for cultural heritage.

Boj dediščine proti podnebnim spremembam

POVZETEK

Članek se osredotoča na temeljne dejavnosti na področju podnebnih sprememb in kulturne dediščine, ki so pred kratkim potekale v Sloveniji, predstavljeni pa so tudi nekateri ključni dokumenti, ki so vsebinsko pomembni.

Poleg ustavne pravice do kulturne dediščine – in dolžnosti, da jo zaščitimo, ki je prav tako določena z ustavo – je najpomembnejši dokument na tem področju Strategija za kulturno dediščino 2020–2023. Veljavnost strategije se je s sprejetjem Nacionalnega programa za kulturo 2022–2029 podaljšala do leta 2029. Dokument temelji na načelu integriranega ohranjanja dediščine. Splošni cilji strategije so: uporaba kulturne dediščine za izboljšanje življenjske kakovosti in družbeno integracijo, spodbujanje trajnostnega razvoja in izboljšanje družbenega odnosa do kulturne dediščine.

Leta 2021 je Slovenija sprejela Dolgoročno podnebno strategijo do leta 2050, v kateri se je zavezala viziji slovenske družbe, ki bo temeljila na dobro ohranjenem naravnem okolju, krožnem gospodarstvu, obnovljivih in nizkoogljičnih virih energije, trajnostni mobilnosti in lokalno pridelani zdravi hrani. V Pariškem podnebnem sporazumu je kulturna dediščina ostala eden tistih vidikov, ki so že opredeljeni v obstoječih zakonodajnih okvirih, čeprav je tako ali drugače povezana z vsemi področji, ki jih pokriva podnebna strategija. Ministrstvo za kulturo in Zavod za varstvo kulturne dediščine Slovenije sta zato pripravila poglavje z ukrepi za področje kulturne dediščine. ICOMOS Slovenija je tudi sodeloval v odprti razpravi in poudaril, da kulturna dediščina ni ustrezno vključena v podnebno strategijo. Slovenija je tako postala ena prvih držav, ki je kulturno dediščino vključila v nacionalni strateški dokument o podnebnih spremembah. Še vedno je ena redkih držav, ki so se odločile za takšen ukrep. V članku so celostno predstavljene dejavnosti tako imenovane skupine za odprto metodo usklajevanja (OMC), ki jo je vzpostavila EU leta 2020. Skupina OMC leta 2022 pripravlja končno poročilo, v katerem so zajete ugotovitve o politikah na področju dediščine. Poročilo poskuša poudariti, kako pomembno je zaščititi kulturno dediščino pred učinki podnebnih sprememb in okrepiti njeno odpornost nanje, pri čemer si pomaga s številnimi primeri dobrih praks. Slovenija je omenjena v mnogih uspešnih primerih, ki segajo na različna tematska področja: na primer obnova partizanske bolnišnice Franja po uničujočem neurju in poplavih leta 2007; obnova zgodovinskih parkov, vrtov in drevoredov po žledolomu leta 2014; prenova Hotela Tivoli leta 2016, s katero se je v celoti ohranila zgodovinska vrednost stavbe, obenem pa so bile izpolnjene tudi minimalne zahteve za energetske učinkovitost; poleg tega pa so tu še primeri s področja ozaveščanja in izobraževanja.

Članek se konča z razmislekom o medsektorskem sodelovanju in zmanjšanju birokracije ter predlogom za vzpostavitev nacionalne mreže za usklajevanje. Poudarjeni so tudi pomen opredelitve neposrednih in posrednih učinkov na kulturno dediščino, potreba po dokumentaciji in večdisciplinarnih raziskavah ter pomen ozaveščanja o preventivnih zaščitnih ukrepih za kulturno dediščino zaradi učinka podnebnih sprememb.

1 Introduction

Although the right to cultural heritage is defined in Article 5 of the Constitution of the Republic of Slovenia,¹ it is often necessary to fight for the right to enjoy it, or for the right to have it considered and included in various strategic and other documents. Often, this results in an indirect threat to cultural heritage. The state and local communities also have obligations with regard to cultural heritage, with Article 73 of the Constitution imposing on them the duty to protect both, natural and cultural heritage. As a result, policymakers on various levels are constitutionally required to guarantee its conservation. The state has also undertaken to create possibilities for its harmonious civilisational and cultural development. What “harmony” means in this context and how it is understood in practice is, of course, another question. Given the sectoral, institutional and thematic division of heritage, a great deal of effort is needed to achieve effectiveness with ample results for society. The harmony of civilisational and social development can also be understood, in the heritage discourse, as a sustainable development with a holistic approach in the ethnological and cultural anthropological sense and can be achieved in society through a participatory and holistic approach in the heritage management context.

The climate crisis is an opportunity for a new “heritage crusade”, if we were to use David Lowenthal’s expression,² for a fresh consideration of an integrated understanding of heritage protection and conservation in order to reduce the negative climate impacts in the future. Climate change cannot and must not be an excuse for unsuitable and unprofessional interventions and approaches. All too often have we seen how the greatest threat to heritage is man and his instantaneous adaptation of his way of life to the various global impacts of social development. If the peoples of the world are responsible for climate change, then we must take action. We are bound to do so by our sustainable development goals.³ The action we take will also have an impact on heritage conservation.

Methods and answers are to be found in past research practices and the results of scholarly research, in records of stories that reveal the heritage of knowledge and other aspects of intangible cultural heritage. Numerous sources and records offer glimpses of things we once had, in the days before industrialisation and globalisation. Things such as a high-quality living environment, balanced spa-

1 <https://www.us-rs.si/media/ustava.republike.slovenije.pdf> (accessed: 20th February 2022).

2 Rethinking heritage as a global legacy. Cf. Lowenthal, David (1998). *The Heritage Crusade and the Spoils of History*. Cambridge University Press.

3 Sustainable Development Goals. <https://www.unoosa.org/oosa/en/ourwork/space4sdgs/sdg13.html> (accessed: 22nd March 2022).

tial relationships, dividing lines between urban and rural concepts and spaces, a diversity of architecture, cultures and landscapes generated by dynamic social relations, the variety of the natural world and its useful characteristics, the materials, know-how and skills of the traditional economy, numerous practices from the everyday lives of different social groups.

Numerous questions are raised, for example: how can we reduce the negative impacts of climate change on heritage and how can we adapt it to climate change? What can we learn from the past guardians of heritage, including institutional heritage? What can we learn from the custodians and creators of heritage? What does heritage tell us? How have individuals lived heritage? How does society live it? Heritage is a living, changing activity of individuals and society. We need to seek opportunities to incorporate it actively into the four fundamental areas of the Green Deal: industry, transport and mobility, agriculture, and the built environment. For its future and for our own.

2 Climate change and cultural heritage in international documents

Numerous international documents important for the field of heritage and climate change have already been adopted. We are going to list some of the most essential ones as regards heritage conservation. Although UNESCO began issuing warnings and predictions as regards the impact of climate change on heritage as early as 2006,⁴ significant movements did not begin to take place until after the adoption of the Paris Agreement and the commitments contained therein in 2015. “The Paris Agreement, adopted in December 2015 and in force from 4th November 2016, is the first universal and legally binding global climate agreement adopted by party States. With the ratification and entry of the Paris Agreement into force,⁵ the international community committed itself to limiting global warming to below 2 degrees Celsius compared to pre-industrial levels and to endeavour to limit global warming to below 1.5 degrees Celsius.”⁶ In 2017 UNESCO adopted its Strategy for Action on Climate Change covering the 2018–2021 period,⁷ which emphasises the importance of integration, cooperation, education and, above all, respect for cultural diversity.

In 2018 the Conference of European Ministers of Culture adopted the Davos Declaration on Baukultur or the culture of building,⁸ placing the emphasis on the initiative to formulate a common and comprehensive European policy to achieve a high-quality and sustainable built environment. One of the focuses of this policy, alongside contemporary architecture, public spaces, infrastructure and cultural processes, is the field of cultural heritage.

4 <https://whc.unesco.org/en/review/77/> and <https://whc.unesco.org/en/CC-policy-document/> (accessed: 20th February 2022).

5 Slovenia ratified it in November 2016.

6 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en (accessed: 20th February 2022). For more see: <https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/2021-01-2552/resolucija-o-dolgorocni-podnebni-strategiji-slovenije-do-leta-2050-redps50>

7 <https://unesdoc.unesco.org/ark:/48223/pf0000259255> (accessed: 20th February 2022).

8 <https://davosdeclaration2018.ch/> (accessed: 20th February 2022).

Other important international documents also highlight the importance of cultural heritage. The Sendai Framework for Disaster Risk Reduction 2015–2030⁹ includes the protection of cultural heritage among the priority tasks of disaster risk reduction. Within the 2030 Agenda for Sustainable Development,¹⁰ cultural heritage is closely connected to the fields of education, the environment and economic growth. Of the 17 sustainable development goals¹¹ adopted in 2015 by the leaders of 197 countries, the eleventh goal is to make cities and other settlements inclusive, safe, resilient and sustainable, while the thirteenth goal calls for urgent action to combat climate change and its impacts.

The New Leipzig Charter¹² adopted in 2020 follows previous commitments and once again emphasises the importance of a high-quality and sustainable built environment in cities for everyone, while its consideration of urban living and urban development follows the guiding principles of the Davos Declaration. All this is important as we realise that the world is becoming increasingly urbanised. Since 2008, more than half of the world’s population has lived in cities, with this figure expected to increase to 60% by 2030 and to 68% by 2050, according to UN forecasts.¹³ Experts in Slovenia are drawing attention to the intensive suburbanisation of rural areas. With the adoption of detailed spatial plans at the municipal level, individual development projects in rural areas are being partially addressed by linear forms of development, the unsuitable placement of developments and the issuing of permits for services that belong in industrial zones. Daily commuting increases traffic and pollution. The guardians of cultural heritage are noting numerous pressures on heritage space and unsuitable developments based on an urban model that are being introduced to the rural environment by city dwellers and planners. Those immigrating to the countryside from cities complain about the noise and smells generated by farming activities. Farmers, on the other hand, are critical of the urban immigrants, whose construction of new dwellings leads, in the long term, to the abandoning of farming activities and farmland. At the same time, they ask themselves who the countryside “belongs” to.¹⁴

One potential source of help for rural areas and for agricultural and non-agricultural ways of life is the Forum Synergies network, founded in 1995 as a European network of experiences in sustainable development by 35 organisations from 16 European countries. The network’s website includes experiences, examples of good practice and recommendations on attracting new inhabitants to rural areas.¹⁵

9 https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf (accessed: 20th February 2022).

10 https://skupnostobcin.si/wp-content/uploads/2020/03/agenda_za_trajnostni_razvoj_2030.pdf (accessed: 20th February 2022).

11 Transforming Our World: The 2030 Agenda for Sustainable Development. https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E; (accessed: 25th March 2022). See also the Report: <https://unstats.un.org/sdgs/report/2021/The-Sustainable-Development-Goals-Report-2021.pdf>

12 https://eurocities.eu/wp-content/uploads/2020/12/New-leipzig-charter_2020.pdf (accessed: 22nd March 2022).

13 <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>

14 Oral source. Author’s note from the online meeting of the Steering Group of Slovenia’s National Rural Network on 11th January 2020.

15 Forum Synergies: https://www.forum-synergies.eu/bdf_motcle-dossier-8_en.html (accessed: 22nd March 2022).

Potential spatial and cultural conflicts could also be resolved with the help of a declaration which, despite being adopted by the European Conference of Ministers responsible for Regional Planning that took place in Ljubljana in January 2003 under the aegis of the Council of Europe, is a lesser-known document. Judging by the chaotic situation that has characterised construction and spatial planning over the last years, the recommendations of this declaration have escaped the notice of planners in Slovenia. The Ljubljana Declaration,¹⁶ as it is known, addresses the spatial planning dimensions of sustainable development, but broadens the cultural aspect to cover the entire territory, not just the protected areas. In Slovenia the boundary between protected and unprotected areas is more than evident from the cultural protection point of view. Discussions on sustainable development were thus taking place in Slovenia many years before the Paris Green Deal and much earlier than the adoption of several international documents, some of which have only been adopted over the last few years.

In 2020 the International Council on Monuments and Sites (ICOMOS) published a revised and updated version of the European Quality Principles for EU-funded interventions with a potential impact on cultural heritage. The main objective of the document is to provide guidance on quality principles for all stakeholders directly or indirectly engaged in EU-funded interventions that could impact cultural heritage, mainly built heritage and cultural landscapes.¹⁷

An extremely important step for heritage was taken in 2021 with the adoption of the European Cultural Heritage Green Paper, produced by Europa Nostra in close cooperation with ICOMOS and the Climate Heritage Network, with an input by other members of the European Heritage Alliance and the support of the European Investment Bank Institute.¹⁸ In its recommendations, the Green Paper put Europe's shared heritage at the heart of the European Green Deal and thus added the importance of an integrated spatial and cultural understanding of heritage to the environment and environmental aspects.

In September 2021 the European Commission announced the New European Bauhaus initiative,¹⁹ which adds a cultural dimension to the economic, social and environmental actions contained in the European Green Deal and places people in the foreground. It emphasises the importance of three inseparable values: sustainability – from climate goals, to circularity, zero pollution, and biodiversity; aesthetics – quality of experience and style, beyond functionality; and inclusion – from valorising diversity, to securing accessibility and affordability. Although it encourages creativity, interdisciplinarity and the possibility of involving anyone and everyone who can contribute to a greener environment and a better society, some concerns are being raised.

16 Ljubljana Declaration: <https://sirdoc.cyl.es/Biblioteca/Dosieres/DL167MapaOrdenacionTerritorio/pdfs/UE-LjubljanaDeclaration-2003-ingles.pdf> (accessed: 22nd March 2022). See also: Koželj, Zvezda (2013). Etnologi in celostno ohranjanje kulturne dediščine. In: Traditiones, 42/1, 201–220.

17 <https://www.icomos.org/en/about-icomos/committees/regional-activities-europe/90984-quality-principles-new-version-available>; available in Slovene language: https://www.icomos.si/files/2021/12/EU_Nacela_Kakovosti_Web.pdf (accessed: 22nd March 2022).

18 Green paper: "Putting Europe's shared heritage at the heart of the European Green Deal". <https://www.europanostra.org/putting-europes-shared-heritage-at-the-heart-of-the-european-green-deal/> (accessed: 22nd March 2022).

19 https://europa.eu/new-european-bauhaus/delivery_en (accessed: 22nd March 2022).

3 Climate activities and cultural heritage in Slovenia

Like in many other places, climate change in Slovenia is directly connected to increasingly frequent and destructive natural disasters that cause irretrievable losses of original heritage. The direct effects are manifested in the form of destructive floods such as those in Železniki, Kropa and Kostanjevica na Krki, which consequently require the establishment of new methodological approaches and new forms of remediation. The torrent that swept away the Franja Partisan Hospital prompted a broader, multidisciplinary approach to the entire gorge during the remediation process. Heritage has been threatened by a catastrophic ice storm and continues to be threatened by landslides, erosion and increasingly frequent hurricane-force winds and fires as a consequence of drought. The role of individuals and their behaviour is also being held to scrutiny, as is the lack of regular maintenance, which has devastating consequences for heritage, people and society.

In Slovenia, numerous activities in the climate change sphere have been implemented based on European directives and recommendations. These include strategic actions by the state and awareness-raising and popularisation of the issue by various specialist organisations and associations. In the case of natural and other disasters, the protection and rescue of cultural heritage is organised within the context of a general system involving the participation of the Ministry of Culture, the Ministry of Defence and the Civil Protection and Disaster Relief Administration, and the Ministry of the Environment and Spatial Planning. The Ministry of Culture is responsible for coordinating the protection of heritage against natural and other disasters and, inter alia, for the preparation of regulations, strategic documents and various forms of guidance, such as the translation of the European fire safety guidelines for heritage buildings.²⁰ The Ministry of Culture also carries out various educational activities for different target groups. It works closely with the Institute for the Protection of Cultural Heritage of Slovenia, especially in the case of following an incident, assessing the damage and eliminating the consequences of natural and other disasters.²¹

The Guidelines for energy renovation of heritage buildings were passed in 2016.²² Expert guidance begins by setting out a series of essential preliminary analyses and measurements, including: an assessment of the cultural importance of the building, structural and thermographic mapping, measurements of internal climate and analysis of illumination and the use of ground-penetrating radar for subsurface imaging. Energy renovation measures relate to the building envelope, with internal or external thermal protection of external walls, define the thermal protection of ceilings, floors and roofs and orient the renovation of building fixtures and mechanical installations and other measures to increase the use of renewable energy sources. Measures are pursued with the aim of conserving the essential protected components of the built heritage. The guidelines

20 Fire safety in heritage buildings. <http://www.szpv.si/wp-content/uploads/Smernica-CFPA-E-Pozarnavnost-stavb-kulturne-dediscine-PREVOD-verzija-14-apr-2014.pdf> (accessed: 22nd February 2022).

21 <https://www.gov.si teme/varstvo-dediscine-pred-naravnimi-in-drugimi-nesrecami/> (accessed: 22nd March 2022).

22 https://www.gov.si/assets/ministrstva/MK/DEDISCINA/NEPREMICNA/smernice_kd-final.pdf (accessed: 22nd February 2022).

do not expressly prohibit the installation of solar panels on historic roofs, but cultural protection consent must be obtained and the guidelines draw attention to problems associated with interventions in a historic structure and visual exposure. A difficult task awaits conservationists, who find themselves caught between climate policies that are promoting and co-financing the energy-efficient renovation of older buildings and owners and administrators who are, rightly, more concerned about waste or energy saving than historical and aesthetic value, and their personal expert judgement from the point of view of protection regimes and cultural protection regulations.

In 2016, Slovenia was one of the few European countries²³ to have adopted guidelines of this kind, although they should have been more binding when it came to procedures for co-financing those interventions that are supported in Slovenia by the Eco Fund and procedures for obtaining permits for interventions designed to achieve energy efficiency. Promoting the renovation of old buildings in order to achieve energy efficiency means that the essential protected components of built heritage are placed at risk by interventions to the façade envelope and the placing of photovoltaic solar panels. A range of activities in the field of cultural heritage and climate change that include guidance and recommendations on treating heritage in a different and sustainable manner are urgently needed.

It is also worth mentioning the architectural policy strategy adopted in 2017, which is indirectly linked to cultural heritage. With the document “Architecture for People”,²⁴ Slovenia undertook to implement the European cultural policy in the field of architecture. The aims of the architectural policy are consistent with the current European development policies: high-quality architecture, smart growth, sustainable development and inclusive architecture.

In 2019, Slovenia adopted its Cultural Heritage Strategy 2020–2023,²⁵ which is based on the European Cultural Heritage Strategy for the 21st Century adopted in 2017.²⁶ Slovenia’s Cultural Heritage Strategy places the emphasis on the principles of integrated conservation of heritage, which includes its remarkable landscape diversity and biodiversity, as the foundation of national identity and Slovenia’s cultural diversity. The general objectives of the strategy are to use heritage to contribute to the quality of life and a better-integrated society, promote sustainable development in Slovenia, and improve society’s attitude towards its heritage.

23 Cf. Energy Efficiency in Historic Buildings or Energy Efficiency in Traditional Homes, Historic England <https://historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/#b6b7e44c>; Preporuke za primjenu mjera energetske učinkovitosti na graditeljskoj baštini, Ministry of Culture of the Republic of Croatia, 2020. <https://min-kulture.gov.hr/UserDocsImages/dokumenti/Preporuke%20za%20primjenu%20mjera%20energetske%20u%C4%8Dinkovitosti%20na%20graditeljskoj%20ba%C5%A1tini.pdf>; Energieeffizienz am Baudenkmal, 1. Fassung: Stand, Wien, September 2021: https://gruenstattgrau.at/wp-content/uploads/2022/02/standards_energieeffizienz_am_baudenkmal_2021_final_bf.pdf

24 https://www.gov.si/assets/ministrstva/MK/DEDISCINA/ARHITEKTURA/df0797cb33/Arhitektura_zaljudi_SLO_2018-05-21.pdf (accessed: 28th February 2022).

25 https://www.gov.si/assets/ministrstva/MK/DEDISCINA/STRAT_KD_2019.pdf (accessed: 28th February 2022).

26 European Cultural Heritage Strategy for the 21st Century (also referred to as Strategy 21) <https://rm.coe.int/european-heritage-strategy-for-the-21st-century-strategy-21-full-text/16808ae270> (accessed: 22nd March 2022).

Various organisations and individuals devoted their attention to the subject of climate change in 2021. In September ICOMOS Slovenia organised an international symposium²⁷ at which participants presented cases that served as a basis for the discussion on how heritage can be made more resilient to the consequences of climate change. In October a conference on the theme of climate change and cultural heritage in Slovenia took place in Idrija. The resulting publication assesses the situation in five regions and attempts to find common answers to the negative impacts of climate change.²⁸ The University of Ljubljana’s Faculty of Architecture hosts the interdisciplinary and interfaculty Institute for Sustainable Protection of Heritage that offers students new interdisciplinary knowledge through various forms of education.

We should also mention the activities of the Institute for the Protection of Cultural Heritage of Slovenia, which among other things works to popularise heritage and its protection. For example, it organises the Cultural Heritage Week every year, and it has adapted the “Know, protect, conserve” project for primary school students. The European Heritage Days are now firmly established in the public consciousness, with a wide range of events taking place across Slovenia every year. The theme chosen for 2022 is sustainable heritage. Sustainable development and tourism is also a topic of several international research projects in which the Institute is involved and which highlight the key aspects of the research, conservation, presentation and interpretation of cultural heritage with the aim of its sustainable management.²⁹

3.1 Long-Term Climate Strategy to 2050

In 2021 Slovenia adopted its Long-Term Climate Strategy to 2050,³⁰ in which it had committed, inter alia, to a vision of Slovenia as a society based on a well-preserved natural environment, a circular economy, renewable and low-carbon energy sources, sustainable mobility, locally produced healthy food and a healthy environment, as well as following sustainable principles in spatial development. Slovenia is one of the few European countries to have included heritage in its environmental strategy, albeit in a truncated form following subsequent negotiations between the Ministry of the Environment and Spatial Planning (which drafted the strategy) and the Ministry of Culture (responsible for cultural heritage). The Cultural Heritage Directorate works closely with the Institute for the Protection of Cultural Heritage of Slovenia on numerous procedures as well as in the drafting of various documents. This means that strategic contents are always supported by theory and by technical and practical considerations. There is still

27 Resilient Heritage. ICOMOS, Ljubljana, 16. -18. 9. 2021 (<http://en.icomos.si/4th-international-symposium-of-icomos-slovenia/>) (accessed: 23rd March 2022).

28 http://www.cudhg-idrija.si/wp-content/uploads/2021/11/Podnebne-spremembe-spletna-izdaja-2_11.pdf (accessed: 23rd March 2022).

29 For more on the projects see: <https://www.zvkds.si/sl/kategorija-projekta/aktualni-projekti>

30 Resolution on Slovenia’s Long-Term Climate Strategy to 2050 (ReDPSS), Official Gazette of the Republic of Slovenia 119/21: <https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/2021-01-2552/resolucija-o-dolgorocni-podnebni-strategiji-slovenije-do-leta-2050-redps50> (accessed: 22nd February 2022). The section, which had to be shortened by half during the process of interdepartmental coordination, is considerably truncated in the adopted resolution. This article merely summarises some of the essential emphases and actions.

plenty of room for de-bureaucratisation and a specialist cultural protection dialogue within intersectoral cooperation. Heritage is – directly or indirectly – part of almost all sectoral fields, something that is reflected through the everyday activities of society in various sectors from agriculture and business to traffic and transport, healthcare, education, etc.

Within the long-term climate strategy, cultural heritage is dealt with in section 7.3. The Register of Immovable Cultural Heritage currently contains around 30,400 units in various categories such as cultural landscape, archaeological sites, buildings, settlements, machinery, industrial complexes, memorials and monuments, parks and gardens. The Register of Intangible Cultural Heritage currently contains 102 units and 273 custodians of intangible heritage.³¹ The state of both registers varies as a result of the ongoing changes and additions. Five properties are inscribed on the UNESCO's World Heritage List, three cultural (prehistoric pile dwellings in the Ljubljansko Barje wetlands as a part of the transboundary property Prehistoric Pile Dwellings Around the Alps; Heritage of Mercury (Idrija, Slovenia and Almadén, Spain); and the Works of Jože Plečnik in Ljubljana) and two natural (Škocjan Caves; and Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe – the virgin forests of Krokari and Ždrecle). The art of dry-stone construction is also among the four units inscribed on UNESCO's list of intangible cultural heritage of humanity.³²

In the field of energy efficiency and heritage protection, there are many examples of good practice such as the energy renovation of schools and other public buildings with the use of cohesion policy funds. Complete energy renovation of heritage buildings is carried out in accordance with the Rules on the efficient use of energy in buildings and the requirements of the EU's Energy Performance of Buildings Directive.

The climate strategy also highlights the efforts and measures to adapt to and mitigate the effects of climate change in the field of cultural heritage. Slovenia will undertake to implement measures that develop innovative, preventive and protective mechanisms. Within the process of climate change, there are three key areas that derive from the previously mentioned Cultural Heritage Strategy: Society: intersectoral and interdepartmental liaison, awareness raising and inclusion of the public.

- Development: sustainability, quality of the environment and space, and innovations.
- Knowledge: identification, planning, research, knowledge transfer, interconnection and implementation.

Slovenia has also committed itself to implementing the following measures in the field of cultural heritage:

³¹ The figure for the Register of Intangible Cultural Heritage refers to the situation as of 14th March 2022. <http://www.nesnovnadediscina.si/si/register> (accessed: 25th March 2022).

³² <https://www.gov.si/drzavni-organi/ministrstva/ministrstvo-za-izobrazevanje-znanost-in-sport/o-ministrstvu/urad-za-unesco/> (accessed: 24th March 2022).

- support for substantive and financial mechanisms that will take cultural heritage into account in the reduction of greenhouse gas concentration, disaster risks and other impacts of climate change,
- studies to monitor the impacts of climate change and socio-economic changes on heritage communities,
- research into preventive and protective conservation processes,
- identification and digitalisation of cultural heritage at-risk,
- financial incentives for renovation and giving precedence to renovation over new construction,
- maintenance of settlement patterns and the ratio of built areas to unbuilt areas; maintenance of use or re-establishment of use of heritage buildings,
- improvements in fire and earthquake safety and energy efficiency,
- improvements in the attractiveness of settlements and the cultural landscape by addressing essential and advanced needs,
- uniform development of urban and rural areas through digitalisation, social innovations and smart specialisation, building on the inherited values of cultural heritage.

4 Open method of the coordination group for climate change and cultural heritage

In the context of international efforts, experts from EU Member States participated in an open method of the coordination group on strengthening cultural heritage resilience for climate change, which was coordinated by the European Commission in the period 2021–2022.³³ A total of 28 countries took part in the group: 25 EU Member States plus Switzerland, Norway and Iceland. During the preparation of the joint report and the exchange of experiences and findings, the members of the group used a questionnaire to gather data on the inclusion of cultural heritage in various national strategic documents connected to climate change and sustainable development. A total of 31 questionnaires were completed by experts from 26 countries. A common methodology was used to gather 83 examples of good practices from 26 countries. These were then divided into four separate areas, depending on the topics covered:

- knowledge, research and innovation,
- renovation of architectural heritage and energy efficiency,
- climate change adaptation measures,
- education, training, policies and awareness raising.

In order to avoid the climate crisis turning into a heritage crisis, the group drew up a joint report containing measures and recommendations for the protection of cultural heritage and the mitigation of the negative effects of climate change.

