PROCULTHER

PROTECTING CULTURAL HERITAGE
FROM THE CONSEQUENCES OF DISASTERS

Funded by
European Union
Civil Protection

European Civil Protection

KEY ELEMENTS OF A EUROPEAN METHODOLOGY TO ADDRESS THE PROTECTION OF CULTURAL HERITAGE DURING EMERGENCIES

LuoghInteriori

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Key Elements of a European Methodology to Address the Protection of Cultural Heritage during Emergencies

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ACRONYMS

AFAD	*Afet ve Acil Durum Yonetimi Baskanligi* -Disaster and Emergency Management Presidency-Turkey
CECIS	Common Emergency and Coordination Information System
CH	Cultural Heritage
CMI	Union Civil Protection Mechanism Introduction Course
CND	Course on Negotiation and Decision-Making
CP	Civil Protection
CPX	Command Post Exercise
DBX	Discussion-based Exercise
DI.COMA.C	Command and Control Center (Italy)
DG-EAC	Directorate-General for Education, Youth, Sport and Culture
DG-ECHO	Directorate-General for European Civil Protection and Humanitarian Aid Operations
DGPCyE	Dirección General de Protección Civil y Emergencias
DPC	Presidenza Del Consiglio Dei Ministri-Dipartimento della Protezione Civile-Italy
DRM	Disaster Risk Management
DRM-CH	Disaster Risk Management Cultural Heritage Sector Plan
DRR	Disaster Risk Reduction
DTL	Deputy Team Leader
EID	European Interoperable Database
EMS	Emergency Management System
ERCC	Emergency Response Coordination Centre
EU	European Union
EUCP	European Union Civil Protection
EWS	Early Warning System
FSX	Full Scale Exercise
FX	Field Exercise
GD	Ministry of Culture and Tourism-General Directorate of Cultural Heritage of Museums (Turkey)
GIS	Geographic Information System
GPS	Global Positioning System
HFA	Hyogo Framework for Action
HLC	High Level Coordination Course
ICCROM	International Centre for the Study of the Preservation and Restoration of Cultural Property
ICOMOS	International Council on Monuments and Sites

ICORP	International Scientific Committee on Risk Preparedness
IFRC	International Federation of Red Cross and Red Crescent Societies
IM	Information Management
INSARAG	International Search and Rescue Advisory Group
JCyL	*Consejería de Cultura y Turismo de la Junta de Castilla y León* - *Spain*
LEMA	Local Emergency Management Authority
LOG	Logistics
MiC	*Ministero della Cultura* - Italy
MBC	Modules Basic Course
Minint-DGSCGC	*Ministère de l'Intérieur - Direction Générale de la Sécurité Civile et de la Gestion de Crises* - France
MoCT	Ministry of Culture and Tourism - Turkey
MS	Member States
NCBR	Nuclear, Chemical, Biological and Radiological
NCPTT	National Center for Preservation Technology and Training
NGO	Non-Governmental Organizations
ODK	Open Data kit
OP	Operations
OPM	Operational Management Course
OSOCC	On-Site Operations Coordination Centre
PDNA	Post-Disaster Needs Assessment
PPE	Personal Protective Equipment
PROCULTHER	Protecting Cultural Heritage from the Consequences of Disasters
PROMEDHE	Protecting Mediterranean Cultural Heritage During Disasters
PS	Participating States
SFDRR	Sendai Framework for Disaster Risk Reduction
TE	Technical Expert
TEC	Technical Expert Course
TL	Team Leader
ToR	Terms of Reference
TTX	Table-Top Exercise
UCCN	National Crisis Coordination Unit
UCCR	Regional Crisis Coordination Unit
UCPM	Union Civil Protection Mechanism
UGRECYL	*Unidad de Gestión de Riesgo y Emergencias de la Junta de Castilla y León*
UNDAC	United Nations Disaster Assessment and Coordination
UNDG	United Nations Development Group
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAR	Urban Search and Rescue
VM	*Fondazione Hallgarten-Franchetti Centro Studi Villa Montesca*

INTRODUCTION

This document has been elaborated in the framework of the PROCULTHER project - Protecting Cultural Heritage from the Consequences of Disasters[1] by Italy, France, Spain and Turkey in collaboration with the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM).

Implemented within a European Union Civil Protection Mechanism (UCPM) initiative and co-funded by the Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG-ECHO), PROCULTHER aimed at contributing to the development of common European rules, shared procedures and operating standards to improve the safeguard of cultural heritage at risk of disaster by promoting a structured cooperation among cultural heritage and civil protection actors at local, national and European level.

At the time PROCULTHER took its first steps towards the development of this document, it was already very clear that a paradigm shift on the importance of including cultural heritage protection in disaster risk management processes was necessary. Indeed, although the resilience of disaster-prone communities is strictly linked to the protection of tangible and intangible cultural heritage, the safeguarding of cultural heritage is still considered a non-traditional civil protection sector both at national and European level. Lack of consideration of this field not only amplifies the underlying disaster risk drivers but also undermines the ability of a system to effectively protect life and the dignity of communities at risk as well as to pursue a sustainable recovery from crisis. Therefore, strengthening capacities to protect cultural heritage at risk of disaster coincides with strengthening the resilience of vulnerable communities.

The urgency of taking adequate measures towards the preservation and protection of cultural heritage from natural and man-made hazards has considerably increased due to the growing effects of climate change, rapid urbanization and more recently the impact of COVID-19 pandemic on both tangible and intangible cultural heritage. In order to address these pressing challenges, PROCULTHER has launched a broad consultative process to assess and analyse existing capacities in terms of cultural heritage protection.

In the first phase of the project, each partner country established a national working group, including all relevant public and private stakeholders, to elaborate a report-product of the consensus generated at each national level. The main outcomes of this joint consultation were shared during an international workshop, held in Rome on 10-11 December 2019. On the basis of this exchange, an index of a common methodology to address the protection of cultural heritage at European level was produced and each country contributed to draft the document by developing specific topics included in the index.

[1] The PROCULTHER Consortium is led by the Italian Civil Protection Department (Italy), and composed of the *Ministère de l'Intérieur-Direction Générale de la Sécurité Civile et de la Gestion des Crises* (France), the Ministry of Culture and Tourism of the Regional Government of Castilla y León (Spain), the Ministry of Interior-Disaster and Emergency Management Authority- AFAD (Turkey), the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM) and the *Fondazione Hallgarten-Franchetti Centro Studi Villa Montesca* (VM).

The following phase of the project focused on sharing the main outcomes of the document among the international community, through a second international workshop, held in remote mode on 7 and 9 June 2021, in which nearly 100 experts from over 30 countries (including 18 EU Member States and 4 UCPM Participating States[2], Argentina, Caribbean region, Israel, Mexico, Palestine, United Kingdom and United States of America), and 16 speakers from civil protection authorities, ministries, governmental and research institutions including the European Commission Directorates DG-ECHO, DG-EAC and international organisations, such as UNESCO and ICCROM, contributed with their insights to the review of the first draft of the document.

In the framework of PROCULTHER, this merging of 'Cultures' from inside and outside the project has yielded a fruitful and conspicuous sharing of experiences and points of view, grounded in the strong will to contribute a combination of knowledge and expertise aimed at guiding actions and strategies for the effective protection of cultural heritage at risk of disaster. From a civil protection perspective, this initiative was conceived by the need of providing methodological elements for the inclusion of the protection of cultural heritage in all the phases of disaster risk management at each territorial level. From a European perspective, it has highlighted the importance and urgency to increase interoperability standards to allow the integration of cultural heritage protection within the operational structures of the UCPM, by defining learning processes that can make the enhancement of cultural heritage resilience a common goal of the European Member States (MS) and UCPM Participating States (PS).

In this sense, this document, built on a common and shared understanding of the subject at European level, aims at providing key operational and technical elements to address cultural heritage at risk of disaster, offering an overview of the main actions that should be taken into particular account to advance preparedness and response activities for the inclusion of cultural heritage safeguard in disaster risk management processes at both national and European level.

Many structural, technical and operational aspects on how to enhance the protection of cultural heritage at risk of disaster at each territorial level have been explored in order to produce a document which concisely points out those elements that are crucial in disaster risk management operations. In this sense, the document does not claim to exhaust all issues related to the protection of cultural heritage at risk, but proposes methods, languages, rules resulting from the learning and capitalisation processes initiated by the project, providing a solid basis for institutional strengthening and capacity building in this field to be further explored and enhanced in the future.

It is also worth mentioning that, even if the document maintains a "Do No Harm" approach, only issues strictly related to the protection of cultural heritage at risk of disaster triggered by natural or man-made hazards are addressed.

In particular, the document proposes and analyses the following topics:

- **INSTITUTIONAL FRAMEWORK** (Part A) focuses on main international regulatory and operational frameworks, actors to be involved and roles, elements for strengthening a cultural heritage governance both at national and European level.
- **INCLUSION OF CULTURAL HERITAGE IN PLANNING PROCESSES** (Part B) provides strategic methodological and operational inputs to reinforce

[2] In the workshop intervened the following UCPM Member and Participating States: Belgium, Bulgaria, Croatia, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, Malta, Montenegro, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Spain, and Turkey.

technical and operational capacities in this field. It also includes an outline to guide the development of cultural heritage sector plan and site security plans. In addition, key operational planning elements are presented to identify potential damages caused by natural hazards, adapt early warning systems to the sector's needs, define priorities for the protection/extraction/removal of cultural heritage in emergency and identify and organize adequate storages for movable assets.

- **COORDINATION STRUCTURE AND SUPPORTING TEAM** (Part C) emphasizes the role that a coordination structure (Safeguarding Cultural Heritage Cell) can have within an emergency operational centre in improving disaster risk management capacities. It also focuses on the establishment of objectives, rules and procedures of a team, to be converted in a Module/Other Response Capacity within the UCPM framework, to ensure the safeguard of cultural heritage at European and international level in case of emergency.
- **TOOLS AND DATA MANAGEMENT SYSTEM** (Part D) proposes reporting tools for risk and damage assessments, as well as the definition of IT systems for sharing data and information to improve operational capacities.
- **TRAINING** (Part E) deals with the definition of training standards related to the safeguard of cultural heritage at risk of disaster to be possibly included under the learning structures of the UCPM, in order to strengthen and test capacities in this field.
- **EXERCISES** (Part F) advocates on the importance of testing capacities to improve the safeguard of cultural heritage at risk of disaster. It proposes an outline to facilitate the organization of cultural heritage full-scale exercises and a list of materials that can serve for the preparation of a dedicated risk-scenario.
- **CONCLUSION AND RECOMMENDATIONS** (Part G) summarizes the actions to be undertaken to achieve an effective protection of cultural heritage at risk of disaster.
- **GLOSSARY** specifies the meaning of the terminology used in document.

In order to provide for specific references and further analysis, the document also reports ten case studies on the practices already developed by the PROCULTHER partners in terms of institutional framework, planning, coordinated structure and teams.

Finally, a training module (see Part E) and its first pilot edition have been designed and implemented in the PROCULTHER framework with the aim of promoting further exchanges and increasing the transfer of know-how in this field. Due to COVID-19 restrictions, the training was adapted to a virtual format and the full-scale exercise converted in a virtual discussion-based exercise. Despite these changes due to compelling reasons, a new path for further improvement and deeper analysis of this document has been traced to encourage a wider participation of all EU MS/UCPM PS in the definition of the contents that can improve this first shared understanding of the elements that will undoubtedly increase the resilience of vulnerable communities.

As a result, around 40 experts both from the field of disaster risk management and cultural heritage, coming from 15 different UCPM Member and Participating States have been trained with a common training standard and tools, aiming at improving and enhancing their capacity in the protection of cultural heritage at risk of disaster. Main findings of this activity have already been included in this document.


DEL FUOCO

PART A

INSTITUTIONAL FRAMEWORK

A.1 Safeguarding Cultural Heritage at Risk of Disaster: an Overview of Main International Regulatory and Operational Frameworks

Ever since ancient times, the world has been endowed by humanity with a boundless amount of cultural heritage, while being at the same time a stage for disasters of varying magnitude, frequency, and type. The building of experiences gained in preserving and protecting cultural heritage from natural and man-made hazards has paved the way for an increasingly strong international commitment to safeguarding its universal and inestimable value in all the phases of disaster risk management (DRM).

The development of a collective awareness of the value of cultural heritage for society at global scale has given rise to a theoretical framework of regulations, principles and agreements aimed at the protection of cultural heritage dating back to the beginning of the 20th century. This complex framework of actions was actually conceived only in the 1990s when it was inaugurated and shaped in the terms that are currently known. In fact, the launch of the International Decade for Natural Disaster Reduction in 1990 has progressively operated a paradigm shift from a relief centric operational scheme towards a more integrated, holistic and people centred approach which also includes the field of cultural heritage protection.

3. Recovery of movable cultural heritage affected by the 2016 earthquake in Umbria region.

In this sense, the adoption of the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disaster (HFA) and furthermore of the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR), the global agreement on disaster risk reduction (DRR) currently in force, have addressed key elements of prevention, risk reduction, disaster preparedness, response, as well as resilient recovery and reconstruction also in the field of cultural heritage protection. In particular the SFDRR, recognizes the primary role of the State to reduce disaster risk which forcibly entails the involvement of all sectors of society, including culture, to prevent new risks, reduce existing risks and strengthen resilience of cultural assets.[1] The same year, the United Nations integrated the protection of cultural heritage among its sustainable development goals in the document Transforming Our World: the 2030 Agenda for Sustainable Development.[2]

[1] Adopted at the Third UN World Conference in Sendai, Japan, on March 18, 2015 by the UN General Assembly is a 15-year, voluntary, non-binding agreement with seven targets and four priorities for action. For more details see: ***https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf***.

[2] The UN agenda Transforming our world: the 2030 Agenda for Sustainable Development foresees the protection of CH through the following goals: Goal 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all; Goal 11 Make cities and human settlements inclusive, safe, resilient and sustainable; Goal 12 Ensure sustainable consumption and production patterns. For more details see: ***https://sdgs.un.org/2030agenda***.

The European Union has also been very active in safeguarding and enhancing Europe's cultural heritage resilience through a number of policies and programmes. In 2005 the European Union adopted the Council of Europe Framework Convention on the Value of Cultural Heritage for Society (Faro Convention, 2005), which highlights the need for greater citizen participation and the ability of local communities, citizens and civil society to respect, preserve, transmit and enrich cultural heritage. This culminated in the Resolution of the Council of 16 November 2007 on the adoption of a European Agenda for Culture that provides the framework for cooperation on culture at European level. In 2012 the consolidated version of the Lisbon Treaty of the European Union also states in the article 3.3 that the Union "shall respect its rich cultural and linguistic diversity, and shall ensure that Europe's cultural heritage is safeguarded and enhanced." [3]

Following the Council Conclusions of May 2014 that have defined cultural heritage as a strategic resource for a sustainable Europe, in 2017 the Council of Europe published the European Cultural Heritage Strategy for the 21st Century[4] proposing 32 recommendations to be implemented at national, regional and local levels to improve protection and valorisation of cultural heritage. In parallel, the Council and the European Parliament proclaimed 2018 European Year of Cultural Heritage and the same year published the Work Plan for Culture 2019-2022 which includes among its priorities "sustainability in cultural heritage" fostering as main topics: participatory governance, adaptation to climate change, quality principles for cultural heritage interventions as well as alternative funding for cultural heritage.

4. A cultural heritage scenario at the EU MODEX SICILY 2019 UCPM-funded exercise.

From an operational poin of view, in 2001 the European Union – through the Council Decision of 23 October 2001 – established a Community mechanism to facilitate reinforced cooperation in civil protection assistance interventions, including among its objectives also the protection of cultural heritage. This objective has been recast and confirmed in the subsequent decisions in particular by the Council Decision 2007/779/EC of 8 November 2007, by the Council Decision No. 1313/2013/EU of 17 December 2013, by the Decision (EU) 2019/420 of the European Parliament and of the Council of 13 March 2019 (EU) 2019/420 on a Union Civil Protection Mechanism (UCPM) and, more recently, by the Regulation (EU) 2021/836 of the European Parliament and of the Council of 20 May 2021 Amending the Council Decision No. 1313/2013/EU of 17 December 2013, on a Union Civil Protection Mechanism. In particular, this last Revision Decision states that the Commission shall focus primarily on the needs and interests of Member States facing disaster risks of similar nature, as well as on the need to strengthen the

[3] For more details see: ***https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A12007L%2FTXT***.

[4] The European Cultural Heritage Strategy for the 21st Century, results of sharing and co-operation strengthened over the last 40 years, is the very rationale of the Faro Framework Convention. For more details see: ***https://www.coe.int/en/web/culture-and-heritage/strategy-21***.

protection of biodiversity and cultural heritage. At the moment, the UCPM, by pooling together European civil protection capacities and capabilities and providing for common standards enabling certified and well-equipped teams to work interchangeably to deal with disasters[5], is an essential and effective system to allow a stronger and more coherent collective response and its commitment to include cultural heritage should be further enhanced at operational level. Operational needs have also been highlighted by the European Civil Protection Forum, celebrated in 2018, which in its final report in the third pillar related to "Scaling up prevention" mentions the importance of strengthening preparedness capacities, improving coordination at EU level and enhancing capacity building for better protection of cultural heritage.[6]

Following the main findings of the Civil Protection Forum, in 2019 the Evaluation Study of Definitions, Gaps and Costs of Response Capacities for the Union Civil Protection Mechanism emphasizes the need, which is likely to increase due to the growing risks determined by climate change, to define a module or other response capacity to protect cultural heritage.[7]

In 2020, the Council Conclusions on Risk Management in the Area of Cultural Heritage claimed for the protection of cultural heritage against various types of risks, also recognising the impact that the COVID-19 pandemic is having on cultural and creative sectors. In particular, the conclusions invite Member States to identify innovative tools and approaches for risk identification, prevention, and mitigation and to integrate cultural heritage into disaster risk policies and management plans from local to European level, establishing cross-sectoral cooperation and taking into account relevant provisions as defined by Decision No. 1313/2013/EU on a Union Civil Protection Mechanism.[8] In May 2021, the Commission Experts Working Group on Capacities has widely accepted the possibility to define a Cultural Heritage Protection capacity in the European Civil Protection Pool. The PROCULTHER project has been asked to provide the minimum requirements for its setting up.

On 21 June 2021, the Council of the European Union approved Conclusions welcoming the EU Concept on Cultural Heritage in Conflicts and Crises, which enhances the EU's approach to peace, security and development.

As operational activities, it is also worth mentioning that in 2008 the European Commission, the United Nations Development Group (UNDG) and the World Bank signed a Joint Declaration on Post-crisis Assessment and Recovery Planning for assessing, planning and mobilizing recovery support for countries and populations affected by disasters, and developed guidelines for the Post-Disaster Needs Assessments (PDNAs) aimed at encouraging the resilience of social systems to disasters, also including Culture as an intervention sector.

It is worth mentioning that currently the International Search and Rescue Advisory Group (INSARAG)[9] is also working on the inclusion of the protection of cultural heritage at risk of disaster within its operational guidelines.

This brief excursus shows how international frameworks are evolving to address a coordinated and sustainable protection and risk-oriented management of cultural heritage. Cross-sectoral

[5] For more details see: ***https://ec.europa.eu/echo/what/civil-protection/mechanism_en***.

[6] See ***https://ec.europa.eu/echo/system/files/2018-03/cpforum_2018_final_report.pdf***, p. 7.

[7] See ***https://ec.europa.eu/echo/system/files/2020-01/capacities_study_final_report_public.pdf***, p. 9.

[8] For more details see: ***https://www.europeansources.info/record/conclusions-on-risk-management-in-the-area-of-cultural-heritage/***.

[9] Within INSARAG a sub-flexible working group on the preservation of cultural heritage has been set-up for this purpose and the review of the operational guidelines should be published by the end of 2022.

cooperation among all the actors involved at each territorial level is key to reach an effective integrated disaster risk management system.

The following paragraph offers an overview on the actors and methods needed to achieve this objective.

5. Recovery of a painting by the firefighters after the fire in St Peter's Cathedral in Nantes (2000).

An overview of the main recent legal and operational frameworks including the protection of cultural heritage at risk of disaster at European and international level is provided in the following Table.

MAIN FRAMEWORKS	YEAR	DESCRIPTION	LINKS
COUNCIL DECISIONS	2013 2019 2021	Main Council Decisions including protection of biodiversity and cultural heritage at European level.	*https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D1313&from=EN* *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019D0420* *https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R0836&from=EN*
COUNCIL OF EUROPE FRAMEWORK CONVENTION ON THE VALUE OF CULTURAL HERITAGE FOR SOCIETY (FARO CONVENTION)	2005	The Convention highlights the need for greater citizen participation and the ability of local communities, citizens and civil society to respect, preserve, transmit and enrich cultural heritage.	*https://www.coe.int/en/web/culture-and-heritage/faro-convention*
RESOLUTION OF THE COUNCIL OF 16 NOVEMBER 2007	2007	Adoption of a European Agenda for Culture providing the framework for cooperation on culture at European level.	*https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007G1129(01)&from=EN*
LISBON TREATY OF THE EUROPEAN UNION	2009	Article 3.3 states that the Union "shall respect its rich cultural and linguistic diversity, and shall ensure that Europe's cultural heritage is safeguarded and enhanced."	*https://eur-lex.europa.eu/resource.html?uri=cellar:2bf140bf-a3f8-4ab2-b506-fd71826e6da6.0023.02/DOC_1&format=PDF*
COUNCIL CONCLUSIONS OF MAY 2014	2014	Cultural heritage as a strategic resource for a sustainable Europe.	*https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XG0614(08)&from=EN*

SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015-2030	2015	The SFDRR emphasises the importance of preventing new risks, reducing existing ones and strengthening the resilience of cultural heritage.	*https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf*
TRANSFORMING OUR WORLD: THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT	2015	United Nations integrates the protection of cultural heritage among the sustainable development goals.	*https://sdgs.un.org/2030agenda*
EUROPEAN CULTURAL HERITAGE STRATEGY FOR THE 21ST CENTURY	2017	32 recommendations to be implemented at national, regional and local levels to improve the protection of cultural heritage.	*https://www.coe.int/en/web/culture-and-heritage/strategy-21*
WORK PLAN FOR CULTURE 2019-2022	2019	The Work Plan includes among its priorities "sustainability in cultural heritage".	*https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018XG1221%2801%29*
EVALUATION STUDY OF DEFINITIONS, GAPS AND COSTS OF RESPONSE CAPACITIES FOR THE UNION CIVIL PROTECTION MECHANISM	2019	The Evaluation Study emphasizes the need to define a module or other response capacity to protect cultural heritage.	*https://ec.europa.eu/echo/system/files/2020-01/capacities_study_final_report_public.pdf*
COUNCIL CONCLUSIONS ON RISK MANAGEMENT IN THE AREA OF CULTURAL HERITAGE	2020	The Council Conclusions claimed for the protection of cultural heritage against various types of risks, also recognising the impact that the COVID-19 pandemic is having on cultural and creative sectors.	*https://www.consilium.europa.eu/media/44116/st08208-en20.pdf*
CONCLUSIONS WELCOMING THE EU CONCEPT ON CULTURAL HERITAGE IN CONFLICTS AND CRISES	2021	The Council reaffirms its support to the integration of international cultural relations in the EU's Foreign and Security Policy.	*https://data.consilium.europa.eu/doc/document/ST-9837-2021-INIT/en/pdf* *https://data.consilium.europa.eu/doc/document/ST-9962-2021-INIT/en/pdf*

A.2 Actors to Be Involved and Roles

The evolution of the international debate has progressively marked several milestones to provide a structured definition of holistic and inclusive actions aimed at strengthening cultural heritage resilience. These actions cannot be efficiently undertaken without the contribution of all the actors covering the disaster risk management phases. In fact, the protection of cultural heritage at risk of disaster implies a series of activities to be accomplished before, during and after disaster.

Prior to a disaster, preparedness activities should be undertaken to develop risk assessment, prevention, and mitigation measures to minimize the impact of hazards, as well as emergency preparedness capacities should be reinforced or developed and practised beforehand by involving all concerned actors. During a disaster, emergency response procedures to ensure the safety of people as well as of cultural heritage assets should be put in place and guaranteed by all the actors in charge. After a disaster, damage assessments and treatment of the damaged components of the affected cultural heritage should be undertaken to ensure the reduction of disaster risks in the future.

6. Participants in a field exercise at ICCROM's First Aid to Cultural Heritage in Times of Crisis (FAC) Course, 2019, held in Rome and Norcia (Italy).

