ICOA730: CULTURAL MAPPING AS A TOOL FOR THE DISASTER MITIGATION

Subtheme 01: Integrating Heritage and Sustainable Urban Development by engaging diverse Communities for Heritage Management

Session 2: Management, Documentation
Location: Stein Auditorium, India Habitat Centre
Time: December 13, 2017, 17:00 – 17:15

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Abstract: UNESCO World Heritage Centre (WHC) indicates that community participation and communication is particularly important for heritage preservation with the 5Cs strategies. In 2015, in the UN Sendai Declaration it is specified that, on risk preparedness for cultural heritage, material and non- material supporting system is necessary. Evidently, community participation should be one of the key issues included in the non- material system.

In view of these considerations, the role of stakeholders and community participation is definitively vital on risk management for cultural heritage. Its task includes various aspects such as recognition of cultural value, understanding hazard history, disaster indicators, drafting disaster management plan and providing training drills.

In this study, based on the concept of cultural mapping, we will explore how different collected information can be analyzed, applied and implemented, while promoting the aforesaid work. Ultimately, it is expected that we can use Geography Information System (GIS) as an important platform for integration and presentation of the information.

Positivism reveals that continuously promoting risk map to communicate with stakeholders is an easy and effective way for comprehension of value, risk identification and disaster relief planning. Relevant information is also sufficiently accumulated, which will provide important basis for other work.

Key words: *community participation, 5Cs, disaster mitigation, cultural mapping*

1. Purpose and background

In 1989, the United Nations General Assembly proposed the International Decade for Natural Disaster Reduction (IDNDR, 1990-1999). In 1994, the "Yokohama Strategy and Plan of Action" provided the action plan about prevention, preparedness and mitigation of natural disasters. In 2005, the "Hyogo Framework for Action 2005-2015" (HFA) put forward by the United Nations International Strategy for Disaster Reduction (ISDR) expanded the level of disaster reduction to disaster resilience of countries and communities in an attempt to build global strategies for major disasters. In 2015, the third United Nations World Conference on Disaster Risk Reduction held in Sendai presented the "Sendai Cooperation Initiative for Disaster Risk Reduction" and the "Sendai Framework for Disaster Risk Reduction 2015-2030", which included disaster prevention of cultural heritage in the global framework for the first time.
In 1996, the "Operational Guideline on the implementation of the World Heritage Convention" (OG) included "Monitoring" as one of the elements in the text, but the content requirements were not clear. After the significant amendment of OG in 2005, there is an increasing demand for monitoring the world heritage. According to the requirements of OG monitoring content in the text, cultural heritage risk management system shall be a comprehensive system which includes administration, regulations and so on in addition to physical quantity monitoring and control system.

This study cited the "Operational Guidance" and the 5Cs Principles and divided the management system of cultural heritage into monitoring, safety and administration based on the concept of Disaster Resilience. It also referred to the framework of the "Sendai Cooperation Initiative for Disaster Risk Reduction" (2015) to plan and build an integrated disaster prevention system from the point of view of harmonization. The system carried out and verified in QIONG-LIN Settlement continues to promote the risk map and communicate the value of cultural heritage to stakeholders. It is a simple and effective way. However, relevant information shall also be fully accumulated to provide an important basis for other works.

2. Research process

This study assessed settlement building disaster-causing factors in relation to the external environment and characteristics of the building, building types, management and maintenance system, and auxiliary fire safety equipment according to the "monument and historic building disaster-causing factor assessment table," "general building disaster-causing factor assessment table," and "settlement building disaster-causing factor assessment table" developed in the study.

Second, the study identified disasters caused by each risk such as fire potential and fire safety equipment settings and collected the data to apply to GIS software. After understanding disaster-causing factors among settlement buildings, relevant evacuation space plans can be proposed. Relevant results can be further integrated as an important platform for risk communication in public and private sectors of cultural heritage.