³³ Open Method of Coordination (OMC) group of Member States' experts on Strengthening Cultural Heritage Resilience for Climate Change.

The cases from Slovenia relate to a range of different areas and address a range of stakeholders. Six characteristic cases were selected. They all share an integrated multidisciplinary approach and successful implementation as well as the fact that they obtained high public visibility and professional recognition (including awards). Some of them incorporate innovative conservation solutions and approaches or introduce new methods. All of them contribute to raising awareness of the importance of protecting and conserving cultural heritage for the future.

The renovation of the Franja Partisan Hospital after a devastating storm and flood in 2007 and the restoration of historic parks, gardens and avenues after the ice storm of 2014 are two projects that touch upon the area of natural disasters and the protection of cultural heritage. The 2016 renovation of Hotel Tivoli took into account the minimum measures necessary to enhance the energy efficiency of the building and, at the same time, maintained all protected elements of high cultural significance. The case of the revitalisation of the meadow orchards within the Kozjansko Regional Park highlighted the importance of expert conservation of a cultural landscape in cooperation with the local population. The “Know, protect, conserve” project and the architecture seminar led by the students from the University of Ljubljana on the revitalisation of the Vevče Paper Mill are two projects from the field of popularisation and education.

A standardised form was used to indicate the type of project, the location of the heritage in terms of climate zone, sources of funding, project participants and details of popularisation or public awareness raising. Greater attention was dedicated to the project justification, for example how climate change has affected the heritage, how the principles of adaptation have been taken into account in order to reduce these impacts, how direct threats have been eliminated, and so on. It was also possible to take into account long-term forecasts for the elimination of negative changes, offer justifications for interventions in the field of energy efficiency that avoid unsuitable interventions, and take into account the principles of a circular economy and other sustainable development objectives. A number of common substantive conclusions can be drawn from the cases, including: indication of the direct and indirect impacts of climate change on cultural heritage, innovation in research, technical work and fieldwork through new methodological approaches, the importance of good cooperation of local communities and the public with experts and organisations from various fields, the importance of suitable documentation, the implementation of regular monitoring and maintenance, the importance of sustainable management, the importance of education and the great importance of raising awareness across the entire society. Based on these results, it is possible to compile methodological starting points and measures that will lead to a more resilient society in terms of heritage protection and climate change.

Responsible conservators from the Institute for the Protection of Cultural Heritage of Slovenia and project managers from the Faculty of Architecture and the City of Ljubljana contributed to the preparation of material with data and documentation.

4.1 Storm remediation of the Franja Partisan Hospital³⁴

The Franja hospital complex in the Pasica Gorge was totally destroyed during a storm in 2007. The torrential stream that flows through the gorge burst its banks and swept away the huts and hospital equipment. The stream’s channel and banks were destroyed, as were the access routes. In view of the great symbolic value of the monument and its location, the decision was reached to reconstruct the site in full, which included the reconstruction of the huts in the gorge, repairs to the channel of the Čerinščica stream and the installation of upstream defences to protect the monument against future floods and landslides.

The full reconstruction of all huts was a major challenge because the configuration of the stream channel had changed significantly during the flood. In order to re-establish the authentic locations of the huts and reconstruct them as they were before, it was necessary to repair the channel and deepen it. Numerous experts participated in the renovation of the monument, together seeking the best technical solutions in accordance with the conservation plan and technical documentation from the 1980s. A geodetic survey of the gorge carried out in 2002 served as a basis for the positioning of the huts in their original locations. The construction followed the original ground plan, using original materials and methods. It was also necessary to harmonise the natural appearance of the gorge with conditions that ensured a sufficient flow of water.

A drainage system was implemented in the wider surrounding area and a retaining mesh and torrential check dam were installed on the Čerinščica above the landslide area. Following a model used in Switzerland, a catch barrier was built using steel wire ropes. In 2012 this was the only structure of its type in Slovenia. Numerous erosion prevention measures were also carried out in the wider surroundings of the remediation area.

The project to reconstruct the Franja Partisan Hospital brought together numerous participants and once again demonstrated the scope of cooperation and solidarity between locals, schoolchildren, museum staff, conservators, geologists, hydrologists and others. The project is important from the point of view of the consensus of different disciplines that were joined together for the purpose of establishing innovative, integrated solutions and putting preventive safety measures in place against new occurrences of similar weather events in the wider area.

4.2 Repairs to designed landscape heritage following an ice storm³⁵

The ice storm that caused great damage across Slovenia in February and March 2014 also affected the most vulnerable type of immovable cultural heritage —

³⁴ Source: Ernesta Drole, ZVKDS, Nova Gorica Regional Unit. Internal material on the reconstruction project, email from 24th May 2021.

³⁵ Source: Miran Krivec, ZVKDS, Maribor regional unit. Report on the project to repair designed land-



Fig. 1: Destruction of the Franja Partisan Hospital after the storm in 2007. Photo: Ernesta Drole



Fig. 2: The Franja Partisan Hospital today. Photo: Valentin Benedik, 2019

historic parks, trees and gardens. The affected areas fell within the areas of competence of the regional offices of the Institute for the Protection of Cultural Heritage of Slovenia (ZVKDS) in Kranj, Ljubljana, Celje and Maribor. This was the first time that a natural disaster had befallen Slovenia in such form and on such a scale. To begin with, it was necessary to set up a system and methodology for recording and documenting historical parks and gardens.

The Institute for the Protection of Cultural Heritage of Slovenia prepared Background documentation for the elaboration of conservation-restoration reports for the elimination of the consequences of the damage caused by the ice storm in February 2014, which was incorporated into the broader programme for the elimination of consequences under the aegis of the Ministry of the Environment and Spatial Planning. Conservators drew up separate expert reports for each park, avenue or garden. They obtained cartographic sources from the owners of the sites, which they unified, and drew up exact inventories of the rehabilitation measures needed to eliminate the damage. Extensive photo-documentation was produced. The cartographic records showed the location, while the inventory lists defined the rehabilitation measures needed for the damaged plants in that location.

The level of damage to historical parks and gardens was extremely high. A total of 507 trees were removed, repairs were carried out on 340 small trees and 1,225 large trees, 699 new trees were planted and 159 treetops were tethered. The work was carried out by various contractors who were either selected by the owners of the property based on their calls for tenders or were assigned the work on the basis of concession agreements. In order to ensure professionalism, the teams of all contractors had to include an internationally certified tree surgeon.

In October 2016 conservators inspected all remediation work and established that it had been carried out correctly and professionally. They drew up a report for each remediated cultural heritage unit and formulated basic instructions on future maintenance for the owners.

A natural disaster always requires immediate intervention, a rapid response and effective action involving an interdisciplinary approach and the cooperation of various stakeholders: experts and representatives of the state, local communities, owners and administrators. The best solutions for heritage and people need to be found as quickly as possible. The group of conservator-landscape architects demonstrated, through their highly professional approach, that events of this kind are also an opportunity to develop a new methodology which is of strategic importance for further preventive measures in future natural disasters.

scape heritage following an ice storm, typescript from 29th May 2021. Grmovšek, T., Jeglič, M., Jernejec Babič, P. (et al.) (2017). Vrtnoarhitekturna dediščina v Sloveniji in njeno ohranjanje. Slovensko konservatorsko društvo: Ljubljana.



Fig. 3: Damage to the lime avenue in Logatec after the ice storm. Photo: Petra Jernejec Babič, 2014

4.3 Energy efficient renovation of the Švicarija building³⁶

The renovation of the former Hotel Tivoli represents a new business model with a new, adapted use for the building that takes full account of sustainable and environmental principles.

The former hotel was built in 1908 in the middle of Ljubljana's Tivoli Park. It is also known as Švicarija (The Swiss House) after the original building that stood on the site. At one time it was an important meeting place for the city's inhabitants and artists. It was left in a state of disrepair for several years, until the owner of the building, the City of Ljubljana, decided to carry out a complete renovation in 2009. Before the renovation could begin in 2015, it was necessary to find 19 alternative dwellings and eight alternative studios for the artists who had lived and worked in the building.

The technical, energy and structural requirements had to follow the guidelines and methods of the conservation plan drawn up in 2011 by the Institute for the Protection of Cultural Heritage of Slovenia. In order to increase the building's energy efficiency, the foundations were insulated, an underfloor insulation layer was installed and the roof was also insulated. An insulation layer was installed on the inside of the stone walls of the "ice house" and a new extension was built in accordance with

³⁶ The case was prepared in cooperation with the conservator in charge Tatjana Adamič from the ZVKDS Ljubljana Regional Unit (email from 7th September 2021) and Jerneja Batič from the City of Ljubljana (email from 24th May 2021), both of whom provided relevant information.

modern energy efficiency standards. All original fixtures were renovated. The significant decision was made to conserve all the original box-type windows, which were once again fitted with single panes, since the slender frame elements made it impossible to fit double (or triple) panes. A further argument in favour of the conservation conditions was a calculated saving on heating costs of around 500 euros a year. Only two apartments on the 2nd attic of the building have built-in air condition units. The appliances are in a ventilated technical space, without visible installations on the roof or façade. The cooling system is designed to a maximum temperature difference of 6°C between the external and internal temperature.

Otherwise, air conditioning units were not installed, since one of the advantages of the Švicarija building is its location at the edge of a forest in the midst of extensive green areas, which provides a favourable natural microclimate in summer.

The Švicarija building is an example of a model renovation that has preserved the building's significant cultural, architectural, historical and aesthetic value and is at the same time a structurally stable building with good fire safety and energy efficiency characteristics. It is a modern arts centre containing 13 studios and four apartments, a café, a gallery and other spaces that are open to the public. Five-year rent-free tenancy agreements were concluded with 15 artists selected through a public call. The tenants will only be required to cover utilities and other costs. Two full-time staff are employed at the centre.

This successful renovation, which was completed in 2017, is the result of extremely good cooperation between the conservators, the builders and other contractors and the developer.³⁷



Fig. 4: The Švicarija building prior to the renovation. Photo: Tatjana Adamič, 2011.

³⁷ Details of the project can be found on the City of Ljubljana website: <https://www.ljubljana.si/sl/moja-ljubljana/ljubljana-zate/projekti-mol/hotel-tivoli-svicarija/> (accessed: 28th March 2022).



Fig. 5: The renovated Švicarija building. Photo: Valentin Benedik, 2017.

4.4 Kozjansko orchards³⁸

The case of the revitalisation of the Kozjansko orchards is extremely important in terms of raising awareness as regards the importance of conserving the cultural landscape of meadow orchards in order to mitigate the negative effects of climate change.

The Kozjansko Regional Park extends between the Sotla river and Mt. Bohor and as a result of its rich biodiversity it was also declared a part of the Natura 2000 area. It also encompasses 314 protected units of cultural heritage. The Kozjansko and Obsotelje biosphere area was designated a UNESCO biosphere reserve in 2010. According to the Kozjansko Regional Park management, based in Podsreda, the area contains around 50,000 fruit trees of various apple, pear, cherry and walnut varieties. These trees play an important role in preserving and maintaining the biodiversity of the entire area. Bees and other pollinating insects, important for the preservation of fruit varieties, have been protected here since 2004. Experts from the Kozjansko Regional Park collaborate with various specialist organisations and coordinate elements relating to the protection of architectural heritage and the cultural landscape with the Celje regional unit of the Institute for the Protection of Cultural Heritage of Slovenia. In cooperation with local communities, they have created, over the course of several decades, an important network involving the area's farmers and the local population and, in this way, succeeded in revitalising old meadow orchards, which are an important part of the agricultural cultural landscape. They also work to popularise the area and its long-term management and development strategy. They organise workshops, education and training, cultural events and events such as the Kozjansko Apple Festival.³⁹

³⁸ Information was provided by Andreja Mihelčič Koželj of the ZVKDS Celje Regional Unit, who is the conservator in charge for the area of the Kozjansko Regional Park (email from 29th November 2021).

³⁹ For additional information on the Kozjansko Regional Park see: https://kozjanski-park.si/?page_



Fig. 6: Cultural landscape in the area around Podsreda in Kozjansko. Photo: Andreja Mihelčič Koželj, 2007

Although meadows and orchards around the world are particularly at risk from climate change, the Kozjansko Regional Park management explains that, after more than twenty years of expert care, more and more are being conserved in Kozjansko, where they are flourishing.

4.5 Perceive, protect, conserve⁴⁰

This educational project for children, which has been running successfully since 2007, has proved to be a vitally important introduction to the protection and conservation of cultural heritage for children of all ages.

Through workshops, guided tours and presentations of conservation work with the help of various teaching aids, primary school students learn about the heritage in their environment and the methods used to protect and conserve it. Experts from the Institute for the Protection of Cultural Heritage of Slovenia share their knowledge on architecture, archaeology, ethnology, landscape architecture, etc. with young people throughout Slovenia. Participants are thus also acquainted, albeit indirectly, with the challenges posed by climate change, the sustainable aspects of conservation and reflections on how to mitigate negative climate impacts.

The programme is also presented each year at the Cultural Bazaar in Ljubljana. This is an important form of culture popularisation, at which various cultural organisations present themselves for the purpose of incorporating cultural content and art education into the school-based education system.

id=1911&lang=en (accessed: 28th March 2022).

⁴⁰ The case was prepared in cooperation with the author and project manager Milena Antonič from the ZVKDS Maribor Regional Unit (email from 24th November 2021). For more on the project see: <https://www.zvkds.si/sl/kategorija-projekta/aktualni-projekti> (accessed: 28th March 2022).

Thus, in addition to the established autumn events such as the Cultural Heritage Week and European Heritage Days, Slovenia has, for a number of years, been providing systematic education for young people and raising the awareness of the general public as regards the importance of protecting and conserving cultural heritage.

Fig. 7: As a part of an educational workshop on conservation called “A stroll through Maribor”, children discover the cultural heritage of their city. Photo: Vlasta Čobal Sedmak, 2010



4.6 The Vevče Paper Mill adaptive reuse ⁴¹

The climate crisis and the pandemic have meant that discovering neighbourhoods, communities, parks and recreational areas, even breathing fresh air and enjoying nature – everything that we otherwise take for granted – have become a real challenge for students. With a research workshop and project entitled “Paper Futures”, architecture students immersed themselves in the historical development of the Vevče Paper Mill, analysed its current abandoned state, considered the challenges of heritage and proposed new solutions. They considered new contents with which the industrial heritage in question could match the wishes of the owner, connecting it to the local community and making it accessible to the general public.

The Vevče Paper Mill stands on the Ljubljanica river, on the eastern margins of the city of Ljubljana, and was founded in the mid-nineteenth century by the Slovene industrialist Fidelis Terpinč. Today, the paper mill operates in line with modern sustainable manufacturing standards. With its numerous possibilities of reuse in a variety of recycled forms, paper is an important research topic for a more sustainable future alongside the architectural and urban planning challenges. The reuse of abandoned buildings and premises and the search for suitable cultural heritage contents are still inadequately exploited potentials. Cli-

⁴¹ The case was prepared in cooperation with Dr Sonja Ifko, an associate professor at the University of Ljubljana's Faculty of Architecture (email from 13th January 2022). For more on the project see the Faculty of Architecture's website: <http://razstava2021.fa.uni-lj.si/seminarji/ifko/> (accessed: 17th May 2022).

mate change is an opportunity for reconsidering the numerous advantages of heritage, which in the future need to be consciously planned and implemented on all levels.

Having recognised the importance of creating sustainable solutions, the paper mill company Papirnica Vevče d.o.o. cooperated closely on both, the research and the resulting publication. The project is a response to environmental, socially responsible challenges and offers economically effective solutions. The students envisaged various possibilities of renovation and enhancement, with the key connecting elements of public paths, courtyards and other areas. The industrial heritage area of the paper mill is a century-old record of the coexistence and connection of the mill workers with the locality. Today it is recognised as an important co-creator of new development opportunities in the wider area and region.

The research project connects to the field of higher education and is an example of discovering, researching and revitalising industrial heritage in cooperation with an enterprise. It also helps raise awareness of the importance of cooperation between an enterprise and young people. It speaks in favour of conserving architectural heritage as a building block of the identity of a community and offers solutions that include the objectives of sustainable development for the future.



Fig. 8: Postcard of the Vevče Paper Mill from 1920. Source: OE-IKA photo library, University of Ljubljana Faculty of Arts, dlib.si

4 Conclusion

The many successful projects in the field of cultural heritage reflect results that show us how to respond in the future, what measures and processes to select, how to mitigate negative climate impacts and, last but not least, how to take preventive action by changing and adapting our own culture of living and working. Unfortunately, the path to good results and examples of good practice has many branches and the data is extremely fragmented. In the case of the consequences of a natural disaster, the chief coordinator is the civil protection authority

with its established systems and procedures under the aegis of the Civil Protection and Disaster Relief Administration at the Ministry of Defence. In the case of damage to cultural heritage, coordination is entrusted to a single individual at the Institute for the Protection of Cultural Heritage of Slovenia. Within what is, in most cases, a very short time frame allocated to responding, identifying, documenting and cataloguing damage on the basis of a prescribed code list of remediation works, the task is divided up amongst the conservators responsible for the region. Material containing data is kept by each regional unit separately, while aggregated data is kept by the coordinator from the Institute, but is not publicly accessible. The aggregated data includes the name of the heritage unit, the unique heritage number (Slovene abbreviation: EŠD), the name of the municipality where it is located, the competent regional unit and an assessment of the damage. If we wish to identify the negative effects of climate change on cultural heritage that are apparent through various recurrent natural disasters, we urgently need to ensure that data is publicly accessible. As well as the existing data, we would need to be able to search by year and by type of natural disaster, with a search engine based on an alphabetical list of settlements or a map of Slovenia. We would also need to define the types of heritage, since this would enable us, on the basis of observations over the course of several years, to obtain information on the potential vulnerability and threat with regard to the type and location of the heritage unit, as well as identify and estimate the potential damage. We could define a projection of potential threat with measures to mitigate the negative impacts. Data on the funds invested for remediation and an indication of the success of the implementation would also be useful and necessary. There is an urgent need to establish a national coordinator for the preventive climate-change-related protection of cultural heritage. One of the tasks of such a coordinator would be to connect the data from different sectors, organisations and the heritage users/custodians. Communication in both directions is urgently needed, since this would address the shortcomings of a ramified cross-sectoral system with bureaucratic procedures that vary according to the type of competence and free up the time frame for knowledge and a more inclusive society.

With the national coordinator, we would set up a national information centre and embark on data digitalisation. We need a single information and documentation system that could identify the direct and indirect impacts on cultural heritage, with a central database of cultural heritage research carried out by different research organisations, data which is currently fragmented and not available to the experts involved in heritage, for example the results of dendrological or geological research, research in agriculture, forestry, civil engineering, etc. In collaboration with experts and other stakeholders, we would also identify the needs for further research and innovations in the fields of social sciences, humanities and natural sciences and encourage such research.

Alongside the popularisation and raising awareness on the importance of protecting and conserving cultural heritage in order to mitigate the negative impacts of climate change, the future of heritage and society also requires education at all levels and in all directions. We need to combine knowledge and experience and improve cooperation and information sharing.

The climate crisis is an opportunity for cultural heritage and society, for sustainable methods of heritage conservation and a lasting future for humanity.

TOPIC II

Key Challenges

Ključni izzivi



Photo: Barbara Vodopivec

ROKO ŽARNIČ AND BARBARA VODOPIVEC

Topic II introductory paper

On the Resilience of Cultural Heritage Assets

ABSTRACT

The evidence of millennia of human influence on the environment is preserved in what is today recognized as a cultural heritage asset, whether this is a movable or immovable one. In an invisible way this also contains a variety of intangible messages that are difficult to read and understand, however, they should be preserved for the future generations. Each asset is exposed to long-term and sudden environmental and man-made harmful impacts, which damage or erode the asset's materials and components and lead to the loss of the incorporated intangible messages. The lack of knowledge and improper decisions of site managers significantly increase exposure of the assets to all kinds of risks. Therefore, they are obligated to increase the assets' resilience. A resilient asset can respond to harmful impacts with less damage and has a better recovery potential following an environmental or man-made disastrous event. In this paper we explain our views on the heritage resilience concept based on data collection protocols and the significances of cultural heritage assets. The outline of the cultural heritage resilience model is briefly presented and commented in relation to its further development and its importance for the development of related standards and protocols. This paper is a result of the authors' research and experience as well as the study of relevant literature.

KEYWORDS

cultural heritage asset, data collection, significances, resilience model.

O odpornosti virov kulturne dediščine

POVZETEK

Dokazi o tisočletjih človeškega vpliva na okolje so ohranjeni v današnjih virih kulturne dediščine, najsi bodo ti premični ali nepremični. V takšnih virih se skriva obilica neotipljivih sporočil, ki jih je težko brati ali razumeti, vendar bi jih morali nedvomno ohraniti za prihodnje generacije. Vsak vir kulturne dediščine je izpostavljen dolgotrajnim in nenadnim okoljskim in človeškim vplivom, ki poškodujejo ali razjedajo materiale in sestavne dele kulturne dediščine. Tako tudi izginjajo neotipljiva sporočila, ki jih ti viri nosijo. Upravljalci virov kulturne dediščine pogosto nimajo dovolj znanja in sprejemajo neustrezne odločitve, kar še poveča izpostavljenost kulturne dediščine najrazličnejšim tveganjem. Prav zato je njihova dolžnost, da okrepijo odpornost takšnih virov. Odporen vir kulturne dediščine bodo negativni učinki manj poškodovali, prav tako pa ga bo lažje obnoviti po okoljskih katastrofah ali katastrofah, ki jih povzroči človek. V članku je razloženo naše razumevanje koncepta odporne dediščine, ki temelji na protokolih zbiranja podatkov in pomenu virov kulturne dediščine. Na kratko je orisan tudi model odpornosti kulturne dediščine, sledijo pa še pripombe o njegovem nadaljnjem razvoju in pomenu za razvoj povezanih standardov in protokolov. Dokument je plod naših raziskav in izkušenj, pa tudi pregleda zadevne literature.

KLJUČNE BESEDE

vir kulturne dediščine, zbiranje podatkov, pomen, model odpornosti.

1 Introduction

The current scientific discourse in the field of heritage preservation introduces a holistic integrated approach, which involves humanities and social sciences as well as natural sciences and engineering.¹ Even though each type of heritage should always be investigated and observed within its specific context, stakeholder participation and sustainable strategic planning, which aims to harmonize economic, environmental, and social aspects of the development dimension, should be implemented as an umbrella approach that addresses the common challenges of heritage preservation. Consequently, heritage preservation is marked above all by sustainable preventive conservation and regular maintenance. However, the development of appropriate management strategies for preventive conservation and maintenance, and informed decision making on interventions must be based on reliable data, which is supported by appropriate documentation methodology. Over the last decade, the academic, research and professional environment started focusing on the issue of cultural heritage resilience as an important part of maintaining a resilient society. This resulted in the decision of the EU Horizon 2020 Programme to launch several calls on this topic and their probable continuation in the current EU Horizon Europe Programme.

2 Concept of Resilience

As a term with various origins “resilience” has been used in various disciplines with different variations in its meanings and context. According to the Oxford English Dictionary, “resilience” comes from the post-classical Latin “resilientia” meaning avoiding. It also comes from the classical Latin resilient, resiliens, the present participle of resilire. It entered the English language from *Sylva Sylvarum*² where it is defined as “the action or an act of rebounding or springing back; rebound, recoil”.

The concept of resilience is still not sufficiently understood by many professionals dealing with the preservation of cultural heritage and the management of heritage sites. The concept of resilient societies is defined by emergency readiness and response as well as by systemic mitigation of damage. It is based on the analysis of factors that influence social and technological change in order to adapt society to the fast-changing environment. In modern times, the concept of resilience was first introduced in the 1950s in natural sciences and later adopted

¹ Appelbaum, Barbara, 2012. Conservation Treatment Methodology London, Routledge.

² Bacon, Francis, 1626. *Sylva Sylvarum*, or, a Natural History, in Ten Centuries, Published after the author's death by William Rawley.

by psychology and education sciences. Since the end of the 1990s the notion of resilience has been increasingly applied to corporate contexts.

There are four leading concepts of a resilient society. The first originates from the concern as regards the impact of natural and man-made risks and the constant need for mitigating the consequences of sudden and unexpected unfavourable events. The second focuses on risk adjustment and disaster transformation in order to adapt the society to the fast-changing environment. The third is based on the analytical approach to stocktaking, attempting to provide tools needed to transform “natural” social resilience into criteria suitable for action. The fourth, and the newest concept, is based on innovative cognitive paradigms, which integrate technology, democracy, and society. This approach is characterized by liberation technology and participatory technological innovation. Thus, everyone should be granted the basic right to use certain technologies such as computers, mobile phones and the internet as well as be given the knowledge on how to use them.

However, related specifically to cultural heritage, the definition of resilience according to the Intergovernmental Panel on Climate Change³ reads as follows: “The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions.”

3 Components of Cultural Heritage Resilience

The resilience of cultural heritage assets aggregates multi-fold aspects. In its simplified version, it can be observed as an aggregate of three important aspects, although others can be added. These three are: managerial, societal, and technical (Fig. 1). Managerial aspects include activities carried out by stakeholders, who are in charge of covering organizational, legal, financial and other support activities necessary for the integral management of the asset. Societal aspects mostly cover the intangible significances of the asset, i.e., its role and value for the local and broader society, which also includes the importance for economic growth and the well-being of the population. Technical aspects are related to physical integrity, stability, and general condition of the asset, assuring its resistance to long-term environmental and unintentional man-made impacts as well as environmental and intentional man-made disasters.

3.1 Proper management

One of the most important issues in increasing resilience is high awareness, professionalism, and knowledge of the stakeholders in charge, including the authorities responsible for heritage preservation. An illustrative example of the

3 Field, Christopher B., Vicente Barros, Thomas F. Stocker, and Qin Dahe, eds., 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.

decision-making process is reported in the paper by Jigyasu et al. from 2013,⁴ which examines the extent to which disaster risk reduction is considered within the management systems of various World Heritage sites. Those that appear to be most exposed to disaster risks are particularly targeted. The study surveyed 60 World Heritage sites and identified 41 properties in 18 countries as most at risk from natural and man-made hazards according to the World Risk Index.⁵ The study revealed that the Risk Preparedness Plan is not a main priority in the management of World Heritage sites. The problem is that numerous managers of heritage sites do not find the time or motivation to read and implement the plan when solving everyday problems. They could find useful information in the comprehensive collection of texts on the conservation of art and architecture.⁶



Fig. 1: Components of establishing resilience of cultural heritage assets.

3.2 Societal engagement

Societal resilience in small towns and rural areas rich in cultural heritage was addressed as an important issue in the European Regional Initiative Project in INTERREG IVc, HISTCAPE – Historic Assets and Related Landscape.⁷ A high percentage of Europe’s 747 million people, of which 514 million inhabitants live within the European Union, live in rural landscapes that are home to a scattered pattern of smaller historic towns and villages. The HISTCAPE project focused on some 4,500 small towns rich in heritage assets with a population under 20,000 inhab-

4 Jigyasu, Rohit, Manas Murthy, Giovanni Boccardi, Christopher Marrion, Diane Douglas, Joseph King, Geoff O’Brien, Glenn Dolcemascolo, Yongkyun Kim, Paola Albrito and Mariana Osihn, 2013. “Heritage and Resilience: Issues and Opportunities for Reducing Disaster Risks.”, the 4th Session of the Global Platform for Disaster Risk Reduction, 19-23 May 2013, Geneva, Switzerland.

5 <http://whc.unesco.org/>, accessed on 25th June 2021.