All these activities should be focused on avoiding the possibility of crystallising old or potential new risks (approach of "Build Back Better", priority 4 of the SFDRR) and fostering a *continuum* of preparedness activities throughout disaster risk management processes to allow constant improvements in the sector. Therefore, among other assets crucial for the resilience and the sustainable development of society, the protection of cultural heritage at risk of disaster requires a clear identification of those actors operating in the emergency response phase, based on the responsibilities and competences established at each territorial level. Their involvement should be ensured in all disaster risk management phases and formalized with the actors responsible for cultural heritage. This approach has been already translated in the operational schemes of some EU Member States through the establishment of interdisciplinary working groups/teams, co-led by the Cultural Affairs Authority and Civil Protection/DRM Authority, to ensure the necessary assumption of responsibilities in the definition of coordinated and sustainable actions to increase the resilience of vulnerable communities. At the same time, the connection between the operational structures of the Cultural Affairs Authority and the other actors involved is es-

sential both at central and peripheral level. For this reason, their responsibilities should be mirrored at each territorial level.

The table below provides an outline of the main actors involved in the protection of cultural heritage at different territorial levels.

TERRITORIAL LEVEL	MAIN ACTORS (IN ALPHABETICAL ORDER)
INTERNATIONAL LEVEL	**As International/Intergovernmental organisms** Emergency Response Coordination Centre (ERCC)/Union Civil Protection Mechanism (UCPM) European Commission (DG-ECHO and DG-EAC) International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM) International Search and Rescue Advisory Group (INSARAG) ISPRA-JRC (Joint Research Centre) United Nations Educational, Scientific and Cultural Organization (UNESCO) United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) World Bank **As International Non-governmental organisations** Blue Shield International Institute of Contemporary Art (ICA) International Council of Museums (ICOM) International Council on Monuments and Sites (ICOMOS) International Scientific Committee on Risk Preparedness (ICORP) International Federation of Landscape Architects (IFLA).
NATIONAL LEVEL	Authorities in charge of Cultural Affairs Civil Protection Authority/Ministry of the Interior Defence/armed forces Inter-ministerial and ministerial coordination centres National agencies (meteorology, seismology) Civil society and non-governmental organizations (NGOs) Rescue services/National Fire Brigade Corps Research centres/Academics (institutes and research centres) Telecommunication operators.
REGIONAL LEVEL	Civil society and non-governmental organizations (NGOs) Professional organizations and associations Regional authorities in charge of Cultural Affairs Regional authorities representing the State, regional Civil Protection Authority, Regional operational centres Research institutes and Universities.

LOCAL LEVEL	Communities Local authorities in charge of Cultural Affairs, heads of cultural or religious institutions, curators/mediators (of museums) responsible for drawing up plans to safeguard cultural property, private owners Local authorities representing the State, mayors, civil protection committees Non-governmental organizations (NGOs), civil society organizations Professional organizations and associations Research institutes and Universities.

To increase disaster risk reduction capacities and allow an effective interdisciplinary collaboration of all the actors concerned, it is essential that each country provides for guidelines or memoranda of understanding to clarify who must intervene to guarantee the safety and management of cultural heritage in the event of an emergency. At a national level, this should be defined in ordinary time in agreement with each country's Cultural Affairs Authority and those responsible for disaster management (Civil Protection/Rescue Services/Ministry of the Interior/Ministry of Defence). The main areas to be considered for the formalization of joint activities should be established according to the determination of the types of risk (risk assessment) present on the territory, DRR oriented land use planning activities, emergency planning activities, procedures for alerting, emergency management and recovery phases and the identification of the subjects that must intervene, each within their own competence.

In other respects, if the coordination among all rescue and cultural heritage actors is crucial to achieve an effective protection of cultural heritage at risk of disaster, cultural heritage professionals and volunteers drawn from local communities also play a key role in emergency response operations dealing with cultural heritage. Therefore, their capacities should be enhanced to ensure effective disaster management operations. In parallel, the scientific-academic community and international organizations are also essential to the safeguard of movable, immovable and intangible cultural assets. Despite the differences – namely in terms of objectives, deployment rules, technical profiles and actions – their involvement can provide an essential auxiliary and technical support expanding the reach of governments during disasters. For this reason, they should be adequately identified and previously integrated into all domestic disaster risk management plans and their presence encouraged and sustained through a clear legal framework, *ad hoc* training and adequate benefits and recognition of the work delivered to vulnerable people as well as to prevent and reduce the risk of disasters.

Also, the involvement of expert volunteers can be useful for logistic purposes (setting up warehouses, packing and transporting movable assets to temporary warehouse, selecting cultural heritage rubble), as well as, in case of volunteers with specific expertise and accreditations (engineers, architects, conservators, restorers, archivists), for supporting assessment or rescue operations on movable cultural heritage or for identifying structural conditions of the affected immovable assets and implementing short-term countermeasures.

The involvement of these actors in cultural heritage emergency should be defined upon adequate certified training enabling them to con-

tribute to disaster risk management. Concerning volunteering associations, these should identify volunteers particularly interested in cultural heritage to be trained and skilled to provide auxiliary support during cultural heritage emergencies. Experts should be identified among technicians with a specific background and trained in courses such as that described in Part E.

At the same time, civil society and volunteering organizations can play an important role in defining and implementing context-based approaches, as well as in raising public and political awareness on the importance of protecting cultural heritage in emergency and supporting local authorities in developing cultural heritage emergency plans. In this sense, it is also worth mentioning that, as stated in many conventions (e.g., Faro Convention, the European Heritage Strategy for the 21st Century), the participation of citizens and communities is key to increase cultural heritage resilience, being crucial not only in terms of increasing good governance and accountability processes but also in terms of strengthening preparedness and coping capacities.

Universities and research centres will be actively involved as well by extending their scope of action in this field. Thanks to research programs, they can contribute to innovate and support the recovery of affected assets and/or the securing of cultural buildings. At the same time, they can collaborate with the competent institutions in developing training courses on specific techniques and methodologies to protect and recover vulnerable cultural heritage.

Reinforcing synergies among relevant actors can also be useful in the preparedness phase to guarantee a fruitful capitalisation of existing best practices and lessons learnt to fine-tune methodologies and standard operating procedures, allowing an adequate learning process at national and international level for better protecting cultural heritage in emergency.

CASE STUDY 1

STRENGTHENING COORDINATION CAPACITIES DURING AN EMERGENCY: SOME INSIGHTS FROM THE IZMIR EARTHQUAKE OF OCTOBER 30, 2020

GENERAL DATA	
Country	Turkey
Starting year	2020
Institutions/ actors involved	Ministry of Culture and Tourism (MoCT), Ministry of Environment and Urbanization, General Directorate of Cultural Heritage and Museum, AFAD, ICORP-Turkey

Partners	Middle East Technical University (METU) and Yildiz Technical University (YTÜ)
Description	Following the 2020 Seasam Island Earthquake of October 30th, the Ministry of Culture and Tourism-General Directorate of Cultural Heritage of Museums (GD) urgently asked its provincial offices to assess damages of cultural heritage assets. AFAD and ICORP Turkey established a Task Force to this purpose, also involving the Provincial Directorate of Culture and Tourism and the Municipality of İzmir. Site inspections at İzmir Centrum were organized to define the actions to be undertaken for the safeguarding of cultural heritage affected or at risk. This Case Study highlights the importance of reinforcing a formal institutional collaboration among all relevant actors involved in disaster risk management operations related to the protection of cultural heritage at risk of disaster.

7. Interinstitutional Task Force meeting after the site inspections at İzmir Centrum.

DETAILS	
Objective	Reinforce the coordination among the different actors involved in disaster risk management operations so as to guarantee an effective protection of cultural heritage at risk of disaster after the seism occurred on October 30, 2020 Seasam Island.
Achieved results	This experience has shown the importance of defining roles and functions before a disaster occurs. Thus, effective protection of cultural heritage at risk or damaged by the impact of the 30 October 2020 earthquake has been possible thanks to the activation and coordination of the actors concerned: AFAD, MoCT, ICOMOS-ICORP, GEA SAR, Universities METU and YTU and provincial/local public authorities.
Activities	Immediately after the earthquake, a series of meeting have been arranged among all the actors concerned to assess damage and define actions to promptly secure cultural heritage affected or at risk.
Observations	Strong points Insights for the elaboration of a damage assessment form were collected directly from a real field experience. Weak points Although disaster risk management operations have enabled effective protection of cultural heritage, further action is needed to establish an institutional framework that can cover the effective and sustainable involvement of the necessary actors.

A.3 Strengthening Governance on Cultural Heritage Protection

So far, a clear path has been traced on the methods and processes needed to efficiently protect cultural heritage at risk of disaster. Some areas are still uncovered and not fully incorporated at each national level, where many efforts should still be made to achieve an integrated, inclusive, and holistic approach. In particular, as already seen, a structured collaboration among cultural heritage and civil protection/disaster management actors has not been yet completely formalized at European level and in the policies of some EU Member States.

In order to allow the definition of management models that link short-term relief measures with longer-term development programmes, the institutional framework should clearly foresee who is to make the decisions in the event of a disaster or emergency, who is to ensure coordination between institutions, in what order and according to which chain of command who is in charge of defining "Build Back Better" processes in the aftermath of emergency.

The ability to make rapid decisions and to implement them quickly in the event of a disaster or emergency is of vital importance. The most important elements for an effective disaster management plan are the determination and written indications step-by-step of who is to do what, when and with whom, in all relevant institutions and organizations. Likewise, what needs to be done during the preparedness stage should also be defined, following the same principles. Coordinated risk assessments, based on comprehensive and heritage specific vulnerability and capacity analysis, should be carried out to draw a full picture of the context and avoid underestimating capacities and readiness of the concerned communities to deal with a major disaster. Scenarios should be prepared for all possible situations that may be encountered, and road maps detailing measures to be applied to reduce manageability, as well as any threats and weaknesses encountered in the scenario, should be prepared (Gündoğdu, 2014). For this reason, it is crucial to set up an effective risk governance specifically dedicated to cultural heritage, able to establish mechanisms, strategies, plans (including land use and urban planning), agreed with all the actors involved in all the disaster risk management phases based on adequate risk-informed processes, to guarantee appropriate financial and technical resources to ensure high level of compliance in a sustainable way.

Furthermore, in order to enable an effective and sustainable protection of cultural heritage at risk of disaster, these actions should also be synergistically combined and optimized at both European and international level.

Thanks to the experience of the several stakeholders involved in the implementation of the PROCULTHER project, this document offers some technical and operational insights related to specific preparedness measures needed to reinforce the governance in this sector. To en-

sure a comprehensive vision of the actions to be undertaken at each territorial level, recommendations on cultural heritage institutional strengthening will be addressed in Part G.

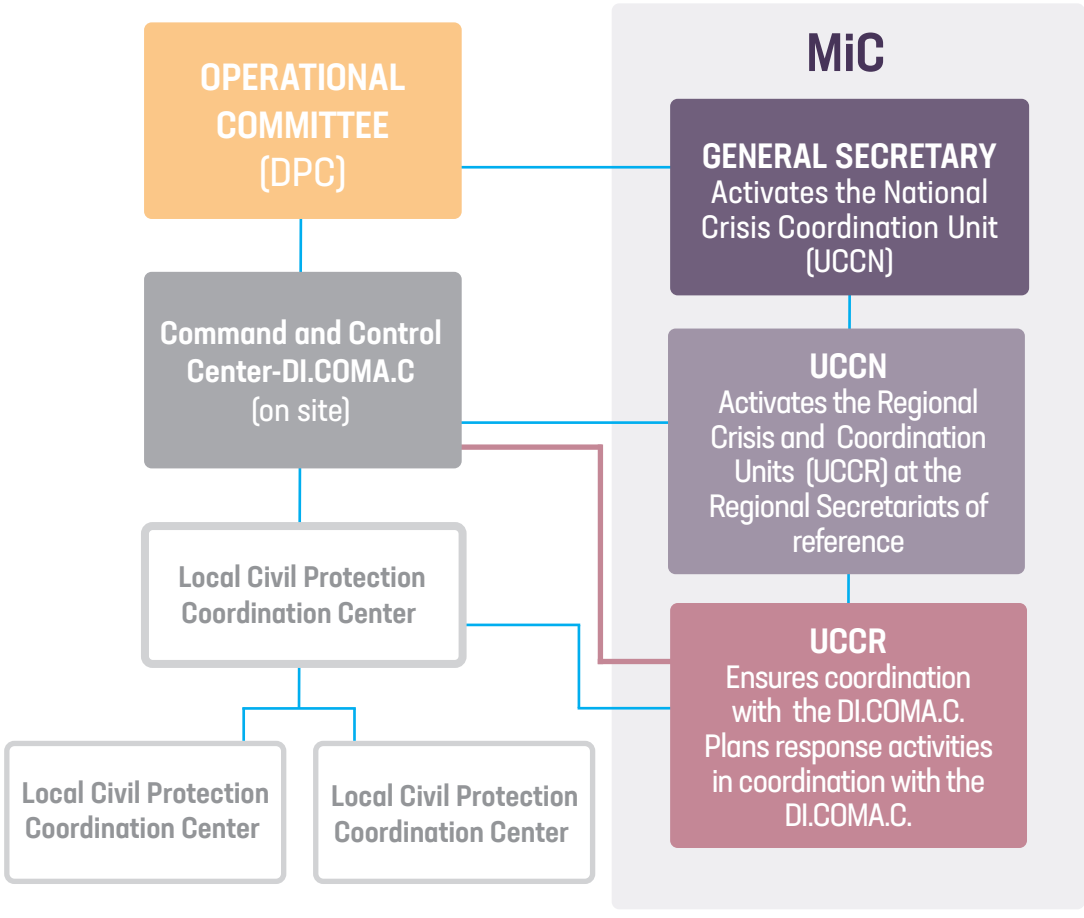
CASE STUDY 2

DIRECTIVE OF THE MINISTRY OF CULTURE OF 23 APRIL 2015 "PROCEDURES FOR THE MANAGEMENT OF ACTIVITIES FOR THE SAFEGUARDING AND PROTECTION OF CULTURAL HERITAGE IN THE EVENT OF EMERGENCIES DERIVING FROM NATURAL HAZARDS" AND ITS APPLICATION IN THE EVENT OF NATIONAL EMERGENCIES

GENERAL DATA	
Country	Italy
Starting year	2012
Institution involved	Ministry of Culture (MiC)
Partners	Italian Civil Protection Department, National Fire and Rescue Service, Regions, Italian Army, Carabinieri Command for the Protection of Cultural Heritage
Description	Italy's experience in the protection of cultural heritage assets at risk and the safeguarding of cultural heritage assets in emergency has been fundamental in the development of an *ad hoc* legal framework and procedures currently undergoing a constant updating process. In particular, the Ministry of Culture has developed a governance for the protection of cultural heritage, which is gradually becoming more detailed and complete. The Directive of 23 April 2015 "Procedures for the Management of Activities for the Safeguarding and Protection of Cultural Heritage in the Event of Emergencies Deriving from Natural Hazards" constitutes the point of arrival and integration of all previous experiences, but also the reference point for continuous updates and improvements. According to the MiC Directive, the National Coordination Unit (UCCN-MiC) coordinates the response activities of the crisis units at the regional level (UCCR-MiC) and supports the Secretary General of the MiC in ensuring the necessary coordination with the national institutions external to the Ministry, particularly with the other components and operational structures of the National Civil Protection Service.

Description	In the case of national emergencies, the deployment of all the components of the National Civil Protection System takes place under the coordination of the Department of Civil Protection. Since 2020, the Directive has been partially updated following the establishment of the General Directorate for Cultural Heritage Safeguarding, whose Director has assumed the role of co-ordinator of the UCCN. The UCCR-MiC comprises three operational units (Unit for the Cultural Heritage Damage Survey, Unit for Technical Coordination of Safety Measures, Unit for Temporary Storage and Emergency Intervention Laboratory on Movable Property). In the affected area, the UCCR ensures liaison with DI.COMA.C (National Emergency Command and Control Center) or with the higher-level Civil Protection Coordination Centre established on the territory, in order to define and implement a comprehensive plan of interventions aimed at the immediate assessment of damage to the cultural heritage, and the subsequent implementation of activities to secure the buildings and shelter of movable assets of cultural interest. These activities are carried out in collaboration with the territorial divisions of Civil Protection, National Fire and Rescue Service, Carabinieri Command for the Protection of Cultural Heritage, Italian Army, the scientific community and the civil protection volunteers specialised in safeguarding cultural heritage.
DETAILS	
Objectives	Minimize damage to cultural heritage through an effective management of the emergency phase, and the definition of a consistent intervention strategy. Guarantee the maximum timeliness and effectiveness of the actions aimed at safeguarding cultural heritage, operating in a synergistic and coordinated way with the branches of the Ministry and the Civil Protection Bodies.
Achieved results	The coordination network developed by the Civil Protection Department and the MiC, as well as the creation of a 'chain' of activities with precise indications of operational tasks, planning of human/financial resources and synergies with the other institutions involved, has granted the realization of numerous activities for the safeguarding of the affected heritage.
Activities	The activities implemented for the safeguarding of cultural heritage jointly coordinated by DI.COMA.C and MiC are:

Activities	1) Damage assessment to cultural heritage: • Management and training of the MiC emergency teams personnel • Planning of inspections according to operating regulations • Verification and digital archiving of the inspection documentation provided, according to shared scheduling tools. 2) Securing and safety interventions on movable and immovable cultural heritage. 3) Management of temporary deposits and rapid intervention laboratory on movable cultural heritage.
Observations	Strong points Italian cultural heritage is, among other things, extremely widespread throughout the country and often concentrated in smaller centres and peripheral aggregates that are difficult to reach by central administration bodies. The UCCN-UCCR binomial has allowed for stronger relations and constant updating with local communities. Weak points Currently, the information systems and ITC infrastructures available do not efficiently support a real-time and wide scale sharing of recording instruments and planning of activities.
AVAILABLE DOCUMENTATION	
Title	Directive 23 April 2015
Language	Italian
Author	MiC
Year	2015
Link	*https://storico.beniculturali.it/mibac/multimedia/MiBAC/documents/1437986288170_DIRETTIVA_23Aprile2015.pdf*



1. Central Italy earthquake 2016-2017. Coordination scheme in national-level emergencies

PART B

INCLUSION OF CULTURAL HERITAGE IN PLANNING PROCESSES

B.1 Disaster Risk Management Plans Focusing on Cultural Heritage Protection

The protection of cultural heritage from the consequences of disasters represents a great challenge in the disaster risk management planning sector. Even if a few good practices in this sense have been developed in some European countries, in many others, specific laws or recommendations related to the cultural heritage management in emergency do not exist yet or are not based on appropriate processes of law enforcement.

Heritage losses and damage negatively influence the communities' capacity to react and recover from disasters and, at the same time, their preservation and protection represents a strong means of resilience for vulnerable communities.

Dealing with disaster risk management, cultural heritage should receive the same attention and consideration of other critical and/or essential sectors and assets. Promoting its inclusion among disaster risk management issues would help to improve prevention, preparedness, response and recovery capacity at all levels.

To achieve the goal of integrating the protection of cultural heritage into emergency management, an effective coordination between disaster risk managers and cultural heritage actors should be put in place by a clear definition of roles and competences, actions, and measures to reduce the risk of disaster.

In this sense, the importance of developing cultural heritage emergency plans, specifically drafted and dedicated to the definition of actions and actors prepared to deal with cultural heritage at risk of disaster, should be clearly acknowledged. Such plans need to be adequately included into the general disaster risk management emergency plan, as a specific subsection dedicated to all aspects of cultural heritage safeguarding.

The cultural heritage sector plan

Planning does not only mean organizing the action of those who deal with the protection of cultural heritage in case of emergency: the sector plan related to cultural heritage is a tool that serves to develop, in ordinary time, risk awareness, to organize the pooling of resources, to build skills and professional competence, and to ensure the connection between different administrations, institutions, relevant stakeholders and communities. The plan therefore does not provide for a set of operational procedures for intervention but is also a useful tool to define the organization's structure, with the aim of improving the performance of disaster risk management activities: from forecasting to prevention and preparedness, from disaster management to recovery. Disaster risk management planning is a systemic activity, to be carried out jointly by the administrations and organizations dealing with cultural heritage protection, whether public or private and at each territorial level, and it should include the involvement of the local community in the whole process.

In the context of cultural heritage protection, this concept is particularly important because, the multiplicity of historical and artistic pre-existing assets present in a territory and the different responsibilities for each property must be identified and organized in order to provide an integrated and coordinated model of intervention.

10. The severe damages on the Kaya Çelebi Mosque after the 2011 earthquake in the Upper Bay of Bakracli.

For this reason, the sector plan on cultural heritage, which is an integrating part of the more wide-ranging Disaster Risk Management Plan, is designed to provide consistent and shared procedures and terminologies, although suitable for different local realities. The plan must be constantly updated and evolve in relation to the developing territorial planning and the variations in the expected scenarios. In addition, the plan must be flexible enough to adapt to different emergency situations, including unforeseen events.

One of the main challenges for the effectiveness of a Disaster Risk Management Plan is the lack of coordination between the cultural heritage site management system and the organizational set-up, policies, and procedures for disaster management in the municipality or region in which the property is located. In order to make a cultural heritage sector plan effective, it is crucial to ensure a continuous and constant coordination between the general Disaster Risk Management Plan itself (DRM Plan), which deals with all possi-

ble disaster risks existing in the territory, and the various emergency site plans of cultural heritage buildings (museums, libraries, monuments, etc.). Therefore, the two levels DRM Plan and Cultural Heritage-Site Security Plan (CH-Site Security Plan) should be integrated.

Ideally, the overall DRM Plan should include, among the other sectors dealing with emergency operations (for example health, functionality of essential services, population evacuation and transport), also a specific section dedicated to the disaster risk management of cultural heritage: the Disaster Risk Management–Cultural Heritage Sector Plan (DRM-CH Sector Plan), which should provide specific information about the identification of cultural heritage at risk and the measures to prevent or mitigate the consequences of disaster (see the outline in Chapter B.2). A few examples of DRM-CH Sector Plans can be found in Europe (e.g., *Piano Vesuvio* and *Campi Flegrei*[1], *Piano Arno*[2]), however a lot needs to be done yet.

Where a comprehensive CH-Site Security Plan is already in place for a particular heritage property, it should be updated in order to be integrated and connected with the DRM Plan and, in particular, with the DRM-CH Sector Plan. On the other hand, if a site management plan does not exist, the DRM Plan can stand alone but it must incorporate and test existing procedures for managing the site. In this sense, the formulation of a DRM Plan can also play a catalyst role to advance and prepare the site management plan so as to improve preparedness and response capacities in the specific site as well as in the wider context of the affected area.[3]

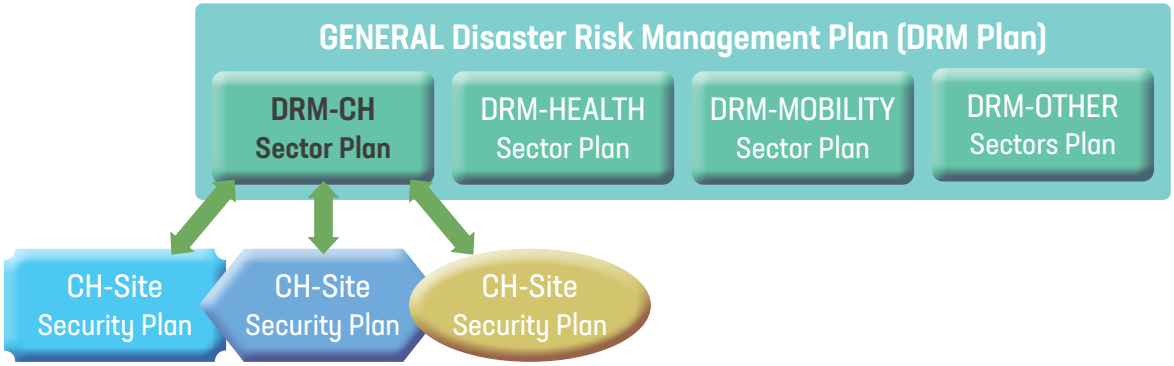
In this sense, a hierarchical interconnection should be respected among the existing plans. At local/regional/national level the structure of the DRM Plan should

11. Temporary protective covering of the Anime Sante Church (L'Aquila) hit by the 2009 earthquake.

[1] For more details see: ***https://www.protezionecivile.gov.it/it/normativa/direttiva-del-14-febbraio-2014-0*** and ***https://www.protezionecivile.gov.it/it/normativa/decreto-del-capo-dipartimento-del-2-febbraio-2015-0***.

[2] See Case Study n. 8, p. 82.

[3] UNESCO *et al.*, Managing Disaster Risks for World Heritage, 2010, p. 17. Also available on ***https://whc.unesco.org/en/managing-disaster-risks/***.