3. Research results and analysis

(1) Development of risk management mechanism

This study referred to international researches on risk management and established the cultural heritage risk management mechanism in consideration of domestic factors. The mechanism can be divided into three main systems: cultural heritage monitoring and management system, cultural heritage safety management system and cultural heritage administrative management system for the basis to further implement the cultural heritage risk management. (As shown below)

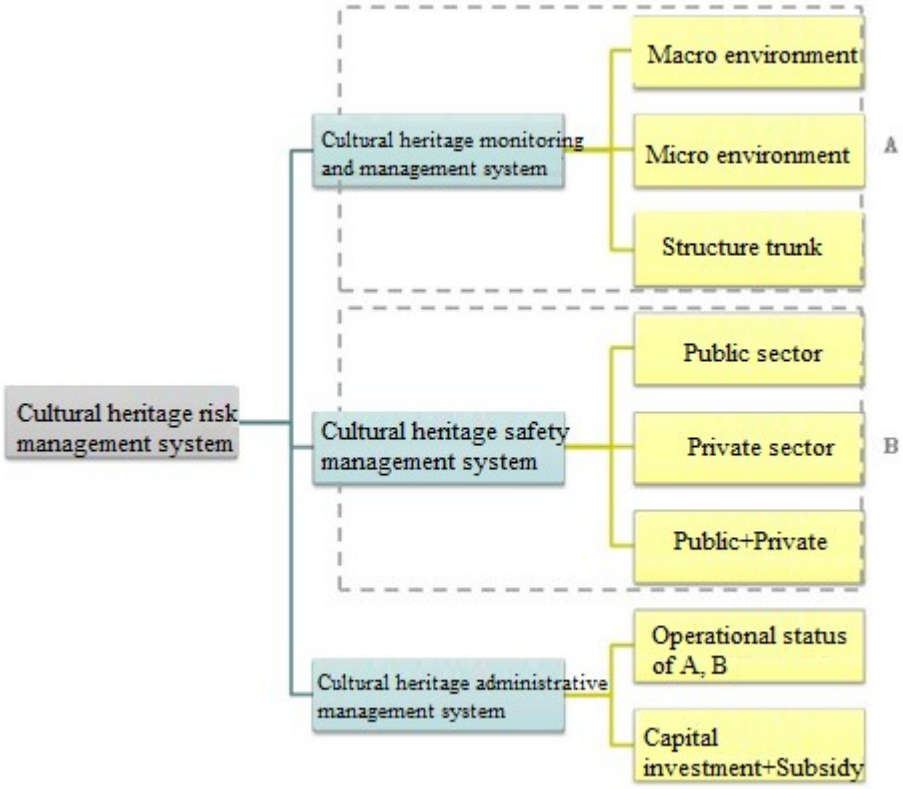
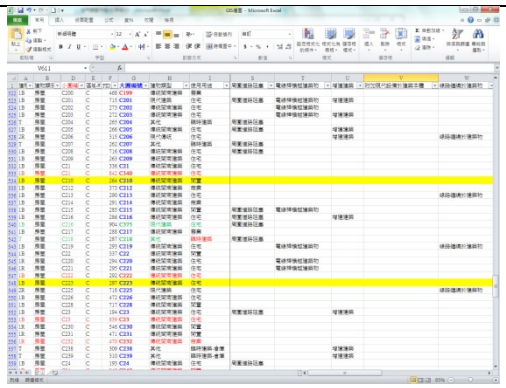


Fig.1 –Mechanism diagram of cultural heritage risk management system

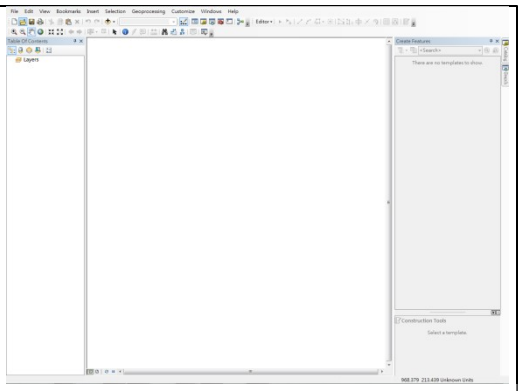
(2) Establishment of cultural heritage disaster prevention risk map and its operation mode

This study adopted digital technology as an integration platform. The results of each subproject are presented on the platform by three-dimensional information system (3D GIS). At the same time, the disaster prevention space planning and public coordination risk communication platform is established based on "risk map".