6 Clifford A. Price, Eric Doehne. 1996. Stone Conservation: An Overview of Current Research. Getty Conservation Institute. Los Angeles.

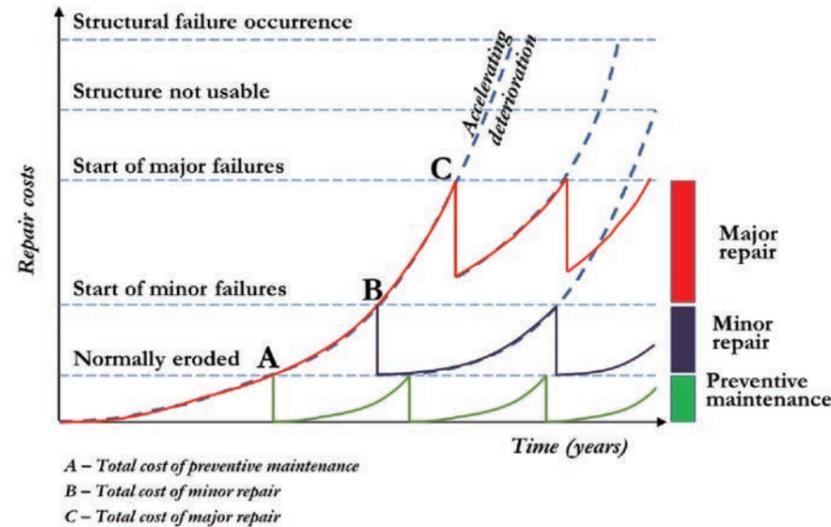
7 Eppich, Rand, Alexandra Kulmer, Juan Carlos Espada, Barbara Vodopivec, and Roko Žarnić, 2014. “Quality of Rural Life and Culture: Managing Change through the Identification of Good Practice, Pilot Implementation Projects and Evaluation.” In Euro-Mediterranean Conference, pp. 353-363. Springer, Cham.

itants that have traditionally acted as community hubs – a focal point for economic activity and social cohesion. However, over recent decades, this role has come under serious threat as a result of migration, particularly of young people who move away from these places as a direct consequence of the changing patterns of economic activity – adversely affecting the demographic balance and sustainability. The ensuing loss of facilities and services combined with the loss of economic activity has resulted in a lack of investment in these communities. The acceleration of this trend, exacerbated by the recession, threatens the existence of many European historic assets. The HISTCAPE project addressed this challenge by focusing on the sustainable management of historical assets in small rural towns.

3.3 Technical measures

Technical measures encompass two groups of activities: regular maintenance and structural rehabilitation. When the decision is reached to upgrade the physical resilience of a building or any other heritage object, a series of activities are carried out. Fig.2 redrawn from⁸ presents five possible conditions of an asset: normally eroded, minor failures, major failures, unusable condition, and structural failures. Regular preventive maintenance keeps the asset in a good condition, enables normal use of the asset and is cost effective. In the event of sudden events or neglect, minor failures can develop on structural and non-structural parts of the asset. Immediate measures after observing minor failures prevent the object from developing major failures. Costs of minor repairs are higher than preventive maintenance costs, but still much lower than the costs of major repairs. Each repair contributes to the increase in the asset's resilience and regular interventions help maintain the targeted resilience.

Fig. 2: Comparison of preventive maintenance, minor and major repair costs (Matulionis and Freitag, 1991)



The conservation of monuments and heritage buildings is a well-developed scientific and professional discipline and there are several books and other publications

⁸ Matulionis, Raymond C., and Joan C. Freitag, 1991. *Preventive Maintenance of Buildings*. New York: Van Nostrand Reinhold.

that offer theoretical and practical knowledge for professionals and researchers.⁹ These books offer a comprehensive survey of the fundamental principles of conserving historic buildings and provide the basic information needed by architects, engineers, and surveyors for solving the problems of architectural conservation in almost every climate in the world. As they offer reliable intervention methods that have been proved to be efficient and can serve as a source for solutions, they can help professionals in every day heritage maintenance.

Structural rehabilitation increases the resistance of a heritage asset to disastrous natural and man-made impacts. During such an intervention both, major repairs of the asset and structural strengthening, are performed. Due to the sensitive nature of the cultural heritage asset, any intervention needs to engage experts from different disciplines and be coordinated by experts with high technical capacity and cultural sensibility. Within the discipline of earthquake engineering, heritage building repair and strengthening has been well developed and extensively published. Since new knowledge keeps developing and new experiences are gained from earthquake responses, the literature is constantly updated although there are well established principles and methods of structural assessment and repair/strengthening design. The International Council for Research and Innovation in Building and Construction (CIB) has published “The Guide for the Structural Rehabilitation of Heritage Buildings”¹⁰ which can serve not only for interventions in heritage buildings with the aim of increasing their earthquake resistance, but also to increase their resistance to other disastrous events.

4 Resilience Model of Cultural Heritage Assets

4.1 Characteristics of a resilient system

Over the past two decades the interest in the resilience of built heritage assets in the context of its vulnerability has become an important research and long-term heritage protection planning issue. The high interest of the European Union in protecting and promoting the importance of cultural heritage has been reflected in its research policy since the early research programmes. It started with the 1st Framework Programme for Research & Technological Development (1984–87) and continued with HORIZON 2020 (2013–2020). Within this programme, several calls on resilience of cultural heritage have been launched, and selected projects are already taking place. In general, a resilient system is one that shows:

- Reduced failure probabilities.
- Reduced consequences from failures, in terms of lives lost, damage, and negative economic and social consequences.
- Reduced time to recovery (restoration of a specific system or set of systems to their “normal” level of functional performance).

⁹ Feilden, Bernard, 2007. *Conservation of Historic Buildings*. Routledge.

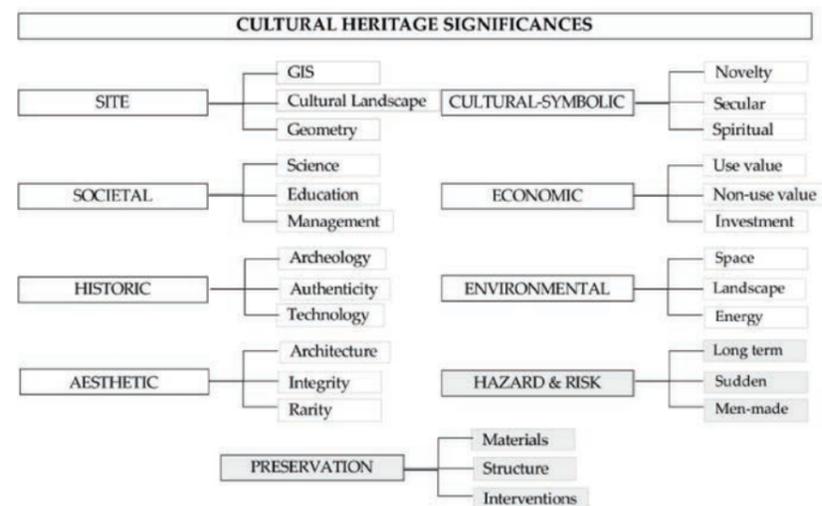
¹⁰ Santos, Sergio P., Claudio Modena, Elli Vientzileou, Miha Tomazevic, Paulo Laurenco, Roberto Capozucca, Samir E. Chidiac, and Wolfram Jaeger, 2010. “Guide for the Structural Rehabilitation of Heritage Buildings.” In CIB Publication, vol. 335.

4.2 Data based significances of cultural heritage assets

For over a century researchers and professionals have focused on the significances of cultural heritage. This interest is especially visible since Alois Rigel's classic essay "The Modern Cult of Monuments: Its Character and Origin" (1903). Fredheim and Khalaf¹¹ (2016) provided a critical discussion of value typologies for heritage conservation and management based on their review of published literature on heritage values.

The presented heritage significances were first defined within the framework of Vodopivec's (2019) interdisciplinary PhD study. Her research resulted in a multiple-criteria decision making (MCDM) methodology for assessing architectural heritage properties.¹² Her study confirmed that the methodology can offer relevant and scientifically sound support for decision makers aiming to plan scientifically justified renovation and maintenance interventions, especially when public funds are limited. The methodology can also serve as a basis for planning the revitalization and integration of monuments into the local environment and regional development (e.g. planning the management and function of object).

Fig. 3: List of significances of cultural heritage assets as proposed by the authors of this article



The proposed scheme of significances is organized in nine blocks, each further divided in three sub-blocks that cover vast spectra of different aspects, properties and values of heritage assets following the idea of a holistic approach to the understanding and managing of cultural heritage. A detailed description of significances is presented in a research published in 2017.¹³ However, in the case of cultural heritage asset under observation, only its properties organized according to the scheme (Fig.3) can be derived from the available data. Data collections represent the key to understanding and learning about the asset.

11 Fredheim, L. Harald, and Manal Khalaf, 2016. "The Significance of Values: Heritage Value Typologies Re-examined." *International Journal of Heritage Studies* 22, No. 6: 466-481.

12 Vodopivec, Barbara, 2015. *Interdisciplinary Definition of a Sustainable Approach to the Environmental Protection - the Case of Castle Heritage*, Ph.D. Thesis, University of Ljubljana, FGG.

13 Zarnic, Roko, Vlatka Rajcic, and Barbara Vodopivec, 2017. "Data Collection for Estimation of Resilience of Cultural Heritage Assets." In *Mixed Reality and Gamification for Cultural Heritage*, pp. 291-312. Springer, Cham.

Recognizing the importance of reliable and complete data on various aspects related to cultural heritage, its properties and values, experts and authorities in many countries have been developing and using various systems and tools for creating an inventory and documenting cultural heritage. The entire tradition of care for cultural heritage is reflected in these systems, however, their approach to content stems from local approaches and understandings.

The need for an unified approach to collecting and organizing data on cultural heritage that can be compared on the European level lead to an action of researchers and experts from 15 EU countries and Egypt which resulted in the EU FP7 Coordinated Action "European Cultural Heritage Identity Card" (EU-CHIC, 2009-2012). The main aim of the Action was to propose a strategy and the most efficient methods and tools for harmonising the criteria as well as define the indicators that need to be addressed for tracking environmental changes and human interventions on the tangible cultural heritage objects across Europe and neighbouring countries. The project demonstrated a significant cost-benefit advantage for all owners, managers, authorities, and conservators who are in charge of protecting movable and immovable cultural assets and should monitor and systematically report all human and natural changes of state, so that they can reach the most appropriate economic choice for effective preventive conservation.

One of main objectives of the EU-CHIC was to develop and test guidelines needed for the efficient compilation and storage of data pertinent to each monument under observation. The EU-CHIC system supports sustainable maintenance, preventive conservation and rehabilitation of historic sites and monuments.

EU-CHIC partners developed a data collection protocol in which data is divided into three groups. Level 1 incorporates the general data on the heritage asset following the recommendations of the Council of Europe.¹⁴ The template for data collection and Guidelines translated into 13 languages are available online.¹⁵ The second level of data is more detailed and can be collected through various approaches and organized according to the previously presented grouping by significances. The third level of data contains the aggregation of level 1 and level 2 data that can serve in the decision-making process for planning and executing interventions (Fig.2), thus maintaining, and increasing the resilience of the cultural heritage asset.

4.3 Concept of the resilience model of cultural heritage assets

In contemporary systems where the operational condition and structural properties are known and well documented a broad measure of resilience that captures these key features can be mathematically expressed and calculated. Resilience depends on the quality of the asset. Its performance can range from 0% to 100%, where 100% means no degradation in quality and 0% means total loss (Fig.4a). In the event of a disastrous short-term event, the asset could be sufficiently damaged for the quality measure to be immediately reduced (from 100% to a much lower percentage, or in the worst-case scenario of collapse to

14 Palmer, Robert, and John Bold, 2009. *Guidance on Inventory and Documentation of the Cultural Heritage*. Council of Europe Publishing.

15 <http://euchic.eu/index.php/news/entry/chiceberg/>, accessed on 25th June 2021.

0%). Following the post-event intervention, the asset is entirely repaired and returned to its full function (indicated by a quality of 100%). At the time of the occurrence (t_0) of the event the infrastructure is assumedly 100% resilient. Due to a known and documented condition and functionality prior to the event it can be restored with appropriate intervention in a certain period (t_1) to the initial level of resilience ($R=1$, 100% performance level).

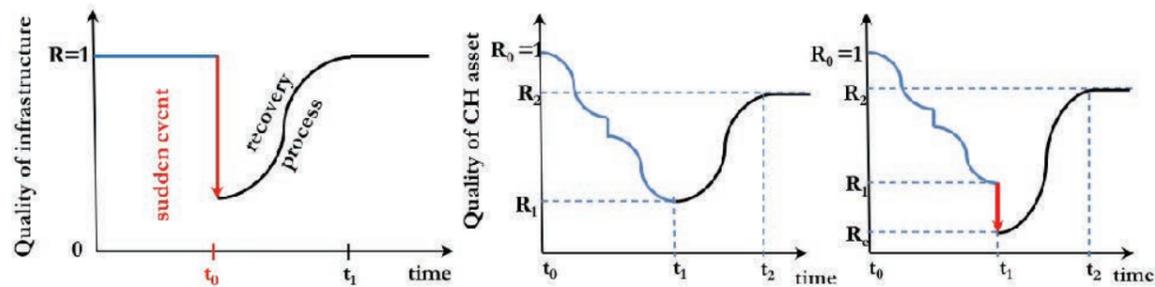
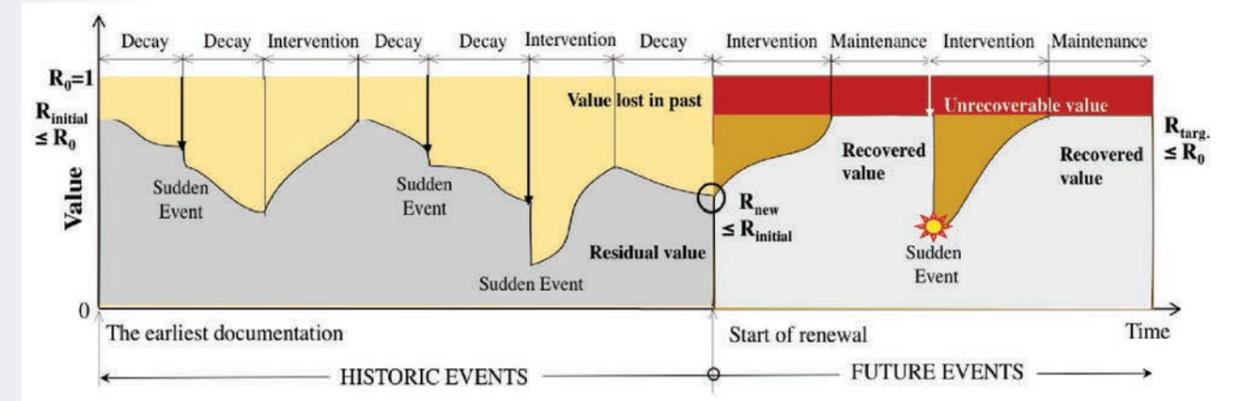


Fig. 4: Schematic presentation of: (a) the performance of a contemporary infrastructure before and after the disastrous event, (b) the decreasing value of a cultural heritage asset due to long-term influences and short-term impacts and the increasing value as a result of the radical intervention during regular maintenance and (c) the decreasing value of the cultural heritage asset due to long-term influences and short-term impacts and the increasing value as a result of a radical intervention following the disastrous event.

In the case of built heritage, the situation is more complex because the value of the heritage asset depends on the state of its preservation, taking into account all its known significances (Fig. 3), including the condition of materials and structure, maintenance, and previous interventions. Because of the specific nature of cultural heritage assets the proposed concept of the resilience model for cultural heritage assets differs from the model for contemporary infrastructures. The heritage asset's value was 100% ($R_0 = 1$) at the time of its creation. Various long-term and sudden impacts occurred during its lifetime that is measured in centuries or even millennia. At the present time (t_1) the resilience of this asset is much lower than it was in its initial stages ($R_1 < R_0$). The asset can practically not be restored to its original state (Fig. 4b), but only to the best achievable state ($R_1 < R_2 < R_0$). Theoretically, it would be possible to reach its initial resilience (R_0) only in cases where complete documentation of the initial state is available and the reconstruction in its parts would be allowed. The documentation is complete only if it contains both, data on tangible characteristics and intangible values of the asset. The solution of the problem becomes even more demanding if in the observed, present time (t_1) (Fig. 4c) an additional sudden drop (R_e) of value occurs due to a natural or man-made impact.

Because of its uniqueness, a detailed investigation, study and even research are needed to quantify the resilience of each heritage asset. Due to the variety of heritage assets, this is unlikely to develop into a universal resilience model. However, the presented concept can help create the basic rules of the model. The main idea is to preserve and mitigate further loss of the inherited asset value (with appropriate interventions).

Figure 5 schematically presents the loss of value in the past until the day of renewal, marked by the circle in graph, and the target situation after that day. Since its creation, the heritage asset was exposed to various long- and short-term influences that gradually and/or instantly decreased its value. In some cases, mainly during sudden events, the post-event interventions were recorded, but most of these records have been lost.



Learning from the available documentation and data obtained from the inspection and assessment of the heritage asset, the current value of the heritage asset can be identified when a decision to renew the asset has been made. Based on the collected data that covers all tangible and intangible significances of the asset (Fig. 3), its resilience can be estimated in relation to the assumed resilience at the earliest documented date ($R_{initial}$). This estimation can also be considered as the new (R_{new}) initial resilience to which all future resiliencies will be compared. The purpose of the renewal intervention is to upgrade the heritage asset to its highest possible level in order to recover as much of the original value as possible. Due to the lack of information as regards the asset's creation and due to its alternation in use, function, or purpose, a certain part of the original value cannot be recovered. However, the owner or the responsible authority can assign a new purpose and use of the heritage asset, which is in line with its sustainable economic exploitation and that can enrich its original value. The result of the renovation is a recovered value and the asset's resilience can, at this stage, be calculated as the targeted resilience (R_{target}). In this stage of the asset's life, complete and holistic documentation should be created and this should reflect its economic value as well as the values expressed by all other significances. Following the completion of the renovation, a precise maintenance plan and its execution should be assured in order to keep the resilience of the asset at its target level (R_{target}). Maintenance should be carried out regularly and in a way that neutralises all long-term environmental and unintentional man-made impacts. Environmental and man-made disastrous events cannot be avoided in the future life of the renewed asset. However, the high level of resilience achieved by the renovation and extensive documentation can diminish the risk of losing the entire value of the asset and enable a faster recovery after an unwanted event up to the targeted level of resilience.

5 Discussion

The presented approach does not serve merely as support in the planning of the renovation and maintenance of monuments; it can also offer profound material that can be used to revitalize and integrate monuments into their environment and regional development, as well as define their function. Thus, the concept of heritage resilience management also addresses the use of heritage objects,

Fig. 5: Schematic presentation of value degradation during the past lifetime of the heritage asset and recovering its value due to renovation and regular preventive maintenance.

which is one of the most ardent challenges in heritage preservation. In addition, the scheme of significances, supported by ICT tools, allows for collecting, presenting, and storing data, which enables preservation and conservation, as well as the reconstruction of heavily damaged objects. The scheme was originally defined for architectural heritage, however, it can also be used for other types of heritage. In this case, the structure needs to be re-considered and re-assessed prior to its use. Furthermore, the user needs to be aware of the limitations of the approach, in particular the potential simplification of individual scientific disciplines and potentially dangerous generalization of results if applied without the support of specific, in-depth case studies.

The resilience concept brings together various concepts from heritage values and significances to risks, hazardous events and their mitigation. To this purpose the cultural heritage resilience model, designed especially for heritage assets, was developed through joint efforts of various disciplines, civil engineering being the leading one. However, there is an evident need to standardise data collecting, organizing, and processing on the global level (ICOMOS, UNESCO, ISO...), thus introducing a systematic approach from the general and global to the particular and detailed data.

AUTHORS CONTRIBUTION

Conceptualization, R. Žarnić, methodology, R. Žarnić and B. Vodopivec, investigation, B. Vodopivec, writing—original draft preparation, R. Žarnić; writing-review and editing, B. Vodopivec, supervision, R. Žarnić project administration, B. Vodopivec; funding acquisition R. Žarnić. Both authors have read and agreed to the published version of the manuscript.

ACKNOWLEDGMENTS

The research leading to these results has received funding from the European Union's Seventh Framework Programme FP7/2007-2013/ under grant agreement No. [226995], EUCHIC - European Cultural Heritage Identity Card (2009-2012) and from the European Union's Horizon 2020 research and innovation Programme /2013-2020/ under grant agreement No. [665220] INCEPTION- Inclusive Cultural Heritage in Europe through 3D semantic modelling (2015-2019).



GAŠPER STEGNAR, STANE MERŠE, SAMO GOSTIČ,
MARJANA ŠIJANEC ZAVRL, MIHA TOMŠIČ

Balancing Investments in Energy Efficiency Measures with the Conservation of Cultural Heritage Buildings in the Light of Global Warming – A Slovenian Case Study

SUMMARY

There is a growing concern that global warming will significantly change the buildings' performance pattern in the future. In their fight against climate change, countries have already committed to reducing greenhouse gas emissions, increasing the share of renewable energy, and improving energy efficiency. In the building sector, a substantial contribution to these efforts will be made through extensive energy renovation of buildings and the restructuring of heat supply. Cultural heritage buildings present an important part of the building stock, especially in historic cities, and improving their energy efficiency can represent significant savings in the overall energy consumption.

The study investigates the effects of climate change related impacts and policies on energy use, overall investments, and the risk of neglecting important conservation features on cultural heritage buildings in Slovenia. A comprehensive assessment of any building renovation should not address merely its energy characteristics, but also the aspects of cultural heritage protection and seismic renovation, focusing on the experiences gained in previous renovations of public buildings. The study demonstrates the possible solutions for energy and seismic renovation and improvement of indoor thermal comfort that can be applied to cultural heritage buildings.

Climate change related actions cause a paradigm shift in the building renovation design, while the magnitude of climate change impact and related investments require a holistic approach to the design and planning of resources in order to comply with cultural heritage building protection rules.

Usklajevanje naložb v ukrepe za doseganje energetske varčnosti in ohranjanja stavb kulturne dediščine v luči globalnega segrevanja – slovenska študija primera

POVZETEK

Pojavlja se vse več pomislekov, da bo globalno segrevanje v prihodnosti korenito spremenilo vzorce učinkovitosti stavb. Države so se že zavezale, da bodo v okviru boja proti podnebnim spremembam zmanjšale izpuste toplogrednih plinov, povečale delež obnovljivih virov energije in izboljšale energetske učinkovitost. Znatno prispevek gradbenega sektorja bo obsežna energetska prenova stavb in prestrukturiranje toplotne oskrbe. Stavbe kulturne dediščine so zlasti v zgodovinskih mestih pomembni del stavbnega fonda, zato je mogoče zagotoviti znaten prihranek pri skupni porabi energije, če izboljšamo njihovo energetske učinkovitost.

Študija preučuje tudi učinke, povezane s podnebnimi spremembami, ter politike o porabi energije, skupne naložbe in tveganje, da bi pri stavbah kulturne dediščine v Sloveniji zanemarili pomembne vidike ohranjanja. V celovito oceno kakršne koli prenove stavb bi morali vključiti tako energetske značilnosti kot tudi vidike zaščite kulturne dediščine in seizmičnega načrtovanja prenove, pri čemer se je treba osredotočiti na izkušnje, zbrane pri predhodnih prenovah javnih stavb. Študija predstavlja možne rešitve za energetske in seizmično prenovno ter izboljšanje notranjega toplotnega ugodja, ki bi jih lahko uporabili pri stavbah kulturne dediščine.

Ukrepi, povezani s podnebnimi spremembami, spreminjajo paradigmo pri načrtovanju prenove stavb, zaradi obsežnih učinkov podnebnih sprememb in s tem povezanih naložb pa je treba zagotoviti celosten pristop v zvezi s pripravo in načrtovanjem sredstev, da bi ustrezno upoštevali predpise o zaščiti stavb kulturne dediščine.

1 Introduction

In order to achieve an economically reasonable working life, buildings need to satisfy several basic requirements. They should provide a high level of safety and well-being for their occupants and operate so that their impact on the environment is as neutral as possible. When discussing their sustainability we consider environmental, economical and social aspects, and in the case of heritage buildings we also add the cultural aspect.¹ Cultural heritage buildings present a comprehensive challenge because we aim to preserve their appearance, materials and other valuable characteristics as much as possible, while recognising the need to upgrade their construction as well as their technical and functional aspects in order to make them usable for the future generations. In this sense, energy and seismic renovation are of a particular interest concerning the Slovenian cultural heritage buildings' fund.

When evaluating the possible quantitative effects of energy renovation, we cannot treat all buildings in the same manner. This is not connected merely to their different ages, the wear and tear of building elements and mechanical systems, or the technical feasibility and cost-effectiveness of the renovation, but also, for example, their possible special status arising from their cultural and historical significance. The level of protection of such buildings against a wide variety of interventions is defined by regulations and other acts in the field of cultural heritage protection.

Buildings that have recognizable building elements and are protected as cultural heritage usually cannot go through a comprehensive energy renovation without some sort of a negative impact on the protected values. Therefore, all measures that would unacceptably alter the character or appearance of the building are excluded from the list. The permitted scope of comprehensive energy renovation thus depends on the architectural and historical significance of the building, which is previously defined by the cultural protection professionals.

To put it simply, comprehensive energy renovation of cultural heritage buildings is an energy renovation that includes all – or to be more precise, only those – measures to improve energy efficiency permitted by cultural protection conditions and consent. Regardless of the fact that the restrictions of the protection regime might hinder us in carrying out a comprehensive energy renovation or achieve energy indicators that would be as favourable (“good”) as for conventional buildings, the

¹ Comité Européen de Normalisation. EN 16883:2017. Conservation of Cultural Heritage—Guidelines for Improving the Energy Performance of Historic Buildings. 2017. Available online: <https://standards.iteh.ai/catalog/standards/cen/189eac8d-14e1-4810-8ebd-1e852b3effa3/en-16883-2017> (accessed on 27th February 2021).

results are positive. The effects are manifested, among other things, in the improvement of living comfort and reduced operational and maintenance costs.

Energy renovation also contributes to the protection of the protected building fabric and individual elements, while extending their lifespan. We can mention the improved protection against moisture, the elimination of structural and convection thermal bridges, an increase in surface temperatures and a reduced risk of mould development. Measures for the preservation of heritage and for more efficient use of energy do not have mutually exclusive goals and outcome as long as the constructive cooperation of the competent professions is secured.

As if the problems of balancing energy efficiency measures with the preservation of cultural heritage values of buildings were not enough, an additional layer of problems arise when we take into account that Slovenia is on an earthquake prone area. Most cultural heritage buildings are old, older than the contemporary seismic codes, in most cases older than any seismic codes. In the case of Slovenia, certain requirements regarding earthquake safety were introduced in 1964 (and toughened in 1981 before adopting Eurocodes in 2008). But even then, the considered earthquake (horizontal) load was small (about 1 % to 4 % of the building weight) while now it can be up to 40 % (depending on the location and type of building). Thus, most cultural heritage buildings do not possess the seismic resistance required today. Old cultural heritage buildings are mostly masonry buildings (at least in Europe). They might look solid, strong and imperishable, however, their fragility is hidden in the construction details and in old, inappropriate and weathered material. Such buildings are generally capable of resisting vertical loads, though they are vulnerable to horizontal seismic loading. During earthquakes, a sudden collapse of a part or the entire building might occur due to the overturning of the walls, collapse of the corner connections or the shear failure of masonry walls.