2. Interconnection among Disaster Risk Management Plan (DRM Plan), Risk Management-Cultural Heritage Sector Plan (DRM-CH Plan) and Cultural Heritage-Site Security Plans (CH-Site Security Plans)

include the DRM-CH Sector Plan whose operational elements will guide the definition of actions in this field at each territorial level. Specific cultural heritage site security plans should be coordinated with the DRM-CH Sector Plan and tested so as to be consistent with the actions undertaken at local/regional/national level.

12. The Italian Army recovering antique books damaged by the earthquake in Central Italy (2016).

B.2 Outline for the Elaboration of a DRM-CH Sector Plan

Main contents of the DRM-CH Sector Plan

As mentioned above, the overall Disaster Risk Management Plan of a specific territory (municipality or region) should contain a section dedicated to cultural heritage, that is what we call a DRM-CH Sector Plan.

The essential contents of a DRM-CH Sector Plan are listed below:

CHAPTERS	DESCRIPTION
1.0. INTRODUCTION	Purpose of the Sector Plan should be given as well as a brief presentation of the local territory and its historical and cultural heritage.
2.0. LEGAL FRAMEWORK	Existing regulatory frameworks on the safeguarding of cultural heritage from the national to the local level with a particular focus on functions and duties, as well as documents dealing with particular aspects of cultural heritage and regional regulations and norms may be included.
3.0. STAKEHOLDERS INVOLVED	A list of the structures, administrations, bodies, agencies, civil society organizations, companies concerned – and their responsibilities and roles – that ordinarily and in emergency deal with cultural heritage. An important role should be given to the local communities from the very beginning.
4.0. RISK ASSESSMENT	Brief description of the elements characterizing the morphology of the territory, weather-climate conditions, human settlements, cultural heritage assets exposed and infrastructural network. **4.1. Hazard profile** Main natural and man-made hazards and other threats concerning the specific area should be identified and described also by taking into account the main historical events occurred. **4.2. Identification of the cultural heritage prone to be affected** Scale, consistency and location of buildings/sites of historical and cultural relevance, including any tangible and intangible cultural assets, according to the identified risks.

4.0. RISK ASSESSMENT

4.3. Risk analysis

An assessment of the vulnerabilities that could increase the impact of hazards, the degree of exposure, the expected impact and the potential risk increase, as well as the capacities that could minimize them.

4.4. Cultural heritage priorities

Criteria to be used for prioritizing cultural heritage and a list, by order of priority, of tangible and intangible cultural heritage.

5.0. RISK MITIGATION

Structural and non-structural measures to mitigate the risk of disaster and priorities according to the duration of implementation, costs and resources available.

6.0. REGISTRATION AND CONTROL OF MEANS AND RESOURCES AVAILABLE

Catalogue of all those means and resources, including experts and specialized volunteers, to be used in emergency should be prepared and constantly updated. This should mainly consist of:

6.1. Basic cartographic references

Appropriate cartography prepared with the geolocation of each property and the description of any content.

6.2. Databases and digital archives

An organized set of data, and of measures to preserve digital archives of cultural heritage buildings and cultural objects.

6.3. Technologies

Any technology available for setting up the activities (computers, laptops, laser scanner, drones, etc.).

6.4. Materials

List of any material available for setting up the activities (material for securing cultural heritage, material for setting up temporary stores, material for packing cultural objects, etc.).

6.5. Means of transport

Any means of transport suitable or adaptable for the transport of cultural heritage objects or debris (vans, trucks, etc.).

6.6. Warehouses and storages

Identification of adequate spaces for stocking materials and recovering vulnerable or affected cultural heritage.

6.7. Cultural heritage experts

Updated list of experts to be involved in activities related to the protection of cultural heritage.

6.8. Specialized voluntary associations and experts in cultural heritage management

List of specialized voluntary associations and cultural heritage experts trained in cultural heritage safeguard and protection and their specific competence. The involvement of volunteers must not be limited to emergency events, but also to preparedness activities.

7.0. AGREEMENTS AND MEMORANDA OF UNDERSTANDING

Description of any agreement signed in ordinary time between national and/or local actors in support of the cultural heritage protection sector (including voluntary associations, private companies, etc.) or supply of materials, means, technology needed.

8.0. EMERGENCY RESPONSE ORGANIZATION

Description of actions dealing with cultural heritage during the different phases of intervention, paying particular attention to the organization of the disaster risk management structure, strategic elements and operational procedures to be adopted according to the existing risks.

8.1. Response structure

Description of the response structure adopted at all levels, the operational centres and the coordination and situation rooms activated.

8.2. Alert system

Description of the alert system adopted in the area.

8.3. Response actions

Actions to be implemented by the participating actors in the emergency management to face the event at the different local coordination levels.

8.3.1. Surveying the damage and securing immovable goods

Description of procedures and inclusion of tools for the assessment and prompt recognition of damage and needs for urgent interventions and measures, including on-site inspections.

8.3.2. Setting up of temporary storage areas

Identification of specific storage areas, warehouses and temporary storage rooms, suitable for the shelter of movable assets and pre-identified in peacetime, with environments designed to ensure maximum safety and protection. These areas/structures must be indicated in the basic cartographic plan of reference.

8.3.3. Surveying the damage and securing of the protection and safeguard of movable assets

Provision of methodologies to be implemented for the safety and protection of movable assets; the Administrations that are ordinarily responsible for individual assets and those that can/must intervene in the event of calamitous events will be indicated.

8.3.4. Handling and transport of movable heritage

Main methodologies and techniques for the transport of movable assets, including details related to the means provided for transport. Any agreement with transport companies or with volunteer associations should be listed.

8.3.5. Securing, management and handling of rubble of cultural interest

Specific procedures established for the selection and treatment of cultural heritage rubble, in agreement with the territorial authorities and administrations that ordinarily deal with cultural heritage. Possible dedicated areas for the storage of rubble should be indicated.

9.0. RECOVERY PHASE OR RETURN TO NORMALITY	Description of the means, timeframe and actors needed to address the gaps created by the disaster (including fundraising actions and insurance claims). The adoption of a people centred approach should ensure the development of adequate processes of 'Building Back Better' so as to reduce future risks and make the recovery intervention as sustainable as possible. This phase will last until the reestablishment of the minimum conditions essential for the return to normality of the affected area.
10.0. VERIFICATION AND UPDATE OF THE SECTOR PLAN	Assessment of the Plan's functional operability at the different local levels must be carried out with objective and replicable tools. A preliminary check of the Plan's effectiveness and adequacy must be carried out by applying a method of 'self-assessment' by the responsible body.
11.0. TRAINING PROGRAM	Focused on emergency management principles and cultural heritage issues, the training program should be addressed to all levels of governance, and to all potential actors involved in cultural heritage emergency activities.
12.0. ORGANIZATION OF EXERCISES	Description of exercise activities on cultural heritage aimed at assessing the validity of the DRM planning indications, so as to test the organizational and intervention models as well as to favour the dissemination of the Plan's contents to all the subjects involved.
13.0. COMMUNICATION OF THE PLAN	Provision of specific guidelines for sharing the Plan with those who ordinarily deal with the protection of cultural heritage, including the involvement of local communities.
14.0. ACRONYMS AND GLOSSARY	

CASE STUDY 3

INCLUDING THE PROTECTION OF CULTURAL HERITAGE AT RISK OF DISASTER IN DISASTER RISK REDUCTION PLANS AT PROVINCIAL LEVEL

GENERAL DATA	
Country	Turkey
Starting year	2019
Responsible institution	AFAD-Provincial directions
Partners	All local institutions and organizations involved in cultural heritage and disaster risk management actions
Description	As of 2019, AFAD has initiated a process for the development of local Disaster Risk Reduction Plans (IRAP, Turkish acronym) to reduce human and economic losses, including measures to protect cultural assets from disasters. Guidelines have been elaborated to support the definition of the objectives and actions to prevent and reduce the impact of natural and man-made hazards (earthquake, flood, mass movements, industrial accidents, etc.), as well as for the promotion of climate change adaptation actions.
DETAILS	
Objectives	Promote a better understanding of the existing risks and vulnerabilities at local level. Identify the risks cultural heritage is exposed to. Inform decision making processes on adequate measures to reduce the risk of disaster before, during and after the impact of natural and/or man-made hazards.
Achieved results	Currently, Disaster Risk Reduction Plans have been elaborated in 7 provinces selected as pilots in 2020.

Activities	Workshops and meetings are held by bringing together all stakeholders in the local area within the scope of ensuring a participatory approach for the definition of the Plan. During the workshops, institutions and organizations discuss actions in order to address multiple risks. Risk assessments are also made especially with regard to cultural heritage. SWOT analysis, disaster scenarios and definition of structural and non-structural measures are also carried out in the workshops. In addition to the above, precautionary recommendations regarding the measures to be taken for each scenario are provided. These proposals for measures are decided together with the participants and, if appropriate, converted into actions. The responsible and supporting institutions and the time frame for each action are determined. Based on each risk scenario, actors, methods and actions are defined to ensure a coordinated and effective emergency response. In order to ensure sustainable processes and to enable the widest participation of concerned communities, awareness-raising campaigns were conducted, especially in the context of strengthening the protection of cultural heritage.

13. Meeting of cultural heritage and disaster risk management experts to elaborate the IRAP (Local DRR Plan).

Observations	Strong points Definition of all disaster risks at local level. Identification of disaster risks to which cultural assets are exposed to, and plan of disaster risk reduction actions. Weak points In some provinces, personnel participation was low. In some provinces, the personnel of the Provincial Directorate of Culture did not participate in the process.
AVAILABLE DOCUMENTATION	
Title	*Kültür Varliklari Ve Miras Alanlarinin Korunmasi Kilavuzu* (Guidelines on the Protection of Cultural Heritage)
Language	Turkish
Author	Mehmet Akif ALKAN
Year	2021
Links	IRAP preparation guide: *https://irap.afad.gov.tr/* Guide to assess action for cultural heritage protection: *https://irap.afad.gov.tr/upload/Node/42062/files/KULTUR_VARLIKLARI_VE_MIRAS_ALANLARININ_KORUNMASI_KILAVUZU+3.pdf*


6

B.3 Cultural Heritage Site Security Plan

The increasing impact of disasters of all types has highlighted the complexity of intervention in cultural heritage sites and buildings and the need to draft new specific disaster risk management plans and to build capacities to deal with crises affecting cultural heritage.

To reduce risks and provide a rapid and adequate response to critical situations facing natural or man-made hazards, it is necessary to draw up specific site emergency plans for securing immovable and movable cultural assets. In accordance with the more general DRM Plan in place for the region or the inter-municipality territory, each cultural property and each building containing movable cultural assets needs a CH-Site Security Plan, including all the information and measures provided therein.

The drafting of this Plan involves all actors concerned in various ways in the safeguard process, in a framework of inter-institutional cooperation, in accordance with their respective competences.

The CH-Site Security Plan should be defined at each site level and interconnected with the DRM-CH Sector Plan in place, as already specified in Chapter B.1.

The Cultural Heritage-Site Security Plan, an operational tool for emergency situations

It must be stressed that the Cultural Heritage-Site Security Plan (CH-Site Security Plan) is a tool that does not replace the ordinary maintenance, verification and monitoring activities of the various security systems and devices with which cultural buildings and sites are normally equipped and not free of compliance from the specific regulations issued by the country concerned, especially those relating to the safety of places and people.

The CH-Site Security Plan, drawn up by the Head of the structure or by the person entrusted with this responsibility, with the support of all the actors involved, is an operational tool for assessing, planning, and monitoring actions and behaviours to be implemented in order to both prevent risks and avoid or minimise damages. The document should identify the priorities for action and operations to be implemented to ensure the stability of buildings and safety of cultural assets through protection *in situ* or evacuation to safe areas.

The CH-Site Security Plan must always be accessible and easily consultable by the emergency operators and must also contain the measures necessary to ensure the timely protection of people and cultural assets, in relation to the different and previous identified types of risk.

The risk analysis must be carried out on the basis of an in-depth knowledge of the structure, its background and organisational system, taking into account the features of the territory, the environmental context, the type of buildings and assets stored, type of emergency scenarios and external actors that could be involved in case of major disaster.

Initially, a risk assessment is conducted to identify the events feared and potential damage to cultural assets: heavy rain leading to floods, storms, fires, and earthquakes. It is then possible to assess the potential threats and response scale required.

The Plan must be considered as a flexible document, that can always be updated and modified according to the arising needs in time (e.g., expansion of sites, assets, internal moves, adaptation to specific regulations, etc.).

The drafting of this Plan could take several months before becoming fully acknowledged and available to its stakeholders and entails a suitable organization to allow their effective involvement. The first step is to identify all the people and services to be alerted and to clearly define each one's mission. People and services concerned must be trained and tested through regular exercises.

An exhaustive inventory of the assets to be protected is also needed. Priorities and methods of action are established, taking into account the value of cultural assets and also the logistical capacities to protect them (size of the assets, weight, fragility, state of conservation etc.). In case of emergency, not everything can be rescued, as for example, rather than moving a piece of artwork it is often better to leave it in its location and protect it *in situ*.

Logistical needs must be clearly established by taking into account both, the sites or areas where the artworks can be safely stored, determined according to the architectural features of the buildings, and the necessary equipment: clothing, lighting, cutting tools, transport, protection, exhaustion and drying. This special equipment should be wisely stored and checked periodically.

The result is a concise and pragmatic operational document that can be articulated in the form of scenarios; it is also preferable to include plans, diagrams, and photographs to facilitate understanding.

The key points to be included in the CH-Site Security Plan are the following:

1. Structure data sheet
2. Risk assessment
3. Analysis of the site's safety and its context
4. Site's cultural heritage assets analysis
5. Roles and responsibilities of the personnel/staff
6. Emergency scenarios and countermeasures
7. Linking-up with the local emergency plan
8. Training of the operators
9. Monitoring
10. Emergency Handbook/Vademecum.

1. Structure data sheet

This sheet must include general information about cultural sites and buildings. Namely, it should indicate its name, address, and geo-referencing data. In addition, it must list the staff and related contact details, with particular reference to those in positions of responsibility (e.g., Director, safety and emergency managers, emergency operators) and useful numbers in case of emergency. As the participants in the process could easily change, the contact list should be constantly reviewed and updated.

2. Risk assessment

With reference to the structure, context and organisation, the risk assessment concerns the identification of hazards, capacities, risks exposure, frequency, and vulnerability, in order to minimise the consequences caused by the occurrence of an event.

Risk must be considered in relation to the territory where the cultural asset is located. The coexistence of secondary risks should be always taken into account.

For quick reading and use, it may be useful to create charts and map legends as well as to adopt a standard priority system in relation to the type of risk considering the severity and probability of the disaster.

For reference only, the most common hazards are listed below:

- Fire/explosion and other man-made hazards
- Seismic
- Volcanic
- Floods/overflows
- Adverse weather events (e.g., storms, tornadoes, and lightning).

3. Analysis of the site's safety and its context

It considers the cultural site both in relation to the urban, rural or forest context in which it is located (connections, public infrastructures, relationship with neighbouring facilities, services, etc.) also taking into account its architectural and structural features and available technologies (dimensions, materials and construction characteristics, floor plans, accessibility, use of the site, artworks collections, offices, warehouses, electrical installations, fire extinguishing systems, thermal, air conditioning, sanitary and alarm systems, telephone line, emergency exit routes, state of maintenance, etc.).

4. Site's cultural heritage assets analysis

It describes the type, extent, and distribution of cultural assets on the site and provides relevant information about its conservation, hazard, vulnerability, and risk exposure. It also identifies the order of priority for securing assets in the event of an emergency.

For prioritisation purposes, the significance of tangible and intangible cultural assets has to be taken into account along with issues that can facilitate disaster risk management operations such as the weight, size, state of conservation and accessibility of the concerned assets.

Procedures for the movement and securing of cultural assets in temporary storages, or their possible protection *in situ*, must be identified in advance and established according to verified and tested methodologies.

5. Roles and responsibilities of the personnel/staff

It describes the structure's organisation with particular reference to those responsible for the site, safety and emergency. The tasks and activities of each person in charge and of the emergency staff (e.g., Director, security/emergency manager, emergency teams) should be listed here. In case of major events, the involvement of volunteers specialised and adequately trained in cultural heritage protection can also be envisaged to support securing activities.

6. Emergency scenarios and countermeasures

Here are identified the specific emergency scenarios, according to multiple hazards and vulnerabilities, and the effects they produce on people and cultural heritage, the possible damages, and the countermeasures to be undertaken to minimize the risk of disaster. The resources (human and instrumental) needed to deal with the emergency are also mentioned.

It is necessary to implement prevention, preparedness, and mitigation measures according to the risk expected.

The main **preparedness measures**, aimed at eliminating or reducing risks to the greatest possible extent, include:

- Optimal identification of space use in relation to possible risks and emergency procedures.
- Identification of cultural assets storage in sites equipped with appropriate security and air conditioning systems and located in non-risk areas (e.g., not flood-prone nor subject to collapse areas, etc.).

15. Participants setting up of a shoring structure in a cultural heritage scenario during ICCROM's FAC Course, 2019, held in Rome and Norcia (Italy).

- Adequate setting up of exhibition rooms (e.g., steady and safe display cases, etc.).
- Setting up of museum itineraries that ensure a sustainable flow of visitors, differentiated from that of internal staff.
- Space/rooms partitioning.
- Installation of alarm systems.
- Procurement of useful material for emergencies (e.g., material for artworks packaging, protecting them on site, personal protective equipment, tools, etc.). This material must be placed in an easily accessible place and periodically checked.
- Availability of communication tools (e.g., radio, telephone).
- Elaboration of specific operational procedures detailing the tasks and actions to be followed by each emergency operator when an event occurs.

The main **mitigation/prevention** measures aimed at reducing the effects of an event include:

- Reinforce building to reduce structural vulnerability.
- Improve the conditions of 'accessibility' of the property, as well as facilitate the possibility to extract and evacuate movable goods.
- Improve the capacity of the deposit areas to provide the safe and adequate recovery of movable goods/rubbles.
- Ensure that all procedures are established by law and that their functioning is constantly monitored and tested.

7. Linking-up with the local emergency plan

The CH-Site Security Plan must be closely linked to the local Disaster Risk Management Plan and included and tested in higher level emergency plans (e.g., in the municipal DRM Plan).

8. Training of the operators

It identifies specific training activities and refresher courses for security and emergency personnel. It also describes the periodic exercises to be carried out, aimed at improving response operations in case of events and assessing the effectiveness of the Plan.

9. Monitoring

It establishes the methods and frequency of monitoring the Plan in order to check its validity. The Plan is also updated in the event of changes occurring over time (e.g., changes in the use of the sites, changes in internal organisation, relocation of assets, adaptation of installations, etc.).

10. Emergency Handbook/Vademecum

The Emergency Handbook/Vademecum is a support tool to facilitate the reader's comprehension especially in case of an event. The production/distribution of this handbook should be considered a priority for the proper protection of the site. Therefore, this should be easily accessible and drawn up in a practical way, so that can be consulted by all the actors involved. A multi-risk approach should be guaranteed and its contents (e.g., plans, escape routes, storage areas, artworks to safeguard in priority, check lists, useful numbers, procedures by points, etc.) constantly monitored and regularly updated.

CASE STUDY 4

SAFEGUARDING PLAN FOR CULTURAL PROPERTY	
GENERAL DATA	
Country	France
Starting year	2016
Responsible actors	Cultural Heritage buildings Supervisors/Administrators
Partners	Fire Brigade Units Territorial Administrative Bodies *Centre de recherche et de restauration des Musées de France*

16. Firefighters in the Louvre Museum testing the Safeguarding Plan for Cultural Property.

Description	The safeguarding of cultural property requires, depending on the kinetics of the disaster, a structured and rapid intervention. The programme therefore consists in drawing up an operational plan for safeguarding museums and other cultural property. This document, can be immediately available to the staff and Fire Brigade operators in the event of a disaster. It has been drawn up under the direction of the site responsible, in consultation with the local emergency services. It provides an appropriate response to the various civil protection risks and enables works of art to be rapidly evacuated or protected on site according to pre-established priorities and procedures.
DETAILS	
Objectives	Be prepared to mobilize immediately all available resources to deal with a disaster: • Identify natural and technological risks • Define priorities for safeguarding cultural properties • Identify all the useful local actor • Buy the necessary emergency equipment • Define areas for emergency evacuation and treatment of works • Draw up plans to facilitate emergency response • Identify actors to be mobilized and facility/structure for setting up a local crisis unit.
Achieved results	About 30% of museums is provided with the safeguarding plan for cultural property.
Activities	The *Centre de recherche et de restauration des Musées de France* plans workshops every year in different regions to incentivate museums to draw up their Safeguarding Plan for cultural heritage assets. Local exercises are organized by the museums in conjunction with the fire department, in order to test the effectiveness of the emergency plans and to improve coordination.
Observations	Strong points Pragmatic emergency plan adapted to local risks, actors and means available. Identification of safeguarding priorities. Consultation with firefighters.

Observations	Weak points The implementation duration of the Safeguarding Plan is approximately one year. The relevance of the Safeguarding Plan requires constant updating with regard to the evolution of the permanent collections (works on display and works in storage) and temporary exhibitions.
AVAILABLE DOCUMENTATION	
Title	Safeguarding Plan for Cultural Property
Language	French
Author	Ministry of Culture/ General Director of Heritage
Year	2016
Links	*https://c2rmf.fr/sites/c2rmf/files/1_circulaire_mcc.pdf* *https://c2rmf.fr/le-plan-de-sauvegarde-des-biens-culturels*

CASE STUDY 5

CATHEDRALS SAFETY PLAN	
GENERAL DATA	
Country	France
Starting year	2019
Responsible institutions	French Ministry of Culture (General Direction of Heritage) and Regional Directions of Cultural Affairs

Partners	Clergy, Firefighters, National Museum Center
Description	The fire at Notre-Dame Cathedral left its mark and highlighted the fragility of this type of religious buildings. This is why the State, and more specifically the Ministry of Culture, has set up a national Safety Plan for the 89 religious buildings it owns. This Plan proposes a range of fire prevention and operational planning measures, in order to limit the risk of fire ignition and to reduce the severity of the consequences in the event of a disaster. Three levels of safety are identified as follows: a regulatory level, which ensures the safety of people, a reference level set up by the Ministry of Culture, which takes into account the safeguarding of cultural heritage property, a high level based on the redundancy of constructive and organisational measures. The implementation of this Plan is placed under the responsibility of the Regional Directorates of Cultural Affairs, local representatives of the Ministry.

17. St Peter's Cathedral in Nantes: a perfect scenario for a civil protection exercise.

DETAILS	
Objectives	Reduce the probability of a fire outbreak. Limit the development and spread of fire through construction measures. Facilitate the action of firefighters. Maintain privileged relations with the emergency services. Supervise the operating conditions, especially in the context of cultural activities. Reducing the consequences of a disaster, in particular by setting up a plan to safeguard cultural heritage property. Strengthen the training of stakeholders on fire safety issues. Put in place management and 'reporting' tools.
Achieved results	In June 2021, 70% of the cathedrals have reached the level of fire safety imposed by the regulations. 25% have reached the reference level requested by the Ministry of Culture (safeguarding of cultural property). The work to improve the level of safety will continue in the coming years.
Activities	Multi-year safety work plan, combined exercises with civil protection forces and bishopric representatives, stakeholders training, periodic inspections.
Observations	Strong points Global Safety Plan followed by the Ministry of Culture. This plan includes prevention, forecasting and intervention measures. Weak points High investment costs: in 2021, the economic recovery plan has estimated an investment of 80 million euros for the implementation of the Cathedrals Safety Plan.
AVAILABLE DOCUMENTATION	
Title	Cathedrals Safety Plan
Language	French

Authors	Ministry of Culture/General Director of Heritage
Year	2019
Link	*https://www.culture.gouv.fr/Sites-thematiques/Monuments-Sites/Ressources/Les-essentiels2/Plan-d-action-Securite-cathedrales*

CASE STUDY 6

PILOT PROJECT FOR THE PROTECTION OF CULTURAL HERITAGE FROM RURAL AREAS: THE PONFERRADA CULTURAL HERITAGE SAFEGUARDING PLAN

GENERAL DATA

Country	Spain
Starting year	2019
Responsible institution	*Junta de Castilla y León*
Partners	National University of Distance Education (UNED)-Campus de Ponferrada, City Council of Ponferrada, Fire Service of Ponferrada (SEPEIS), Bishopric of Astorga (León)
Description	The rural environment presents many challenges in terms of disaster risk management: among the most crucial are the distance to emergency services and problems of physical and digital connectivity, which also complicate the response of emergency services. The project aims at systematically integrating heritage conservation into disaster risk reduction processes by enabling prevention and mitigation solutions, the preparation of response teams, as well as the development of an effective response and the incorporation of all necessary documentation in case of an incident, including the prioritisation of movable heritage and the systematisation of its characteristics and evacuation requirements by means of a relevant summary sheet.