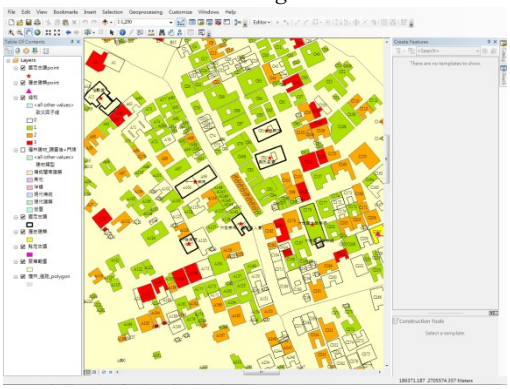
The literature research and analysis indicates that the site investigation includes information on risk analysis of cultural heritage locations and fire safety equipment. It shall confirm whether the equipment is available or the location is correct, and the roads, wells, pools and squares on site can be used for evacuation. Relevant data of each building are collected and compacted according to results of on-site investigation. The library and information numbers correspond to disaster-causing factors. After importing relevant data into GIS library information database, each building block is plotted with colour to present disaster-causing factor layers of this area, and then stacked plots will be made. (This project took QIONG-LIN Settlement in the Kinmen County as an example)



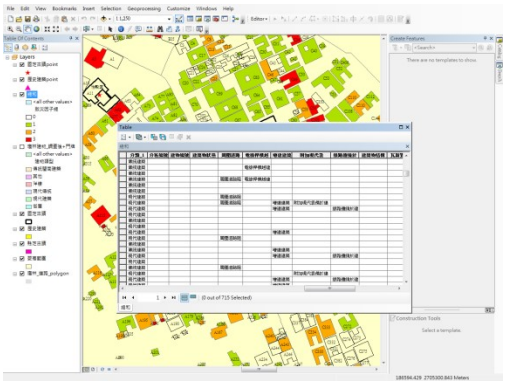
Using Excel to organize disaster-causing factors of buildings



The main screen for GIS platform



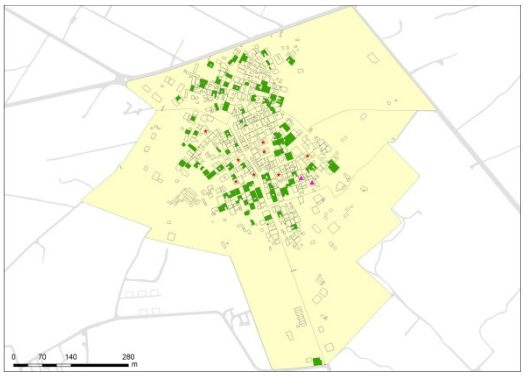
Importing basic information of monuments and historic buildings



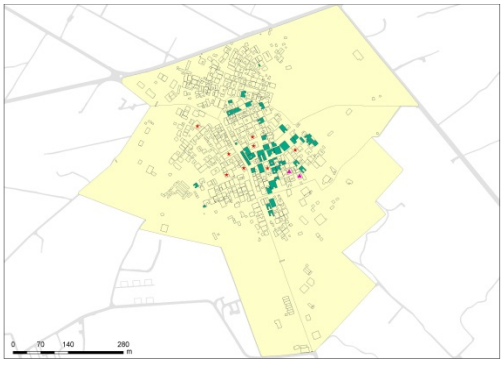
Excel data import

Fig.2– GIS operator interface

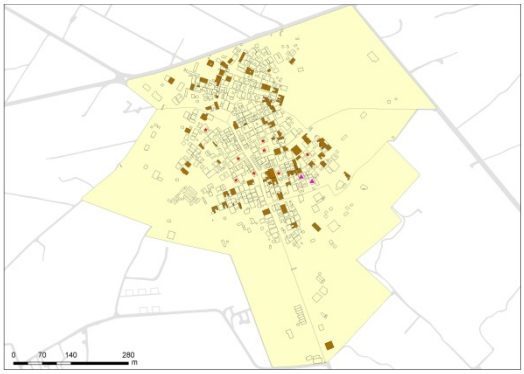
After data collecting and compaction, the above table is imported into of GIS library information database. Each building block is plotted with colour to present disaster-causing factor layers of this area a, and then stacked plots will be made.



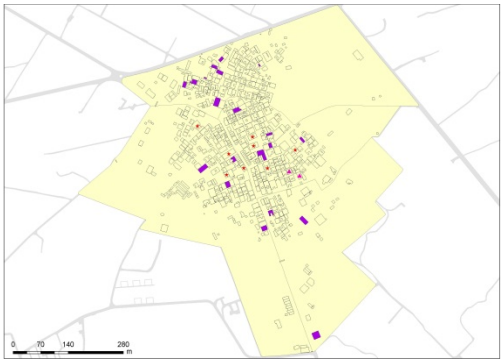
The surrounding roads are blocked.