2 Methods

2.1 Energy efficiency first – a difficult concept to grasp when dealing with cultural heritage buildings

It is widely recognised that in order to be prepared for the future, buildings need to consume minimum energy and minimise greenhouse gas emissions while ensuring comfortable conditions in a changing climate. In 2016, Slovenia was one of the 197 countries that adopted the Paris Agreement, aiming to keep the global average temperature below 2 °C above the pre-industrial levels while pursuing efforts to limit the temperature increase to 1.5°C.² Slovenia's current emissions reduction targets are represented by the 2030 target to reduce emissions to 20 % below 2005 levels and to reach net zero levels in 2050.³

² UNFCCC, 2016. Available online: <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement> (accessed on 31st August 2022).

³ National Energy and Climate action Plan (NECP), 2020. Available online: http://www.energetika-portal.si/fileadmin/dokumenti/publikacije/nepn/dokumenti/nepn_5.0_final_feb-2020.pdf (accessed on 31st August 2022).

However, as a part of the European Green Deal, the EU has set a binding goal of achieving climate neutrality by 2050 with European climate rules. Therefore, the current levels of greenhouse gas emissions must be significantly reduced over the coming decades. As an interim step towards climate neutrality, the EU has increased its climate ambitions by 2030, pledging to reduce emissions by at least 55 % by that year.⁴ As a part of the “Fit for 55” package, the EU is preparing a review of its climate, energy and transport legislation that would bring the current laws in line with the 2030 and 2050 ambitions that have yet to be adopted on national levels.

Improving the efficiency of new and existing buildings is globally recognised as a good way of reducing emissions related to energy generation: energy efficiency is key to ensuring a safe, reliable, affordable and sustainable energy system for the future. Energy efficiency is the one energy resource that every country possesses and is the quickest, and least costly way, of addressing energy security, and the related environmental and economic challenges. This means that by creating a more efficient way of using resources in buildings, we can retain the same level of comfort while consuming less energy. On an annual basis, the small proportion of new-builds added to the existing building stock is low, therefore it is important to develop and implement technical solutions that would provide both cost-effective new-builds as well as cost-effective renovations. Slovenia still has a large building stock of dwellings that need to be upgraded, as every uninsulated building is wasting energy through excessive heating and is adding to the global climate change by releasing greenhouse gas emissions into the atmosphere. From a global, local and individual point of view, it makes a lot of sense to make Slovenia's built environment energy-efficient now.

The impact of inefficient buildings is not only harmful for the environment, but also for people, as the building users are affected by the consequences, either through high energy bills for heating such spaces or, when they cannot afford to heat them, having to cope with cold and unhealthy environments. Although Slovenia has a relatively mild climate, about 10 % of households are estimated to live in fuel poverty. Around 100,000 households in single family buildings deal with high heating bills, since it was recognized their building's efficiency falls in the category of energy classes F and G.⁵ Most of these buildings were built before 1980.⁶ The average indoor temperatures are low by international standards and occupants regularly report they feel cold, because they cannot afford to adequately heat their inefficient buildings.

The adaptation of current buildings for future needs shall consider all possible challenges and stresses that these structures might be subjected to. As renovation is defined as works done to change the performance, function or capacity of a building or an upgrade to a building to adjust to new circumstances or require-

⁴ Consilium Europa, 2022. Available online: <https://www.consilium.europa.eu/sl/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/> (accessed on 31st August 2022).

⁵ From 150 to 210 kWh/m²a inclusive (F), and from 210 to 300 kWh/m²a and more (G), according to the national scale.

⁶ Long Term Energy Renovation Strategy (LTERS), 2021. Available online: https://www.energetika-portal.si/fileadmin/dokumenti/publikacije/dseps/dseps_2050_final.pdf (accessed on 31st August 2022).

ments,⁷ renovating our most vulnerable building stock is of high importance. Internationally, the application of energy renovation strategies to historic buildings has seen intense development in research and practice, with energy efficiency policies becoming more sensitive to heritage conservation principles over the years. Until recently, energy renovation was seen as a threat to conservation, but it is gradually gaining recognition as a measure to help with the protection of heritage buildings by providing healthy indoor environments that can have a longer lifespan. Renovation in places of cultural and historical significance is often described as a balancing act between optimisation and conservation of original features.

Another challenge for the adaptation of historic buildings to current and future requirements is their seismic vulnerability. This is particularly important for historic constructions made of load-bearing masonry, organised in complex aggregates, which present an intrinsic vulnerability and are particularly susceptible to local or global collapses in case of seismic loading. Earthquake protection of the built heritage can be realised through preventive knowledge of the seismic risk, with which we can plan mitigation strategies and schedule the necessary renovation measures to reduce vulnerability. Strengthening cultural heritage structures in order to meet the requirements of contemporary seismic codes often requires invasive interventions that may not be applicable because of their impact on the heritage fabric and other limitations. The challenge of balancing safety with the maintenance of architectural and artistic features of historic structures remains a pressing issue.

Despite the fast-developing international scenario on energy renovation of historic buildings, neither Slovenia nor the European Union have a large list of renovation projects for its existing buildings and even fewer examples of energy renovation of historic buildings. On the other hand, seismic renovation of historic buildings is becoming more common in the country. The reasons for this lack of energy renovation interventions are investigated in this paper, and ways to encourage energy renovation strategies are discussed, aiming to integrate both energy and seismic upgrade efforts.

2.2 The Integration of Energy and Seismic Renovation in Cultural Heritage Buildings

The integration of energy and seismic considerations in the renovation of cultural heritage buildings aims to increase the resilience of built heritage by concurrently addressing the threats of natural disasters related to climate change and earthquakes. This integrative approach considers the long-term sustainable management of heritage, and fits within the wider concept of preventive conservation, recognising that ‘prevention is better than cure’ when safeguarding cultural heritage. According to UNESCO, disaster mitigation calls for a change in the line of thought, from post-disaster reaction to pre-disaster action,⁸ so

7 European Commission. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A Renovation Wave for Europe: Greening Our Buildings, Creating Jobs, Improving Lives, COM/2020/662 Final. 2020. Available online: https://ec.europa.eu/energy/sites/ener/files/swd_2020_662_en.pdf (accessed on 31st August 2022).

8 Arya et al., 2010. Guidelines for Earthquake Resistant Construction.

that these preventive strategies aim to address the possible issues before they occur. The main benefits of preventive measures can be found in the improved protection of heritage values, cost-effectiveness, the reduced risk for accumulating deterioration and additional damage, the prolongation of the service life of buildings and building parts and the empowerment of local communities in dealing with heritage.⁹

The links between energy and seismic renovation are multiple-fold: energy efficient renovation is useful for structural protection, while structural strengthening prevents the environmental impacts and required energy associated with damages, repairs or reconstruction. In addition, both types of interventions are generally applied to the building envelope, therefore their impact on heritage fabric can be minimised by applying strategies that work harmoniously together, rather than duplicating the use of new construction elements.

Examples of research and practice integrating energy and seismic renovation can be found in Europe, especially in Italy, after the recent earthquakes that have led to greater urgency on seismic strengthening solutions and a few studies have identified the benefits of this integrated approach. Many authors have identified that most building renovation interventions tend to focus on either energy efficiency or seismic resilience techniques, pointing out the need for greater integration and understanding across both fields. There is a disconnection among the stakeholders that arises from the development of seismic risk mitigation independently of the sustainable development goals. Calvi and Ruggeri¹⁰ presented a proposal for an integrated assessment of energy efficiency and earthquake resilience, according to which environmental and seismic impact metrics are translated into common financial decision-making variables.

Several initiatives targeting energy and seismic renovation were developed following the 2009 earthquake in L'Aquila, Italy, as well as other cities damaged by previous earthquakes in the country. There were proposals to turn the recovery process into an opportunity to improve the energy performance of cultural heritage buildings as a part of an integrated energy and seismic renovation approach. Pilot projects developed in the villages of Caporciano and Apice Vecchia, analysed the renovation solutions for both, individual buildings as well as for the entire village. The ultimate goals of the proposed strategies were to integrate passive energy renovation actions on building envelopes, introduce structural interventions aimed at improving seismic performance and integrate or add energy systems that run with the help of renewable energy sources, such as photovoltaic systems.¹¹ Bournas and Davoli¹² evaluated the financial feasibility and benefits of the combined approach to seismic and energy renovation. It was shown that the payback of the interventions can be significantly reduced (i.e. by 50 to 10 years) when seismic renovation is applied concurrently with energy renovation, combining advanced construction materials, mainly due to the large savings related to labour costs.

9 C.J. Whitman, O. Prizeman, J. Gwilliam, P. Walker, A. Shea., 2020. Energy Renovation of Historic Timber-frame Buildings-hygrothermal Monitoring of Building Fabric.

10 Calvi and Ruggeri, 2016. Energy Efficiency and Seismic Resilience: A Common Approach.

11 Belpoliti et al., 2010. La riqualificazione energetico-ambientale.

12 Boarin and Davoli, 2014. Preliminary Audit And Performance Improvement.

Overall, the literature on the integration of energy and seismic renovation of cultural heritage buildings suggests this is a growing field of study, with a potential to be further explored in many different contexts and cultures. There are calls to improve the energy efficiency of cultural heritage buildings around the world and, in the case of countries with valuable built heritage that is seismically vulnerable, a combined approach might be appropriate. Countries that could benefit from this approach include Italy, Greece, Turkey, Chile and Nepal, among many others. This integrated approach is usually attempted after earthquakes cause significant damages to built heritage and there is a need to repair and renovate concurrently; however, preventive measures before a disaster takes place would be far more effective for safeguarding cultural heritage for future generations.

2.3 Seismic strengthening – a necessary, but high expense

Various strengthening methods can be used to improve the seismic resistance of buildings with masonry walls, however, in the case of cultural heritage, the renovations are restricted by the acceptable methods. Many applicable methods are quite invasive and can significantly alter the appearance (and substrate) of the building. Listed below are some typical methods for strengthening the structure, with an indication of the problems that might occur when used for cultural heritage buildings (denoted below as CH):

1. Connecting load bearing elements (in order to prevent disintegration – an application of measures that will ensure the structure will behave as a whole, the horizontal load will be distributed to the walls according to their stiffness, and the walls will be protected against excessive rocking and possible failure in the out-of-plane direction)
 1. horizontal steel ties (but their installation impairs facades) or perfo ties (drilled inside the wall, but demand a more complex application, which is expensive)
 2. anchoring the roofing (to prevent sliding and deformation)
 3. exchange/stiffen wooden floors with reinforced concrete or planking with OSB (this method strongly interferes with the appearance of floors and ceilings and is often unacceptable in CH)
2. Strengthening the load bearing structure (to meet the current resistance requirements)
 1. cement grout injections into the stone masonry (great improvement of strength but irreversible)
 2. refill or grout injections into the cracks in masonry (if cracks have to be repaired due to structural reasons; again, an irreversible method)
 3. partial rebuilding of the brick masonry (might not be an option in CH due to aesthetic reasons or substrate preservation)
 4. reinforced concrete coating of brick masonry walls (very effective in terms of strength but almost never an option in CH)

3. Strengthening the foundations (in the case of weak foundations it is necessary to widen or deepen them, which can be achieved by constructing a reinforced-concrete tie-beam along the edge of the foundations)
4. Removing or anchoring ‘loose’ elements (ornaments, chimneys), however, this can be sometimes connected to restoration works (frescos, altars, stone ornaments...)

New methods are being developed in order to overcome the above stated problems of these invasive methods. One of the most promising is the reinforcement of masonry with fibre reinforced polymer (FRP) fabric on the surface of the wall (in the plaster). Its efficiency and reversibility favour this technique in the case of CH buildings. The idea of using FRP for strengthening masonry walls is not as new as it is vast in possibilities for strengthening configurations, providing new materials and a variety of underlying inhomogeneous basic material. New materials can be engineered to match the required properties of strength, aesthetics and compatibility with the substrate.

Other methods include earthquake isolation for individual elements or for the entire building (which is extremely difficult in the case of CH buildings). One can also introduce new structural elements to dissipate the earthquake’s energy: braces, dampers, or ductile connectors can be incorporated in the structure and they can be visually separated from the CH substrate (if that is required from the CH point of view).

Measures for strengthening the load bearing structure can be invasive, they can degrade the aesthetics of the building and they are very expensive due to their complexity. The costs of strengthening the building to withstand an (expected) earthquake varies dramatically, but can easily consist of 50 % or more of the total renovation costs. Nevertheless, it should be taken into consideration that all expenses on energy efficiency (or other) measures can be lost in the case of an earthquake if the structure is not sufficiently resilient. Thus, earthquake resistance must be taken into consideration and other measures should be applied (and costs incurred) only once basic earthquake resistance is ensured. Or at least the cost benefit and risk analysis are performed and an action is decided upon their results.

3 Results

3.1 Decarbonising cultural heritage buildings is not straightforward

The 2030 National Energy and Climate Plans (NECPs) present the framework for Member States to outline their climate and energy goals, policies and measures between 2021 and 2030. The short-term goal for Slovenia is to, by 2030, reduce greenhouse gas emissions in buildings by at least 70 % compared to 2005. Besides this, at least 2/3 of all energy use in buildings must derive from renewable energy sources. By 2050, the goal is to reach zero net emissions in the building sector by maintaining a high level of energy renovation of buildings with low-carbon and renewable materials and by focusing on heating

methods using renewable-based technologies and remote heating systems with renewable energy sources.

The main challenges for the decarbonisation of the building stock by 2050 are to increase the current low renovation rates and the application of ambitious minimum requirements for existing buildings. Decarbonisation scenarios for the building sector are being created through energy models. The latter have been widely applied to the analysis of energy system decarbonisation in order to assess the options and costs of the transition to a low carbon supply. However, questions persist as to whether they are able to effectively represent and assess heat decarbonisation pathways for the buildings sector. This question stands out especially for the cultural heritage buildings, since in the case of inadequate addressing of their specifics, the overall energy and CO₂ savings can quickly be overestimated.

Older cultural heritage buildings are often more energy-efficient than buildings built between World War II and late 1970s. Some studies have shown that buildings constructed before 1940 require less energy for heating and cooling than houses built during the subsequent 35 years.¹³ Before electricity was available, homes capitalized on natural sources of lighting, heating and ventilation because the house itself – not electric lights and heaters – was all that protected the occupants from the elements. Regardless of their level of energy efficiency, all buildings must still be maintained properly in order to function fittingly as well to offer an appropriate environment so that they serve their purpose. This means that the thermal envelope components still need to be renovated to the permitted extent and the heating and cooling system must be, if technically possible, in accordance with the national heating and cooling guidelines.

Some specific elements of older buildings – with or without heritage significance – that contribute to their noteworthy energy efficiency are: (1) thick, heat-retaining masonry walls made from stone or brick, (2) exterior balconies, porches, wide roof overhangs, rooftop ventilators, clerestories, skylights, awnings and shade trees, (3) windows often include exterior shutters, interior venetian blinds, curtains and drapes and (4) exterior walls were often painted in light colours to reflect the hot summer sun, resulting in cooler interior living spaces.

Measures for the energy renovation of cultural heritage buildings are not primarily evaluated according to the achieved energy indicators, but according to their impact on the protected heritage values. The proposed technically feasible and economically justifiable measures require cultural protection consent, and not all of them may be eligible in each individual case. In general, they can be applied in the following fields:

- Opaque building envelope (e.g. additional external or internal thermal insulation, sealing of cracks and joints)
- Windows and doors (e.g. general repair, replacement of glazing, replacement of whole elements, weatherstripping)
- Installation of energy efficient HVAC systems and components (e.g. local and central heating, connection to remote heating, hydraulic bal-

13 <https://www.nachi.org/energy-efficiency-historic-buildings.htm>

- ancing of the heating system, ventilation with heat recovery, installing an energy management system)
- Installation of renewable energy systems (e.g. heat pump, biomass, solar collectors for domestic hot water, photovoltaics)

Organisational measures (e.g. regular maintenance and repair, installation of occupancy sensors, energy accounting)

In November 2016, the Guidelines for Energy Renovation of Cultural Heritage Buildings¹⁴ were published in Slovenia as the first formal national document dedicated specifically to this topic. Measures as listed above are described in detail, ranked according to their potential impact on the protected heritage values, and accompanied by further explanations of their possible mutual influence and building phenomena. The guidelines serve as a practical orientation and source of knowledge for building conservation specialists, architects, engineers and investors.

The long-term goal of buildings in the public sector is energy renovation of 3 % of the total floor area, where the minimum energy efficiency requirements are achieved in accordance with the national legislation. The central government buildings in Slovenia consist of almost 500 buildings with a total floor area of 890,899 m². In the scope of the long-term energy renovation strategy by 2050 it was established that 39 % of the buildings are officially protected as a part of a protected environment or because of their special architectural or historical significance. Furthermore, according to the modelling process, 23 % of the assessed buildings do not meet the required seismic resistance according to Eurocode 8-1. The buildings were divided into cohorts according to their compliance. Based on their potential for either deep or partial energy renovation and taking into account the cultural heritage aspect, the potential energy and CO₂ savings were calculated (Table 1).

Table 1: Energy renovation potential for central government buildings in Slovenia.

Group	Energy efficiency	Cultural heritage	Seismic strengthening	N	Floor area	Energy savings	CO ₂ savings
Unit	[compliance]	[compliance]	[compliance]	-	m ²	GWh/a	kt/a
1	yes	-	-	22	55.250		
2	no	no	no	166	263.986	20,85	5,85
3	no	yes	no	59	121.982	9,64	2,70
4	no	ne	yes	21	47.723	3,77	1,06
5	no	yes	yes	34	81.539	6,44	1,81
6	no	yes	-	10	33.889	2,68	0,75
7	no	no	-	179	286.531	22,64	6,35
Sum				491	890.899	66,02	18,5.

14 Vendramin, M, et al, 2016. Smernice za energetska prenova stavb kulturne dediščine. Ljubljana: Ministrstvo za infrastrukturo: Ministrstvo za kulturo, 2016. ISBN 978-961-93518-6-4. Available online. <http://www.energetika-portal.si/podrocja/energetika/energetska-prenova-javnih-stavb/> (accessed on 31st August 2022).

If 3 % of all central government buildings would be renovated in a deep manner, the estimated annual investment would reach approximately six million euros, if their heritage significance aspect is taken into account. If the buildings were also seismically strengthened, the overall investment would increase in the range of 27.1–52.6 million euros. This analysis highlighted several issues:

- The potential for energy renovation is substantial, but the necessary investment is high.
- A sizeable proportion of this building stock is under cultural heritage protection. Such buildings should be treated with care and separate financial funds should be allocated to this building cohort.
- The seismic aspect presents an important issue. Many buildings should be seismically strengthened before any energy renovation works take place, but the investment needed is considerably higher than that for the energy aspect. Slovenia does not allocate any grants for such works, and this presents another issue.

The results indicate that deeper knowledge of the overall building stock status is needed. Since the EU is tackling building decarbonisation by 2050, the majority of the buildings will have to be renovated and countries have to be prepared for this renovation wave. Suitable and stimulative financial instruments are necessary.

3.2 Effects of investing in energy efficiency

As indicated above, every assessment of the actual potential to improve the energy efficiency of cultural heritage buildings hides numerous pitfalls. We cannot treat them in the same way as other buildings, as their protected values and thus also permitted interventions are individually determined. We can only confidently state that this potential is less than the otherwise total technical potential. We checked how this is manifested in practice on the example of buildings owned and used by municipalities that applied for co-financing the renovation measures from cohesion funds.

As a part of the Operational Programme for Implementing the European Cohesion Policy 2014–2020,¹⁵ the first call for co-financing comprehensive energy renovations of buildings (co-)owned and used by municipalities from cohesion funds was published in 2016.¹⁶ Comprehensive energy renovation was defined in the tender as the coordinated implementation of measures for efficient use of energy on the building envelope (e.g. facade, roof, floor) and on the building's technical systems (e.g. heating, ventilation, air conditioning, hot water) in a way that, as far as it is technically possible, utilizes all the economically justifiable potential for energy renovation.

Up to 40 % of the eligible costs of the operation were co-financed by the funds of the European cohesion policy, of which 85% came from the Cohesion Fund and 15 % from the Slovenian participation in the cohesion policy. The criteria for selecting projects included the contribution to energy efficiency (50 %), share

¹⁵ <http://www.eu-skladi.si/kohezija-do-2013/2014-2020/operativni-program-za-obdobje-2014-2020>

¹⁶ <https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/2016005800004/javni-razpis-za-sofinanciranje-energetske-prenove-stavb-v-lasti-in-rabi-obcin-st-4301-5201615-ob-290616>

of co-financing the eligible costs by the beneficiary (35 %) and contribution to social change and raising social awareness (15 %).

Specific criteria were additionally set for cultural heritage buildings, which were derived from the principles presented in the Guidelines for Energy Renovation of Cultural Heritage Buildings. Thus, when calculating the indicator of the contribution to energy efficiency (the ratio between the annual final energy savings and the conditioned area of the building; kWh/(m².a)), the effects of the renovation were taken into account, including the measures that could not be implemented in full due to the protection of cultural heritage, or partially (e.g. only the facade), as if the measure had been implemented.

We obtained the first set of applications that Slovenian municipalities sent to the tender from the Ministry of Infrastructure. An integral part of the documentation consisted of the calculations of the energy indicators of the planned new state after the energy renovation, as well as the estimated financial parameters of investments needed to improve the energy efficiency. Above all, we were interested in the specific information for each individual building, whether it is protected as cultural heritage, or whether there are no cultural protection restrictions for the selection of renovation measures.

Since we received scanned original documentation, the data had to be manually transferred to an Excel file and arranged according to various parameters. Taking into account the identified variations of particular planned measures, the file comprised of over 300 columns, with each row dedicated to a particular building. With the help of filters, the data were then combined and analysed according to individual topics. We compared the technical and financial parameters of the first group of applications submitted to the above-mentioned public tender, as presented in the appendices to the applications. We were interested whether and what the differences are in the indicators for cultural heritage buildings and other buildings. We analysed 188 projects submitted for the tender, of which 59 or almost one third were buildings with a cultural heritage status. Logically, not all measures were planned for all buildings. For cultural heritage buildings and for other buildings, we calculated separately:

- the average U-value of the facade with additional thermal insulation (W/(m²K)),
- the average U-value of the roof with additional thermal insulation (W/(m²K)),
- the average U-value of new windows (W/(m²K)),
- the average cost of the specific investment in the measure (EUR/m²),
- the annual total (kWh/a) and specific (kWh/(m².a)) energy use after renovation,
- the annual total (kWh/a) and specific (kWh/(m².a)) energy savings after renovation,
- the annual total (kWh/a) and specific (kWh/(m².a)) use of renewable energy sources after renovation.

The key findings are summarised as follows:

- Cultural heritage buildings achieved, on average, higher (worse) U-value of external walls after renovation than other buildings. (Figure 1)

- The price of energy renovation of facades in cultural heritage buildings was lower than the price in other buildings (cause: lower final U-value of external walls, less complex facade systems). (Figure 1)
- A comparison of cultural heritage buildings and other buildings did not show any significant deviation, neither in the investment prices nor in the achieved U-value of the renovated roof. (Figure 2)
- The analysis of the investment in windows showed a significant difference in price. New windows installed in cultural heritage buildings were generally more expensive, but also had slightly worse thermal characteristics compared to windows in other buildings. (Figure 3)
- With the planned renovation measures, a 10 % lower specific energy consumption was achieved for buildings that are not under the cultural protection regime, which was expected.
- The specific final energy savings following the implementation of the planned measures showed a similar expected situation; they were 28 % higher for buildings without a protection regime, while the specific use of energy from renewable sources was higher by almost one third.

Fig. 1: Energy renovation of facades: specific investment and U-value. The average specific investment was 71,37 EUR/m² for heritage buildings (n=46) and 93,86 EUR/m² for other buildings (n=123). The average new U-value was 0,25 W/(m².K) for heritage buildings.

● Cultural heritage
● Other

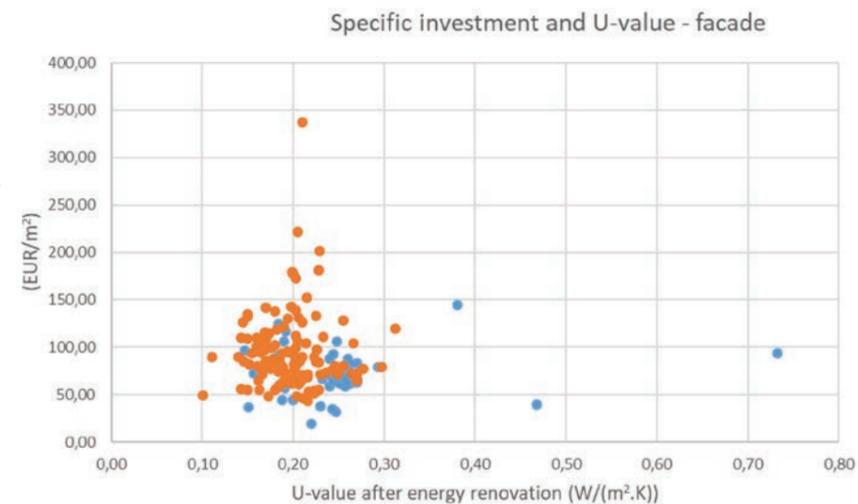


Fig. 2: Energy renovation of roofs: specific investment and U-value. The average specific investment was 64,33 EUR/m² for heritage buildings (n=51) and 66,14 EUR/m² for other buildings (n=108). The average new U-value was 0,20 W/(m².K) for both groups of buildings.

● Cultural heritage
● Other

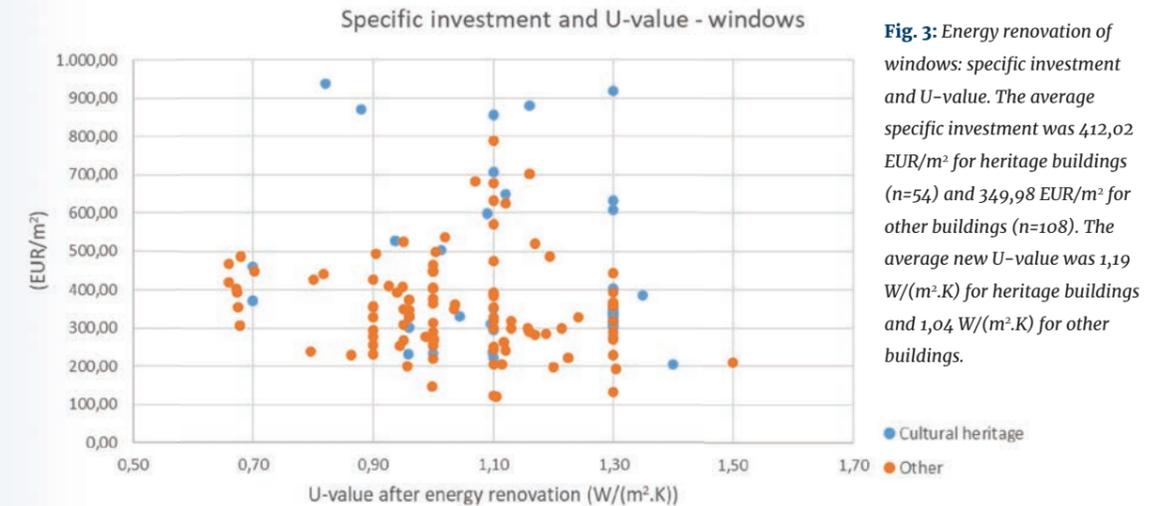
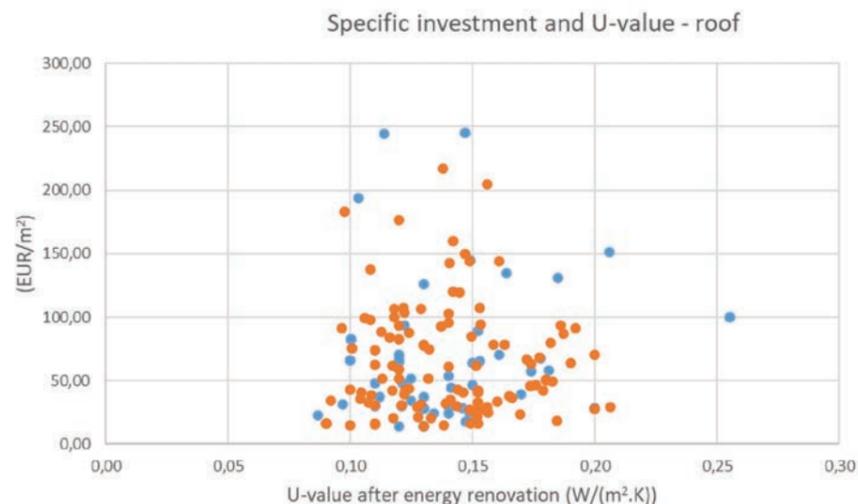


Fig. 3: Energy renovation of windows: specific investment and U-value. The average specific investment was 412,02 EUR/m² for heritage buildings (n=54) and 349,98 EUR/m² for other buildings (n=108). The average new U-value was 1,19 W/(m².K) for heritage buildings and 1,04 W/(m².K) for other buildings.