18. Church of Santo Tomás de Las Ollas (León, Spain) included in the CH Safeguard Plan.

DETAILS	
Objectives	Enabling a method to minimize the impact of hazards on cultural heritage elements located in the area that will serve as a pilot project to meet the needs of the rural environment. Reduce risks and improve coordination and effectiveness of disaster risk management operations, as well as address communication gaps – digital and telephone – that affected emergency response.
Achieved results	Thanks to the joint work of all those involved, the Ponferrada Cultural Heritage Safeguarding Plan has advanced in its implementation, enabling the Ponferrada firefighters to determine the flaws in the alarm systems, establish their own response operations, determine and locate the resources needed for their action. A set of information from which precise protocols are articulated has been defined reducing the response time and making disaster risk management operations more efficient.

Activities	In order to identify the hazards, establish the vulnerability and assess the level of risk of the cultural heritage involved in the Plan, an analysis of each area has been carried out, including the inspection of each building to establish its state of conservation. After this phase, the necessary prevention and mitigation measures were defined, as well as improvements in the facilities and structures of each building, aimed at solving the deficiencies detected (electrical systems, lightning rods, etc.). Roles, communications network, risk practices (storage of dangerous substances, candles, cleaning protocols, etc.) were also emphasized. At the same time, safe warehouses were identified in the event that goods had to be evacuated during an incident. IT technologies are incorporated to correct connectivity faults, promoting, through a network of sensors, the monitoring of parameters related to the conservation and the prevention of incidents such as fires and theft. The process will be complemented with training courses and action drills, essential to achieve a good coordination of all the actors, providing them with a common language and promoting an automatic response.
Observations	Strong points Involvement of the emergency services and assets. Weak points Given the lack of organizational structure in these heritage sites, operations are based on users and volunteers. A greater involvement of the owner and users would be needed.

CASE STUDY 7

PREVENTION AND ACTION PROTOCOLS OF THE SIEGA VERDE AND LAS MEDULAS ROCK STATION (UNESCO WORLD HERITAGE SITE) IN FOREST ENVIRONMENT AGAINST FIRES

GENERAL DATA

Country	Spain
Starting year	2017

Responsible institutions	*Junta de Castilla y León*: General Directorate of Cultural Heritage and General Directorate of Defense of the Natural Environment
Partners	Municipalities in the area, local development associations
Description	Major forest fires and their impact on cultural heritage is, as we are seeing in recent periods, a growing problem due to the effects of climate change. The assets exposed in forest environments constitute a whole composed of cultural heritage and natural heritage and it is within this relationship that they must be conserved. The destructive effects of flames affect all categories of heritage and are not taken into account when planning emergency actions in forest land that include its protection. Damages can be classified into three categories: • Direct damage (primary): damages caused by fire • Indirect damages (secondary): those that take place after the fire is extinguished due to the lack of protection of the land • Operational damages: those produced by the operation itself and the means in charge of the emergency resolution, such as the opening of firebreaks with heavy machinery that can knock down archaeological structures.

19. Damage assessment of archaeological sites and vernacular architecture after the Navalacruz forest fire (Ávila, Spain) in 2021.

DETAILS	
Objectives	Protect cultural heritage in forest environments against fires, increase public awareness through dissemination and advocacy activities.
Achieved results	Achieved knowledge to inform measures and decision for the protection of archaeological sites that are exposed to forest fires. Established measures for the protection of archaeological sites that are exposed by the loss of vegetation cover against despoilment by informing the Civil Guard (SEPRONA). Improved coordination of extinction services/cultural heritage in the world heritage sites.
Activities	Risk assessment through the history of fires in the area and the accumulation of combustible biomass found in the forest. Design of prevention strategies: clearing and fire breaks. Protocol activation in case of fire by the extinguishing services, incorporating a heritage technician in the Command Post, coordinating actions and avoiding causing operational damage. Follow-up of the fire through the georeferenced database of the community's heritage/European Forest Fire Information System (EFFIS). Damage assessment sheets that contemplate the undesirable effects of the fire in the short and medium term, establishing mitigation and recovery actions.
Observations	Strong points Address an issue that has been largely neglected in equity risk plans and raise awareness. Guide preventive measures of proven effectiveness. Rational use of georeferenced databases. Weak points Lack of awareness of the problem in emergency services and therefore difficulty to coordinate all the actors involved, especially in emergency. Cultural heritage is not yet considered as a 'critical infrastructure'. More efforts should be made to highlight the importance of establishing sectoral emergency plans dedicated to cultural heritage safeguard.

B.4 Key Operational Planning Elements

B.4.1 Brief overview of the risks affecting cultural heritage assets

The knowledge of the risks affecting a particular territory and of the existing monitoring and operational warning systems is of great importance for the safeguard of cultural heritage in emergency management. The activities to be organized in the area should be implemented taking into account these systems and the alert phases provided for each specific risk.

Some natural phenomena can in fact be predicted with accuracy and in advance, but many cannot be foreseen as they depend on various factors that are not entirely known which makes it very difficult to accurately predict where, when and with what intensity they will occur.

Therefore, the risks where precursor elements are monitored, such as for example the hydraulic/hydrogeological risk and the volcanic risk, allow for activities concerning cultural heritage safeguard to be planned in the pre-alarm phase, while the risks for which it is not possible to establish the exact time and place where the event will occur, such as the seismic risk, activities will be implemented only after the event has occurred.

20. Flash flood in the Monastery of Santa Maria de Huerta (Soria) in 2018.

In order to ensure effective and sustainable disaster risk management actions a 'multi-risk' approach should be adopted. This operation can be very complex. Furthermore, when assessing a risk, it is necessary to consider when the event occurred in terms of temporal succession, sometimes very close, as they depend on each other – the so-called 'cascade effects' – or because they are the effect of a common triggering cause. As per cascade effects, technological accidents are a frequent consequence: interruption of essential services, NBCR risk, etc.

In case of an event, it is necessary to immediately collect data/information on the type of event, its location, and the size of the area concerned and the quantity and type of cultural heritage present. With reference to the DRM-CH Sector Plan, the most likely disaster scenarios will be considered and the intervention methods provided will be implemented.

In case of an event, it is necessary to immediately collect data/information on the type of event, its location, and the size of the area concerned and the quantity and type of cultural heritage present. With reference to the DRM-CH Sector Plan, the most likely disaster scenarios will be considered and the intervention methods implemented.

The pre-alarm phase activities implemented for the protection of cultural heritage, include the

closure of visits and forbidden access to cultural heritage sites and monuments: it is important to secure the movable cultural assets and protect, as far as possible, the immovable cultural heritage assets. Given the uncertain duration of this phase, it is very important to have in place a list of intervention priorities.

During the subsequent alarm phase, the activities relating to the safeguard of cultural heritage may continue if deemed not to hinder those relating to the evacuation and safety of the population.

B.4.1.1 Hydrogeological and hydraulic risk

For this very complex type of risk, an alert system is generally available, at national and/or regional level, divided into the following phases:

1. A forecasting phase, which has the purpose of evaluating the expected situation, as well as the effects that this situation may cause.
2. A monitoring and surveillance phase, which aims to observe and follow the evolution of the current situation and the potential impacts on the territory.

The national and regional alert system is based on the forecast of rains and related phenomena such as landslides, floods, weather phenomena (snow, strong wind, etc.), as well as the effects that these phenomena determine on the territory. These phenomena generally cause damage to essential support services, as well as to cultural heritage exposed to hydrogeological and hydraulic risk.

The forecasting phase leads to the issue of uniform alert levels throughout the country and classified according to increasing severity levels (yellow, orange, and red alert).

The relationship between the levels of danger or risk, the alert levels, and the operational phases of the disaster risk management plans at the various territorial levels must be defined, also considering multi-risk contexts.

The issuance of alert levels by the local level allows for an effective activation of the DRM-CH Sector Plan and, where possible, activates the operational phase of pre-alarm in order to allow as much time as possible to the responsible body for cultural heritage at risk to implement actions aimed at safeguarding the assets in custody, envisaged by the aforementioned plans.

The alarm phase involves the adoption of concrete actions on assets exposed to hydro-geological and hydraulic risk.

PHENOMENA	ELEMENTS AT RISK	EXPECTED DAMAGE
FLOOD	**Buildings and properties containing cultural heritage/ archeological sites**	Damage from mild to severe up to partial or total collapse. Dragging or breaking of elements, undermining foundations by erosion, widespread leakage. Archeological sites: damage to structures protecting archaeological ruins (roofs, enclosures, etc.). Major damage to ornamental elements (more exposed than in a closed building), such as mural paintings/frescoes and plastering, mosaics, etc., which may even disappear. Particularly serious for ruins made of soil/ adobe.

FLOOD	**Roads, exit routes**	Possible interruptions due to flooding, collapse of road systems, mud and debris blockage, damage to bridge/ crossing infrastructure, damage to power, water and gas supply.
	Movable assets	Medium-serious damage to assets located in the basement and lower floors affected by the flood, also due to possible water pollution. Organic objects on the ground floor and in the basement will be affected.
MUDSLIDE (DEBRIS FLOW)	**Buildings and properties containing cultural heritage/ archeological sites**	Damage from mild to severe up to partial or total collapse of the structure. Partial collapse due to floating of heavy debris. Archaeological sites: the sediments deposited on the surface of the archaeological ruins and the retained humidity will cause damage in the short and medium term.
	Roads, exit routes	Possible interruptions due to debris and rubble, damage to crossing infrastructure and bridges, damage to road system.
	Movable assets	Possible damage and collapse. Mud deposits. Archeological sites: many elements will be lost due to the flooding, such as learning resources, signs, etc. used to facilitate visits and understanding.
LANDSLIDE	**Buildings and properties containing cultural heritage/ archeological sites**	Widespread damage to the structure, from mild to severe up to the partial or total collapse of the structure. Foundation slipping, collapse of walls. Archeological sites: they may be completely buried, collapsed or displaced. Protective structures will be damaged and may even cause problems for the ruins to be protected.
	Roads, exit routes	Possible interruptions due to debris and rubble, damage to crossing infrastructure and bridges, damage to road system.
	Movable assets	Possible damage and collapse, transported by landslide together with debris and rubble.

AVALANCHE	**Buildings and properties containing cultural heritage/ archeological sites**	Damage from mild to severe up to the partial or total collapse of the structure. Archeological sites: similar damage as those determined by floods and landslides.
AVALANCHE	**Roads, exit routes**	Possible interventions due to snow and rubble blockage, damage to crossing and bridge infrastructure.
	Movable assets	Possible damage and destruction. Burial of assets, wet objects.
TSUNAMI	**Buildings and properties containing cultural heritage/ archeological sites**	Damage from mild to severe up to partial or total collapse of the structure Archeological sites: similar to damage determined by floods and landslides.
	Roads, exit routes	Possible interruptions due to rubble and debris blockage, damage to crossing and bridge infrastructure, damage to road system.
	Movable assets	Possible damage and destruction, transported by the current.
HURRICANE/ TORNADO	**Buildings and properties containing cultural heritage/ archeological sites**	Damage from mild to severe up to the partial or total collapse of the structure (damage to the roofing, apertures and vertical structures – such as bell towers and towers – dragging of building parts). Archeological sites: modern structures for the protection of archaeological ruins are the ones that will be most affected.
	Roads, exit routes	Possible interruptions due to rubble and debris blockage, damage to crossing and bridge infrastructure, damage to road system.
	Movable assets	Movement, dragging and lifting the ground, destruction or severe damages.

B.4.1.2 Volcanic risk

A volcanic eruption looks like the succession of a series of different physical phenomena albeit closely connected, each of which contributes in a different way to the impact on the territory and on the cultural heritage therein.

The following table is a concise and simplified example of the expected volcanic phenomena and possible consequences.

Furthermore, also in this case the possible secondary effects on essential services, essential infrastructures, etc. should be take into account.

PHENOMENA	ELEMENTS AT RISK	EXPECTED DAMAGE
EARTHQUAKE	**Buildings and properties containing cultural heritage/ archeological sites**	Medium to severe damage and partial or total collapses.
	Roads, exit routes	Possible interruptions due to rubble and debris blockage from earthquake.
	Movable assets	Possible damage or destruction due to displacement, falling objects, rubble and building collapse.
ASH FALL AND BALLISTICS	**Buildings and properties containing cultural heritage/ archeological sites**	Widespread damage to the roofing of structures and collapses. Archeological sites: particularly critical for the protective structures of archaeological ruins (the ash can easily sink modern protective structures [canopies], direct impact on the archaeological ruins that can produce mechanical damages and chemical alterations depending on the composition of the ashes and the degree of environmental humidity/rain after the event).
	Roads, exit routes	Possible interruptions due to ash and ballistic blockage.
	Movable assets	Medium severe damage and possible destruction. Mechanical damages and chemical alterations depending on the composition of the ashes and the degree of environmental humidity/rain after the event.

PYROCLASTIC FLOWS	**Buildings and properties containing cultural heritage/ archeological sites**	Severe damage to structures, collapses and destruction. Archeological sites: due to the increased exposure of the archaeological ruins, severe alteration of the materials depending on the composition of the pyroclastic flows.
	Roads, exit routes	Interruptions due to obstruction from volcanic deposits even at high temperature.
	Movable assets	Destruction due to casting and fusion or melting.
LAHAR	**Buildings and properties containing cultural heritage/ archeological sites**	Widespread damage to openings and widespread collapse of structures.
	Roads, exit routes	Possible interruptions due to obstruction by debris and rubble.
	Movable assets	Possible damage and collapse.
LAVA FLOWS	**Buildings and properties containing cultural heritage/ archeological sites**	Collapse. Archeological sites: destruction or partial coverage of the archeological ruins.
	Roads, exit routes	Infrastructure failure due to collapse.
	Movable assets	Damage due to casting and fusion or melting.
FIRE	**Buildings and properties containing cultural heritage/ archeological sites**	Medium severe damage and partial or total collapses. Explosion, fusion or melting and structural damage. Archeological sites: physical-chemical transformations of the materials that make up the archaeological ruins.
	Roads, exit routes	Possible interruptions.
	Movable assets	Medium to severe damage and collapse, explosion, fusion or melting or structural damage of objects or physical-chemical transformations of the materials.

B.4.1.3 Fire or explosion risks

Regarding the effects of this type of risk, the consequences that fires have on the load-bearing structures of buildings are particularly relevant. The high increase in temperature in fact causes the degradation of building materials, the reduction of mechanical strength and substantial increase in thermal expansion. This combination of factors can lead to the collapse of the structure. Many cultural assets are located in vegetated areas with a limited number of both access and escape routes, a condition that must be taken into account both in the planning and emergency management phases.

21. UGRECYL technicians carrying out damage assessment in archaeological areas after forest fires.

As per the alert system the origin of the fire must be taken into account:

- In the case of forest fires or urban-rural interface, it is possible to have an early warning phase in which to ensure the safety of both movable and immovable assets or in any case actions aimed at reducing the possibility that the aforementioned areas are affected from events, such as patrolling the territory or preventive reinforcement of the local firefighting system.
- If it is a fire or explosion caused by flammable or dangerous materials, the pre-alarm phase may not be possible.
- It should be noted that the presence of forest fires or interface fires can cause damage to any structures present, not only by direct contact with the flame front but also by possible spotting phenomena which, under certain conditions, can carry embers and cause potential damage even several hundred or even thousands of meters from the flame front. The risk assessment and mitigation phase, supported by a forecasting phase and adequate communication, becomes essential for the protection of cultural assets and the safety of its users.
- Cultural assets in forest contexts such as historical sites, cultural landscapes, archaeological sites, ruins or especially rock art, are directly affected by high temperatures (including artefacts that are underground) causing alterations of materials, cracks and exfoliation. The products and by-products of combustion coat the materials, generating medium and long-term conservation problems. Coordination is essential, as the same extinguishing systems can cause damage (use of water for air, chemical retardants or fire openings). The assessment phase must take into account that the loss of surface vegetation will cause a significant amount of secondary damage (soil erosion, looting, etc.). As per the fire risk, secondary risks concern different forms of hydrogeological instability and the possible consequences on network systems such as water and gas systems, etc.

PHENOMENA	ELEMENTS AT RISK	EXPECTED DAMAGE
INTERFACE FIRE	**Buildings and properties containing cultural heritage/ archeological sites**	Moderately severe damage and partial or total collapses. Roof collapse, deformation of wooden, steel or concrete structures. Archeological sites: physical and chemical damage to the materials that make up the archaeological structures and elements. Total or partial damage of associated resources.
	Roads, exit routes	Possible interruptions due to flames and reduction of visibility due to smoke.
	Movable assets	Total or partial damage to organic substrates, physical and chemical transformation of inorganic materials, total or partial damage of support layers (e.g., preparations, paints, varnishes, etc.).
FOREST FIRE	**Buildings and properties containing cultural heritage/ archeological sites**	Widespread damage to roofing, materials, structures and collapses due to spotting phenomena. Archeological sites: physical and chemical damage to the materials that make up the archaeological structures and elements; total or partial damage of associated resources.
	Roads, exit routes	Possible interruptions due to presence of smoke.
	Movable assets	Possible damages due to spotting phenomena.
FIRE OF FLAMMABLE MATERIALS	**Buildings and properties containing cultural heritage/ archeological sites**	Widespread damage to roofing, structures and collapses.
	Roads, exit routes	Possible interruptions.
	Movable assets	Medium severe damage and possible destruction.

B.4.1.4 Seismic risk

As per the seismic risk there is no warning system, therefore the activities are carried out only in the alarm phase. An important feature to consider for this type of risk is the possibility of further subsequent seismic events (aftershocks) even with epicentres other than the first event and a seismic swarm. In seismic risk, the secondary risks generated by the earthquake can be: landslides, soil liquefaction, tsunami, breakdowns of network systems such as water and gas, collapse of essential service structures. Further events induced by earthquakes can be caused by the collapse of dams, damage to energy production plants, especially in case of the use of radioactive fuels, and by emissions deriving from explosions in industrial plants at significant risk due to the processing of hazardous materials.

PHENOMENA	ELEMENTS AT RISK	EXPECTED DAMAGE
EARTHQUAKE	**Buildings and properties containing cultural heritage/ archeological sites**	Moderately severe damage and partial or total collapses. Damage to structural and non-structural elements: cracks in the wall, façade disconnection, displacement of the roof and/or wall, wall bulging and wall bowing, liquefaction-induced settlement of foundation. Partial to total collapse: soft storey collapse, partial arch collapse and cracks in the vault, chimney or tower bell collapse and fall, collapse of surrounding tall elements.
	Roads, exit routes	Possible road closures due to rubble and debris blockage.
	Movable assets	Possible damage: fall of objects, collapse of shelves, breakage, deformation and abrasion of ceramic and other fragile objects.
FIRE	**Buildings and properties containing cultural heritage/ archeological sites**	Widespread damage to structures and collapses.
	Roads, exit routes	Possible blockage or road closures due to fallen burnt objects, trees, buildings.
	Movable assets	Moderately severe damage and possible destruction. Explosion, fusion or melting of objects according to the materials.

FLOOD	**Buildings and properties containing cultural heritage/ archeological sites**	Possible damage also to the electrical power supply.
	Roads, exit routes	Possible road closures due to flooding, collapse of road systems, mud and debris blockage, damage to bridge/ crossing infrastructure, damage to power, water and gas supply.
	Movable assets	Possible damage to assets located in the basement and lower floors affected by the flood, also due to possible water pollution. Organic objects on the ground floor and in the basement will be affected.
LANDSLIDE/ LIQUEFACTION	**Buildings and properties containing cultural heritage/ archeological sites**	Moderately severe and partial or total collapses.
	Roads, exit routes	Possible closures due to rubble and debris blockage, damage to crossing and bridge infrastructure, damage to road system.
	Movable assets	Possible damage and destruction, transported by landslide together with debris and rubble.
TSUNAMI	**Buildings and properties containing cultural heritage/ archeological sites**	Moderately severe damage.
	Roads, exit routes	Possible road closures or blockage due to rubble and debris blockage, damage to crossing and bridge infrastructure, damage to road system.
	Movable assets	Possible damage.

B.4.2 Early Warning Systems for the protection of cultural heritage

Early Warning System (EWS) is a complex process that involves a wide range of stakeholders. This complexity requires to build a collaborative project with a strong institutional capacity.

EWS are often based on interconnections between visual observations, past experience, and cooperation to mitigate losses from upcoming hazards.

An effective early warning system is based on the provision of timely and effective information, through identified institutions, allowing individuals exposed to hazard to take action to avoid or reduce the risk of danger and prepare for effective response.

As the definition 'early warning system' implies, an EWS is much more than just hazard forecasting in combination with a network ready to issue warnings and alerts to the public. For an early warning system to be effective, the inclusion and interaction between four key elements is crucial: risk knowledge, monitoring and warning services, dissemination and communication, and response capability.[4] Each part must operate efficiently for the system to be successful.

The EWS is a crucial element of DRR strategy and its functioning depends on the efficiency of the other strategy elements. It is the synergy among these that will provide the greatest protection for lives and cultural heritage.

A EWS, a system of systems, should centralize information, responses and warnings, of all hazards that are pertinent to a given level/scale paying special attention to resilience and vulnerability.

EWS CHART

The preservation of cultural heritage in case of naturally triggered disasters depends on or is closely connected to an effective EWS. In particular for floods, tsunami, hurricanes, volcanic and

3. Key elements of an early warning system

[4] United Nations Office for Disaster Risk Reduction – UNDRR, Terminology – Effective 'end-to-end' and 'people-centred' early warning systems. For more details see: ***https://www.undrr.org/terminology***.

wildfire events, the activities for the evacuation or the securing of cultural heritage assets, should be coordinated with the other activities foreseen by the DRM Plan. For this reason, it is important that a EWS establishes a specific stage for cultural heritage protection activities, according to the planned warning level.

The four EWS key elements are analysed below in relation to cultural heritage: how they can be fulfilled, the involved actors and the suggested tools.

Risk knowledge

Risk identification and assessment requires systematic data collection and analysis accounting for the dynamic nature of hazards and vulnerabilities.

Risk knowledge is defined as the interplay between establishing organisational arrangements, identifying natural hazards, community vulnerability assessments, risk assessments, and information storing and sharing.

RISK KNOWLEDGE: IDENTIFICATION OF HERITAGE VULNERABILITIES AND PRIORITIES

HOW	ACTORS	TOOLS
Identifying the priorities of the objects and properties to be safeguarded and knowledge of the heritage sites through existing databases and GIS.	DRM Management Authorities Culture Heritage Authorities	Databases on cultural heritage with prioritization
Improving the knowledge of hazards, in order to better anticipate risks, thanks to shared digital tools using geospatial information technology.	ERCC DRM Management Authorities National agencies (meteorology, seismology) Research institutes; Universities	Global Disaster Alert and Coordination System (GDACS)
Identifying new priorities according to their vulnerabilities with regard to each hazard or for combined hazards, thanks to the digital tools shared between the different actors.	ERCC DRM Management Authorities Culture Heritage Authorities National agencies (meteorology, seismology) Research institutes; Universities	Global Disaster Alert and Coordination System (GDACS) Copernicus Databases and interoperable data systems on cultural heritage and hazards at national level

Setting up a national database by collecting hazard-related information from national and regional authorities with digital applications. Using it at regional and national level to generate a national risk atlas for heritage assets from the maps of issues and hazards.	DRM Management Authorities Cultural Heritage Authorities Regional authorities in charge of Cultural Affairs and Civil Protection Heads of cultural or religious institutions Private owners	National risk atlas for heritage assets with maps of specific data and hazards
Increasing awareness and knowledge on the existing risks faced and improving the response capacity in the warning system framework.	DRM Management Authorities Culture Heritage Authorities	Training activities, Exercises, community risk awareness campaigns Media Social networks

Monitoring and warning service

Warning services lie at the core of the system. Warning services for different hazards should be coordinated, where possible, to gain the benefit of shared institutional, procedural and communication networks. Monitoring is the logical follow-up activity to keep updated on how those risks and vulnerabilities change through time.