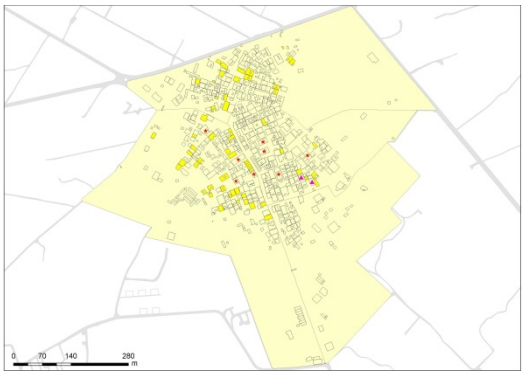
The utility poles traverse buildings.



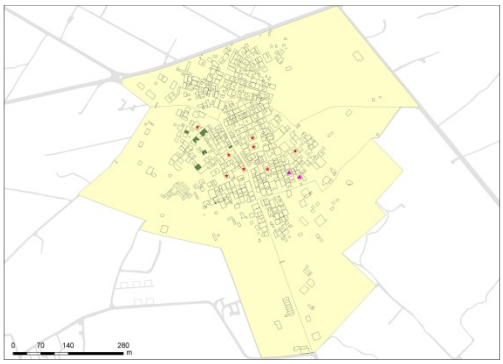
Augmented buildings



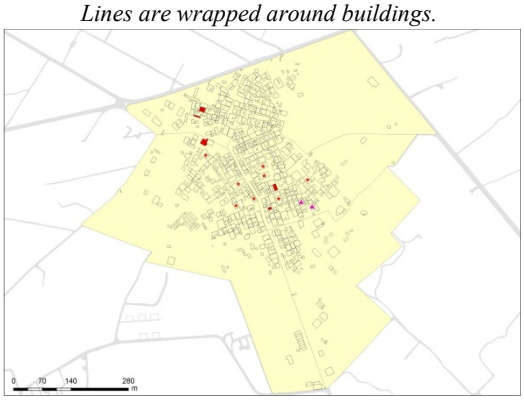
Additional modern equipment on the structure trunk



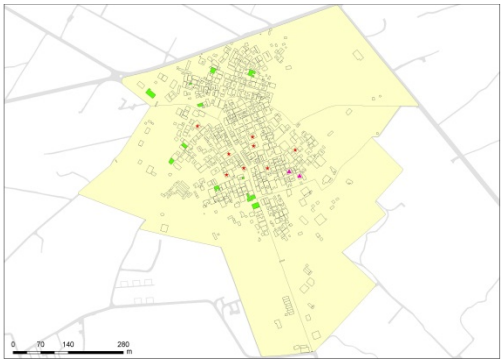
Lines are wrapped around buildings.



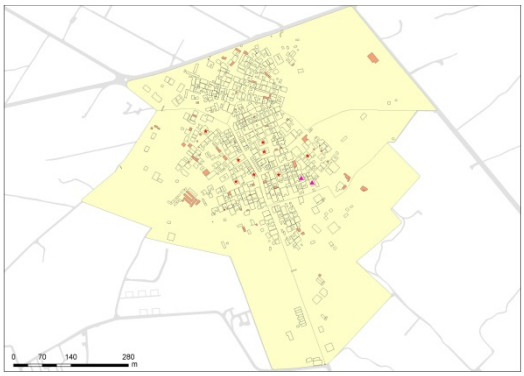
The building structure is not safe.



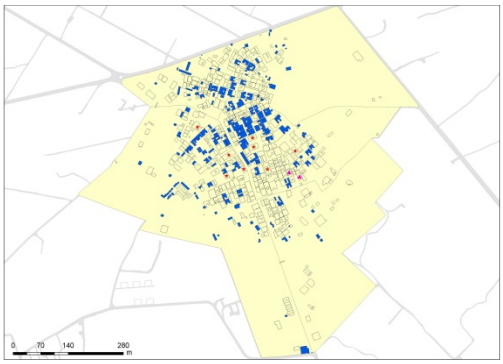
The gas bucket is placed outside the house.



Potential falling objects are placed on the high-rise terrace.