The results are consistent with the fact that the suitability or the permissibility of measures for the energy renovation of cultural heritage buildings is not judged by the achieved energy indicators, but primarily by the extent of their impact on the protected elements and on the building as a whole. It is precisely from this potential impact that limitations arise, whether in the choice of materials or products and systems, or in their dimensions and capacities.

We have also established that the proportion of buildings in which hydraulic balancing of the heating system, installation of thermostatic valves and installation of ventilation systems with heat recovery were planned was higher in cultural heritage buildings than in other buildings. Renovation of interior lighting was planned in approximately the same proportion, while the central control system was planned in a noticeably higher proportion in buildings without a protection regime.

The cultural heritage buildings submitted for the tender showed relatively well-planned characteristics of the thermal envelope and came fairly close to the minimum requirements of the technical regulations in force at the time for efficient energy use in buildings. We can conclude that the reason for the lower specific investment in the case of the facade and the higher one in windows was due to technical reasons related to the boundary conditions of cultural heritage protection. The specific final energy saving after the implementation of the measures was expected to be lower for cultural heritage buildings than for other buildings, but the difference was less than 25%. In the case of cultural heritage buildings, the use of solar energy such as solar collectors for the preparation of hot water and photovoltaics was expectedly not among the planned measures (although this possibility is not absolutely excluded), but renewable energy sources can also find their place in this part of the building stock, e.g. when replacing the existing fossil energy source with a renewable source.

The analysis of the buildings in question showed that the frequent general opinion that interventions (measures) to increase energy efficiency are practically not allowed in cultural heritage buildings is not true. According to the considered set of buildings, cultural heritage buildings comprised 31 % in number, and 34 % in terms of conditioned floor area of the whole. This roughly one-third share of buildings contributed 27 % of final energy savings and 26 % of energy from renewable energy sources to the overall planned result. (Table 2)

	Cultural heritage (n=59)	Other (n=129)
Total renovated conditioned area (m2)	127.249,70	245.963,40
Total final energy savings (kWh/a)	6.767.654,99	18.064.569,93
Specific final energy savings (kWh/(m2a))	53,18	73,44
Total final energy use after renovation (kWh/a)	15.317.098,83	27.309.127,84
Specific final energy use after renovation (kWh/(m2a))	120,37	111,03
Total renewable energy use after renovation (kWh/a)	2.519.442,70	6.995.179,43
Specific renewable energy use after renovation (kWh/(m2a))	19,80	28,44

Table 2: Comparison of selected energy indicators according to planned energy renovation measures for both groups of analysed public buildings.

On the other hand, we cannot conclude from the available data what the actual share of cultural heritage buildings is (in this case: owned or used by municipalities), in which interventions listed above would be permitted, and to what extent. It is also not known according to which key the buildings in each municipality were selected and what is the number of remaining municipal public buildings (both all buildings and cultural heritage buildings). With considerable probability, it can be concluded that for individual cultural heritage buildings, information was primarily obtained on (more numerous or more extensive) intervention options for energy efficiency and renewables. We assume that those cultural heritage buildings that had a greater potential in terms of such permitted interventions were selected to apply to the tender, therefore we cannot unconditionally generalize the stated results to the entire building heritage fund. The limitation of the possibility of generalization also stems from the “individuality” of the assessment of the cultural significance of an individual building and its associated categorization and cultural protection conditions. Finally, we must underline that the above results and comments are based on the trust in the correctness of the calculated parameters and indicators both for the existing state and planned renovation of each building, as provided by the applicants in their tender documentation.

4 Discussion

Over 20 % of the European building stock was built before 1945, with low energy performances and high energy consumption.¹⁷ Only about 1 % of this stock is renovated each year.¹⁸ Thus, its energy saving potential is high. Based on this data, the European Union recognizes the importance of the improvement of energy efficiency and the decarbonization of the existing building stock. These strategies permit the mitigation of climate changes and favour the energy transition while also preserving heritage values and historical characters. The European policies focus on the instruments and measures for increasing energy performance,¹⁹ renewable energy

¹⁷ European Commission. EU Buildings Factsheets. 2014

¹⁸ European Commission. Energy Performance of Buildings Directive. 2021.

¹⁹ European Parliament. Directive 2018/844

sources,²⁰ building renovations, and quality of life,²¹ as well as for cutting greenhouse gas emissions and generating new jobs in the green construction sector.

Each intervention on historic buildings involves physical changes and may include visual and spatial impacts, irreversibly altering their authenticity.²² Thus, their renovation requires vast building knowledge that supports the selection of compatible retrofit solutions that balance energy efficiency, human comfort, heritage preservation, and environmental sustainability. Energy audits require the understanding of original construction techniques, heritage values, modifications over time, actual performances, problems, and renovation opportunities.

It should be emphasized that, apart from rare exceptions, we can talk about “special” materials, products or technologies that can be used for the renovation of cultural heritage buildings, as long as we do not require to use the most authentic or the same elements as the original ones. In other words, in a strictly technical sense, everything that is suitable for renovating a building that is not subject to a special protection regime is also suitable for a cultural heritage building from a comparable time period and built using a comparable construction method. The cultural protection conditions determine whether such a technical option is also permissible in practice.

A possible special protection regime for a specific building, except in rare exceptions, does not mean that it was built in a significantly different way from other – unprotected – buildings, that unique building materials and products were used, that special energy sources are required for its operation, or that it generally has significantly different (energy) properties than comparable buildings from the same periods.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Gašper Stegnar: Conceptualization, methodology, investigation, writing - original draft, writing - review & editing, supervision. Stane Merše: Methodology, investigation, writing - review & editing. Samo Gostič: Conceptualization, methodology, investigation, writing - original draft, writing - review & editing. Marjana Šijanec Zavrl: Methodology, investigation, writing - review & editing. Miha Tomšič: Conceptualization, methodology, investigation, writing - original draft, writing - review & editing, supervision.

ACKNOWLEDGEMENTS

This work was partly developed within the frame of two projects, LIFE IP CARE4CLIMATE (LIFE17 IPC/SI/000007) and LIFE ClimatePath2050 (LIFE16 GIC/SI/000043). Tender applications data processing (Chapter 3.2): Luka Zupančič, Building and Civil Engineering Institute ZRMK.

²⁰ European Parliament. Directive 2018/2001

²¹ European Commission. A Renovation Wave for Europe

²² Comité Européen de Normalisation. EN 16883:2017

TOPIC III

***Cultural Heritage as an Example:
Experiences and Case Studies***

*Kulturna dediščina kot zgled:
izkušnje in primeri*

PILAR MONTERO VILAR, JORGE GARCÍA GÓMEZ-TEJEDOR

Risk Management and Emergency Plan for Collections

Case Study: Museo Nacional Centro de Arte Reina Sofía and its PROCOERS Plan

SUMMARY

The Museo Nacional Centro de Arte Reina Sofía is a modern, contemporary Spanish museum on an international scale. Its Collections Emergency Protection Plan (PROCOERS Plan) is a comprehensive management system for the entire museum that aims to provide an effective response to the protection of the works hosted by the Museum at its four venues in the event of an emergency situation. The PROCOERS Plan integrates a dynamic data collection infrastructure model that is used to globally and dynamically analyse works and spaces in real time. The advantages of this model under development are, among others, the integration and updating of all necessary information with sectorised access possibilities within a single system, the capacity to predict various risk situations linked to the different variables, the anticipation of different solutions or obtaining action proposals that would facilitate the decision-making process in the event of an emergency.

Obvladovanje tveganj in načrt za izredne razmere za muzejske zbirke.

Študija primera: načrt PROCOERS muzeja Reina Sofía (Museo Nacional Centro de Arte Reina Sofía)

POVZETEK

Museo Nacional Centro de Arte Reina Sofía je svetovno znan, sodoben španski muzej. Načrt za zaščito zbirk v izrednih razmerah (načrt PROCOERS) je sistem za celovito upravljanje celotnega muzeja, s katerim je zagotovljen učinkovit odziv za zaščito muzejskih eksponatov na vseh štirih lokacijah muzeja v izrednih razmerah. Načrt PROCOERS vključuje model infrastrukture za dinamično zbiranje podatkov, ki se uporablja globalno ter v realnem času dinamično analizira muzejska dela in prostore. Model trenutno še razvijajo, njegove prednosti pa so, med drugim, vključevanje in posodabljanje vseh potrebnih informacij v enotnem sistemu, ki omogoča dostop po sektorjih, zmožnost predvideti posamezna tveganja, povezana z različnimi spremenljivkami, predvidevanje različnih rešitev ali priprava predlogov ukrepov, ki bi olajšali postopek sprejemanja odločitev v izrednih razmerah.

1 Introduction

Unfortunately, the destruction of heritage assets of well-known historical and cultural value is not an intermittent story composed of anecdotal episodes, but a compendium of various circumstances involving the potential risk for World Cultural Heritage. Over the previous century, we have observed the historical evacuation of some of the works conserved at Museo del Prado during the Spanish Civil War, first to Valencia and then to Geneva; if we cross borders, we can see that the two world wars have also left a trace of destruction of historical heritage similar to is currently taking place in the Ukrainian war. As a matter of fact, less than a decade after the end of World War II, an international treaty known as the Hague Convention (1954) was signed to protect and safeguard the cultural heritage in case of a global armed conflict, which forced all signatory states to implement preventive measures also in times of peace. Likewise, the Blue Shield was created as a distinctive emblem for those assets that demand special protection, either in situ or during their transportation and, by extension, for the people in charge of their protection. In 1999, Spain, who joined this treaty in 1992, ratified the Second Protocol to the Hague Convention, which describes the detailed measures that lead to the safeguarding of Cultural Heritage (inventory development, contingency planning, adoption of evacuation measures, appointment of people in charge, etc.).

On the national level, articles 44 and 46 of the Spanish Constitution (1978) state that public authorities shall promote and watch over the access to culture, as well as guarantee the preservation and promote the enrichment of historic, cultural and artistic heritage of the peoples of Spain, and of the property of which it consists, regardless of its legal status and its ownership. Law 16/1985 on Spanish Historical Heritage¹ clearly states this duty and responsibilities in its general provisions (articles 1–8), and defines this obligation by decisively expressing the obligatory nature of protection, growth and transmission, explicitly referring to undesirable situations such as plundering or illicit export.

On 23rd March 2007 the Royal Decree 393/2007² was passed, by which the Basic Self-Protection Regulation was approved for centres, establishments and premises devoted to activities liable to emergency situations; it urges the owners of centres which feature certain characteristics, such as the Museo Nacional Centro de Arte Reina Sofía, to have a self-protection system for measures of

1 <https://www.boe.es/buscar/pdf/1985/BOE-A-1985-12534-consolidado.pdf>

2 <https://www.boe.es/boe/dias/2007/03/24/pdfs/A12841-12850.pdf>

risk prevention, alarm, evacuation and assistance of people and goods. Among other things, this system must aim to prevent emergencies, adopt evacuation measures and appoint the people in charge.

On 11th May 2011, the earthquake in Lorca, made public authorities aware of the need to move on to a more proactive creation of instruments and planning means for the protection of one of the most important assets we possess: our cultural heritage. The Lorca earthquake, which killed nine people and destroyed a considerable number of cultural properties, 74 of which were listed monuments, was perceived by the Spanish population as an irreparable loss. Indeed, that event became a landmark in the Ministry of Culture's policies as regards heritage protection in emergency situations, and was undoubtedly the trigger for the creation of the National Emergency and Risk Management Plan for Cultural Heritage³ (2015) which, coordinated by the Spanish Institute of Cultural Heritage, aims to define and implement the necessary preventive and palliative actions for the protection of cultural assets. Obviously, in such a context, in which we are liable to experience multiple risk situations, the citizens should be able to count on the certainty that the public authorities will establish the necessary and appropriate mechanisms to protect cultural property against catastrophes, accidents and emergency events.

Back in 2003, twelve years before the approval of the National Plan, the Commission for the Building of the Emergency Plan for Collections was created at the Office of State-owned Museums. This Commission culminated in April 2005, when it conducted a survey amongst all state-owned museums directly managed by the Spanish Ministry of Culture and, especially, with the release of the 2008 *Guide for an Emergency Plan for Collections*,⁴ which includes three essential moments that temporarily occur in such an event: the moments before, during and after the emergency, involving the necessary planning of the three stages gathered in international literature related to this issue:

1. Prevention, analysis and risk reduction,
2. Actions at the moment of the emergency and
3. Recovery and restoration once the emergency situation has ended.

Both this guide and other well-known international ones, such as the guide released by the Getty Conservation Institute, called *Building an Emergency Plan. A Guide for Museums and Other Cultural Institutions*,⁵ propose the general lines of action that each institution must gather and adapt to its own circumstances.

14 years have passed since then, the world has become more complex and Spain, a country with a global level of moderate risk as a whole, but which has been together with Italy one of the worst hit by the COVID-19 pandemic during the last year, has signed the international Sustainable Development goals of the 2030 Agenda and the Sendai Framework, both in 2015. The Sendai Framework

3 <https://www.culturaydeporte.gob.es/planes-nacionales/planes-nacionales/emergencias-y-gestion-riesgos.html>

4 Culubret, B., Hernández, M., Hidalgo, E., et al. (2008) *Guía para un Plan de protección de colecciones ante emergencias*, Madrid: Ministerio de Cultura

5 Dorge, Valerie, and Sharon L. Jones. (1999). *Building an Emergency Plan: A Guide for Museums and Other Cultural Institutions*. Los Angeles, CA: Getty Conservation Institute.

is extremely relevant in our context because this is the first time that Cultural Heritage is named as one of the elements that needs to be protected against disaster risk; in addition, the need to assess losses and the impact of disasters on cultural heritage is highlighted. Moreover, when investment in disaster risk reduction for resilience is proposed, there is specific focus on protecting and supporting cultural institutions and other places of interest from the cultural heritage point of view. Despite the fact that the challenge is global, the Sendai Framework, which seeks to substantially reduce the risk of disasters and the losses caused by them, establishes that the main responsibility aimed at reducing disaster risk lies in the hands of the individual states, in which the necessary policies have to be established and put into practice in order to face the threats that affect us.

2 National Museum Reina Sofia and its Procoers Plan

The Museo Nacional Centro de Arte Reina Sofia is an autonomous organization that depends on the Spanish Ministry of Culture and was created by Royal Decree 535/88 in May 1988. Based in the former Hospital de San Carlos, the Collection was created from the works that had been kept at the time by the Spanish Museum of Contemporary Art. The Museo Nacional Centro de Arte Reina Sofía opened its doors in 1990, and stood as a modern, contemporary Spanish museum on an international scale. Nevertheless, its building has gone through many challenges in order to achieve this goal.⁶

In 1980, restoration began under the direction of Antonio Fernández Alba, and in April 1986 the Centro de Arte Reina Sofia was opened. Its ground and first floors were used as temporary exhibition galleries. Towards the end of 1988, architects José Luis Iñiguez de Onzoño and Antonio Vázquez de Castro made the final modifications, of which the three steel and glass elevator towers – designed in collaboration with the British architect Ian Ritchie – merit special attention.

On 10th September 1992, their Majesties King Juan Carlos and Queen Sofia inaugurated the Permanent Collection of the Museo Nacional Centro de Arte Reina Sofía, which until then held only temporary exhibitions.

Throughout the years, the Museo Nacional Centro de Arte Reina Sofia has been expanding its collections, temporary exhibits, audio-visual and educational activities, services and number of visitors, so in 2001 the construction of the new building designed by Jean Nouvel started; this opened its doors in September 2005.

The Museo Reina Sofia is a modern, contemporary Spanish museum on an international scale. By law its collection starts with 1881, the year of Picasso's birth. Works prior to this date belong to the Museo del Prado, although there are exceptions.

6 www.museoreinasofia.es



Fig. 1: Museo Nacional Centro de Arte Reina Sofía, Madrid (Spain)

Currently it has 4 venues, Sabatini, Nouvel and 2 smaller ones, Palacio Velázquez and Palacio Cristal for temporary exhibitions. The latter are located in the Retiro historic garden, not far from the Sabatini and Nouvel venues. Around 20 temporary exhibitions are organised every year and in 2018 the number of visitors reached 3.942.277.

The Permanent Collection holds approximately 32,245 works of art and is still increasing. All of them are BIC (by its Spanish acronym, Bien de Interés Cultural) by law, i.e. listed as Grade I. Numerous masterpieces of modern and contemporary Spanish works of art belong to its collection, including Picasso's *Guernica* (1937) and several masterpieces by Dalí, Joan Miró, Juan Gris and others. In 2021, after years of research, the Museo Nacional Centro de Arte Reina Sofía presented the global reorganisation of its Permanent Collection, which includes hundreds of new pieces thanks to donations, long-term loans and new acquisitions. This reorganisation extended the exhibition space by a further 12,000 square metres. Currently, the Museo has a privileged exhibition space with around 90,000 square meters in its 4 venues where a selection of around 4,000 works of art is on display.

In this context, the Museo Nacional Centro de Arte Reina Sofía has had its own Self-Protection Plan since 2009 and also, perfectly aligned and integrated within the latter, the Reina Sofía Emergency Plan for Collections (PROCOERS Plan), (Figure 2) which is a specific emergency plan for collections that the museum has been developing and implementing since 2014.⁷

⁷ Montero, P., García, J., Barrios, L., et al. (2018): "Plan de Protección de Colecciones ante Emergencias del Museo Nacional Centro de Arte Reina Sofía (Plan PROCOERS)" in 18ª Jornada de Conservación de Arte Contemporáneo. Madrid: Museo Nacional Centro de Arte Reina Sofía.



Fig. 2: Self Protection Plan and PROCOERS Plan for Museo Nacional Centro de Arte Reina Sofía

The main objective of the PROCOERS Plan consists of obtaining maximum protection for the cultural assets conserved by the Museo Nacional Centro de Arte Reina Sofía that may be affected by any emergency situation whatsoever in its 4 venues.

Apart from this general objective, the following specific objectives have been defined:

1. To identify, analyse and assess the risks liable to trigger an emergency situation affecting the cultural assets conserved by the museum.
2. To propose measures for the protection of cultural assets in order to minimise the various risks to which they could be exposed.
3. To establish the criteria to be followed at the time of the intervention (hierarchical organisation of works, priorities, manipulation, transportation)
4. To plan and coordinate the actions and operating procedures of the different human and material means, belonging to either the museum or other public or private institutions involved in the emergency situations that might affect the cultural assets conserved by the museum.
5. To plan the recovery of the assets affected by the emergency situation.

2.1 The PROCOERS Plan and its Comprehensive Management System

The PROCOERS Plan has been conceived as a system of comprehensive management for the entire museum, which helps us analyse, assess and reduce the risks in the event of an emergency affecting the contemporary art collections con-

served by the Museo Nacional Centro de Arte Reina Sofía, as well as deal with incidents affecting the works of art and their subsequent recovery.⁸ When we began our work, we started from three concepts:

1. The idea of *complexity* in risk management in Art Collections
2. The idea of *diversity* of professionals involved
3. And the idea of *confluence* of responsibilities in the museum space (Figure 3)

Fig. 3: Starting point. Complexity, Diversity and Confluence



As a Comprehensive Management System, this plan is organised into two layers. The intersection of both layers, the methodological and the technological, establishes a comprehensive management model.

This management system is divided into three sections devoted to the three essential moments in the event of an emergency:

1. prevention, analysis and risk reduction
2. incident management
3. recovery

⁸ Montero, P., García, J., Barrios, L., et al. 2019: "El Sistema de Gestión Integral del Plan de Protección de Colección ante Emergencias del Museo Nacional Centro de Arte Reina Sofía (Plan PROCOERS)" in Congreso internacional «Patrimonio cultural y catástrofes: Lorca como referencia» pp. 359-364, Madrid: Ministerio de Cultura y Deporte.

The system gathers within a single management system many different elements which, somehow, play a role in the management of emergencies. Among these elements, we can mention certain information on the various levels of emergency, activation criteria, the coordination criteria with the museum's Self-Protection Plan and other higher-level plans, emergency prevention reports in specific spatiotemporal situations, as well as the different dynamics and lines of action for professional groups, the human and material resources available, the training plan, the incident logs, etc.

Not only does the plan offer all this information, but it also presents two innovative aspects of a different nature:

On the one hand, it addresses the design and creation of a methodological model which serves to analyse and assess the risks in contemporary art museum collections and, on the other hand, it addresses the development of an emergency technological infrastructure model for collections (IDCE by its Spanish acronym) which enables the information analysis of the collections in the event of different risks, as well as various interactive enquiries about the particular situation, the edition of risk maps and the specific requirements of each of the works facing risk.

As for the first aspect, the methodological model, we need to take into account the characteristics of the Museo Nacional Centro de Arte Reina Sofía. From the point of view of a heritage emergency, protecting several pieces located in a little church in a rural area differs greatly from the protection of works located in an international contemporary art museum of a big capital city. While a rural church can be viewed as a small space with restricted opening times, low public attendance and fixed movable heritage (normally the location does not change), we have to face the reality of the dimensions and activities of a museum with a very high daily attendance (around 11,000 people), long opening hours (11 hours a day, six days per week) and a very large exhibition space where the rotation frequency of the displayed collection is very high, whether due to reasons inherent to the works (breaks) or external reasons (museographic plan, loans...).

The advantage of the proposed dynamic model is that it analyses the works, spaces and social context as a whole, suggesting a global and dynamic analysis that responds to an equally global (because the building or container and the context affect the potential risk of the works) and dynamic (because reality is variable) situation; that is to say, unlike the more traditional and static models in which the analyses of the collections and the building are made separately, we propose a holistic view where all parameters are considered as a whole. Therefore, in the face of a complex and dynamic reality, we must also respond with an approach that takes into account this complexity and dynamism.

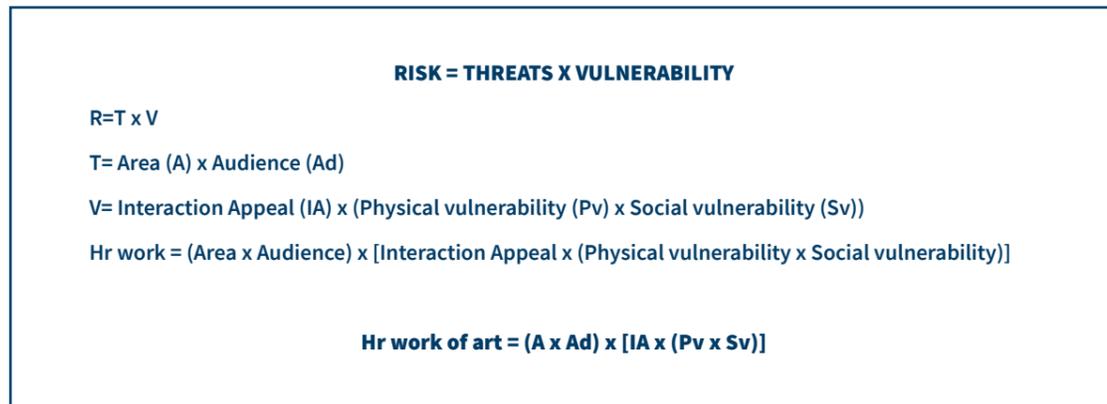
In this case the formula **Risk = Threat x Vulnerability** becomes the following proposal to obtain the hazard ratio of each of the works in the museum. On the one hand, we have the **THREAT** factor (**T**), which takes into account both the Area and the Audience. The specific place where a work is located at each moment is very important: for instance, the potential risk as regards an exhibited work in an emergency situation is not the same as the risk of a work in reserve in an emergency situation. Therefore, it is important to know where each work is located in real time, and to be able to analyse and establish a **Hazard ratio for each specific area**

(HrA). On the other hand, we are all aware that risks in a museum increase as the audience increases, hence the consideration of this factor depends on whether the work is exhibited and on the appeal of the work according to the specific context.

Besides, there is the **VULNERABILITY** factor (V), where we find the **Interaction Appeal (IA)**, which is a rate based on the material aspect of the work: the more detached a work is from traditional arts and the more it resembles a daily object, the more liable it is to be vandalised by the audience. This is a specific factor that we have observed in contemporary works of art.

We can also talk about the **Physical vulnerability (Pv)** of the work, which comes from its material constitution. We should take into account that this factor varies depending on whether the work is made of paper or iron, and the threat, fire or water, for example. This factor, despite being an intrinsic characteristic of each work regardless of their location, is not a static but a variable factor, because the aging of the materials is not something unconnected to their constitution, therefore it should undergo revision. Another factor to keep in mind is the **Social vulnerability** of each work (Sv), which is marked by the specific context of a certain moment in time. As we can guess, the hazard ratio of a work in reserve is lower than that of an exhibited work. The socio-political circumstances, the subject of the work and the materials used in contemporary art make certain works more liable to social risk. This formula allows us to obtain the **Hazard ratio (Hr)** of each work in a specific spatiotemporal situation. (Figure 4)

Fig. 4: Risk assessment formula for contemporary art collections



Therefore, we are facing a dynamic ratio that changes according to different variables, but which lets us preview potential risk situations connected to the different variables, as well as anticipate possible solutions to minimize risks, or the possibility to create relations between the individual risk of each work and the global risk of the entire collection, what we have called the Tolerance Index of the Hazard Ratio (TiHr). Therefore, we are proposing a global and dynamic model with a holistic view where all parameters are considered as a whole, and which responds to a global and dynamic situation; global because we assume that the building or container and the context affect the risk situation of the work, and dynamic because all these parameters are subject to change. But this methodological model needs to develop a technological infrastructure for collections in emergency. And this means we needed to consider digital transformation (Figure 5):

- 1) Integrating information exchange and management into the technological environment.
- 2) Simplifying the interaction and reporting (query, modification, report) and finally,
- 3) Ensuring constant updates to the whole (multidisciplinary, information comes from different areas)

In order to adopt a digital standard we started studying the state of technology in Facility Management. There are two digital standards: BIM, which is the reference technology in digital building management and GIS, the reference technology in digital space management.