MONITORING AND WARNING SERVICE: MECHANISMS FOR FORECASTING, DETECTION AND MONITORING OF HAZARDS AND THEIR IMPACT ON THE CH

HOW	ACTORS	TOOLS
Setting up multi-risk and multi-sectoral monitoring, forecasting and detection systems, with a participatory process involving all the actors concerned.	ERCC/ISPRA-JRC Civil Protection Authorities Culture Heritage Authorities Ministry of the Interior/Armed Forces National agencies (meteorology, seismology) Regional operational centers	EWS Copernicus European Flood Awareness System (EFAS) European Forest Fire Information System (EFFIS)

Comparing the evolution of the hazard (combined hazards) with digital simulation models, satellite monitoring, radars and analysis of feedback from the ground.	ERCC/ISPRA-JRC Civil Protection Authorities Culture Heritage Authorities Ministry of the Interior/Armed forces National agencies (meteorology, seismology) Regional operational centers Experts Research institutes	EWS Copernicus European Flood Awareness System (EFAS) European Forest Fire Information System (EFFIS)
Defining for every hazard the foreseeable damage to heritage property.	Civil Protection Authorities Culture Heritage Authorities Regional operational centers	National risk atlas for heritage assets with the maps of issues and hazards
Defining needs more precisely through on-site damage assessment.	International/National CH assessment module Civil Protection Authorities Culture Heritage Authorities Fire Department forces Non-governmental organizations (NGOs)	Geosatellite photo Manuals Digital tools
Defining actions to reduce damage to these properties. Elaborating preventive and restoring/ operational instructions for operators and various stakeholders.	Culture Heritage Authorities Research institutes; Universities	Manuals Digital tools
Automatic protection system for cultural heritage objects: for example mechanisms to raise a painting above flood level.	Civil Protection Authorities Culture Heritage Authorities Regional Authorities in charge of Cultural Affairs Research institutes; Universities Heads of cultural or religious institutions Fire Department Forces Private owners Associations	Automatic protection system

Response capability

It is essential that communities understand their risks, respect the warning service, and know how to react. Response capability can be enhanced either by increasing public and institutional preparedness, or by automating emergency responses. Preparedness and prompt responses can be additionally enhanced through drills and training, or by producing checklists of actions to undertake in certain situations. The response capability insists on each level, local, regional, national, and global level, aimed at a cross-synergy approach.

RESPONSE CAPABILITY: MEASURES TO REDUCE THE RISK OF DISASTER IN THE PRESENCE OF A HAZARDOUS EVENT-CONTINGENCY PLANNING

HOW	ACTORS	TOOLS
Elaborating a cultural heritage safeguarding plan for each remarkable heritage asset thanks to digital tools shared between the different actors.	Civil Protection Authorities Culture Heritage Authorities Regional Authorities in charge of Cultural Affairs Heads/directors/owners of cultural or religious assets	National directives CH Safeguarding Plan Digital Tools
Implementing specific site plans in order to facilitate the intervention for each remarkable heritage property thanks to operational/command centers.	Cultural Heritage Authorities Rescue/emergency services	Internal procedures
Building the capacities of the different actors at alert messages; Elaborating strategies to increase the response capacity through training, exercises, awareness campaigns for the general public.	Civil Protection Authorities Local Authorities Non-governmental organizations	Exercises Media Social networks
Defining an intervention protocol for the engagement of the UCPM driven module (Damage assessment and intervention modules).	European Commission (DG ECHO, DG Culture) ERCC	Protocol/Agreement
Defining a multi-annual financing plan and establishing the legal framework (commitment of responsibilities) through regulations and a European Directive.	European Commission Civil Protection Authorities Culture Heritage Authorities	
Taking into account lessons learnt as part of a continuous improvement process.	All actors	Debriefing

Dissemination and communication

The spreading of intelligible warnings and preparedness information to those at risk of disaster boosts the dissemination and communication process.

This component of EWS can be seen as the ensemble of risk communication infrastructure (reliable and disaster-resistant hardware, information, and communication technologies) and strategies (appropriate interactions among main stakeholders, effective and customised warning messages).

DISSEMINATION AND COMMUNICATION OF ACCURATE, PRACTICAL AND TARGETED RELIABLE WARNINGS ON ONE OR MORE EVOLVING HAZARDS BY THE AUTHORITIES

HOW	ACTORS	TOOLS
A multi-hazard and multi-sectoral early warning system with the involvement of all actors.	European Commission DRM Authorities Cultural Heritage Authorities	
Involving all the stakeholders in setting up an operational, simple, scalable multi-hazard early warning system and making aware them on the use of all the new communication vectors (SMS, social networks, visual alarms in public places, etc.). Rapid data sharing between the various stakeholders in Open Source.	European Commission DRM Authorities Cultural Heritage Authorities Telecommunication operators	National Alert System
Alerting the authorities, emergency services, media and necessary resources, with the dissemination of instructions and preventive measures updated according to the evolution of the hazard(s).	ERCC DRM National Operational Centre National agencies Regional operational centres	National Alert System
Alerting operators and issuing preventive and corrective instructions.	ERCC DRM National Operational Centre National agencies Regional operational centres	Emergency Warning System
Informing and preparing the reference communities.	DRM authorities	Risk awareness campaign Media Social networks

CASE STUDY 8

ALERTING SYSTEM FOR SECURING THE CITY OF FLORENCE'S CULTURAL ASSETS IN THE FLOODING EVENT OF THE ARNO RIVER

GENERAL DATA	
Country	Italy
Starting year	2007
Responsible institutions	Prefecture of Florence, Tuscany Region, Province of Florence, Municipality of Florence, Regional Directorate for Cultural and Landscape Heritage of Tuscany, Arno River Basin Authority
Partner	Subjects and bodies owning or managing cultural goods
Description	The presence of the Arno River in the urban area of the historic centre of Florence exposes the city's cultural heritage to the flood risk. Since the dramatic events of the 1966 flood, several activities have been carried out to ensure the safety of the territory and cultural heritage. In particular, a shared action strategy has been elaborated to safeguard the cultural heritage in case of flooding of the river Arno.
DETAILS	
Objectives	Set up suitable conditions to adequately and effectively safeguard the extraordinary cultural heritage at risk in the event of flooding of the River Arno. Define priority actions to optimise early prevention measures, establish the procedures for the alert, pre-alarm and alarm phases, guarantee a shared warning and communication methodology and promote a coordinated and integrated system of liaison between the institutions, managing bodies and/or owners of buildings containing cultural assets of historical, artistic and religious value.
Achieved results	Adoption of a preventive, coordinated and shared methodology in response to the hydrogeological risk, in accordance with national and regional regulations on civil protection activities aimed at protecting the cultural heritage of Florence in the event of flooding of the River Arno.

Activities	The work began in February 2007 with a census of the cultural assets located in museums, churches, libraries and deposits in the historic centre of Florence, within the perimeter of the hydraulic hazard area. According to the assessments of the Basin Authority, a survey of cultural heritage properties located in potentially floodable areas was carried out, acquiring the following data: quantity, location, mode of possible transport (teams and time). The information collected was incorporated into a single database shared and usable by all the bodies involved in disaster risk management. A total of 177 properties were monitored (belonging to a total of 25 bodies), which were then reported by the Basin Authority in a georeferenced map indicating their different vulnerabilities. The Prefecture, in cooperation with the National Fire and Rescue Service, the Municipality of Florence and the Province of Florence, provided support to the owners of the buildings surveyed, where necessary, by drawing up plans to secure their property or setting up structural passive defence works for buildings identified as vulnerable. In November 2020, the Protocol for securing Florence's cultural assets in the event of flooding of the Arno River was updated, taking on the title of Alerting System for Securing Florence's Cultural Assets in the Event of Flooding of the Arno River. The new System involves the owners or holders of cultural assets belonging to the State, Regional, Metropolitan City and Municipal Administrations, and identifies three critical moments according to which the timing and actions of the interventions are established: "alert", "early warning" and "alarm". The parties updated their internal emergency plans with the aim for the individual entities to put in place all the measures and strategies necessary to adequately and independently safeguard cultural heritage. Within each structure, a safety contact person was identified, acting as an emergency coordinator, the recipient of warning communications ready to call in the previously identified and specifically trained volunteer teams. Taking a proactive approach, a Coordination Committee was set up at the Prefecture of Florence in order to initiate the exchange of information between its members before the issuing of warning notices. This technical body also played a coordinating role between all the signatory bodies so that, prior to the expected flooding of the river, those responsible for the individual vulnerable buildings were able to implement the most appropriate measures to safeguard their cultural assets. In addition, a Coordination Table was set up at the Prefecture of Florence, with the role of linking and coordinating the analysis, updating and monitoring the procedures and contents of the Protocol. Finally, in order to improve and ensure the most timely and effective implementation of actions aimed at securing the cultural heritage, an experimental database was created for the most vulnerable sites identified according to the expected level of flooding, containing the main information useful for the management of emergency situations.

22. Georeferenced system to identify vulnerable areas in support of the Florence flood alert system.

Observations	Strong points Improving interventions to safeguard cultural heritage. Weak points Difficulties in coordination due to the number of actors involved.
AVAILABLE DOCUMENTATION	
Title	*Messa in sicurezza dei beni culturali fiorentini in caso di esondazione del fiume Arno*
Language	Italian
Authors	Institutions and managing bodies
Year	2007
Links	*www.adbarno.it/beniculturali/cartografia.php* *http://met.cittametropolitana.fi.it/public/misc/20201126115538099.pdf*

B.4.3 Define priorities for protection/ extraction/removal of cultural heritage at risk

Actions to be implemented for the purpose of securing the assets exposed to the danger of damage or loss, whether it is handling or protecting on site, must be as far as possible designed and planned in advance, through the definition of actions, resources and time presumably needed. To this regard, it is important to remember that the internal safety plans of the individual buildings containing cultural heritage should always include a definition of intervention priorities of the assets.

Yet in order to ensure a timely and coordinated response in terms of disaster risk management, this is not enough. It is crucial to plan any interventions taking into account the general context and the resources and means available in the affected area, establishing in what order and according to what priorities to proceed for evacuating or protecting *in situ* the existing assets.

These priorities must be identified by the responsible body in charge of coordinating the response, in agreement with the responsible authority for the protection of cultural heritage and the administrations in charge of local jurisdiction in the field of civil protection and cultural heritage and their definition and adoption should be agreed with the communities of reference. Prioritisation should focus on the significance of the cultural asset in order to make reasoned, verifiable and, as far as possible, objective statements about its value, with a multidisciplinary approach and based on the consensus of each party involved, with respect to all aspects, values and attributes of the cultural asset.

Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places, and related objects. Places may represent a broad range of values for different individuals or groups.

The so-called 'prioritization' of assets is determined by numerous factors, partly objective, partly dictated by the contingent emergency. According to ICOMOS (Burra Charter, 2013) this can be defined as the aesthetic, historic, scientific, social or spiritual value for past, present or future generations.[5] Some cultural prioritization

23. Just in front of the Cathedral's monumental door, the teams coordinate for the activation of the fire extinguishing robot inside the monument.

[5] Australia ICOMOS. 2013a. The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance. Burwood: Australia ICOMOS. ***http://australia.icomos.org/wp-content/uploads/The-Burra-Charter-2013-Adopted-31.10.2013.pdf***.

criteria can be recognized for their intrinsic significance by the responsible authority for cultural heritage protection and often formalized through a legal bond or by registering the asset/property in dedicated lists. Nevertheless, the significance of the asset should mostly be recognized by the community to which it belongs. In particular, any objects, works, goods connected to uses, customs and popular traditions, secular or religious celebrations can be prioritized to preserve the identity and customs of the community.

There are further factors that contribute to the prioritization of assets and which are strongly linked to the specific emergency situation. Among these, the needs dictated by the emergency in progress that must have prior consideration are:

RISK OF PUBLIC SAFETY	For example, the imminent collapse of an asset on a house or on a public passage) which is an absolute priority in emergency management.
RISK CONDITIONS OF CULTURAL BUILDING/ASSET	Partial or total collapses, exposure to theft and vandalism, exposure to conditions of 'accessibility' of the property, which could be compromised due to the emergency and therefore lead to preparatory actions (clearing of paths and accesses to the property, lifting rubble, etc.).
CAPACITY AND COMPLEXITY OF THE INTERVENTION	Available means, materials and tools, as well as of highly specialized personnel.
STORAGE CAPACITY OF GOODS	Immediate availability of spaces, possibly near the area of origin of the goods, to be used as temporary storage areas.
INSURANCE VALUE	Available information, for example, in the Facility Report drafted on the occasion of artwork loans.

In conclusion, the successful management of the interventions will be conditioned by the clear definition of the intervention priorities and therefore a careful and thoughtful evaluation of the factors that can contribute to this choice.

B.4.4 Identification and organization of storage

Emergency planning for the protection of cultural heritage essentially requires the identification of storage areas, warehouses and temporary storage rooms suitable for the shelter of mobile works of art, equipped with environments capable of guaranteeing maximum safety, if possible, of air conditioning and anti-theft systems with active and passive external protections, as well as adequate supervision. The security depots of movable goods will also have to be equipped with restoration laboratories in order to be able to carry out timely safety operations on recovered goods after the occurrence of a calamitous event.

The storage areas must be located in safe environments with respect to the type of calamitous events affecting the area. Such areas should be identified according to the following characteristics:

MAIN CRITERIA FOR THE IDENTIFICATION OF TEMPORARY STORAGE AREAS

THE LOCATIONS IDENTIFIED FOR THE TEMPORARY STORAGES/WAREHOUSES TO STORE CULTURAL HERITAGE ASSETS MUST BE:

- Safe from a hydro-geological and seismic point of view and far from possible volcanic eruptions.
- if identified in the course of an emergency, they must be located outside the area affected by the event but not too far away from it in order to be easily accessible.
- Near safely operating road infrastructure, in order to be easily reachable by vehicles and heavy means of transport.
- Independent from other properties, for management without external interference.
- Capable of containing cultural assets of all types and size.

SAFETY AND OPERABILITY REQUIREMENTS

THE FOLLOWING SAFETY REQUIREMENTS MUST BE MET:

- Seismic safety, in order to guarantee operability also in case of further calamity events.
- Human safety and protection, by setting up effective physical barriers.
- Video surveillance systems and intrusion alarms must be provided.
- Fire safety precautions and systems in case of fire.

THE FOLLOWING OPERABILITY REQUIREMENTS MUST BE MET:

- Building with a preferably horizontal layout.
- Suitably sized electrical system.
- Heating / conditioning and / or air treatment system designed to ensure the microclimatic parameters functional to the different intended use of the storage areas.
- Telephone system and data transmission (including wireless).
- Water-sanitary system.
- Internal handling system.

SETTING UP OF TEMPORARY STORAGE AREAS

FOR THE PREPARATION OF THE STORAGE AREAS THE FOLLOWING REQUIREMENTS SHOULD BE MET:

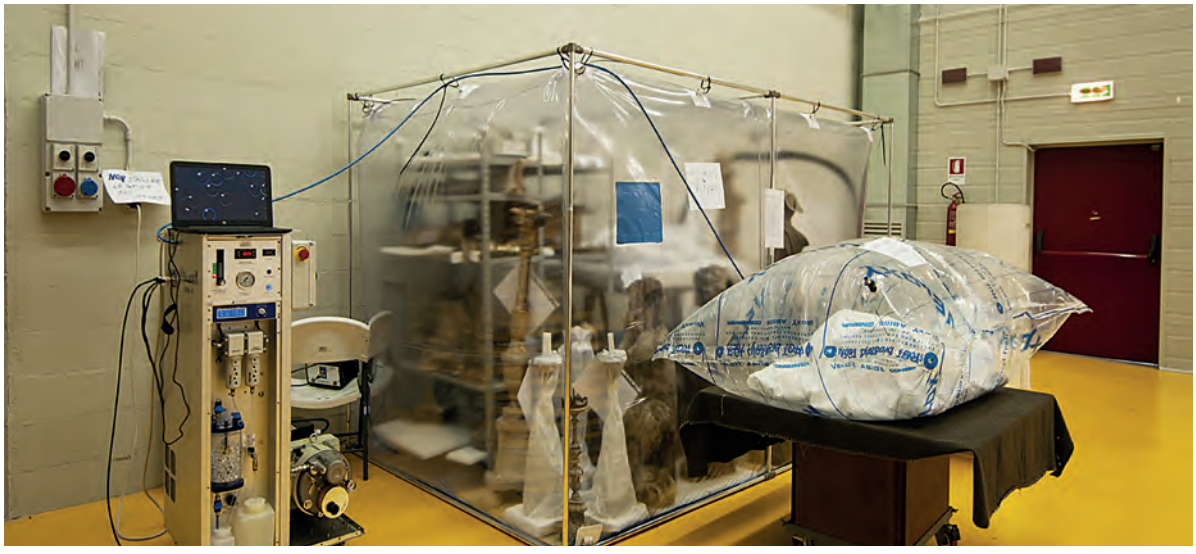
Provide spaces with modular and scalable structures capable of containing and supporting all types of works (eg tube-joint boxes, shelving, racks, stretchers, rollers, drawer units, pallets).

Guarantee an internal road system that allows the safe handling of the products and operators.

Provide clear signs that enable operators to know their position and that of the works within the warehouse with clarity and immediacy.

Draw up a map of the warehouse structure, with an indication of the functional areas and the storage areas and sectors, to facilitate the proper management of the recovered cultural heritage.

Include in the temporary warehouse/storage the following areas:
- outdoor access area
- reception area
- area for unloading / loading of goods
- storage area
- office area, technical rooms
- toilets and changing rooms
- safety and restoration laboratory area, equipped with compartmentalized areas for specific risk activities (e.g., biocide treatments or progressive reduction of relative humidity in wet works; nebulization of volatile substances; storage of high-risk products; storage of waste pending separate disposal)
- Possible areas for temporary exhibitions, guest quarters, teaching rooms.



24. Anoxic chamber for the disinfestation of wooden artifacts in the Santo Chiodo Depot, Spoleto.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PART C

COORDINATION STRUCTURE AND SUPPORTING TEAM

C.1 Managing a Cultural Heritage Emergency

Part C provides a general introduction to the management methods of any emergency event involving cultural heritage. As already indicated in the previous Parts, the protection of cultural heritage is closely linked to the possibility of setting up teams able to manage the different challenges imposed by disaster management in this field. In this sense, based on the experience gained by the PROCULTHER partners, two possible schemes and operational methods have been proposed:

- Activation of a Safeguarding Cultural Heritage Cell as a coordination structure able to manage the disaster risk management activities necessary to safeguard cultural heritage. This operational scheme is mainly aimed at strengthening technical and operational capacities at national and local level.
- Creation of specialised teams to be deployed in support of or in the implementation of activities related to the protection of cultural heritage. This focuses in particular on the quality and interoperability standards foreseen in the UCPM framework to provide effective support in dealing with risks and disasters.

27. Briefing of the Safeguarding Cultural Heritage Cell during the EXE FLEGREI 2019 full-scale exercise.


PARIS

C.2 Coordination Structure's Activities and Procedures

Cluster systems have been developed at international level and replicated by many countries at national level in the form of cells or operational functions with the aim to guide preparedness, response, and early recovery actions in areas such as health, food security, education, water, and sanitation, etc.

At the country level, clusters ensure that the activities of partners are coordinated and harmonized. As far as possible, clusters should mirror national response structures and use terminology that is similar or identical to that of the national sectors, and be co-chaired by Government representatives. Where required, country-level clusters can be established at the onset of a disaster and may or may not remain following the initial phases of response based on in-country assessment of continued need.[1]

These structures are conceived as a coordination system based on a series of objectives and are aimed at identifying and implementing operational responses to the various needs that arise during an emergency.

All ordinarily competent responsible subjects adequately prepared through specific training programmes contribute to the implementation of activities by the cell. These subjects carry out specific activities according to their institutional competences and on the basis of any agreement or understanding.

Since specific expertise is required to intervene in cultural heritage protection, the definition of a cell is crucial to coordinate operations related to the safeguard of cultural heritage in emergency, ensuring the necessary interdisciplinary and intersectoral coordination, as well as the involvement of all relevant actors, including local communities.

However, only a few countries have integrated a specific cell dedicated to cultural heritage[2] in their coordination structure. In order to better face emergencies which could affect cultural heritage, the PROCULTHER project proposes the inclusion of a Safeguarding Cultural Heritage Cell (CH Cell), co-led by cultural heritage and disaster risk management institutions, able to ensure an effective management and protection of cultural heritage at risk of disaster.

The CH Cell should be conceived to provide the liaison and connection between the coordination centre for the management of the emergency and the structures of the competent administration for cultural heritage both at the central and local levels, for census activities, damage relief, securing cultural buildings and assets and possible removal and relocation of the cultural assets present in the stricken area.

In order to guarantee effectiveness and efficiency in the safeguard of cultural heritage assets in case of calamitous events, the Cultural

[1] For more details, see: ***https://sheltercluster.s3.eu-central-1.amazonaws.com/public/docs/cluster_coordination_reference_module_2015_final.pdf***.

[2] Italy has gained experience in this field due to the activation of a dedicated "cultural heritage cell" within the National Emergency Command and Control Center (DI.COMA.C) which coordinates the emergency activities in the affected area, both in the Abruzzo earthquake in 2009 and then in Central Italy earthquake in 2016-17.

Heritage Authority in coordination with the Disaster Risk Management Authority should specify procedures for the management of activities, in synergy with all the actors involved in the protection of cultural heritage in emergency, as specified in Chapter A.2.

The level of cooperation between institutions is directly related to the disaster risk management processes that have been created and agreed upon at international/national level. In this respect, it is of utmost importance to appropriately and compatibly include the protection of cultural heritage within integrated disaster risk management practices.

In this sense, it is necessary to identify actors and responsible bodies (national and international institutions and organizations, local government, local institutions and organizations, local users, and the general public) involved in the protection of cultural heritage and to assign them 'appropriate' tasks (individual structures, historical sites, cultural landscape, archaeological sites, etc.).

The activities and procedures processed by the Safeguarding Cultural Heritage Cell, or the Coordination Structure in charge of the protection of cultural heritage during emergency response activities, are mainly organizational and coordination tasks. These can be implemented within the emergency management structure as for example the Local Emergency Management Authority – LEMA, both at national or regional level; they include the preparation of response activities and operations led by the teams on the field. These will be described in the following paragraphs.

4. Actors to be included in the Safeguarding Cultural Heritage Cell

C.2.1 Preliminary actions. Before going into the field

When it comes to intervention on cultural heritage in danger, in the case of unforeseeable events, normally cultural heritage assets assessment and securing activities cannot be implemented in the very first hours following the event. This phase is of course primarily dedicated to safeguarding human life.

However, in order to facilitate specific activities related to the safeguarding of cultural heritage, when safe to do so, a few preliminary actions can and must be implemented as soon as possible. In particular, it is necessary to start making contacts with the most relevant actors for the management of activities and to collect and analyse all useful data and information for the work required. This not only refers to general information on the emergency event and its evolution, but also to the cultural heritage present on the territory, through the possible presence of databases relating to the area concerned, georeferenced information systems and open source data on the web. In addition, it will be necessary to start collecting specific information on any damage that the heritage has suffered, on the first pressing needs encountered, and on the resources and capacities that may be available to launch the necessary operations.

In this regard, the operational structures activated from the first moment on the territory, as well as the local administrations affected by the event, represent a decisive resource in order to constitute an initial cognitive framework of the event in progress also in the cultural heritage sector.

For instance, in the first hours/days immediately after the event, emergency operators such as Fire Brigades, Military Forces, Police Forces, etc, conduct a preliminary rapid assessment in order to identify priorities in terms of public safety, reinstatement of primary functions and to define interdicted or inaccessible areas. This phase should also include, if previously agreed, general data related to cultural heritage damages.[3]

The information collected on the event, the cultural heritage present, any damage observed, first needs and response capacity will contribute to the definition of the clearest possible picture of the ongoing situation and will allow a more adequate preparation of the activities to be implemented when possible.

C.2.2 Activation of the Safeguarding Cultural Heritage Cell

When a disaster occurs or is impending, the Safeguarding Cultural Heritage Cell can be set up at the emergency coordination structure, possibly located in the area affected by the event. It provides for the involvement of disaster management experts, cultural heritage experts and the main local actors involved in the management of emergency activities relating to the safety of cultural heritage (Fire Brigades, Police Forces, Army, etc.).

The following indications are defined on the basis of experience acquired during the earthquake emergency that hit Central Italy in 2016-2017, when the Italian Civil Protection Department activated the National Emergency Coordination Structure (DI.COMA.C), which included the Safeguarding Cultural Heritage Cell. The CH Cell supports the local emergency structure by implementing activities related to the safeguard of cultural heritage, following up on the requests received and the needs gradually identified.

[3] The Italian National Fire and Rescue Service conducts a preliminary rapid assessment which also include general data related to affected cultural heritage. Note of the Italian Civil Protection Department n. 7761 of 12 February 2021. For more details see: "Indicazioni Operative per il raccordo e il coordinamento delle attività di sopralluogo tecnico speditivo", available at ***https://www.protezionecivile.gov.it/it/normativa/indicazioni-operative-per-il-raccordo-e-il-coordinamento-delle-attivit--di-sopralluogo-tecnico-speditivo***.