Warehouse



Dilapidated houses

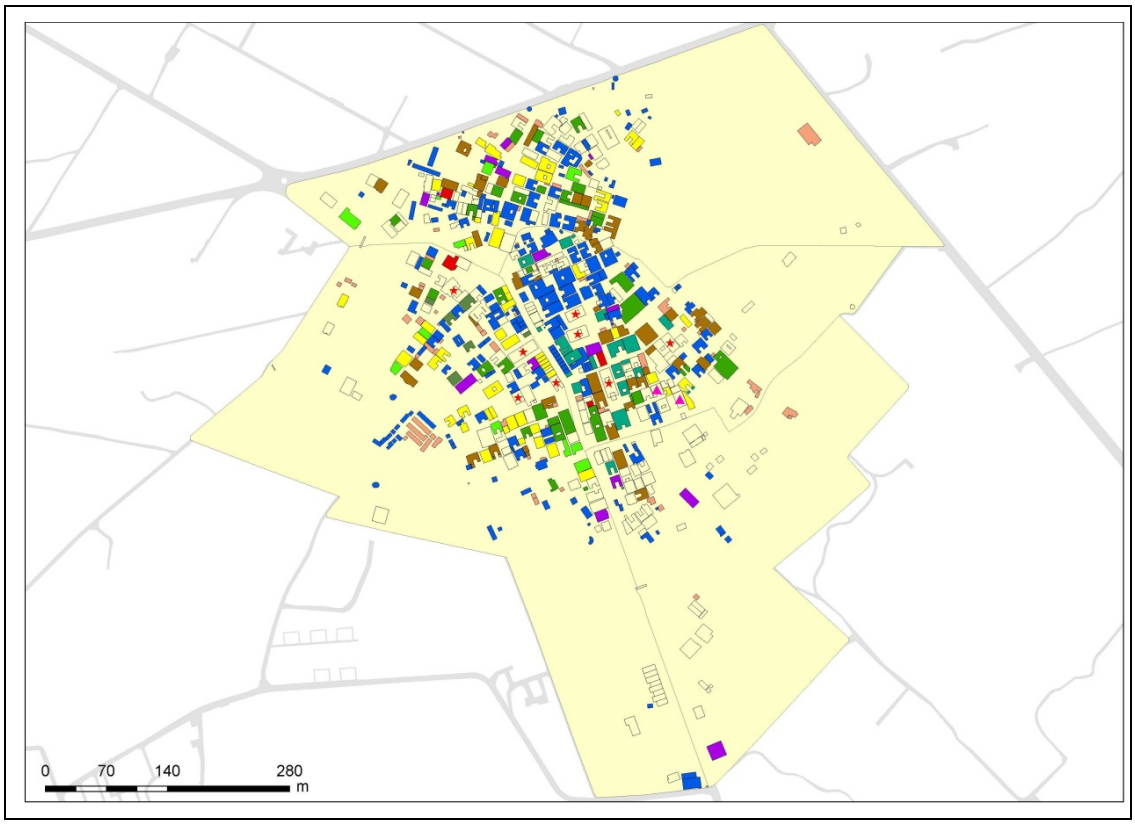


Fig.3– Kinmen QIONG-LIN Settlement disaster-causing factor analysis chart

(3) Risk communication

The risk communication in relation to all the information above can be developed with public and private sectors through the visual GIS platform.

Fig.4– Temporary refuge space map of Kinmen QIONG-LIN settlement

4. Conclusion

(1) Disaster prevention space planning

Establishment of disaster prevention information for cultural heritage space includes risk assessment and enhancement of public and private sector cooperation. The information established through the public participation can be provided for review of public and private sectors.

In addition, the cultural heritage space disaster prevention platform is established through digital technology to construct the basic information of cultural heritage. With GIS software, the disaster prevention map exclusively for cultural heritage can be planned.

(2) Preservation ability reinforcement plan

Disaster prevention management for cultural heritage shall not only be monitoring of physical data (such as the installation of monitors). It shall also strengthen cooperation between public and private sectors. The disaster prevention information established through the public participation in risk communication can be provided to the relevant public and private sectors to construct the GIS security management disaster prevention platform from top to bottom.

Acknowledgements

This study is sponsored by the Ministry of Science and Technology and Bureau of Cultural Heritage Ministry of Cultural for 2014-2017 Research. (MOST 103-5-2625-M-163-001)

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