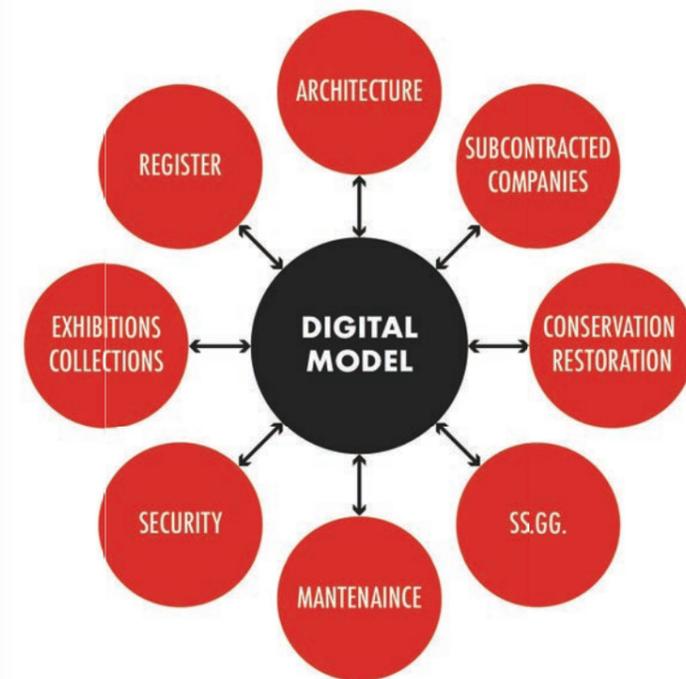


Fig. 5: Digital Model Transformation: Integrate, Simplify, Ensure.

As regards the second element, the PROCOERS Plan counts on an Emergency Infrastructure for Collections Information (IDCE). This database infrastructure is linked to a geographic information system (GIS), which is a computer-based tool for the management of geographic and alphanumeric information that enables problem solving using a geographic component such as spaces and the works. Since 2016 we have been working on identifying potential BIM+SIG applications for our Emergency Plan and we have developed our GIS model which is designed to store, capture, analyse, predict, update, manipulate, recover, transform and visualize geographically referenced information in order to troubleshoot the planning and management of the emergency for the various users involved in it. It is compatible with the databases that manage museum collections, and its aim is to serve as a management tool for the analysis, decision making, planning and management of human and material resources in order to face any potential emergency situation of the collections.

This infrastructure allows us to combine this data with the essential practical information for the management of contingencies, so that we can comprehensively:

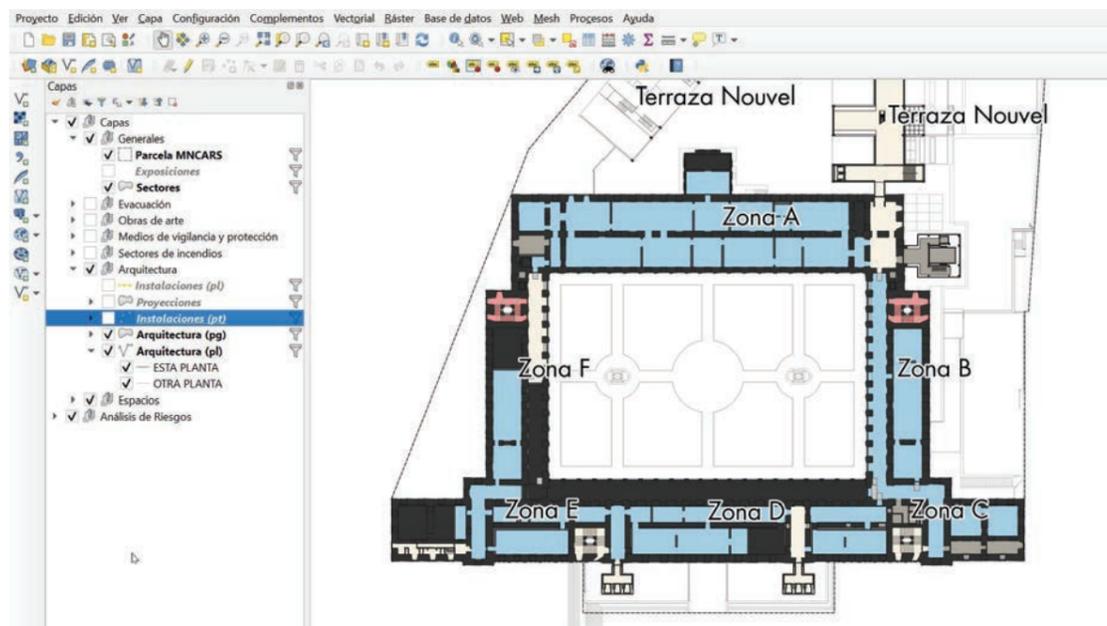
- Carry out a detailed analysis of the physical characteristics of the exhibition area
- Carry out an exhaustive risk analysis of the space
- Have better control over the exhibited works
- Facilitate the decision making in the event of an emergency
- Obtain action suggestions in case of emergency

We have collected data on the state of the museum spaces, we have performed a comprehensive study of daily processes in risk as well as emergency management, and both are based on museum experience and adapting technology to our routines. Our GIS contains information related to:

- Spatial description of the buildings and inventory of architectural elements and protection measures
- Vulnerability and collections information
- Risk analysis of the different areas
- Evacuation routes for the collections
- Dynamic information generated in the course of a contingency.

The following figures (figure 6, 7 & 8) show the various GIS layers with the components of the PROCOERS Plan referring to the characterisation of the spaces, the evacuation routes and the protection measures for the third floor of the Sabatini building. It is important to point out the advantages of visualising the data of such a dynamic system as the space of a museum and its collections. The GIS is under development. In the future it will be integrated in the Museum system which will allow us to view the evolution of the emergency situations in real time.

Fig. 6: GIS Plan PROCOERS

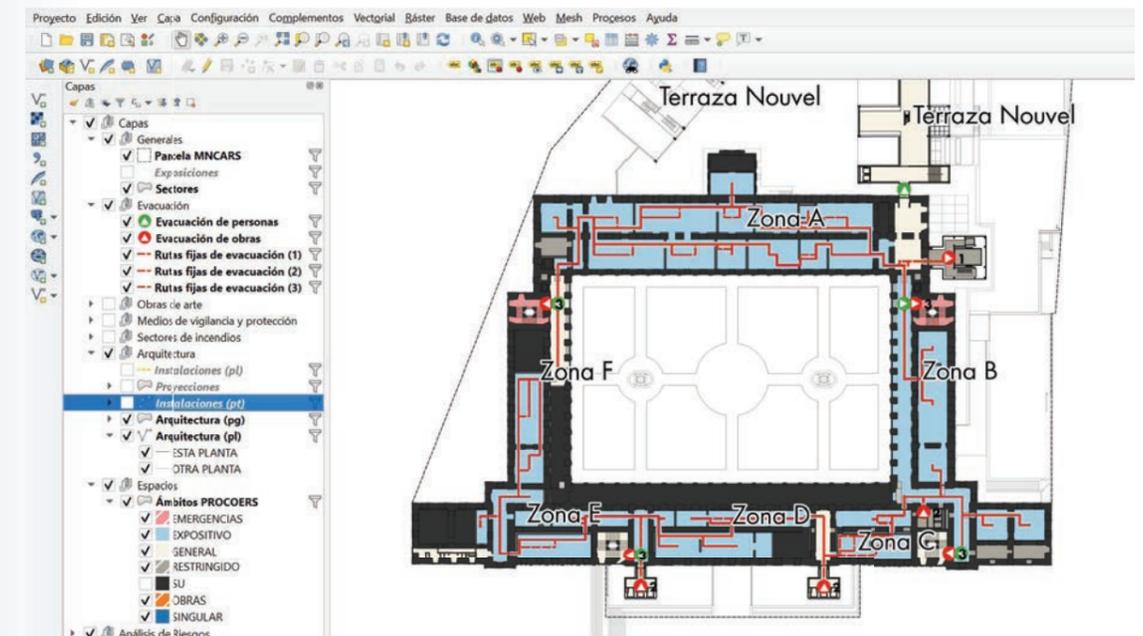


3 Other outcomes: the Emergency Planning Report and the Incidents database

Finally, we would like to highlight other important outcomes of our system. The results include the following:

- Emergency Planning Report
- Security Report
- Cleaning Staff Report
- Incidents Database

Fig. 7: GIS Plan PROCOERS (Evacuation Routes)



3.1 The Emergency Planning Report

The Emergency Planning Report,⁹ Security Report and the Cleaning Staff Report are carried out before each temporary exhibition by an automated process. Some of them, such as the Security Report or the Cleaning Staff Report, are specific to certain groups of museum staff, however, the Emergency Planning Report can be used by museum staff as well as by borrowing institutions in order to get acquainted with the specific plan for the protection of the Reina Sofia Museum collections.

The Emergency Planning Report, IPAE, (by its Spanish acronym, Informe de Planificación ante Emergencias) provides detailed information on the institution and its exhibition areas in the context of a possible emergency and is therefore an indispensable tool for the Museum with which it analyses and proposes risk

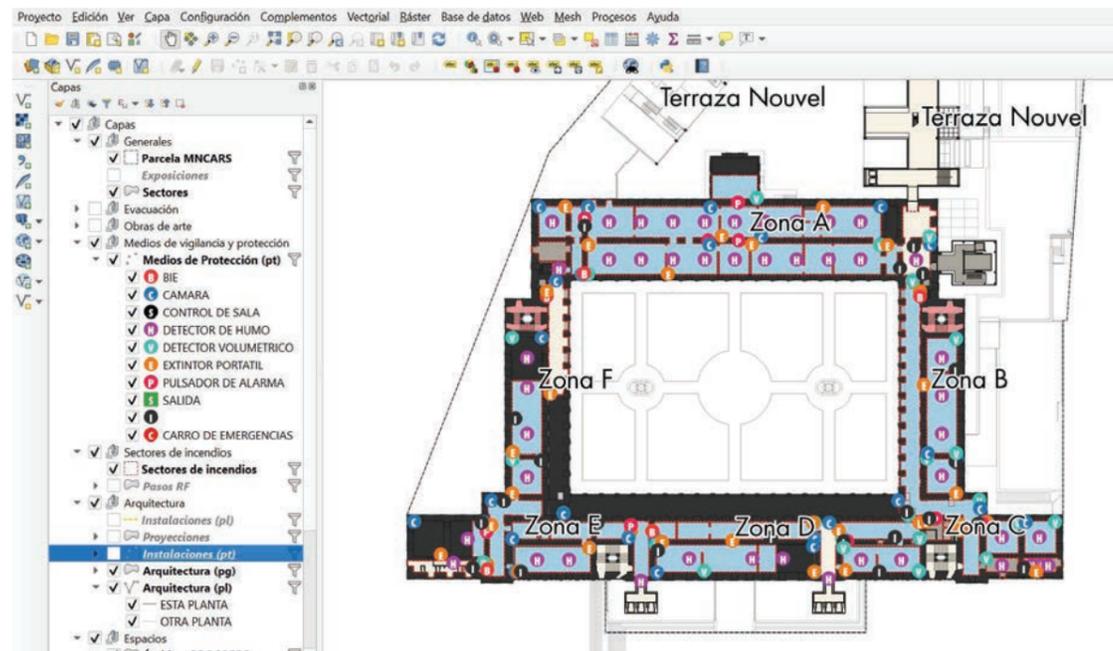
⁹ Montero, P., García, J., Barrios, L., et al. (2019): "Implementación del Plan PROCOERS: El Informe de Planificación ante Emergencias". in 19ª Jornada de Conservación de Arte Contemporáneo. Madrid: Museo Nacional Centro de Arte Reina Sofía.

minimisation measures. It also helps the Museum to be prepared in the event of a possible emergency situation in which the PROCOERS Plan needs to be activated.

This report is an indispensable reference element in the day-to-day running of the Museum insofar as it allows us to issue parameterised opinions on the museum spaces in the face of possible risks and, more importantly, it is a document which, as its name suggests, serves to plan and detail what risks can be assessed in the museum as well as the resources available to deal with an emergency affecting the works and, if necessary, where the affected works would be evacuated to and from.

The IPAE is a document with an internal and external utility. Internal insofar as it serves as an instrument of study, control and prevention for the departments of collections and exhibitions, architecture and maintenance, security and conservation-restoration; external insofar as it complements the information of the Facility report of the museum with respect to third parties, but always bearing in mind that the IPAE, unlike the Facility report, is oriented towards the possibility or concurrence of an emergency situation in which the works in the museum's custody could be compromised. The IPAE affects all the museum buildings, however, it can be sectorised by zones. In this sense, we can talk about the different IPAEs that might arise both from the different exhibitions in the museum's permanent collection as well as from the temporary exhibitions held each year.

Fig. 8: GIS Plan PROCOERS (Protection Measures)



The IPAE structure consists of eight sections, the first of which serves as an introduction and contextualises this report as one of the instruments of the PROCOERS Plan in the preparation phase. The structure of the IPAE, a planning instrument that has been established as a result of the implementation of the plan, reflects the risk management and emergency response cycle, so that chapters 2, 3 and 4 are dedicated to analysis and prevention, chapters 5 and 6 to preparedness and, finally, sections 7 and 8 refer to execution.

Chapters 2-5 are dedicated to the characterisation of spaces and their risk analysis. Chapters 5 and 6 are devoted to the material and human resources available for emergency planning, which would be compromised in the event that the contingency plan had to be activated at any of the levels contemplated in the PROCOERS Plan. Finally, sections 7 and 8, referring to execution, resolve the problem of evacuation routes and the sites to which the works will be moved in the event this task needs to be carried out.

3.2 Incidents Database

The Incidents Database of the PROCOERS Plan is one of the essential instruments in the implementation of the Plan. The main objective of this database is to have a reliable record of the incidents that affect the works in the museum's custody and to be able to extract objective data that will help us analyse the events that affect the works, taking into account different parameters. Furthermore, based on the different data recorded, we can propose opportunities for improvement with the ultimate aim of reducing the risks that threaten the works of art and, as a consequence, the incidents.

As established in the PROCOERS Plan, an emergency is defined as any event that affects the works of art and in which, due to its seriousness, teams from outside the museum must intervene, while we call incidents those events that occur in the day-to-day running of the museum without disturbing its daily operations and to which a global response can be given and whose negative consequences for the works of art can be curbed with the museum's own resources.

The Incident Database collects all the data necessary to describe the incident (day, place, work, author, area, type of incident, description, etc.). The exploitation of data allows us to generate a series of reports in which we can visualise data such as the number of incidents per year, the areas in which they occur, the type of incident, the day of the week in which the most incidents usually occur, the time, the month, the work post with the most incidents, etc. It also allows us to make a comparative analysis by type, month, year, space, author, work, etc. Thanks to the data collected over the years, we now have accurate information on the most common incidents that occur within the museum. This knowledge helps us locate the critical points with greater precision as well as find the causes that generate recurring incidents. On the other hand, the registration of all incidents generates knowledge that helps us identify the opportunities for improving the distribution of our resources for the prevention of new incidents.

4 Conclusion

The development of an adaptable system that can respond by providing maximum protection for the cultural assets of collections within a complex institution such as the Museo Nacional Centro de Arte Reina Sofía represents a great challenge. A comprehensive management system with a two-fold approach is proposed for the implementation of its plan to protect collections from emergencies: the methodological and the technological.

This approach has several advantages:

- a) Integrated information: information from the various areas of the museum is collected within a single system.
- b) Permanent updating of the information. The integration and connection of the different databases within a single system allows updates for different user profiles.
- c) Orderly dissemination of the information handled by the PROCOERS Plan depending on the different museum professionals involved in the collections.
- d) Access to all information on the protection of collections over time, thus providing us with historical information on the process in which we can observe the changes made in the protection of collections according to the risks analysed.

It is possible to conclude that the integration of the GIS into the Museum system allows us to view the evolution of the emergency situations in real time, and generate relevant content for decision making, so that the intervention protocols can be activated as fast as possible, optimizing the resources and sharing information between all collectives and bodies involved in an emergency situation of collections at the Museo Nacional Centro de Arte Reina Sofía.

ACKNOWLEDGEMENTS

The research that has led to these results has received funding from the Spanish State Programme for Research, Development and Innovation oriented to the Challenges of Society. Ministry of Economy and Competitiveness (2016-2019): Diseño e implementación de un modelo para la Gestión de Riesgos ante Emergencias de las Colecciones: Museo Nacional Centro de Arte Reina Sofía (HAR2016-76999-R). The authors would like to thank the staff of the Restoration, Security and Maintenance Departments of the Museo Nacional Centro de Arte Reina Sofía for their support.



The Mural painting of Amphawan in Samut Songkhram temple portrays the way of life in Amphawa.

SIRIWAN SILAPACHARANAN

Cultural Heritage Resilience of the Mae Klong River Basin, Thailand

SUMMARY

Covering the area of the Samut Songkhram Province, the low-lying land of the Mae Klong River Basin is influenced by the daily tides in the Gulf of Thailand. The ecological system of Samut Songkhram can be classified into three types: freshwater, brackish water and saltwater. The freshwater ecosystem in the northern part is suitable for horticulture, the brackish water ecosystem in the middle part is suitable for growing fruit trees such as coconut, tangerine, pomelo, lychee, mango, etc., and the saltwater ecosystem in the coastal area comprising salt pans and mangroves is suitable for aquaculture and fishery. In the past, this area was covered by shallow muddy sea and, later, it was elevated above the sea level. This elevated land enables people to settle down and grow crops by using their local wisdom to live harmoniously with nature – raised bed farming. The raised beds were created by digging soil to make mounds for planting trees, while the ditches between the beds became an irrigation system that can preserve water for use in agriculture all year round. Moreover, the geometric pattern of the beds and ditches that connect the water tributaries creates a complex and interesting network. In addition, the houses are built on high stilts to avoid flooding during high tides, providing a cultural landscape with several floating markets within the backdrop of coconut trees along the river. Consequently, the settlements (including the agricultural areas) were self-protected from the severe floods in 2011, which ruined a large area of farmland and settlements in the northern and central regions of Thailand. In conclusion, the raised bed orchards in the Mae Klong River Basin is an example of excellent cultural heritage resilience practice that could reduce severe floods resulting from climate change, and it can be used to promote cultural tourism in a sustainable development manner.

Odpornost kulturne dediščine v povodju reke Mae Klong na Tajskem

POVZETEK

Pokrajina, v kateri leži provinca Samut Songkhram, je nizka in zajema povodje reke Mae Klong, na katero vplivata vsakodnevna plima in oseka v Tajskem zalivu. Ekološki sistem province Samut Songkhram lahko razdelimo na tri tipe: sladkovodni, brakični in slanovodni. Sladkovodni ekosistem na severu je primeren za vrtnarstvo, brakični ekosistem na sredini za pridelavo sadja, npr. kosa, tangerin, pomela, ličija in manga, slanovodni ekosistem v obalnem pasu, kjer so soline in mangrove, pa je primeren za ribogojstvo in ribištvo.

V preteklosti je to območje pokrivalo plitvo kalno morje, pozneje pa se je površje dvignilo nad morsko gladino. To je omogočilo prebivalcem, da so se tam naselili in začeli gojiti pridelke, pri čemer so uporabljali lokalno znanje in bivali v sožitju z naravo – kmetovati so tako začeli na dvignjenih gredicah. Dvignjene gredice ustvarijo tako, da izkopane prsti naredijo gredice, v katere posadijo drevesa, jarke med gredicami pa zalije voda, kar ustvari namakalni sistem, v katerem voda, namenjena uporabi v kmetijstvu, ostane vse leto. Poleg tega iz gredic in jarkov, ki povezujejo rečne pritoke, nastane kompleksno in zanimivo omrežje v obliki geometričnega vzorca. Hiše, zgrajene na visokih kolih in tako zaščitene pred poplavami, pa skupaj s plavajočimi tržnicami ustvarjajo kulturno krajino, v ozadju katere se vzdolž reke pozibavajo kokosove palme. Zaradi takšne postavitve so bile nasebine, vključno s kmetijskimi površinami, varne pred hudimi poplavami leta 2011, ki so uničile obsežno območje kmetijskih in bivalnih površin v severnih in osrednjih regijah Tajске. Sadovnjaki, ki rastejo na dvignjenih gredicah v povodju reke Mae Klong, so tako izvrsten primer za gotavljanje odpornosti kulturne dediščine. S takšno prakso bi lahko zmanjšali število hudih poplav, ki jih povzročajo podnebne spremembe, prav tako pa bi lahko služila za spodbujanje kulturnega turizma na trajnosten način.

1 Background of the Study

This study aimed to investigate traditional raised bed farming that is commonly found in the lower part of the Mae Klong River Basin, which is influenced by daily tides. This type of farming is a result of indigenous knowledge introduced by the settlers living in this mixed ecosystem – freshwater, brackish water and salt water. This type of farming represents an effective agricultural technique for managing water and soil and can reduce the severity of floods that result from climate change. In the Central region, raised bed farming is found along the Chao Phraya River, the Mae Klong River, the Tha Chin River and the Bang Pakong River. It is evident that the Chinese have settled these areas in the 18th and 19th century. The 1896 map of Bangkok displays a network of raised bed gardens along the water network of the Chao Phraya River and its tributaries that connected the Bang Pakong River Basin in the Chachoengsao Province. A stuccowork decoration of Wat Sampatuan, Chacheongchao depicts Chinese migrants working in a sugar cane raised bed farm in the 19th century. Raised bed farming is still practical for monoculture farming such as coconut palms and polyculture farming such as coconut, betel, mango, lime, rose apple, etc. Like the raised beds found in the lower part of the Mae Klong River Basin, a geometric pattern of raised beds is also found in the St. Paul community. Raised bed farming not only leads to food security for the urban population, but is also resilient to environmental issues.

2 Methodology and Definition

This study examined and observed the lower part of the Mae Klong River in the Samut Songkhram Province. The methodology included 1) document research – maps, books, and electronic documents, 2) field survey during the three seasons – summer, rainy and cold and 3) interviews with farmers and locals.

The keywords in this research are defined as follows:

- 1) river basin: an area of land drained by a river and its tributaries.¹
- 2) raised bed farming: the agricultural technique of building freestanding crop beds above the existing level of soil.²
- 3) cultural heritage: may be defined as the corpus of material signs either artistic or symbolic, handed down through generations and therefore to

1 <http://www.internetgeography.net> (accessed on 2nd January 2022)

2 <http://kennfonfg.com/blog/post/1536/raised-bed-farming-techniques> (accessed on 3rd January 2022)

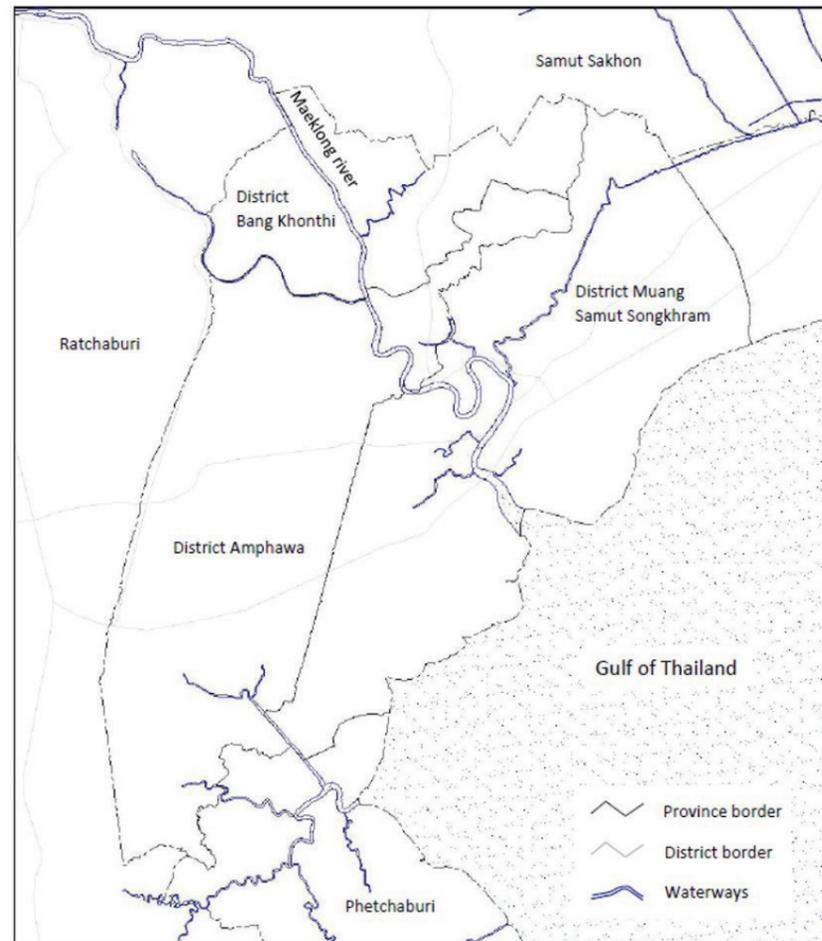
entire mankind. As a constituent part of affirmation and enrichment of cultural identities, a legacy belonging to all mankind, cultural heritage gives each particular place its recognizable features and its storehouse of human experience.³

- 4) resilience: the ability of a substance to return to its usual state after being bent, stretched or pressed.⁴
- 5) sustainability: the capacity of systems and processes to endure with minimal degradation of ecosystems and quality of life.⁵

3 Geographic Location

Samut Songkhram Province is located in the lower part of the Mae Klong River and can be considered the smallest province in Thailand since it covers a total area of 416.7 kilometres. The average temperature is 28.1 Celsius, and in 2021, its popu-

Fig. 1. Samut Songkhram Province and the Mae Klong River Basin. Photo: Siriwan Silapacharanan.



3 <http://cif.icomos.org/pdf-dus/heritage.def> (accessed on 2nd January 2022)

4 <http://dictionary.cambridge.org> (accessed on 1st January 2022)

5 <http://ip51.icomos.org/file.blanc/document.s/terminology/doc-> (accessed on 3rd January 2022)

lation stood at 189,063. (Figure 1) Most people are engaged in agriculture, fishery and food processing industries such as making shrimp paste, fish sauce, aquatic-food processing, making coconut water and coconut sugar, etc. This study focused on the area on the mouth of the Mae Klong River in the northwest of the Gulf of Thailand. 3,000 years ago, this area was part of the sea, but it was elevated above sea level as a result of the accumulation of sediments.⁶ With this, the area became a marsh and mangrove forest favouring the settlement of fishermen. Since this area was subjected to marine influences, raised bed farming was introduced. This type of farming is thought to be a result of the indigenous knowledge of the Chinese who migrated from the South of China during 19th and 20th centuries.⁷

Samut Songkhram is a coastal plain about 1 – 3 meters from the sea level. The plain formed as a result of the accumulation of dirt and sand is divided into 2 parts: active tidal flats and former tidal flats. The active tidal flats are composed of poorly drained fine sand. The former tidal flats are composed of poorly drained fine clayey texture. These flats are areas formed by the accumulation of marine and freshwater sediments to the north of the studied area.

Most of the land in this province (71,062.0 acres or 68.22%) is used for agricultural purposes, 40,835.6 acres (39.20%) of which is used for growing fruits, 28,574.4 acres (27.42%) for raising aquatic animals and the rest for growing rice and other plants.⁸ The agricultural products include coconuts, pomelos, lychees, mangoes and bananas, all of which are grown in raised bed orchards.

4 Why Raised Bed Farming

Raised bed farming is the result of creating freestanding crop beds above the existing level of soil. It may be regular or look like a flat top mound. The bed shapers transform flat land into tight crop beds for planting crops. The sizes of the beds vary depending on the sizes of the plants when they are mature and the beds are usually oriented in the north-south direction so that the plants can get sufficient sun all year round.