Preliminary actions (before setting foot on the field)

Make contacts with main relevant stakeholders (cultural heritage authorities, operative structures, religious institutions, local admins, volunteers, etc.)

Collect and analyse info on:
– The event (kind, intensity, extension, etc.)
– CH located in the affected area (database, web, geolocalized systems, etc.)
– The affected CH (how many? where? how severe?)
– First specific needs
– Available resources and capacities

Have a clear framework on the ongoing situation

There are a number of initial actions that the CH Cell must undertake as soon as it is installed in the affected territory. In particular:

First on-site actions

Set up the Cell space with the necessary ICT equipment.

Create a link with relevant stakeholders (local, national, international level).

Organize a preliminary meeting involving all stakeholders, in order to identify the needs, based on the expected scenario following the event and the first needs related to the safety of cultural heritage.

Define an action plan with the local authorities and initiate the first actions based on the contingent emergency situation.

Prepare and constantly update the list of useful contacts (telephone numbers and email addresses of all those involved in any capacity in the emergency activities).

Define the communication flow among stakeholders at all levels.

Be aware of safety and security issues.

In addition, the following actions must be consistently implemented throughout the duration of the CH Cell activation.

While the emergency is in progress

Facilitate the implementation of activities, also by providing the necessary equipment, means and personnel.

Monitor the evolution of emergency, be informed of any change.

Monitor the progress of the activities in place, through the implementation of summary data from the territory.

Constantly share updated info on ongoing activities with the emergency coordination (through press releases, reports and summary of the situation) reporting updated info on the evolving state of the emergency and progress of the work.

Liaise with subjects involved in the management of the emergency (cultural heritage experts, firefighters, Police Forces, Army, etc.).

Liaise with local representatives concerned (local communities, citizen committees, representatives of the ecclesiastical community, private citizens and more).

C.2.3 Safeguarding Cultural Heritage Cell activities

The following are the main activities that could be set up for the protection of cultural heritage at risk of disaster and whose management may require the contribution of the CH Cell:

a. Collection of reports from the territory on cultural heritage damage
b. Damage assessment to immovable and movable cultural heritage
c. Identification and set-up of temporary storages and warehouses for cultural heritage
d. Securing immovable cultural heritage
e. Creation of temporary coverings to protect collapsed buildings
f. Securing movable cultural heritage
g. Selection and conservation of cultural heritage rubble
h. Assessment of the impact on intangible heritage.

29. After dark the fire-fighting robot has been fighting for several hours the blaze in the nave after the collapse of the roof.

a. Collection of reports from the territory on cultural heritage damage

The first activity to be performed in case of emergency or in the imminence of disaster is the determination of a summary estimate of the impact on cultural heritage of the event in progress or about to occur. It is necessary to acquire, through the appointed subjects, the data relating to the quantity of goods present in the affected area and to determine, as far as possible, the quantity of goods involved or potentially involved in the event. This can happen through interoperability between databases, catalogues, artwork archives and census of the cultural assets exposed to risk.

The CH Cell also collects, following the event, the reports from the territory (from the authority responsible for the protection of cultural heritage, from the municipalities, from the operational structures present in the territory such as Police Forces and firefighters, etc.), consolidates them in consistent lists by geographical areas of origin and records them on cartographic scale. Both the lists and the related maps require constant and accurate updates.

In order to facilitate the info collection process related to the reported damages, a Damage Report Form should be drafted from the beginning. It should contain the main information related to the location of the building/objects, a short descrip-

tion of the damage, the contacts of the reporter (CH owner or user) and at least one clear picture of the damaged CH.

b. Damage assessment to immovable and movable cultural heritage

The activity is aimed at assessing the damage to cultural assets in the area affected or potentially affected by the event and the necessary safety measures; it also involves, upon occurrence of an event, the classification of usability of the building, aimed at granting accessibility to cultural buildings in the shortest possible time.

In fact, many cultural buildings are in use as ordinarily lived places (historical palaces, villas and residences) as well as many other cultural heritage buildings where cultural activities take place for the local communities. These buildings need to be urgently reactivated or, if not possible, temporarily replaced. With regard to churches and holy buildings instead, the need for communities to participate in religious activities and traditions requires rapid intervention to grant the usability of such buildings, thus ensuring a safe worship place for religious communities in each of the affected areas, or providing for the setting up of temporary structures (tents, sheds, etc.) to be used for the same purpose.

Upon the occurrence of an event, the CH Cell organizes the teams to carry out a cultural heritage damage survey and assigns to each team the list of assets to be identified, based on the needs assessed. The teams composed of representatives of the competent authority for cultural heritage are adequately trained technical experts (engineers, architects), belonging to professional orders, the academic world and/or voluntary associations specialized in the sector. The teams will also be integrated by cultural heritage experts (conservators, restorers, etc.) with the task of identifying the presence and amount of movable cultural heritage within the cultural buildings surveyed.

The teams should be composed at least in part by local staff, experienced and aware of the cultural heritage present in the area, able to guide even non-local technical experts in damage relief activities. It is advisable that the agreements relating to the participation methods by the various parties involved in the relief operations are stipulated in peacetime.

The CH Cell organizes briefings with the teams to provide information regarding:

- Safety and security condition and plan
- Objectives of the mission
- Brief presentation of maps and survey templates.

For the survey of the damage to immovable and movable cultural assets, specifically dedicated templates are used (see Part D, Templates 1-2-3-5).

The CH Cell also has the task of collecting the damage assessment forms compiled by the teams, verifying their correct compilation, transmitting the results to the competent subjects, and arranging for their filing. Finally, it updates the emergency structure on the activities' progress.

c. Identification and set-up of temporary storages and warehouses for cultural heritage

In order to protect movable cultural assets at risk of damage, it is necessary to identify, preferably in non-emergency conditions, temporary deposit areas/warehouses, as potentially suitable places in relation to the assets' security and conservation requirements.

If such places have not been previously identified, the CH Cell facilitates their identification, also through the stipulation of agreements with the Armed Forces that allow the use of supervised and secure locations such as barracks,

hangars, monitored military sites; it also provides, where necessary, to their preparation, by finding the necessary resources, equipment, and material.

d. Securing immovable cultural heritage

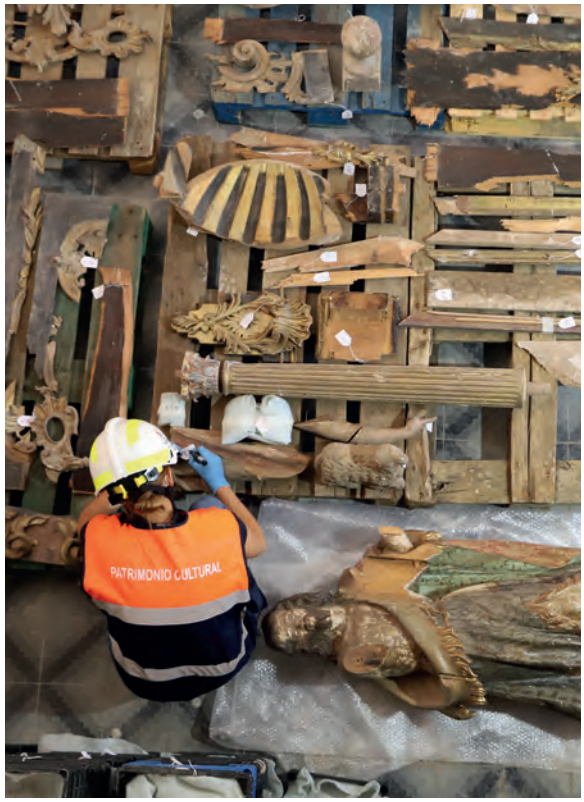
The activity is aimed at securing architectural, historical-artistic, and archaeological assets through the construction of temporary works (such as temporary artificial embankments, artificial anti-flood barriers, shoring, hoops, and tie rods of buildings, etc.) and more in general interventions necessary to avoid or limit further damage to structures and assets of cultural interest contained therein.

Interventions are usually consequent to urgent measures, issued by public authorities (Mayor), also according to urgent prescriptions provided in the damage assessment and securing templates in relation to the damage and usability of cultural buildings.

Any temporary safety measures must be agreed in advance with the cultural heritage competent authority. Taking into account the complexity and specificity of certain interventions, the contribution of operating structures specialized in the construction of these temporary works, such as the National Fire Brigade, may also be requested.

In fact, shoring cultural building implies the use of specific techniques and devices that ensure the protection of building surfaces and architectural elements. The ordinary systems are often not adequate for this purpose.

30. Firefighters securing the dome of the Anime Sante Church (L'Aquila).



31. Selection and classification of damaged altar pieces in Almenara de Adaja (Valladolid) 2020.

The Cell plans the interventions, monitors their implementation, transmitting the results to the emergency coordination structure and facilitates the involvement of experts.

e. Creation of temporary coverings of collapsed cultural heritage

In order to protect cultural heritage sites, buildings containing goods or parts of them that have undergone or could undergo partial or total collapses and which therefore are or could be subject to theft, vandalism, bad weather or other, some temporary coverages are set up.

The CH Cell acquires the availability of the subjects who could provide for the construction of such covering structures (firefighters, Police, Army, specialized technicians, etc.) and plans the activity; provides, where necessary, the materials required for their realization; monitors the interventions, transmitting the results to the emergency coordination structure.

f. Securing movable cultural heritage

The activity is aimed at securing movable cultural heritage – historical-artistic, archaeological, audio-visual, archival material and books – through the implementation of the necessary interventions to avoid or limit damage to the cultural heritage. These are precautionary measures, concerning assets that are not damaged but placed in buildings at risk or consequence measures for those damaged assets in the collapsed buildings or buried under the rubble.

The safeguarding intervention of movable assets can be implemented both through the creation of on-site safeguard, which preserve the assets from harmful atmospheric agents or other damage, and through removal, admission to temporary deposits and first intervention on damaged assets. At the same time, whenever an asset is removed from its original location, it is of paramount importance to track the item in order to avoid any dispersion. It is necessary to identify a responsible for the movement and a responsible for the new location of the asset. These are interventions that require constant supervision by the authority responsible for cultural heritage.

As per interventions aimed at securing movable assets, the dedicated templates should be used (see Part D, Templates 4, 5 and 6).

The CH Cell plans interventions based on priorities, taking into account the accessibility conditions of the site, the feasibility of the intervention and the needs arising from the contingency in progress; it provides for the involvement of the necessary resources (means of transport, specific technical equipment, etc.) and personnel (conservators, restorers, archivists, cultural heritage specialists, etc.) also drawing, if needed, from specialized volunteers in cultural heritage protection and from the Police, the Army and the Fire Brigades; it monitors the interventions and communicates the results to the emergency coordination structure.

g. Selection and conservation of cultural heritage rubble

The recovery and conservation of rubble of cultural interest following an emergency event has the purpose of allowing its reuse in the subsequent reconstruction phase, thus contributing to recapturing the identity of the places affected by the event.

The rubble can be divided according to certain categories (protected assets, historic buildings, rubble of no historical-cultural interest) in order to improve removal operations, as well as to allow for an appropriate recovery and relocation of valuable materials (stone materials, door and window jambs and thresholds, frames, shelves, fireplaces, any decorative elements, balconies, ceramics, worked wood, worked metals, tiles, etc.).

The CH Cell contributes, where necessary, to finding the materials, means and personnel necessary for the selection and recovery of rubble of

cultural interest; facilitates dialogue between those involved in the activity; monitors the mapping of the rubble, the actual clearing and transport of the rubble from the storage places to the identified deposits and updates the emergency coordination structure regarding the progress of activities.

h. Assessment of the impact on intangible heritage

The assessment of the impact on intangible assets must necessarily be implemented in the presence of cultural heritage expert personnel living in the area affected by the event, aware of the

32. A restorer from the *Istituto Centrale per il Restauro* marking selected blocks from the rubbles of San Benedetto's Church.

value and historical/emotional significance of the intangible assets at risk, and familiar with the local communities and their strong bond with those intangible assets.

The main objective is to preserve knowledge and ensure as far as possible the survival of certain customs, traditions, sacred or profane events, various kinds of rituals and practices that are often connected to specific physical places and which are therefore strongly linked to the conditions of these assets and their use following a disaster.

In order to assess the impact on intangible assets, the team in charge, made up at least in part of local experts, will use a specifically dedicated Template (see Part D, Template 7).

The CH Cell, based on the needs and priorities of the territory, organizes the teams for the damage assessment to intangible assets, collects the forms completed by the teams, verifies their correct compilation, transfers the results to the competent subjects to provide for their data storage.

Finally, it updates the emergency structure on the activities' progress.

C.2.4 Logistic, IT and needs

To carry out the activities of the Cell, it is necessary to have suitable workstations with the following minimum equipment:

QUANTITIES	MINIMUM EQUIPMENT
4	computers network, connection to a printer.
1	land or mobile phone line and possibly internet connection.
1	printer/copy machine/ scanner.
2	cameras.
1	magnetic board.
4	stationary material kit.
4	individual personal protective equipment kit (helmet, gloves, safety shoes, reflective vest).
1	service car.

The Cell must also be able to produce and distribute documents to be provided to the teams (safety and security documentation, maps and directions to the cultural heritage sites, cultural heritage damage assessment forms, contact lists of the cultural heritage teams) and everything else useful for the management of cultural heritage emergencies.

If the emergency conditions do not allow the use of IT devices, be prepared to be equipped with paper for all the documentation mentioned above.

C.2.5 Closure of activities

At the end of the activities, for the purposes of the handover to the person identified for the continuation of the activities started by the Cell, a final report must be prepared, based on the indications provided by the emergency coordination structure. As a rule, the final report includes the following content:

CONTENT OF THE FINAL REPORT	
GENERAL OVERVIEW	General overview of the level and extent of damage to cultural heritage.
STRATEGY OF INTERVENTION	Intervention strategy adopted for emergency management.
PERSONNEL INVOLVED	Configuration of the Cell (personnel of the structures involved).
TOOLS	Tools used for data collection and activities management, including forms, graphics as well as technical procedures, circulars.
OPERATIONS	State of implementation of activities.
PENDING ACTIONS	Activities to be completed.
HANDOVER	Subjects appointed for the handover.
CRITICALITIES	Main criticalities emerged in the management of the emergency.
CONCLUSIONS	Final remarks.

33. Interview with experts during the BELICE full-scale exercise, 2018.

34. Brainstorming of the interinstitutional Task Force after the site inspections at İzmir Centrum.

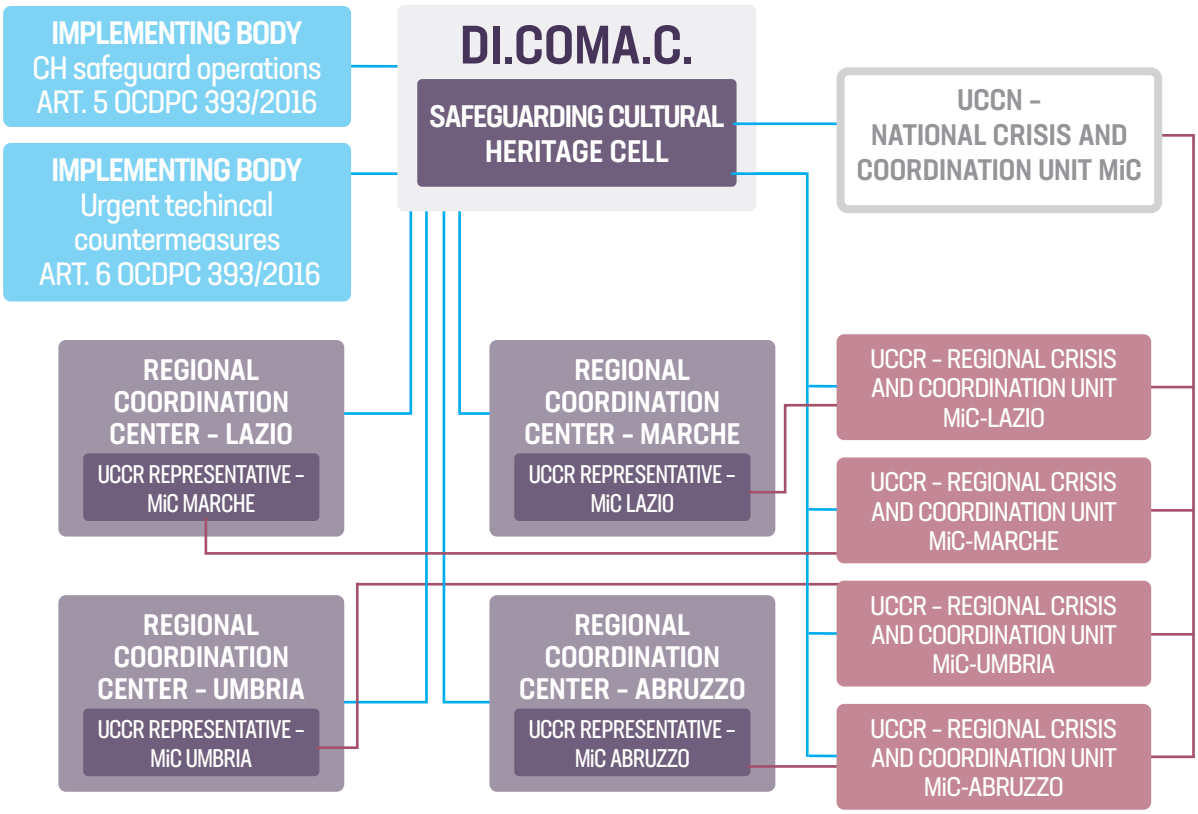
CASE STUDY 9

THE "SAFEGUARDING CULTURAL HERITAGE CELL" IN THE 2016-17 CENTRAL ITALY EARTHQUAKE

GENERAL DATA	
Country	Italy
Starting year	August 2016-April 2017
Responsible institutions	National Civil Protection Department (DPC) and Ministry of Culture (MiC)
Partners	National Fire and Rescue Service, Carabinieri Command for the Protection of Cultural Heritage, Italian Army, Regional Civil Protection Departments of Lazio, Umbria, Marche and Abruzzo
Description	The 2016 earthquake was particularly severe and affected a very large area: about 8,000 km^2 distributed in: - 4 Regions (Abruzzo, Lazio, Marche, Umbria) - 10 Provinces (3 Abruzzo, 1 Lazio, 4 Marche, 2 Umbria) - 24 Dioceses - 140 Municipalities. The amount and scale of cultural heritage affected was enormous. In order to effectively coordinate actions to respond to the earthquakes that struck Central Italy starting from 23 August 2016, the National Civil Protection Department, having declared a national state of emergency, decided to reinforce its emergency coordination structure set up on the affected territory by activating a specific cell dedicated to securing the cultural heritage within. The Cell, coordinated by the DPC in synergy with the MiC, was the point of reference for all operations to secure the damaged or at risk cultural heritage present in the four regions affected by the earthquake (Lazio, Umbria, Marche, Abruzzo). The activation of the Cell allowed for a stronger consolidation of the already established relations between the DPC, the MiC and the other actors involved. The activities were carried out with the involvement of numerous actors: National Fire and Rescue Service, Carabinieri Command for the Protection of Cultural Heritage, Italian Army, scientific community, civil protection volunteers specialised in safeguarding cultural heritage.

Description	Thanks to the synergy between the various actors involved, inspections were carried out to survey the damage of about 5.500 immovable cultural assets (churches, palaces and various artefacts), and safety and securing measures were then implemented on the properties (for a total of 1.837 interventions) including the sheltering of movable assets of cultural interest (30.704 movable goods in 34 deposits).
DETAILS	
Objectives	Provide in real time a coordinated and shared response for the purpose of securing the cultural heritage in the area affected by the earthquake, in accordance with national standards (Directive 23 April 2015, see Case Study n. 2). Ensure the coordination between the actors involved in the territory of the 4 affected Regions. Optimise time and human and instrumental resources to secure the cultural heritage affected by the earthquake.
Achieved results	The damage assessment, preservation and securing of cultural assets in the area affected by the earthquake according to standard consistent criteria and in a relatively short time.
Activities	The Department worked in close collaboration with the MiC's National and Regional Crisis and Coordination Units, coordinating and facilitating the implementation of numerous activities, including in particular: • Planning and management of inspections to assess damage to cultural heritage, with the support of the National Fire and Rescue Service and the scientific community. • Planning and management of interventions aimed at securing immovable cultural heritage, with the support of the National Fire and Rescue Service and specialised companies. • Planning and management of interventions aimed at creating temporary coverings for collapsed cultural assets, with the support of the National Fire and Rescue Service and the Italian Army. • Planning and management of interventions aimed at securing mobile cultural assets, with the support of the Carabinieri Command for the Protection of Cultural Heritage and specialised civil protection volunteers. • Planning and management of the selection and preservation of rubble of cultural interest, with the support of specialised civil protection volunteers and the Italian Army.

Observations	Strong points In light of the experience gained, it is possible to update and improve the procedures and tools implemented to enable a more effective and efficient response in future emergencies. Weak points Coordination difficulties due to the extensive scale of territory affected (4 regions). Shortage of staff available to accomplish the many tasks to be implemented simultaneously.



5. Seismic event Central Italy 2016-2017. Intervention model on the cultural heritage of reference

C.3 The Role of the European Union Civil Protection Mechanism in the Protection of Cultural Heritage

With the overall objective of strengthening the cooperation in the field of civil protection among the European Union Member States and 6 Participating States (Iceland, Norway, Serbia, North Macedonia, Montenegro, and Turkey), the European Union Civil Protection Mechanism (UCPM) plays a crucial role in providing for common standards enabling certified and well-equipped teams to work interchangeably when a disaster strikes, as well as in supporting countries overwhelmed by the impact of disaster. Since its creation in 2001, the UCPM has responded to more than 400 requests for assistance inside and outside the European Union.[4]

At this stage the UCPM does not include any registered team dedicated to protecting cultural heritage at risk of disaster. Nevertheless, thanks to the work carried out by PROCULTHER, the European Commission and Member States are developing the terms of reference to be included in the standard modules of UCPM, in order to provide effective support to affected or disaster-prone countries. Therefore, the operational capacities of the UCPM could be strengthened to ensure the protection of cultural heritage at risk of disaster through the following:

a. Inclusion of a trained cultural heritage management expert as a member of the European Civil Protection (EUCP) Team, in case of generic assistance request for cultural heritage protection.
b. Involvement of dedicated Module/s or other Capacities, when affected Countries issue specific requests for the deployment of cultural heritage teams to be deployed in response missions or advisory missions.

This Chapter capitalizes on the need assessments and discussions conducted by the project partners, as well as on main recommendations produced by other projects (such as PROMEDHE and other ongoing initiatives) in order to provide a solution to the increasing urgency of encouraging a cross sectoral cooperation aiming at protecting cultural heritage at risk at European and international level.

Taking into account the references and reflections reported by the sources mentioned in Chapter A.1, this Chapter focuses on the objectives, profile, structure and equipment of a European Assessment and Advisory Team able to be deployed for the protection of cultural heritage at risk of disaster at European and International level. The same Team could also play a crucial role in advisory missions.

C.3.1 Toward a UCPM module for cultural heritage protection

The constitution of an interdisciplinary capacity/module is crucial to ensure an effective management and protection of cultural heritage prone to be impacted by adverse events. This should be included within the framework of UCPM to support affected countries or interested international organisations during emergencies and in the prevention, preparednessand response phases.

This paragraph describes the Team's main features and purpose to strengthen UCPM capacities

[4] For more details see: ***https://ec.europa.eu/echo/what/civil-protection/mechanism_en***.

when responding to countries requesting cultural heritage protection in case of disaster. The main task of the Team is, in fact, to support the requesting country and/or upon request of the Emergency Response Coordination Centre (ERCC) in case of Response Missions to cope with a specific on-going emergency or Advisory Missions to assist general assessment needs concerning cultural heritage emergencies (risk awareness, prevention policies and training, technical advice, etc.). The main functional areas and expertise provided in the management of cultural heritage emergency events are the following: Planning, Operations, Prevention, Preparedness, Logistics, and Response. In addition, the members of the Team should be able to provide expertise in the following main fields: risk assessment, prevention actions and policies, awareness actions, training, planning and analysis, post-event damage assessment, risk assessment, Post Disaster Needs Assessment (PDNA), damage mitigation techniques, cultural heritage emergency management, cultural heritage information management, as well as assistance to the Local Emergency Management Authorities (LEMA) in technical, operational and safety aspects during emergencies impacting on cultural heritage.

The Team must be composed by personnel with a specific background and skills in assessing and mitigating the impacts of disaster effects on cultural heritage assets, as well as in defining the main steps/phases of a recovery strategy plan in this field. Besides the competences related to cultural heritage protection, all team members must be trained under the UCPM training and exercises programs. In addition, it is essential for team members to attend and have successfully com-

35. A member of the EUCP Team assessing damages on the Parish of the Asunción (Amecameca-Mexico).

pleted training courses on cultural heritage protection, such as those proposed in Part E.

Based on the terms of reference (ToR) of the mission and on the typology of goods to be protected (both tangible and intangible), the personnel will be selected by the competent national authority among experts pre-identified and listed in a dedicated multidisciplinary pool of experts specially created to guarantee operational readiness and effectiveness in the field. Moreover, the number of experts will be decided on the basis of the ToR according to the needs identified by the requesting country.

The composition of the teams is as follows:

a. **Response missions**: up to 8-10 experts with extensive knowledge, experience and training in the field of cultural heritage protection, emergency management and multi-hazard mitigation and response, and ready to intervene, in compliance with the ToR of the mission, for the protection of tangible and intangible cultural heritage.
b. **Advisory missions**: a varied number of experts with extensive knowledge, experience and training on cultural heritage protection, emergency management, Post Disaster Needs Assessment and multi-hazard mitigation and response, according to the specific objectives and the nature of the advice sought.

The team composition will depend on the type of mission and the terms of references proposed, according to the capacities and resources available on the field or at disposal by the UCPM or the International Community. Furthermore, each team will be organized according to the respective national rules. For these reasons, the following set up just provides for a functional guideline of the cultural heritage team to be deployed upon request in the affected country.

GENERIC FUNCTIONS

TEAM LEADER/ DEPUTY TEAM LEADER	The main function of the Cultural Heritage Team Leader (CH TL) is to effectively lead, coordinate, support and organise the CH Team. The CH TL shall ensure that all activities meet the mission objectives and fulfil the terms of reference (TOR) of the mission (see Paragraph C.3.3). The CH TL is responsible for ensuring relations with relevant stakeholders both in civil protection and the cultural heritage sector such as host nation, international/ intergovernmental bodies and EUCP Team or other relevant actors (e.g., UNDAC, NGOs, IFRC). She/he is also in charge of maintaining relations with the media, in case a specific team member is not appointed. Safety and security issues are under her/his responsibility, even if a team member could be appointed to cover the role responsible for safety and security issues. The Cultural Heritage Deputy Team Leader (CH DTL) assumes the responsibilities of the CH TL if necessary. All the functions identified herein must fully abide by the instructions of the CH Team/Deputy Team Leader and by the rules, procedures, code of conduct, safety and security etc. established for the UCPM Team, where the CH TL needs to be specifically briefed.

COORDINATION AND ASSESSMENT ON CH OPERATIONS

The main function of the Coordination and Assessment Profile on Cultural Heritage Operations (CH OP) is to develop a global, detailed and consolidated operational overview of the ongoing activities, including the CH Team's mission and UCPM assistance.
The CH OP shall ensure that all response actions are being considered.
The CH OP shall assess the situation taking into account possible CP operations, especially the ones connected to the CH sector, and available CP capacities.
The CH OP shall support the identification of the main operational priorities, recommendations for action and indication of possible gaps and limits for the success of the operations.
The CH OP function may provide for several experts, including some with specialised knowledge and experience (i.e., cultural heritage management/protection experts).

COORDINATION AND ASSESSMENT ON CH INFORMATION MANAGEMENT

The main function of the Coordination and Assessment Profile on Cultural Heritage Information Management (CH IM) is to collect, analyse and compile relevant mission related data, while identifying information gaps.
The CH IM shall be able to provide relevant and reliable information to the different interlocutors according to their needs.
Within the CH Team, the CH IM disseminates and gathers information to and from the CH Team members and makes sure that all members are updated on the significant information related to their tasks. It also keeps an information management logging system and has the task of defining the information management flow.
The CH IM shall utilise GIS application and other geographic databases, such us COPERNICUS.

COORDINATION AND ASSESSMENT ON CH LOGISTICS

The main function of the Coordination and Assessment Profile on Cultural Heritage Logistics (CH LOG) is to undertake the logistical activities required to support the CH Team and the mission, including facilitating the arrival and entry of the modules.
The CH LOG shall coordinate with external partners on issues relating to logistical activities.

CH TECHNICAL EXPERT

The main function of the Cultural Heritage Technical Expert (CH TE) is to advise on technical topics, identify associated risks and provide appropriate recommendations to the CH Team Leader.
A CH TE would normally be selected and embedded as part of a CH Team, to provide specific CH technical expertise. It is strongly recommended that the CH TE has at least participated in the UCPM Technical Expert Course.

In case of intervention in conflict or similar contexts, a specific function dedicated to Coordination and Assessment on Safety and Security[5] will be established to support and advise the Team Leader and Deputy Team Leader in their activities.

Once the deployment of the Team is confirmed, the members will start developing the safety and security plan for the mission. During the deployment phase and in the course of the mission, regular specific contacts on safety and security issues.

In terms of quality and interoperability, the requirements set out by Regulation (EU) 2021/836 of the European Parliament and of the Council of 20 May 2021 amending the Council Decision No. 1313/2013/EU of 17 December 2013 should be taken into account to guarantee the capability of the Team to operate with other modules in an international context and to support affected countries in a coordinated and effective way.

Furthermore, the most relevant international standards will apply to ensure a people centred, context specific and effective intervention. The adoption of a 'Do No Harm' approach will be ensured and the principle of humanity, impartiality, independence, neutrality, integrity, confidentiality and accountability will constitute the pillars of all operations.

C.3.2 Team equipment

The Team will be self-sufficient for the period established by the mission. For advisory missions the needs of both technical and logistic equipment will be assessed based on the mission's ToR and the level of activation.

The Team will be supplied with the technical equipment necessary for an effective implementation of the mission, such as:

- Personal protective equipment (PPE), special clothing and vests, mobile radio transmitting equipment; satellite telephone.
- Mobile phones, lap-top computers/tablet devices.
- Portable printer, camera, laser distance meter, damage and risk assessment formats, office supplies.

Furthermore, if required by the ToR, the technical equipment will also include equipment for evacuation and salvage operations, including drones. If the host nation is available to provide support, the Team will use local material in order to replicate the procedures in other areas and to facilitate the transfer of know-how to the host nation support experts involved in the operations.

Concerning logistic equipment, the Team will benefit from the host nation support, as foreseen by the Host Nation Support Guidelines.[6] In case the host nation cannot provide for logistics, the Team will be self-sufficient guaranteeing the necessary logistic equipment to carry out the mission.

The Team leader will communicate by mobile or satellite phone with ERCC, the requesting country's LEMA and with the cultural heritage authorities involved in the intervention, during all mission phases. Specific phone numbers and/or radio frequency and contact details will be provided for each mission.

C.3.3 Preparedness and operational procedures

The preparedness phase coincides with the period preceding the request of support. This

[5] The main function of the Coordination and Assessment on Safety and Security (CH S&S) is to address all issues related to the safety and security of the CH Team. The CH S&S shall undertake this role in close coordination with relevant stakeholders such as ECHO Security Sector, ECHO field staff and/or UNDSS, EU Delegation. Support Team Leader and Deputy Team Leader in an advisory function.

[6] For more details see: ***https://ec.europa.eu/echo/files/about/COMM_PDF_SWD%2020120169_F_EN_.pdf***.

could include main activities related to the experts' selection, training and exercise, management of administrative issues (funds, health, insurance, and effective deployment procedures). In this sense, the national competent authority should guarantee that:

1. In order to allow a rapid and effective identification of experts to involve in a mission related to cultural heritage protection, a dedicated multidisciplinary pool of experts needs to be established and constantly updated.
2. Training and exercise regularly offered to reinforce and refresh Team capacities and skills.
3. Administrative and health documents in place, updated and compliant with the national and European rules of deployment. In particular, the national competent authority should guarantee the necessary funds to cover the mission, protective insurance to the experts according to its own internal rules and employment contracts. Moreover, the experts are advised to keep their personal and/or service passport in order and make sure it is valid and renewed ahead of time. The Team should also be vaccinated accordingly to work in the affected country and a pre-deployment medical check should be made.
4. Maintenance and availability of the logistic and technical equipment ensured by the national competent authority.

At the same time, the Team members should ensure their own personal preparation, by being:

- Physically trained to withstand hard working conditions.
- Psychologically trained to work under stressful circumstances.
- Technically trained in the field of cultural heritage safeguarding.

36. Preparedness phase of the EU MODEX SICILY 2019, experts' reception.

Internal training for the Team personnel will be carried out in order to fulfil the quality requirements and tasks of the module/capacity. In particular, the Team should be trained on how to include the safeguard of cultural heritage in disaster risk management processes. Part E describes the training standards to prepare for a rapid and successful involvement of technical staff/experts in international missions. The Team members will be required to attend specific national and international training and exercises on a regular basis.

The Team members should also have attended the relevant courses foreseen by the UCPM Training Programme[7], such as: Community Mechanism

[7] For more details see: ***https://ec.europa.eu/echo/files/civil_protection/civil/prote/pdfdocs/Training%20brochure.pdf***.

Induction Course (CMI), Technical Course (TEC), Module Basic Course (MBC) for experts and Operational Management Course (OPM), Assessment Mission Course (AMC), Course on Negotiation and Decision-Making (CND) and High Level Coordination Course (HLC) for the Team Leader and Deputy Team Leader.

In addition, the whole pool of experts is required to meet at least twice a year to review lessons learnt from previous exercises, missions, or any other UCPM-related activity, with the aim to identify possible adaptations and improvements, update the standard operating procedures when necessary and plan for future activities/missions.

CASE STUDY 10

EXPERTS MISSION TO SUPPORT MEXICAN AUTHORITIES IN THE PRODUCTION OF METHODOLOGY AND CRITERIA FOR THE RESTORATION PHASE OF CULTURAL HERITAGE FOLLOWING THE EARTHQUAKES OF SEPTEMBER 2017

GENERAL DATA	
Country	Mexico
Starting year	2017
Responsible institutions/ actors	Institution Emergency Response Coordination Centre (ERCC) Actors EUCP Team: María Vara Moral (Team Leader); Ángel Luis de Sousa Seibane (Cultural Heritage Expert); Juan Carlos Molina Gaitán (Cultural Heritage Expert); Raquel Soler Porras (Cultural Heritage Expert); Miguel San Nicolás del Toro (Cultural Heritage Expert); Marina Gil Castro (Information Management); Juan Escalante (Liaison Officer)
Partner	Spain
Description	In the aftermath of a series of earthquakes that severely hit Mexico in 2017, the National Institute of Anthropology and History (INAH), the responsible agency for the protection of Mexico's cultural heritage, expressed interest in assessing a set of monuments, which are representative of the situation of all the damaged heritage sites, as a testing ground to develop recommendations for the restoration of the whole cultural heritage affected.

Description	The list of selected monuments was presented at the first meeting for discussion and approval, it was adjusted in order to achieve an efficient performance by the EUCP Team on site and in the phase of data processing. The Team performed 33 field visits to cultural and religious heritage sites selected by INAH, which are representative of all the cultural heritage affected. After the fieldwork, the Team carried out an analysis of historical documentation and pathologies observed in the assessed buildings as well as identification of the inherent values of each monument, taking into account relevant documentary and architectural aspects as well as their significance. After the assessment phase, two working groups were held with the National Institute of Anthropology and History, the General Directorate of Sites and Monuments of Cultural Heritage, the National Autonomous University of Mexico, ICOMOS and other organizations involved in cultural heritage restoration, in order to share viewpoints and exchange opinions on the nature and magnitude of the damages to the cultural heritage, main causes of damages, emergency actions carried out, restoration strategies and intervention criteria. The conclusions of these sessions were incorporated in the final report on criteria and methodology suggested for cultural heritage restoration. The final report was presented by the EUCP Team to the Government of Mexico on 3 November 2017.

37. The EUCP Team during a site inspection in San Marcos Tecomaxusco hit by the 2016 earthquake.

DETAILS	
Objectives	Define technical criteria and recommendations for the elaboration of a Master Plan for designing, planning and executing all the needed actions for cultural heritage sites' recovery in the short, medium and long term. Assess historical temples/churches structures in view of the cultural/historical heritage restoration phase. Produce restoration methodology/criteria to support Mexican authorities on the restoration phase of historical temples/churches.
Achieved results	Assessment of 33 cultural heritage sites. Defined criteria and methodology for the restoration phase.
Activities	Meetings with authorities responsible for the protection of the cultural heritage of Mexico. On-site evaluation of 33 cultural heritage sites affected by the earthquakes that hit Mexico throughout September 2017. Meetings and technical sessions with experts from relevant stakeholders. Final report.
Observations	Strong points Responsible agencies proved to have a good level of expertise in cultural heritage protection. Important mobilization of territorial departments of federal agencies for an initial assessment of damage. Weak points Need to coordinate all actions in the short, medium and long term, necessary for the recovery of cultural heritage sites, and to involve resources from international, federal, state, local and private levels.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PART D

TOOLS AND DATA MANAGEMENT SYSTEM

D.1 Assessing Damage on Tangible and Intangible Assets

In recent decades, the increasing impact of natural and man-made hazards has stressed the need for the definition of tools to record and assess in a systematic way both damages and risks that can partially or irreversibly affect tangible and intangible cultural heritage assets. Many tools have been elaborated with this purpose and most of them have proven to be very effective to inform decision making processes for the definition of adequate and sustainable response and early recovery actions.

To define European standards also in this field, the PROCULTHER project has oriented its reflections taking into account the needs and capacities of potential recipient countries, as well as the role that a UCPM-driven cultural heritage team can play in supporting them in case of disasters affecting cultural heritage. This has implied to revise available tools to achieve the following objectives:

- Defining the collection of data as an essential tool for planning post-event actions to ensure the timely protection and recovery of cultural heritage affected or at risk.
- Maintaining a need and context-based approach to enable the widest possible effective application of the tools and the best organiza-

40. 2016 Central Italy earthquake: information tools supporting decision in Amatrice (Lazio).

tion of activities for damage assessment, recovery and eventually evacuation of cultural heritage assets.

- Sustaining the adoption of a holistic and people-centred approach taking into consideration needs and capacities of possible concerned communities.
- Ensuring a multi-risk approach to be prepared and accounted for the increasing impact of climate change related hazards, as well as the cascading effects that can bring about the worst-case scenario.
- Identifying adequate procedures of collection and systematization of data to facilitate decision making processes, as well as the potential involvement of public and private donors to intervene for the prompt and effective assistance and recovery of affected goods.
- Embedding the definition of tools in a methodological framework that takes into account not only the key elements that can reinforce the resilience of cultural heritage assets (as those proposed in this document) but also the importance of monitoring, evaluating and learning processes to ensure their effective adoption and further adaptation.
- Defining easily employable and compatible formats that can be used on printed paper or on digital devises.

The purpose of this Chapter is to present the results of this revision that has led to the development of seven Templates to ensure the protection of cultural heritage affected by natural or man-made hazards. In particular, the Templates herein proposed have been drafted taking into consideration existing forms and sheets, such as those formulated by the DPC and MiC as well as the template outlines developed by ICCROM[1], fed by the main lessons learnt gained during recent emergencies (e.g., Central Italy earthquake 2016-2017) and exercises (e.g. PROMEDHE exercise, Lucca, 2018).

These have been conceived to support countries to conduct effective and holistic assessments on the damages that can affect tangible and intangible cultural assets. At the same time, they are intended to guide the operations of a UCPM-driven cultural heritage team, involved upon request during post disaster phases, to support those countries in the collection of useful data to promptly define protection and recovery measures.

The proposed Templates could also be used as a standard model to support assessments where other standard models are not available and can be adapted to the needs of local authorities or, even in contexts where other templates/forms/worksheets are in use, as a reference for implementing them in specific aspects or activities.

D.1.1 Templates and procedures for the assessment

In order to adequately support decision making processes, the assessment phase should be based on three sequential sets of actions:

a. Collection of baseline information
b. Assessment of impact and damage
c. Identification of protection measures.

[1] Main sources for the definition of the PROCULTHER Damage Assessment Templates are:
· Templates to assess damage produced by DPC and MiC, attached to the Directive 23 April 2015 available at the following link: ***https://storico.beniculturali.it/mibac/multimedia/MiBAC/documents/1437986369344_Allegato1_strumenti_schedografici.pdf***.
· Tandon, A. (2018). *First Aid to Cultural Heritage in Times of Crisis*. Vol. I Handbook. Vol. II Toolkit. ICCROM / Prince Claus Fund for Culture and Development: 2018. Available at: ***https://www.iccrom.org/sites/default/files/2018-10/fac_toolkit_print_oct-2018_final.pdf*** and ***https://www.iccrom.org/it/publication/first-aid-cultural-heritage-times-crisis-handbook***.

Following this sequence will make it easier to identify priorities and ensure a more systematic and holistic approach to the needs emerged as a result of an emergency.

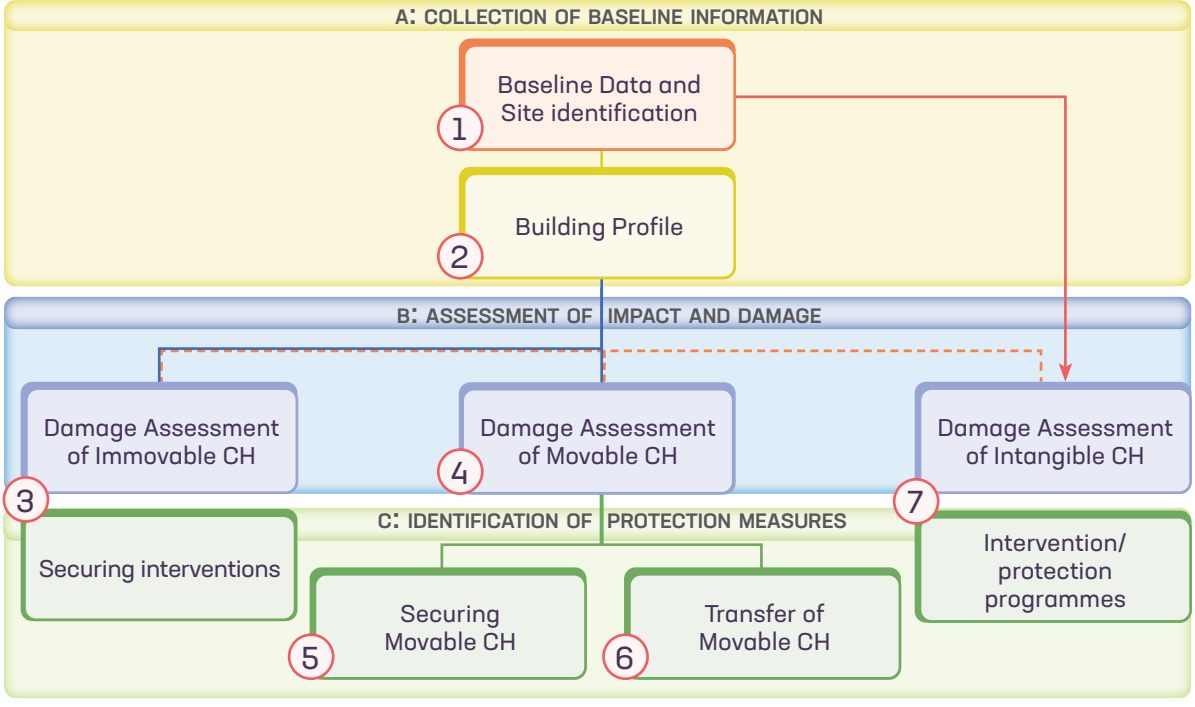
In this sense, the proposed Templates serve to collect data and first-level information useful for defining the first urgent actions aimed at securing cultural heritage. However, it should be noted that the Templates do not replace usability assessments, which must be defined by the competent authority with further specific official acts.

Therefore, the formulation of seven Templates was requested to support the three actions mentioned above, by guiding the process of data collection from the situation analysis to the identification of early recovery measures. These are:

- Template 1: Baseline Data and Site Identification
- Template 2: Building Profile
- Template 3: Damage Assessment of Immovable Cultural Heritage
- Template 4: Damage Assessment of Movable Cultural Heritage
- Template 5: Securing Movable Cultural Heritage
- Template 6: Transfer of Movable Cultural Heritage
- Template 7: Damage Assessment of Intangible Cultural Heritage.

The figure below shows a correspondence between actions and Templates.

In this framework, the baseline information and the building profile Templates will help to collect first data on general references and description of the site/building so as to guide, also in terms of priorities, the other phases of the assessment and definition of the protection measures. The Templates can be used for damage assessment purposes and be a valuable source for conducting Post Disaster Needs Assessment operations, as well as to assist advisory missions for the definition of preventive measures based on data collected in the building/site description.



6. Templates and sequence of actions (◯ = related Template)

Template 1: Baseline Data and Site Identification

This Template allows the identification of persons involved in the assessment including ownership and the collection of key baseline information at site level. This includes the main characteristics of the site, the level of protection, the context and its accessibility, as well as all relevant information to guide next phases of the assessment, such as the existing inventory number and the reference code assigned by the assessor.

Template 2: Building Profile

This Template allows to collect data on cultural heritage buildings' consistency and construction characterization. Usually, a cultural heritage site is an aggregate of different buildings (e.g., a church with an attached monastery with a cloister and a separate chapel) and each of them needs a specific characterization attributed by gathering data observed during a specific inspection on-site. The Template serves to assess a single building, including info about materials and construction system used. At the same time, taking into account the architectural elements, their connection, as well as all the components that may worsen the overall behaviour of the building, the Template provides an idea of their residual risk.

Template 3: Damage Assessment of Immovable Cultural Heritage

Damages of immovable assets are directly linked to their vulnerability to a specific hazard (seismic, flooding, windstorm, fire, etc.). Therefore, in order to adequately assess the damage, it is necessary to identify the main causes of the damage reported, without forgetting that the related impact can be due to the combination of multiple adverse events. Therefore, while conducting the assessment, it is essential to take into account the damage that each hazard or a combination of hazards can produce on immovable assets.

The following is a brief excursus of the damages generally observed following a natural event on immovable assets.

- **Earthquake**. Seismic damage is detectable by the cracks on structural elements in the reinforced concrete. For masonry building, diagonal cracks are typical, but the loss of connection between vertical and horizontal elements is a sign of 'bad behaviour' of the building, as it indicates the beginning of flexing of the structure in some cases. Wall bowing, for example, is a dangerous sign proving bad/poor quality of masonry.
- **Flood**. Floods vary considerably in extent and duration, as they cause damage and failures due to static and dynamic loads (water pressure, water flow and uplift forces), impacts from floating objects, wetting of building materials, and the effects of soluble salts, chemical pollutants and biological infection. The consequences of floods are sudden loads impacting on structures and the long-term floating of objects in moisture. Timbers can subsequently rot and masonry materials may be affected by the corrosive effects of the salt, causing damage that is hardly repairable.
  Damage caused by flood events is globally determined by assessment of the impact on the types of structures that characterize the building and the observable effects on the different components of the building (saturation, bowing, failures, cracks, etc.).
- **Wind**. Damage to buildings due to strong winds is most evident for taller buildings and lean structures such as towers and bell towers. The greatest effects can be seen in the dismantling of roof covers, up to damage to roofing structures if they are light. Also frequently causing the collapse of architectural elements such as statues, pinnacles, fence walls not anchored to the building. Other damage can be found in large windows often leading to the dismantling and tearing down of wooden structures and wall infill damage with consequences to the

bearing structures up to the shifting of some of its parts.

- **Fire**. The damage caused by fire depends on where the fire originates, that is in the internal or external part of a building. In the first case it can be caused by explosions, short circuits, intentional manmade actions, or accidental reasons, and in the latter as a result of environmental overheating due to climate change. The consequences for the building can essentially concern the roof structure, stairs, floors and wall structures in elevation including furnishings and moving elements.

The Template will assist in the inspection and collection of data relating to the likely impact due to the effect of single or multiple hazards, by taking into particular consideration the following two aspects:

- The extension of damage, referring to the area or number of elements affected by the damage.
- The level of damage for the same elements, expressed by the 'absence of damage' up to the extreme damage level that is 'collapse'.

At the same time, to quantify elements of construction impacted by the disaster both in detail and globally the Template allows to analyse the different structural and non-structural components. In particular, assessing damage to non-structural elements can be very useful to mitigate any risk that can further compromise the stability of the structure as well as endanger the recovery operations in case of rescue operators present in the area.

The definition of securing measures will be derived by the information collected in the phase of damage assessment. In this sense, the Template also includes a specific section dedicated to securing interventions, providing the first indications on temporary measures to protect the building or parts of it, as well as safety measures to ensure disaster risk management operations in the affected area.