In the past, raised bed farming was used for transplanting rice cultivation and fruit tree cultivation, according to the stucco at Wat Bang Kaphom in Amphawa built in the late 18th century. (Figure 2) Currently, raised bed farming is no longer applicable to rice cultivation due to the ecological change – saline intrusion – accompanied by pests that infest rice. These plant pests also infest onion, garlic, tobacco and chilies.

6 Pongsri Wanasin and Thiva Supajanya.1981. Ancient Town in the Old Delta of the Central Region of Thailand. Chulalongkorn University, Bangkok, p. 36.

7 Srisakra Valibhotama, 2000. *Tasana Nokreet, Phoomilsat-Phoomilak, Tangban Pangmuang* [in Thai], Bangkok, Muang Boran Publishing, p. 51.

8 Department of Land Development, Available on <http://idd.go.th/agri-Map/Data/C/skm.pdf> (accessed on 11th January 2022)

Fig. 2. Stucco of raised bed orchard in the Bang Kaphom Temple, Amphawa. Photo: Siriwan Silapacharanan.



5 Literature Review

Two selected research works focusing on raised bed farming are:

- A) Agricultural Diversification: Technical, environmental and socio-economic aspects of raised bed systems in the Chao Phraya Delta, François Molle et al., 2001⁹

This research consists of 3 parts:

- 1) General features of raised bed systems in the Chao Phraya Delta
- 2) Environmental aspects of raised bed intensive farming
- 3) Socio-economic and marketing aspects of raised bed intensive farming

The study focused on the Damneon Saduak Canal Area which covers Samut Sakhon, Samut Songkhram, Ratchaburi, Bangkok, Pathum Thani and the Chachoengsao Province in addition to the raised bed development in the Rangsit Area. The beds are usually 3- 6 meters wide and 30 - 100 meters long, and approximately 40% of the raised bed plot is covered by ditches. Some paddy fields had been transformed into raised bed farming because of their low yields that resulted from high acid soil and floods. At present, the raised bed plots are mostly constructed with the aid of a mechanical digger. After that, the plots are flooded between 2 and 4 weeks and left to dry from 2 to 6 months to make sure that all water drains out before the cultivation process begins. This also helps get rid of pests and weeds.

The issues concerning water management in raised bed systems are: 1) saline water from sea water intrusions into the water channel, 2) water inflow and out-flow control in the orchard plots, 3) irrigation at the plot level and 4) water quality problems during the dry season.

The present situation of raised bed farming in Rangsit Area is presented. (Figure 3)

⁹ François Molle et al., 2001. Agricultural Diversification: Technical Environment and Socio-economic Aspects of Raised Bed System in the Chao Phraya Delta (accessed on 21st January 2022)



- B) Morphological Study of an Orchard System in the Lower Basin of Chao Phraya¹⁰ Delta: A Case Study of Amphawa Neighborhood. (Terdsak Taechakitkachorn, 2008). This is an informative research on the pattern of raised bed farming and land parcelling within the orchard system in relation to the hierarchy of the water network and the plot of raised bed farming. The classification of waterways has been performed from the main rivers to the smaller channels that reach into the land parcels. The orchard unit was developed after the expansion of its waterway channels. It could be summarized that the following 3 steps needed to take place when the orchard land parcel was created:

Fig. 3. Horticulture in raised bed farming in the Rangsit Area. Photo: Siriwan Silapacharanan.

¹⁰ Terdsak Taechakitkachorn, 2008. Morphological Study of an Orchard System in the Lower Basin of Chao Phraya Delta: A Case Study of Amphawa Neighborhood, Nakhara; Journal of Oriental Design & Planning, p. 55

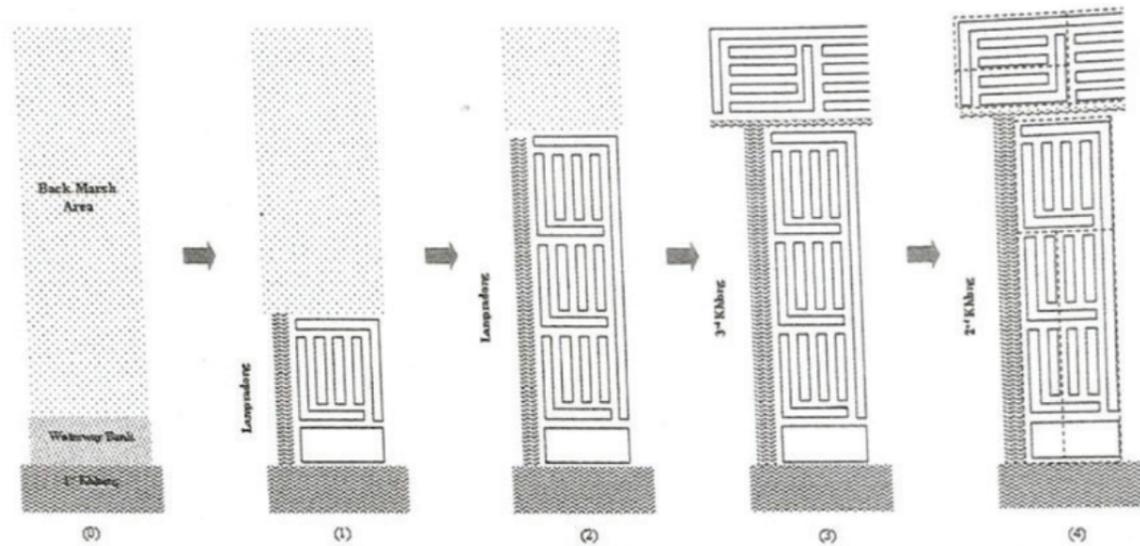


Fig. 4. Transformation process of a raised bed orchard development in a geometric pattern. Photo: Tachakitkachorn, T, 2008.

- 1) formation of the first land parcel along the river
- 2) expansion of the land parcel and subdivision and reunification of the land parcel. (Figure 4)
- 3) Some examples of raised bed farming in Amphawa are presented. (Figure 5)



Fig. 5. Raised bed garden with coconut trees. Photo: Siriwan Silapacharanan.

6 River Water Circulation

In the past, prior to the construction of the two large dams on the main tributaries of the Mae Klong River – the Srinakharin Dam on the Khwae Yai River and the Khao Laem Dam on the Khwae Noi River – the areas in the northern part of Samut Songkhram were flooded for approximately 1 month during the rainy season. Farmers, therefore, built parcel dikes for flood protection. However, these parcel dikes are no longer necessary nowadays. In the past, the water flow from the upper part of the rivers would rid the orchards of insects and termites and carry the alluvial sediments to their lower part, fertilizing the topsoil.

For the first and second hour of the high tide, the river water remains freshwater; for the next 3 to 4 hours, it becomes brackish water and in the next 5 to 6 hours, saline water. The upper Gulf of Thailand experiences tides twice a day. The sea water level varies every 50 minutes. The difference between the high and low tide at the mouth of the Gulf is higher than that of inland areas. For example, in the Bang Khonthi District, the upper part of Samut Songkhram, there is more freshwater than saline water, resulting in freshwater, while in the Amphawa District, the middle part, brackish water prevails and the Muang District, the lower part, is flooded by saline water. At the mouth of the Gulf, the lowest tide of the year was recorded at 0.7 meters while the highest at 3.5 meters.¹¹ Salt water penetrates furthest into the tributaries in the dry season.

In general, the areas on both banks of the river south of the Rama 2 Road are influenced by saline water. Large areas are used for salt farming and ponds for breeding shrimp, fish and shellfish (cockle and mussel). Fine quality mangrove charcoal is also produced here. An 8,000-acre sand bar called Don Hoi Lot teems with plankton, and is a productive location for Hoi Lot, a tubular shellfish unique to this region. The sandbar is named after this shellfish. Don Hoi Lot has been registered as a Ramsar site because it represents a rare type of natural wetland in Thailand. Traditional shoreline fisheries that use traditional tools such as fishing nets, stake traps and fish traps consisting of a long net laid across part of the river, can be found in this area. The Gulf of Thailand is home to the well-known Thai mackerel. The mouth of the Mae Klong River is considered the seafood source of the country.

In conclusion, the tidal influence in the lower part of the Mae Klong River varies according to the season and time of the day; consequently, the flora and fauna has to adapt to this complicated ecosystem – the cycle of freshwater, brackish water and saline water.

7 Important Produce

According to Pallegoix's 1843 Description, the Mae Klong River was a settlement of 10,000 people with floating houses and beautiful temples. The Chinese residents traded and fished while the Thais grew string beans, sweet potatoes, Chi-

¹¹ Sujit Chirawethya, 2008. Khon Mae Klong. [in Thai], 6th edition, Bangkok, p. 47

nese lettuce, eggplants and tobacco and made salt that was sold throughout the country.¹²

At present, the following economically important plants are grown on raised beds in Samut Songkhram:

- 1) Coconut trees, most of which are grown to make sugar. Varieties such as Thale Ba, Mu Si, etc., provide a high sugar content with a sweet aroma and thrive in brackish water. In addition, coconut trees are grown for juice.
- 2) Pomelo trees, especially the popular variety Khao Yai. The tree produces large fruits with small seeds. The peel is smooth and thick. Its flesh is yellowish white and sweet. This variety has been covered by the Geographical Indication (GI) since 3rd March 2010.
- 3) Lychee trees, specially the popular variety Khom, that thrive in the area where freshwater interfaces with brackish water. Most of them are grown in the north of the province. Its fragrant pinkish-white flesh is thick and crisp, while its taste ranges from sweet to bittersweet. They are grown with other fruit trees on the raised beds. The Khom lychee has been covered by GI since 10th March 2008.
- 4) Bang Chang Chili plants are native to this province. With mild spiciness, the ripe chilies are bright red in colour and approximately 4 – 5 inches long. The skin is smooth and glossy. They thrive in sandy clay in elevated areas with a supply of freshwater in the north of the province. Due to pest problems, farmers stopped growing them for a certain period. Later, the chili was reintroduced and has been covered by GI since 8th June 2015.¹³

8

Human Settlement

Originally, the areas in the Amphawa and Bang Khonthi Districts were called Bang Chang. An account indicated that Bang Chang was a checkpoint that collected duty tariff from boats travelling from Ayutthaya, the capital of Siam, to the Gulf of Thailand during the reign of King Prasat Thong (1629 – 1656) and marine products such as salted fish, salt, etc. from Mae Klong were sold at the water market in Ayutthaya. Following the fall of the capital in 1767, numerous people fled Ayutthaya and settled in the studied area. At that time, it was desolate, so it was transformed into an area for cultivation. The area was settled by the Thai, the Chinese, the Khmer, the Lao, etc. During the early Rattanakosin Period (from the late 18th century), the area was inhabited by numerous elephants; as a result, Bang Chang was named after this animal (Chang in Thai or elephant in English). Later it was renamed Amphawa after a mango forest in Buddhist history indicating that it is a fertile area.¹⁴

12 San T.Komolputara, 2009. *Lao Reung Krung Siam*. [in Thai], translated from the Description de Royaume Thai ou Siam, written by Jean-Baptiste Pallegoix, 1854, Nonthaburi.

13 Same as [8]

14 Siriwan Silapacharanan, 2007. Amphawa and its Cultural Heritage. Nakhara; Journal of Oriental Design & Planning, pp. 11-20

The promotion of exporting agricultural products to Europe in addition to China before the 19th century led to the construction of canals from the west of Bangkok with the aim to connect the Tha Chin River and Mae Klong. In 1868, Chinese laborers were hired to dig the Damneon Saduak Canal and they settled along the riverbanks, leading to the waterfront settlement. After the completion of the canals, they became merchants and farmers, growing chili, onion, garlic, taro, sweet potato, etc. and fruit trees such as mango. Some areas alongside the Damneon Saduak Canal are still desolate, while others are flood plains. Consequently, the Chinese introduced raised bed farming to these plains. The land was dug by laborers to make dikes suitable for cultivation. Later, more Chinese people came to live in the lower Mae Klong Basin in the Bang Khonthi and Amphawa districts and were engaged in trading, hiring and raised bed farming. (Figure 6) Some Chinese people were hired to clear the land along the canals such as the Bang Nang Li Canal, in the Amphawa District, and transform it into raised bed gardens for planting vegetables such as onion, chili, garlic, etc. and coconut trees.¹⁵ It can be said that these laborers were good at digging beds and ditches and at making them in straight lines, creating a geometric pattern.



Fig. 6. Amphawa Canalside water-based Community.
Photo: Siriwan Silapacharanan.

The transformation of desolate areas into raised bed farms started with the building of houses on levees and clearing the area behind the house by digging ditches and dikes in a straight line. The beds are at least 1.5 – 2 meters wide, suitable for planting annual crops because this width facilitates the care and harvest of crops, while beds with 2 – 4 – meter width are suitable for growing perennials such as coconut, pomelo, lychee. Because perennials have wide canopies, they have to be grown about 4 meters apart. The ditches are about 1.00 – 1.20 meters deep. The beds are raised 20 – 30 cm above the high tide. (Figure 7) In the past, gardeners

15 Anusorn Unno, 2009. Khontamtan: Prawadtisat, Attalak, Samnuek Lae Kan Klunwai Tongsangkhom, Lae Kanmueng Khong Chaosuen Bangnangli. [in Thai]. The Thailand Research Fund, Bangkok, pp. 91-92, pp. 55-58

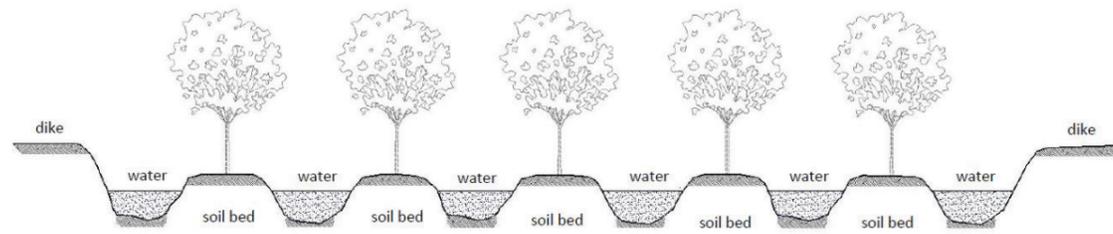


Fig. 7. Section of a raised bed orchard. Photo: Siriwan Silapacharanan.

used to water the plants and trees with the water straight from the ditches. Currently, small boats are used to spray water from the ditches by springers.

Raised beds are designed to retain freshwater for watering plants and trees. The freshwater is stored in the ditches. The water level in the ditch varies in accordance to the daily tides. There are over 20 varieties of coconut trees grown in the lower Mae Klong River Basin. After World War II, coconut sugar has become an important product, while there is a shortage of cane sugar.¹⁶

The surplus of produce from raised bed farming in the lower Mae Klong River Basin is exchanged with other communities for daily consumption. This exchange activity led to the set-up of floating markets. The first floating market was established in the 17th century. In the Mae Klong River, many floating markets are set-up according to the lunar calendar, for instance the Don Manora Floating Market, the Bang Noi Floating Market, the Amphawa Floating Market. (Figure 8) Since 2001, floating markets has been revived as a tourist attraction, resulting in a change in the economic structure of the province – an increase in commerce and tourism, while the agriculture sector gradually reduced from 12.30% in 2013 to 12.07% in 2016.¹⁷

9

Discussion and Conclusion

The 2011 floods that resulted from La Nina lasted almost 2 months in the North and Central Regions of Thailand. They caused massive damage to houses and farms and took many lives. The Chao Phraya River and its tributaries were overflowed, but the Mae Klong River Basin was not affected because the ditches acted as barriers that protected the basin from the floods. Moreover, Thai farms and houses in this area are built on high stilts to let water flow underneath them.

Raised bed farming is a local wisdom and cultural heritage of the people who live in the lower Mae Klong River Basin, Tha Chin, Chao Phraya and Bang Pakong, all of which are on the upper part of the Gulf of Thailand. The areas along these rivers experience brackish water. The bed enables farmers to cultivate crops and protects crops from high tides, so communities can stay there permanently because they can use their cultural heritage to overcome nature.

¹⁶ Anusorn Unno, Same as above, pp. 105-111

¹⁷ Office of the National Economic and Social Development Council, available on <http://www.samut-songkram.go.th>, p. 19 (accessed on 19th February 2022)



Fig. 8. Thakha Floating market. Photo: Siriwan Silapacharanan.

The Mae Klong River Basin is an area in the north of Samut Songkhram, abundant with plants and animals, suitable for planting rice and vegetables. The central part is suitable for growing fruit trees in brackish water, while the coastal area is influenced by marine water, so farmers make salt, raise fish, shrimp, and shellfish. The products from these three types of water are sold nationally and internationally and create food security. As the plants are so unique to their locations that they are covered by the GI, this generates sufficient income to tend to these plants all year round. However, raised bed farming along rivers, including the Mae Klong River Basin, is on the decrease as a result of the urban expansion. Regarding land use, there should be a policy on preserving raised bed farming, which serves as a food source and a resilient area when a natural disaster occurs. Plus, it promotes sustainable development.

NINA UGLJEN ADEMOVIĆ, ELŠA TURKUŠIĆ JURIĆ

Reshaping the City through a Cultural Memory Site: The Revitalisation of Sarajevo's Medieval Bastion Bijela Tabija

SUMMARY

In the contemporary development of a city burdened by numerous crises – cultural, economic, environmental and social – a crisis of architectural culture is inevitable. Thus, there is a need to establish, promote and eventually re-evaluate the architectural heritage that is an integral part of it.

This process, which leads to self-sustainability, faces a series of problems, the ultimate consequence of which is often the long-term neglect and devastation of valuable architectural sites. If an intervention occurs, it is most often for the purpose of conservation or restoration, which results in the exclusion of protected sites from everyday life and the reality that surrounds it, and its self-sustainability becomes questionable. This paper raises the hypothesis that in order to redefine the needs of the city, it is necessary to observe the relationship with architectural heritage through its active integration into urban life as this allows heritage to act as both, a social condenser and an element of collective memory.

The revitalisation of the historic site of Bijela Tabija (the White Bastion) in Sarajevo shows that architectural heritage should not exist as a passive testimony of inherited values. Rather it should be a reference to the physical environment, in harmony with public and private life, which balances the needs of citizens with the specifics of cultural heritage. The restoration process can be combined with the construction of new structures, which can then be juxtaposed with the traces inscribed in the matrices of preceding centuries. Urbanity is thereby encouraged and the city retains its historical position as the nucleus of civilization.

Preoblikovanje mesta s pomočjo spominskega obeležja: oživitev sarajevske srednjeveške trdnjave Bijela tabija

POVZETEK

V sodobnem razvoju mesta, ki ga bremenijo številne krize – od kulturne in gospodarske do okoljske ter družbene –, je kriza arhitekturne kulture neizbežna. Zato je treba vzpostaviti, spodbujati in po potrebi na novo oceniti arhitekturno dediščino, ki je bistven del zadevne kulture.

Pri omenjenem postopku, ki zagotavlja samozadostnost, nastajajo številne težave, končna posledica pa je dolgotrajno zanemarjanje in uničenje pomembnih arhitekturnih znamenitosti. Cilj morebitnih posegov je najpogosteje ohranjanje ali obnova, vendar se tako zaščitene znamenitosti izključijo iz vsakodnevnega življenja in resničnosti, ki jih obkroža, in samozadostnost ni več zagotovljena. V dokumentu je postavljena hipoteza, da je treba za novo opredelitev potreb mesta opazovati odnos do arhitekturne dediščine in način, kako je aktivno vključena v mestno življenje – tako namreč opravlja dvojno funkcijo: združuje ljudi in je obenem kraj kolektivnega spomina.

Ponovna oživitev zgodovinskega spomenika Bijela Tabija (Bela trdnjava) v Sarajevu kaže, da arhitekturna dediščina ne bi smela obstajati samo kot pasiven spomenik podedovanim vrednotam. Morala bi usmerjati k fizičnemu okolju in obstajati v sožitju z javnim in zasebnim življenjem ter tako zagotavljati ravnovesje med potrebami meščanov in značilnostmi kulturne dediščine. Postopek obnove je mogoče združiti z gradnjo novih struktur, ki nato predstavljajo kontrast sledem zapisov iz matrik prejšnjih stoletij. Tako se spodbuja urbanost in mesto ohrani svoj zgodovinski položaj kot jedro civilizacije.

1 Introduction

The proper valorisation of architectural heritage inevitably leads to the establishment of sustainable values in modern life. This includes the valorisation of its overall context and fundamental features, and simultaneously opens the possibility and ability to accept new views consistent with the spirit of the times, and thereby with the “spirit of progress”. Current architectural practices are clear in their view that in addition to discovering the genius loci, the phenomenology of space should reflect its “openness to the world, not its reduction of it”.¹ In the spirit of progress, we thus need to understand space and the city as a cohesive area, which exists only as long as it is possible to create a direct, immediate and intimate connection with it that invokes Lefebvre’s “right of the citizen as an urban builder”,² or creator of urbanity.

Interaction makes cultural heritage sustainable and alive, and it is also what preoccupies us as we strive to answer the question: How can the relationship with culture be conceptualised in the creation of space, as a part of an authentic dialogue between the particularity of inherited values and the universality of dynamic transformation?

Taking into account the complexity of the research question and the topicality of the issue, the paper – through its theoretical discussion and case study (*the presented project*) – discusses the possibilities for the recovery and inclusion of a specific urban locality, which is currently physically, socially and environmentally neglected and its monumental value degraded.

The fundamental criteria for defining a neglected space are its design, ecological, economic, functional, social and urban aspects. These are used to reconceptualise and adapt the space to contemporary requirements, while the attention is focused on a “reflective approach” to the diversity of cultural memory, and how it connects the physical and social.

The first part of the research gives a historical overview of the development of the site, and a description of its current state, including the inadequate use of its potential and its deterioration as a result of cultural, economic and social changes. The second part offers the possible solutions to these problems. Using this approach, we have reached the conclusion that this “closed” area can be opened and reactivated if appropriate content, environmental considerations and sustainable design are introduced. A physically and culturally sustainable spatial organisation can then be achieved.

1 Uskoković, S. 2018. Anamensis, dijalozi u javnom prostoru. UPI-2M Books: Zagreb, p. 14.

2 Lefebvre, H. 1996. Writings on Cities. Oxford Blackwell Publishers

This paper shows how the Bijela Tabija revitalisation project in Sarajevo and its immediate surroundings meets these aims in important ways, while conforming to UNESCO's Sustainable Development Goals (UNESCO Agenda 2030) and its 5 Ps: People, Planet, Prosperity, Peace and Partnership.

2 The Medieval Fortified Settlement of Vratnik with the Bastion Bijela Tabija

2.1 Bijela Tabija's historical characteristics and its current situation

The historical site and the architectural-fortification complex Bijela Tabija are part of the medieval fortified settlement of Vratnik, which was built on the north-eastern area of the Sarajevo valley (c. 15th century). Together with the surrounding Ottoman residential areas³ (mahalas), situated on the gentle slopes that border the valley to the north, east and south, it forms a part of Sarajevo's historic core.

Fig. 1. The medieval fortified settlement of Vratnik with the bastion Bijela Tabija, prior to 1915. (Source: Cantonal Institute for the Protection of Cultural, Historical and Natural Heritage in Sarajevo)



3 The Ottoman city's organisation is based on the urban concept of strictly defined functions and purposes, implemented through the establishment of residential and public zones. The main public space is the bazaar (čaršija), where all administrative, cultural, economic, educational and religious functions take place. The residential neighbourhoods (mahalas) are semi-public spaces, the basis of which provides the inviolability of intimate family life that takes place within the houses and gardens. Each mahala has community facilities such as a bakery, a barber shop, a fountain, a greengrocer's, a mosque with a cemetery, and sometimes a mekteb (an Islamic primary school).

Bijela Tabija was declared a national monument of B&H in 2005, as a part of the "Vratnik Old Town Architectural Ensemble". It is located on the extreme south-eastern plateau of the Vratnik neighbourhood, above the steep and inaccessible slope of the Miljacka river canyon. Vratnik's historic defence system consists of five bastions (or *tabije*: military fortifications intended for canons) – Arab, Arnaut, Bijela (White), Strošočka, and Žuta (Yellow) – three vaulted gate towers (or *kapi-kule*) – Ploče, Širokac and Višegrad – and a defensive perimeter wall, which is partially preserved and visible. Of the five bastions, the best-preserved is Žuta Tabija, which is a popular city lookout that holds occasional public events. The remaining four are in a state of disrepair mainly because of a lack of maintenance, but some are inaccessible or endangered as a result of the intensive construction of residential objects. In 2007, the Ploče and Širokac gates and their ramparts were restored, reconstructed, adapted and opened as the Alija Izetbegović Museum.

Based on archaeological excavations,⁴ data summary from the descriptions and drawings by medieval travel writers and historians, it has been determined that the area of Vratnik was inhabited in the Early Middle Ages. On the site of Bijela Tabija there was a medieval fortress, which corresponds in form to the fortifications built prior to the 15th century.

"Archaeologists that explored the site, believe that this is a structure from the Middle Ages, on the grounds of the predetermined way of laying stones of irregular limestones, very poorly dressed, and the composition of mortar (lime with large sand granulate), also of its ground-plane shape, which is characteristic for medieval Gothic defensive lowland fortifications."⁵

With the arrival of the Ottomans, this area was significantly urbanised and settled, and the fortress was rebuilt, extended and otherwise altered to meet the needs of the new military. The Vratnik's perimeter defensive wall, towers and gates were built in the first half of the 18th century. The Bijela Tabija complex is presumed to have consisted of: a rectangular stone fortress with towers in its corners, a mosque, several houses for officials and soldiers, and service facilities. Over the centuries, the complex was rebuilt and upgraded as its defensive role changed and modernised.

The final changes, made during the reign of the Austro-Hungarian monarchy, erased every visible trace of the previous layers of construction.⁶ Today, the military facility that was built at that time is mostly visible through the remains of its white stone walls and gun loops. Although the Bijela Tabija site is in a state of ruin, closed and unused,⁷ Sarajevo's city administration (Grad Sarajevo – Grads-

4 Archaeological excavations have been carried out non-continuously at the site of the Vratnik defensive system since 1955. Excavations (by the Zemaljski Museum in Sarajevo) and conservation/restoration (by the Cantonal Institute for the Protection of Cultural, Historical and Natural Heritage in Sarajevo) have been carried out intensively and continuously only since 1991. For more see: <https://www.spomenici-sa.ba/?s=bijela+tabija>; www.spomenici-sa.ba/wp-content/uploads/2018/12/bijelatabijaprogram.pdf

5 Pudarić, S. 2012. The Old Town of Vratnik. In Mulabegović, F. et al. Old Castles of Bosnia and Herzegovina. NC ICOMOS in B&H: Sarajevo; p.152.

6 Ibid.

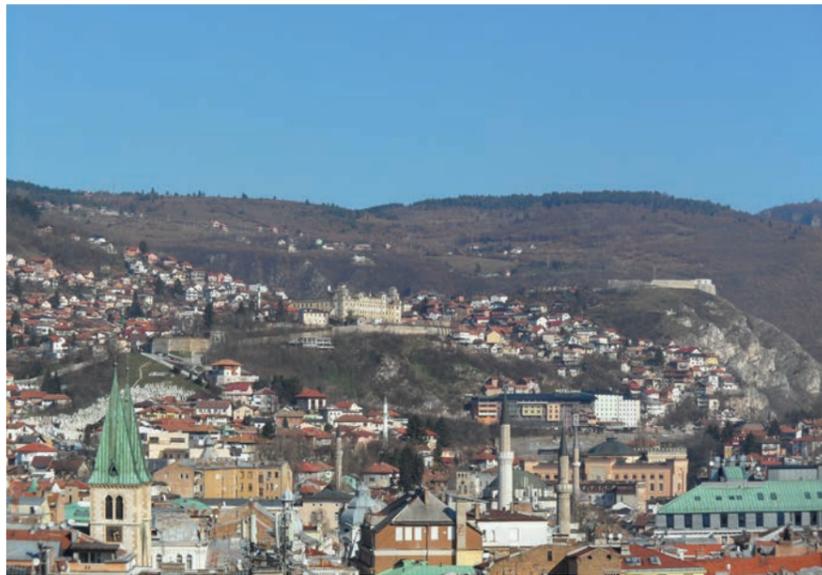
7 The Sarajevo Utility Company (JP Sarajevo) takes care of the Bijela Tabija, thus the site is fenced

ka Uprava) has recently shown interest in its reconstruction and demilitarisation. This resulted in the development of the Architectural project for Bijela Tabija, authored by Zlatko Ugljen in 2014.

2.2 Bijela Tabija's position and potential

Bijela Tabija's position affords spectacular views: to the east, the hilly panoramas of the Miljacka valley and the Moščanica River (a tributary of the Miljacka); to the west, the city of Sarajevo. The bastion is visible from almost everywhere within the city's historic centre, as well as from some of Novo Sarajevo's high-rise buildings. This makes it an unavoidable part of the panorama, and its long, linear silhouette forms a point of visual and symbolic cohesion. Despite this, unlike other urban landmarks, it does not play a recognisable role in the city's cultural memory. Most of Sarajevo's public and cultural content is concentrated in its historic centre, which burdens it with a daily influx of people and leaves other parts of the city monotonous, their diverse potentials neglected.

Fig. 2. "Sarajevo's belvedere" – Bijela Tabija with Jajce Barracks and Žuta Tabija, as seen from the city centre (February 2022)



Directly below Vratnik's southern slopes is the Dariva-Bentbaša recreational green space. This includes an open-air swimming pool, which is today dilapidated and disused. The connection between Vratnik and the city is modest, and restricted to the Kovači plateau. In order to reach Bijela Tabija, visitors must currently pass through the entire neighbourhood, but other options are possible. A green promenade could be built on Pod Bedemom Street, along the southern rampart of the city wall, which has scenic views of Sarajevo; or along Nevjestina

and locked. Since 2019, the site serves as a lookout for individual and group visits, for a fee. Unfortunately, this situation is unacceptable and economically unjustified. For more see: www.klix.ba/vijesti/bih/bijela-tabija-u-sarajevu-vise-nije-dostupna-za-pojedinacne-posjete-jer-ne-postoji-ekonomska-opravnost/210813124; www.sarajevo.ba/bs/article/9665/bijela-tabija-jedna-od-najznacajnijih-turistickih-atrakcija-sarajeva

Street. New forms of pedestrian and/or bicycle access will, however, only be possible once Bijela Tabija has an active role in the city's public life.

Its strategic position has meant that the site of Bijela Tabija has been a significant point of defence for centuries, and it has thereby retained its character throughout the constant transformations of its structure and spatial functionality. Through its multi-layered historical and cultural testimony, the city's (and its society's) memory is revealed and reinterpreted. In order to understand such complex processes, it is necessary to re-analyse and revise the existing relationship between the neighbourhood of Vratnik and the city as a whole, and to establish new ones.

2.3 Vratnik as a residential quarter: spatial and social transformations

The name "Vratnik" indicates that the settlement was both a bulwark (*branik*) and a gateway (*vrata*) to the city from the east, where important trade and administrative roads connected Sarajevo to Istanbul via Visegrad, a city on the banks of the Drina River, on B&H's eastern border. During the Middle Ages, Vratnik developed into a typical Ottoman residential quarter (with several small mahalas), which, unlike other districts and because of its strategic position, was surrounded by defensive walls and fortification it inherited from the earlier periods. The residential quarter is characterised by its fragmented and reasonably low-density construction of individual houses, and an irregular network of narrow and winding streets. The houses are set within spacious gardens and orchards, and their walls and cantilevers (*doksat*) form street-facing facades. Like most of its neighbouring mahalas, Vratnik has lost much of its authenticity over the recent decades:

- The urban matrix has been only partially retained: the street system is the same, but the ratio of built and unbuilt space has changed at the expense of gardens and orchards, which have been partitioned and built upon. As a result, the living conditions in the neighbourhood have changed, as the residents no longer have adequate outdoor and natural "living accompanying facilities". The area's fragmented street structure cannot compensate for this loss.
- Only a few authentic buildings remain: houses in poor condition (cubic forms with hipped roofs, cantilevers (*doksat*), wooden verandas (*divanhana*), and specific aesthetic and design characteristics: proportions, the *play of light and shadow*, the full and void principles), or that have undergone interventions, and local mosques with small green courtyards and (most often wooden) minarets, which have been restored and are in good condition;
- Violations to the area's ease of recognition and visual integrity have occurred, in terms of: the clear distinction between public and private (and the introverted character of the houses), the presence of traditional materials (clay roof tiles-*ćeramid*, shingle, white mortar and limestone), the uniformity of building heights with a spatial hierarchy (one house cannot block the view from another), and the use of cubic proportional forms;

Vratnik's spatial and cultural values and characteristics have changed over the last hundred years as they have adapted to the needs of modern life. Construction interventions that have changed its spatial structure can be divided into two categories: those that were a part of the planned development of the city and its constituent elements, and those that were sporadic and uncontrolled by city institutions, both urban-planning and heritage protection. This recorded amendment to how existing structures are reshaped stems from political and societal changes, specifically the replacement of the former centralised social system with the current transitional one. Under the new system, institutional management and the planning of spatial resources and cultural and natural heritage is hampered by the administrative-political division of space at the expense of regional and natural characteristics.⁸ However, the revitalisation of these significant historical and archaeological sites was lacking in its cultural presentation, and afforded them so little active protection that it was inadequate for the sites to effectively serve the city and its cultural tourism. Several important residential and public buildings were constructed in Vratnik during the last century (building Interventions in the 20th and 21st centuries):

- The grandiose neo-historic Jajce Barracks complex was built in 1915 on the site of the former Ottoman barracks (*kršila*), along the central part of the southern gated wall. It sustained damages during the last war (1992-1995), and has since been left to decay, without clear guidelines on its re-adaptation and restoration. The Jajce Barracks Architectural Ensemble was declared a National Monument of B&H in 2009;
- Hamdija Kreševljaković Primary School (architect: M. Baylon) on Carina Street, built in 1937 and expanded in 1959; It stands out with its volume in the Vratnik panorama
- The Vratnik Volunteer Fire Brigade's station on Mejdan Street, built in the 1950s;
- The Bazar supermarket and former department store on Mejdan Street, built in the second half of the 20th century; It stands out with its volume and facades
- The Vratnik Cultural Centre on Mustafe Dovađžije Street, built in the second half of the 20th century, and renewed in 2007;
- Pčelica Kindergarten on Jekovac Street, built in the second half of the 20th century;
- Hendek Street's residential buildings (formerly Nova Street, and officers' quarters). The analysis of maps and Vratnik's historical matrix shows that in the second half of the 20th century, a wider new street was planned, over what had previously been gardens. Its residential buildings were positioned centrally on the plots, neglecting the traditional *mahala*'s street-facing façades.

Although these interpolated new volumes, contents and typologies were built according to the spirit of their time, they failed to respect the existing spatial relations. As a result, they disrupted the spatial harmony and visual integrity of their locations, and only fulfilled the aspect of functionality by meeting the resi-

⁸ Sarajevo's city administration changed after 1995, in such a way that certain parts that culturally, historically and naturally belonged to it were no longer included in its scope. Additionally, the urban area of Sarajevo now falls under the institutional jurisdiction of the City of Sarajevo, Sarajevo Canton, and the four urban municipalities. This often results in partial management and overlapping competencies.

ents' need for public facilities. The construction interventions over the past few decades have been private rather than public in nature. They are typically manifested as renovations to existing buildings, or completely new builds. Housing in the neighbourhood is generally in poor condition, left to decay and subject to inappropriate interventions, including new and unsuitable (for this neighbourhood) design forms and typologies, and pseudo-design expressions that formalistically endeavour to adapt to the ambient.



Fig. 3. The Širokac vaulted gate tower (*kapi-kula*) at the Kovači plateau – entrance to Vratnik from Sarajevo (September 2021)

Vratnik's protrusion and separation has enabled a highly developed sense of local belonging among the residents – it gave them a local identity. Its microclimatic and topographical features have further shaped the neighbourhood's local identity, and its natural ventilation allows beautiful views and relief from Sarajevo's winter fog. In the past, this geographical separation also meant it was insufficiently connected with the greater city structure, which led to a more developed social life within its walls (such as the establishment of local cultural and sports associations). Today, this type of (self-)organization is less visible, and Vratnik's public facilities are less diverse.

3 Principles of the Revitalisation of Bijela Tabija

3.1 Response through reorganisation: a historical and natural background

Bijela Tabija's physical position (on the Vratnik plateau) in relation to the city makes it one of Sarajevo's natural viewpoints. These viewpoints, which are spread throughout the city, are unique to their immediate and broader surroundings, and thereby bind the observer with the scenery. The Vratnik plateau is one of Sarajevo's original settlements, which makes it special and gives it an epic character. Architectural traces on this site span across at least three historical layers, and speak

of its exclusivity and continuous habitation. This further marks it as a cultural and historical space. By introducing new contents and spatial purposes that make it historically and geographically distinctive, the plateau can contribute greatly to the identity of the city. Proposals for this piece of valuable cultural heritage were directed towards its revitalisation: i.e., the revival of existing contents through the introduction of new, supplementary functions that would in the long term make this neglected site self-sustainable, and able to promote and develop the city's culture as a whole.

The analysis of the entire site (and especially of Bijela Tabija, whose values are transferred to its surroundings) in all its complexity revealed a clear goal for the planned architectural interventions: respecting the values of the Venice Charter and the Amsterdam Declaration; recent efforts (Nara Document and Quebec Declaration) which have affirmed the importance of cultural diversity, and thereby the diversity of cultural heritage, through their concern for the authenticity and integrity of the protected site as a whole.

“The diversity of cultures and heritage in our world is an irreplaceable source of spiritual and intellectual richness for all humankind. The protection and enhancement of cultural and heritage diversity in our world should be actively promoted as an essential aspect of human development.”⁹

“Conservation of cultural heritage in all its forms and historical periods is rooted in the values attributed to the heritage. Our ability to understand these values depends, in part, on the degree to which information sources about these values may be understood as credible or truthful. Knowledge and understanding of these sources of information, in relation to original and subsequent characteristics of the cultural heritage, and their meaning, is a requisite basis for assessing all aspects of authenticity.”¹⁰

The project would also need to be based on the “principles and recommendations to preserve the spirit of place through the safeguarding of tangible and intangible heritage, which is regarded as an innovative and efficient manner of ensuring sustainable and social development throughout the world.”¹¹ The main approach of the reorganization concept therefore rethinks the spirit of the place as an integration of buildings, colours, landscapes, memories, odours, sites, sounds, textures and values.

“Spirit of place is defined as the tangible (buildings, sites, landscapes, routes, objects) and the intangible elements (memories, narratives, written documents, rituals, festivals, traditional knowledge, values, textures, colors, odors, etc.), that is to say the physical and the spiritual elements that give meaning, value, emotion and mystery to place.”¹²

For this reason, it was considered that cultural identity is not static, but rather changeable: it evolves, just like material heritage, the values of which can vary with time. This process requires not only a detailed analysis, but also an understanding of the real significance of this historical complex as representative of

9 The Nara Document on Authenticity, 1994.

10 Ibid.

11 Quebec Declaration on the Preservation of the Spirit of Place, 2008.

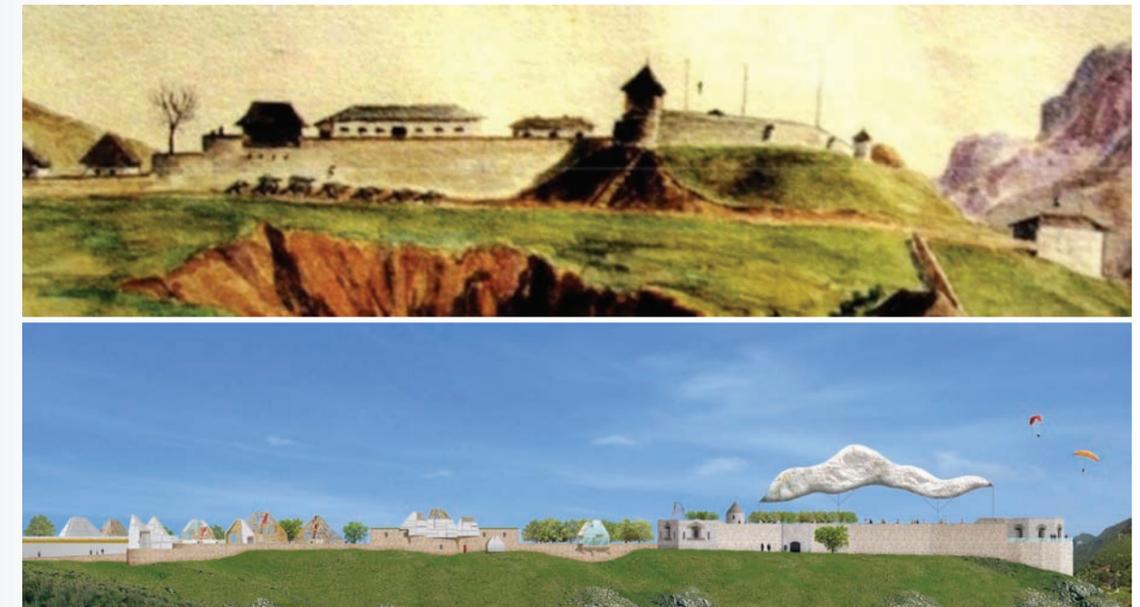
12 Ibid.

“cultural memory”. Today, in the 21st century, the true value of architectural heritage is reflected both in its proper preservation and its ability to make connections with the modern moment: i.e., to mark the spirit of its time.

3.2 The dynamic approach vs. degradation of the spirit of place: understanding and interpreting the old

A watercolour monograph of Sarajevo by the Austro-Hungarian officer Loidolt was an extremely useful source for the architect of this revitalisation project. Especially the 1881 painting of Bijela Tabija, which evoked the architect's interest in the morphological lexicon of the time, and a desire to seek consonance with the area's landscape.

The introduction of new content that the project envisages raises the issues of the old-new relationship, and of its co-optation and consonance: how can this historical structure be approached unobtrusively and quietly, in the interest of preserving identity? How can it be complemented, and by which method?



In projects such as this, architects should endeavour to use elements from the architectural legacy that quote tradition in the spirit of inner affinity, and in the context of time. Further, they should commit to a method of adaptation that allows for a conceptualist approach. The fundamental idea here was to act in the way our predecessors had: to leave another architectural imprint in time, through which the ever-present spirit of the place would be revealed. This method can be explained as a harmonisation of the old and the new, which protects both the authentic and modern versions. The correlation between these two seemingly contradictory phenomena (conditional upon the impossibility of the existence of certain rules on the creation of new structures) depends largely on the level and quality of the creative act itself. This should correspond to the context of providing new values, or a “new authenticity”.

Fig. 4a, 4b. The west façade of the Bijela Tabija on the 1881 watercolour painting by the Austro-Hungarian officer Loidolt (source Z. Ugljen's archive) and as seen as a future representation of cultural memory through the integration of the old and new (source Z. Ugljen);



Fig. 5. The silhouette of the entrance to the Bijela Tabija complex evokes the architectural legacy of the Vratnik ambience (source Z. Ugljen)

3.3 Adaptative and transformative capacity

Loidolt's aforementioned watercolour was the initial stimulus for the main idea, with its plastic ambient composition and emphasis on the visual aspect of ambience. It speaks casually of Vratnik's Bijela Tabija as it used to be, without cold mechanical descriptions, and it is this that aroused the architect's interest and opened the way for a morphological vocabulary in the spirit of internal connections. In order to show deep respect for the historical ground, the *Terra patria*, the architect decided to follow that idea of logical rhythm and modulation. The main idea was reformulated: *good blossoms from good*, and the new should resonate with the vitality of the old. The harmonic ambience of the new multi-purpose spaces should pulsate with cultural identity, creating a micro-complex in the spirit of modern architectural expression.

The aforementioned values and specifics of the site will be reflected in the choice of content and spatial functions (catering, cultural, educational, leisure). The chosen method should harmonise the old and the new, and protect both, authentic and modern versions, "treating the situation as a set of palimpsests that reveal different codex rescripti in their old dimensions, and create a new structure that is in constant communication with its surroundings, through its association with what used to be there."¹³ It should be noted that the term "palimpsest" is transposed here into the applied architectural vocabulary in a specific way.

¹³ Ugljen Ademović, N. (2012). *Kritika- stimulans arhitektonskoj ideji*. Dobra knjiga: Sarajevo



Fig. 6. The Bijela Tabija cultural and recreational complex provides a harmony of multi-purpose spaces, open-air and closed, with beautiful views of the city (source Z. Ugljen)

3.4 Equitable distribution of resources and opportunities

Bijela Tabija is the starting point from which this topic is elaborated. It is the fundamental potential from which the guiding thought of the entire complex is drawn and developed, both in terms of content and (especially) creativity. All of the aforementioned contents, functions and ideas are a reflection and consequence of the attempt to use this former city defence optimally, without compromising its authenticity.

The emphasis here lies on the polyvalent space within the walls, which will contain a stage and stands that can be easily assembled and disassembled. The area will have a temporary cover which can be used when required, ensuring the reversibility of the space: all interventions should be dismantlable in the future, without damaging the protected architectural structure, thereby returning the space to its pre-intervention condition.

The focus of the “plant” tower is a wooden structure: a harp, the paradigm of the hunting or warrior’s bow, which is a distant ancestor of today’s harp. It is electronically programmed to play bright chords once a day. From the ground floor of the tower rises a prism, constructed from COR-TEN steel profiles. It is the symbolic appearance of the old city towers: evidence of historical continuity through the eras, and a contemporary link between the past and the future. The basic aesthetic concept is to emphasise the architectural demilitarisation of Bijela Tabija: to make it the metaphoric flower in the rifle barrel.

Fig. 7. The plant tower with the harp, associations on the city towers and ancient warriors, evoke the physical and spiritual elements of the place; (source Z. Ugljen)



An agglomeration of catering facilities and exhibition spaces will stand to the left of the main entrance, on the plateau of the complex; their integral plastic and disciplinary disorder implies spontaneity in the morphological structure. They are a metaphor for Vratnik’s indigenous habitats, interpreted through the aesthetics of modern technological trends. The created open interspaces assume the function of gardens; they are a homage to the depths of the past of this old walled town, an understanding of its heritage through its contemporary interpretation.

These also represent the most elevated points from which the city and its surroundings can be seen. A promenade half a kilometre in length will stretch around the entire complex, descending and then rising slightly, following the configuration of the terrain. It will have rest areas at lookout points and the terraces of restaurants. The promenade has two aspects: in the summer season it can be used for kite-flying, rollerblading, skateboarding and scooters; and in winter for ice-skating, sledding and snowboarding.

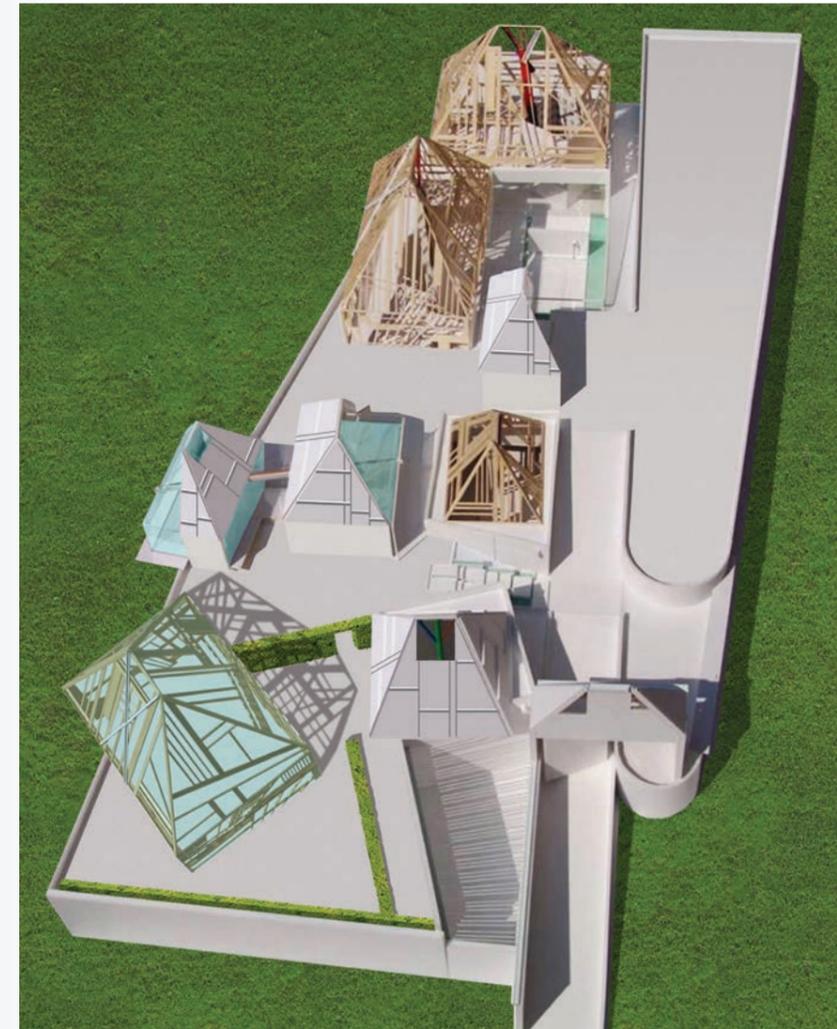


Fig. 8. The disordered agglomeration of the new structures on Bijela Tabija plateau evokes, and implies a traditional morphological structure by accommodating galleries, summer gardens, a cafeteria, a multifunctional hall and the main entrance to the complex; (source Z. Ugljen)

4 Conclusions

The Bijela Tabija cultural and recreational complex will be a visually and substantively organised system for adaptation, learning and transformation. The facilities and capacities on offer will enable the community to interact with the city and region (and beyond), on various cultural, economic and educational levels. In this way, it will provide a support infrastructure for the public life of both the city and the local community. The inclusion of this neglected and abandoned locality in the city’s public circulation will also improve the everyday living conditions for the residents of Vratnik. The methodological approach that Zlatko Ugljen has developed balances his creativity and sensibilities with the real needs of its users, and applies scientific accuracy and ethics as a part of the restoration process.

By reinterpreting and preserving the essence of the artefacts, the project represents a long-term resource, to be re-evaluated and re-interpreted by the local

community and the citizens of Sarajevo. The newly-created place will therefore be a (future) place of memory and lived experience. The proposed conservation and restoration interventions promote authenticity and reversibility, thereby “retaining the original aura”. They are a model for the integration of natural and urban settings into an archaeological site, which may encourage further (equally sensitive) interventions within the existing structure of the city wall.

The formal and substantive elements of the Bijela Tabija historical complex’s rehabilitation include and valorise the “cultural values and identities of the affected communities”. Over time, it is hoped that the complex will become a focal point for the local community’s daily life, accessible to people of all ages. The proposed revitalisation also balances the needs of tourists with those of the local population, thus achieving its primary goal: a solution that harmonises the interaction of public and private in a shared place and time.

The implementation of this project would encourage significant steps towards achieving the 11th and 17th UNESCO Sustainable Goals (Sustainable Cities and Communities; Partnerships for the Goals), through the methodological regeneration of historic sites in the Sarajevo Canton.

Authors

SONJA IFKO

Faculty of Architecture, University of Ljubljana

Ljubljana, Slovenia

sonja.ifko@fa.uni-lj.si

ANDREW POTTS

Climate Heritage Network

Charenton-le-Pont, France

andrew.potts@icomos.org

ANŽE JAPELJ

Slovenian Forestry Institute

Ljubljana, Slovenia

anze.japelj@gozdis.si

TATJANA DIZDAREVIĆ

Idrija Mercury Heritage Management Centre

Idrija, Slovenia

tatjana.dizdarevic@cudhg-idrija.si

GIULIA PESARO

Politecnico di Milano

Milano, Italy

giulia.pesaro@polimi.it

DANIELE CROTTI

University of Insubria, Department of Economics

Varese, Italy

daniele.crotti@uninsubria.it

ANDREEA TRIF

Craiova University

Craiova, Romania

andreea.trif@edu.ucv.ro

TANJA HOHNEC

Institute for the Protection of Cultural Heritage of Slovenia

Ljubljana, Slovenia

tanja.hohnec@zvks.si

ROKO ŽARNIČ

Slovenian Association of Earthquake Engineering

Ljubljana, Slovenia

roko.zarnic@fgg.uni-lj.si

BARBARA VODOPIVEC

ZRC SAZU France Stele Institute of Art History

Ljubljana, Slovenia

barbara.vodopivec@zrc-sazu.si

GAŠPER STEGNAR

Jožef Stefan Institute – Energy Efficiency Centre

Ljubljana, Slovenia

gasper.stegnar@ijs.si

STANE MERŠE

Jožef Stefan Institute – Energy Efficiency Centre

Ljubljana, Slovenia

stane.merse@ijs.si

SAMO GOSTIČ

Building and Civil Engineering Institute ZRMK

Ljubljana, Slovenia

samo.gostic@gi-zrmk.si

MIHA TOMŠIČ

Building and Civil Engineering Institute ZRMK

Ljubljana, Slovenia

miha.tomsic@gi-zrmk.si

MARJANA ŠIJANEC ZAVRL

Building and Civil Engineering Institute ZRMK

Ljubljana, Slovenia

marjana.sijanec@gi-zrmk.si

PILAR MONTERO VILAR

Universidad Complutense

Madrid, Spain

pilarmontero@ucm.es

JORGE GARCÍA GÓMEZ-TEJEDOR

Museo Nacional Centro de Arte Reina Sofía

Madrid, Spain

jorge.garcia@museoreinasofia.es

SIRIWAN SILAPACHARANAN

The Royal Society of Thailand

Bangkok, Thailand

siriwansv@gmail.com

NINA UGLJEN ADEMOVIĆ

University of Sarajevo, Faculty of Architecture

Sarajevo, Bosnia and Herzegovina

ninau@af.unsa.ba

ELŠA TURKUŠIĆ JURIĆ

University of Sarajevo, Faculty of Architecture

Sarajevo, Bosnia and Herzegovina

elsa.turkusic@af.unsa.ba

All papers are peer-reviewed.

The opinions expressed in this book are the responsibility of the authors.

All figures are in possession of the authors if not indicated differently.

CIP - Kataložni zapis o publikaciji
Narodna in univerzitetna knjižnica, Ljubljana

719(082)

RESILIENT heritage = Dediščina, ki kljubuje / [editor Sonja Ifko ; Slovenian translation Amidas, English translation Borut Praper]. - Ljubljana : ICOMOS Slovenija - Slovensko nacionalno združenje za spomenike in spomeniška območja = Slovenian National Committee of ICOMOS, International Council on Monuments and Sites, 2022. - (Monographic Publications of ICOMOS Slovenia ; 04)

ISBN 978-961-94851-4-9
COBISS.SI-ID 128708611