Template 4: Damage Assessment of Movable Cultural Heritage

The Template proposes to gather data specifying which cultural heritage was impacted by the event and which type of damage it suffered or can suffer. The Template can be used for a single artwork, a series, and a homogeneous group of artworks or a small collection. It also includes general information about the building in which the movable cultural heritage is contained and the type and material of the object. Then, data regarding the damage assessment and suggested securing intervention are collected.

Template 5: Securing Measures for Movable Cultural Heritage

The evacuation decision is a crucial point in the process of securing movable heritage. It implies the involvement of human and material resources, with attention to operate safely, and the availability of a temporary storage. This Template is related to emergency evacuation of artworks located in a site. It is a list of the objects evacuated and moved in a safe place inside, outside or near the building premises. The decision regarding rapid interventions to rescue movable cultural heritage involves immediate actions that need to be taken in order to secure and stabilize the artwork, the series or the small collection.

Template 6: Transfer of Movable Cultural Heritage

The Template, used in case of need of evacuation of movable cultural objects, aims at providing crucial information about the responsible body/entity for packaging and transferring, the conservation status and info about the temporary storage where the object will be transferred. For each cultural heritage asset that needs to be moved, a movable transfer Template will be filled.

Template 7: Damage Assessment of Intangible Cultural Heritage

Risk assessment on intangible cultural heritage consists in applying measures that could be completely different from the ones used for assessing tangible cultural heritage.

These measures should ensure the survival of specific practices and rituals, the transmission of traditional knowledge belonging to the affected community, as well as resume the production of cultural goods by local artists and craftsmen. When dealing with intangible heritage, the main focus revolves around the people and the role of the community: the assessment should be conducted upon specific request and with the people's direct involvement. Moreover, important support can be provided by actors rooted in the territory, such as civil society organisations, non-governmental organisations, cultural institutes, local volunteers. They are the ones most familiar and aware of the customs, habits and traditions of the communities and therefore able to provide crucial information on the intangible heritage present in the territory. It should be borne in mind that, unlike other types of assets, for which we can rely on lists, databases and related information systems, such tools are practically non-existent for intangible heritage. This kind of cultural heritage belongs exclusively to those who live it daily and are part of it, by keeping it alive and allowing it to survive generation after generation.

It should be considered that the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003)[2] is the first and only international document to date that deals with and aims to preserve intangible heritage, which is still little considered when carrying out assessment activities.

Usually, a strong connection can be found between several typologies of intangible cultural heritage and specific tangible heritage. Traditional events, festivals or rituals frequently belong to certain sites, places, or buildings, including sacred or secular objects. Their temporary absence or their definitive loss, caused by dreadful events, could seriously compromise the survival of the intangible heritage.

Many emergencies have shown how the evacuation of objects from their original site to a temporary storage could imply a meaningful change of local traditions and social habits that could worsen the psychological and socio-economic situation of the community already affected by the catastrophic event. In the same way, the damage or loss of sacred relics often connected to specific rituals which periodically take place in a specific site or building, in case of restriction of such areas or closure of such buildings, could seriously compromise the possibility to carry on those ritual processions. In the worst-case scenario, if the emergency is protracted for a long time, it could result in an invaluable loss of ancestral inherited knowledge, skills and practices.

In some ways, the same occurs during the outbreak of pandemic emergency situations, as for Covid-19, when a substantial issue of the crisis has been the ban of meetings and festivals, as well as celebration of liturgies: the social and psychological effects of those restrictions have been analysed and have already become evident.

Those tangible elements should then be explicitly considered and analysed in assessing intangible heritage and, at the same time, while assessing tangible heritage these existing connections should be highlighted. With this purpose, a specific section dedicated to intangible aspects is also included in both movable and immovable cultural heritage Templates.

However, the Template will also allow to collect information even if intangible heritage is not re-

[2] For more details see: ***https://ich.unesco.org/en/convention***.

lated to a specific object or site, starting from the collection of baseline information.

D.1.1.1 Conclusion

After this brief description of the Templates proposed, it is worth clarifying that these Templates are intended for the use of cultural heritage and disaster risk management experts. The training course available in Part E of this document has been designed to also reinforce the capacities of these experts in appropriate use and compilation of the Templates. In Annex D.1 each Template is shown with its own sheet and the explanatory notes/instructions for their completion are provided, step by step.

41. 2016 Central Italy earthquake: map generated in the DI.COMA.C to classify rubble of cultural interest (with HD image of the historical centre of Amatrice by Copernicus).

D.2 Information Systems

An effective data management methodology is crucial to allow a coordinated and comprehensive collection, analysis and reporting capability, delivering the right resources to the right location in a timely manner even in the cultural heritage protection sector.

Two interoperable systems are considered, one for emergency management and the other for data capture.

For emergency management, information systems must be available to allow:

- Incorporation of georeferenced data on the cultural heritage assets of the affected country, preferably with the prioritization of elements based on their significance.
- Production of georeferenced information of the cultural heritage through standards that allow the exchange of information, as indicated by the Directive 2007/2/EC-INSPIRE[3] and Open Geospatial Consortium[4], to cross over with the emergency information maps.
- Preparation of simulated risk scenarios to estimate the amount of cultural heritage exposed to a disastrous event.
- Availability of maps showing the real situation of the emergency, incorporating the data and assessments that are being carried out on the cultural heritage on the ground, by considering the area affected by the event, effects of the event and information on the elements exposed.
- Geospatial comprehension of the resources and equipment available and actions that are being carried out.
- Integration of other data and sources of official information (for example satellite images) that allow assessing the evolution of the situation at all times, through the specific coordination centers that already exist.

All this information is used to carry out detailed analysis of the situation in real time, which is essential to provide a coherent strategic response, and a rapid and effective coordination between the different agents acting in the affected territory.

In emergencies involving cultural heritage, clear information and assessments of the damage suffered by buildings of cultural interest, in addition to technical information on their geographical location, are required, collected and performed directly on the disaster premises. The data gathered on the field should complement the estimates resulting from the use of automatic systems, such as products derived from remote sensing detection (satellites or radar) or from any other data source useful for integrating the available information (e.g., social media) processed with the use of innovative technologies (e.g., machine learning, deep learning and Artificial Intelligence) and from damage estimates of any post-event scenarios. This information will be decisive when making decisions on the implementation of security and building safety operations in the most affected buildings, or for the rescue and evacuation of movable property.

The information should be collected by following a standardised and systematic approach and managed through online standardized information exchange platforms that can incorporate the databases, data sets and geographic tools of the affected country.

In particular, it is required to collect and report information at all levels according to these points:

- Develop and implement a digital field data collection capability.
- Provide the capacity to apply data driven decision policies to ensure coordinated tasking and resource management.
- Provide information in near real time that is accurate and relevant to all stakeholders.
- Provide the capacity to analyse data resulting in actionable information.
- Provide information in near real time that is accurate and relevant to all stakeholders.

[3] For more details see: ***https://inspire.ec.europa.eu/inspire-directive/2***.

[4] For more detail see: ***https://www.ogc.org/docs/is***.

- Develop a range of tools to allow a comprehensive post deployment analysis across all phases of the event.

The speed to collect, analyse, disseminate and act with key information determines the focus of the actions to be undertaken for the benefit of the cultural heritage in the affected territory; including the integration and dissemination of information with the agents and organizations involved.

The communication will take into consideration the local infrastructure and the availability of data transfer systems such as WI-FI, local 3G/4G/5G data networks, or satellite connectivity. Situations of operational efficiency offline, where there is no available connectivity, must be considered.

It would also be important that the cartographic and digital products generated following the activations of the Copernicus EMS (Emergency Management Service) in the event of disasters, better integrate the cultural heritage data among the geospatial information already present, with further and more accurate additional information.

As per data capture, an applicable Information System is required on site to be carried out by the assessment module to document the actions carried out by the response teams (Rapid Shoring and rescue/evacuation of movable property). In particular, field data collection should be supported by mobile technologies, such as Open Data Applications (for example KoBo, ODK or RAMP). This type of applications allows to work with electronic forms via mobile phones and tablets. Several international organizations have expressed the importance of the implementation of mobile technology in the field of emergencies. These systems are being imposed in this field through humanitarian organizations such as the Red Cross/Red Crescent or Urban Search and Rescue (USAR) teams. In the field of cultural heritage, the National Center for Preservation Technology and Training (NCPTT), works with ODK, designing a form for the rapid assessment of post-disaster conditions, based on the needs detected as a result of Hurricane Katrina.[5]

These systems are effective data collection tools (including geographic coordinates indicating their position), even if their analytical capabilities are limited and unable to provide an end-to-end solution or effective analysis. Nevertheless, being open source software solutions for data collection, they have the added value to include tools to create and distribute forms, collect, and store data on site and finally transfer and collect it on a central server for processing and analysis purposes.

Forms are XML file structures containing the questionnaire, answer options, and defined validation rules. It also allows other types of data extracted from the mobile itself to be integrated into the questionnaire, such as photographs, audios, videos, and GPS location.

Data capture can occur in real time or asynchronously when there is connectivity, since it does not require permanent connection to the internet, it keeps the data locally and it automatically synchronizes with the server once it finds a connection to the network.

MANAGEMENT AND COORDINATION – Geographic Information Systems (GIS) – these can be very useful to capture, edit, analyse and process geographic information on cultural heritage, allowing the use of historical and real-time data to model different scenarios in an emergency situation, as well as to inform risk assessments and enable adequate planning and decision-making processes. In this sense, GIS technology is an essential tool to spatially define prevention, mitigation, and recovery measures to protect cultural heritage from disasters.

[5] *https://www.ncptt.nps.gov/blog/ncptt-tests-mobile-app-for-post-disaster-building-assessments/*.

In this sense, GIS technology is an essential tool to define prevention, mitigation, and recovery measures at the most local level to protect cultural heritage from disasters.

ArcGIS is one of the best known, as it is a professional complete software, but many other open source applications are available and usable. One in particular among such applications should be mentioned; the most popular one which is the QGIS software.

Moreover, the interaction with the products and services of the Copernicus Emergency Management Services Program as well as with the other coordination structures in case of disasters and emergency management[6], appears fundamental, also in light of the evolving nature of these services. These services, when activated by the competent authorities, are able to interact in an advanced way with users through the wide range of available platforms and applications that are constantly growing and being updated.

Furthermore, taking advantage of the results of DG ECHO projects with a focus on cultural heritage, it is possible to find many EU projects dealing with these issues such as ResCult[7] which has designed the European Interoperable Database (EID)[8] or other projects as CHEERS, ARCH, Protect2SAVE on methodologies for assessing the impact on cultural heritage following disastrous events. In addition, any national cataloguing systems for cultural heritage must be taken into account as well as risk assessment systems operating through the interoperability of databases on cultural heritage.[9]

Even if the approach of these projects is presented as useful for all the phases of the DRM cycle, their main contribution is in the field of risk assessment. In the response phase, the models made available can help emergency operations, establishing priority interventions based on the vulnerability of the assets to be protected and crossing the georeferenced information of the emergency scenario, available to those who are acting in the field and making decisions from a command post.

Finally, it is recommended to adopt the indications resulting from the application of INSPIRE Directive for the collection and organization of geospatial data relating to cultural heritage. In particular, in the case of cultural assets, the Data Specifications relating to buildings and sites of interest appear particularly relevant. Furthermore, these indications appear to be consistent with the recent guidelines expressed by the European Commission (European Data Strategy for Data), which highlight the strategic value of geospatial data and the role of the aforementioned Directive for their harmonization and dissemination within the European Union.

[6] European Commission Disaster Risk Management Knowledge Centre, Emergency Response Coordination Centre and Global Disaster Alert and Coordination System.

[7] ResCult Project proposes a European interoperable database for improving the resilience of cultural heritage subject to disasters in order to gain knowledge on cultural heritage protection during emergencies. The ResCult was designed in order to create a supporting decision tool for the safeguarding of cultural assets. The project aims at enhancing the capability of European Civil Protection to prevent disaster impacts on cultural heritage by implementing a European Interoperable Database (EID) as a supporting decision tool.

[8] The European Interoperable Database is a web service-providing tool composed by six different interfaces: cultural heritage, disasters information, 3d models, risk analysis, advice-seeking, crowd acquiring.

[9] On this issue, the experience of the Italian Department of Civil Protection through the CSRS Web System (Historical Centers and Seismic Risk) constitutes a good exportable practice as it elaborates real-time scenarios on the damaged cultural heritage using databases of the Ministry of Culture. For more details see: ***https://rischi.protezionecivile.gov.it/en/seismic/activities/emergency-planning-and-damage-scenarios/census-historical-centers-exposed-seismic-risk***, ***http://vincoliinrete.beniculturali.it***.

Annex D

Annex D.1 Tangible and Intangible Cultural Heritage Damage Assessment Templates

General instructions for compiling the Templates

_|_|_|_|_|_|_|_| TEXT in capital letter must be written in the spaces.

○ The presence of this round cells in the list or in the rows indicates the possibility of selecting one singe option among those available (SINGLE ANSWER).

□ The presence of this square cells in the list or in the rows indicates the possibility of selecting more options among those available (MULTIPLE ANSWER).

○○○ □□□□□ Round and square cells should be checked to record the extension and the level of damage.

The proposed Templates serve to collect data and first-level information useful for defining the first urgent actions aimed at securing cultural heritage. The Templates do not replace usability assessments, which must be defined by the competent authority by further specific official acts.

Template 1: Baseline Data and Site Identification

BASELINE DATA AND SITE IDENTIFICATION 1

A. Assessment identification

A.1	Date	
A.2	Team ID *(by operation centre)*	
A.3	Form N°	
A.4	Team leader	Expertise / Phone
A.5	Team component 1	Expertise / Phone
A.6	Team component 2	Phone
A.7	Team component 3	Phone
A.8	Site contact name	Role (owner/manager/other) / Phone
A.9	Ownership of the "site"	*Indicate the different owners*

Public ○ Private ○ *Religious* ☐ *Organizations/Foundations* ☐
Other type of owner .....

B. Site

B.1	Name of site	
B.2	GPS coordinates	*Record the geolocation*
B.3	City/Town	
B.4	Address/Name of place	

C. Heritage site characteristics

C.1	Existing inventory number	*Identification CODE as communicated by CH authority*
C.2	Reference CODE	*Temporarily assigned for assessment*
C.3	Heritage site complexity	Single building Yes ○ No ○ Number of buildings
C.4	Heritage site typologies	

monument ☐ castle fortress ☐ archaeological ☐ historic buildings ☐
villa, stately residence ☐ church ☐ mosque ☐ historical site ☐
museum/library/archive ☐ vernacular ☐ industrial ☐ rural ☐

C.5	Date of origin	*Indicate the date/period of construction and recent intervention*

period ..... century _|_|_|_|_|_| year _|_|_|_| restoration _|_|_|_|

C.6	Use of the site	

museum ☐ library ☐ archive ☐ academy ☐ school ☐ residential ☐
other uses .....

C.7	Level of protection	*Indicate the Level of protection (Listed or based on declaration of protection)*

Unprotected ○ Local ○ National ○ International ○

C.8	Insurance of site	No ○ Yes ○ *describe if it includes the contained assets*.....

.....

C.9	Context	*Evaluate the surroundings of heritage site*

Industrial area or suburbs ○ Urban area (residential) ○ Village or Town ○ Countryside ○

C.10	Accessibility	*Evaluate site access by motor vehicles considering existing routes*

many routes ○ two routes ○ dead-end street ○ only pedestrian ○

D. Site and intangible CH

D.1	Connection with intangible CH	No ○ Yes ○ *describe*.....

.....
.....

Instructions to fill in Template 1: Baseline Data and Site Identification

This Template allows the identification of persons involved in the assessment including ownership and the collection of key baseline information at site level. This includes the main characteristics of the site, the level of protection, the context and its accessibility, as well as all relevant information to guide next phases of the assessment, such as the existing inventory number and the reference code assigned by the assessor.

[SECTION A] Assessment identification

The section allows collecting baseline main information at site level based on assessment data and heritage site identification. Firstly it is requested the date of survey [A.1], the Team ID assigned by the operation centre [A.2] and the number of "Form" in ascending order [A.3]. Information concerning the Team leader [A.4], the team's components [A.5, A.6, A.7] and the person responsible for the site and the corresponding role [A.8] should be provided. The ownership of the site is requested in order to understand if the site is public or private and for follow-up activities. In the case of private one specify if it is under the responsibility of a religious entity, a foundation or other type of organization [A.9].

[SECTION B] Site

The section serves to collect information on the name or the title of a built-up complex (e.g., the name of the castle, the monastery, the church, the sanctuary, etc.) [B.1], its geographical reference with Global Positioning System (GPS) or annotated maps coordinates [B.2], as well as the city [B.3] and the address of the site or the name of the place (locality) [B.4].

[SECTION C] Heritage site characteristics

The section allows collecting data about the identification of the assessment: the original inventory number of the cultural heritage asset [C.1], if any, as communicated by the responsible authority and the temporary reference number assigned by the operation centre [C.2] to facilitate the identification of site surveying in the assessment campaign. An additional information is needed in point [C.3] to establish the number of the buildings setting up the site. In case the site under inspection coincides with a single building the "Yes" circle should be marked and the number "1" inserted in the box specifying "Number of buildings". Otherwise, if the site is a complex of buildings, the "No" circle should be marked and the number of buildings quantified in the box [C.3]. Each building of the site must be intended as an autonomous structural unit and should be assessed separately using the Template 2 (Building Profile) and the Template 3 (Damage Assessment of Immovable Cultural Heritage). The "SITE Reference CODE" composed by "Reference CODE" in C.2 and the number that marks the building under inspection (depending in ascending by the number of buildings in C.3), is the key to identify the building not only for the mentioned Templates 1 and 2, but also for the following Templates 3, 4 and 5 dedicated to the assessment, securing and transfer of movable cultural heritage. The heritage site typology [C.4] asks to note each type of building in the site.

The date of origin of the site [C.5] requests to indicate the period, the century or the year of construction and recent intervention of restoration, if any. The prevailing use [C.6], the level of protection [C.7], the insurance information [C.8], the surrounding context [C.9] and information on accessibility [C.10] are key information to define preliminary actions to set up mitigation plan, as well as to give a first idea of the relevance of the cultural heritage under inspection. All this information could also be obtained through direct inquiry with the property owner/responsible or the local communities.

[SECTION D] Site and intangible CH

The section refers to the connection with intangible cultural heritage and its description [D.1], if any.

Template 2: Building Profile

BUILDING PROFILE 2

E. Building identification

E.1	Name of building	
E.2	SITE Reference CODE	*Code reported in C.2 and Number of the building* building n.
E.3	Dimensions	mt mt mt high Volume
E.4	Number of storeys	n. *underground storeys* n. *storeys above ground*
E.5	State of construction	*Referring to the pre-event situation*

Built/rebuilt state: original ○ restored ○ added parts ○ rebuilt ○

Maintenance: well-preserved ○ un-maintained ○ degraded ○ abandoned ○

F. Material and construction system *(wall, roof, flooring and structural member)*

F.1 Structural elements — *Main vertical/horizontal combination structural system*

- ○ Timber Frame
- ○ Masonry + Timber
- ○ Masonry + RC slabs
- ○ Metallic structure
- ○ Concrete columns + Beams
- ○ Stone Buttresses Columns + Arches
- ○ Reinforced concrete frame
- ○ Masonry walls and arches
- ○ Masonry + Reinforced concrete frame

F.2 Walls — *Type of structure*

- Composite ○ ⟹ ○ Stone + Mud ○ Mud + Timber ○ Brick + Mud ○ Stone/Timber
- Mud ○ ⟹ ○ Rammed earth ○ Adobe ○ Cob
- Random rubble ○ ⟹ ○ Brick ○ Stone ○ With timber inserts
- Masonry ○ ⟹ ○ Brick ○ Stone ○ With timber inserts
- Wall panels ○ ⟹ ○ Wood ○ Metal ○ Reinforced concrete

F.3 Stairs

- *material* ⟹ ○ Stone ○ Timber ○ Reinforced concrete ○ Metal
- *type* ⟹ ○ Straight ○ Half landing ○ Arches ○ Compact

F.4 Roof/Coverage — *Considering structural elements of the roof/coverage and their behavior*

- *TYPE*: ○ Flat ○ Gable ○ Sloping ○ Vaulted and Dome
- *MATERIALS*: ○ Mud/tatch ○ Timber ○ Stone ○ Reinforced concrete ○ Metal
- *BEHAVIOUR*: ○ Thrusting ○ NON-Thrusting

F.5 Non structural elements

- ☐ Suspended ceilings
- ☐ Wooden shelf
- ☐ Balconies
- ☐ Cornices
- ☐ Pinnacles
- ☐ Lightings
- ☐ Chimneys
- ☐ Porches
- ☐ Wide glass windows
- ☐ Other

F.6 Floor material — *Referring resistance*

- ☐ Brick ☐ Stone ☐ Mud ☐ Mosaic ☐ Decorative
- ☐ Wood ☐ Tiles ⟹ ○ Stone ○ Brick ○ Ceramic

F.7 Plan layout — *Observing plan of building*

- ○ courtyard shape ○ C shape ○ L shape ○ T shape
- ○ elongated rectangle ○ rectangular ○ irregular shape ○ Other

F.8 Irregularity — *Observing building outside and inside*

○ NO ○ YES ⟹ ☐ Plan ☐ Elevation ☐ Interior walls ☐ Openings

F.9 Additional information

G. Images and drawings

G.1	Photo description
G.2	Attached file name

G.3	Drawing description *Architectural, structural, ….*
G.4	Attached file name

Instructions to fill in Template 2: Building Profile

This Template allows to collect information on the built-up cultural heritage for each built unit within the site previously considered in the Template 1 as an aggregate of buildings. In fact, point C.3 specifies whether the site is a single building (marked with "Number of buildings" = 1) or a complex of buildings (marked with "Number of building" = 2, even more until a defined number…*n*). It should be pointed out that this Template is dedicated at the description of a single building in terms of its consistency and its construction characterization. Therefore, one Template per each single building, interpreted as a structural unit, should be provided.

[SECTION E] Building identification

The section collect useful information to identify the building [E.1], to report the "SITE Reference CODE" [E.2], previously indicated at points C.2 and C.3 of Template 1, in order to have a link among site identification and descending Templates.

As an example see the instructions in the figure for a correct compilation:

The Site n. 12 has only a single building (e.g., the heritage site is a church):

E2	SITE Reference CODE	insert codes reported in C.2 and C.3 of Template 1	0	0	1	2	building n.		1

The Site n. 654 is a complex site, it is composed of 7 buildings, the Building Profile Template refers to the building n. 6, so the site reference code should be compiled as follows:

E2	SITE Reference CODE	insert codes reported in C.2 and C.3 of Template 1	0	6	5	4	building n.	0	6

In the case of a complex site composed of different buildings, it is necessary to note the number of buildings to be inspected establishing a numerical order referred to a key site marked on a separate map to draw point G.3 at the end of Template 2 with the purpose to identify the different buildings as components of the heritage site.

A dimensional estimation is required to calculate the amount of volume in E.3 and the presence of underground storeys and the number of above-ground storeys should be specified in E.4. In the following point [E.5] it is required to provide an evaluation of the state of the construction and its state of maintenance referring to its state prior to the catastrophic event.

[SECTION F] Material and construction system

The material consistency and the structural design of a building are key to determine the vulnerability factors of its setup. Therefore, assuming that the global vulnerability of any building to multiple natural hazards (seismic, hydrogeological, windstorms and fire) is due to materials and construction techniques, a brief description of the construction system is required through the reporting of the horizontal and vertical combination of structural elements (walls, roof, floors, columns, beams, arches) [F.1]. The compilation of this section requires a deeper approach to the building so as to examine it completely going around and inside it, if possible. In addition, the description of the type of walls, considered as vertical barriers, is not to be neglected, as they are decisive in determining the structural configuration of the building [F.2].

The structural component "Stairs" is assessed in terms of material and type: the result is a first evaluation of weakness through the combination of these two aspects [F.3].

At the same time, the presence of thrusting coverage/roofing [F.4], that results in a weakening of the building in response to dynamic actions as a consequence of catastrophic events (earthquake, wind, flood and fire), addresses to define the roof/coverage under the aspect of its "BEHAVIOUR for thrusting" on the underlying walls as explained here below:

- THRUSTING: the roof is sloping and there is no connection among the elements regardless of the building material. The worst situation is when the roof is in reinforced concrete: the heavy and large mass induces significant forces on the walls below.
- NON-THRUSTING: absence of any thrust on the wall due to effective connections among the elements regardless of the material. The roof is aligned with the horizontal beam and the type of "Gable" is usually non-thrusting.

The assessment of non-structural elements [F.5], including floor material [F.6], is crucial not only to assess damage but also to get an overall picture of the hazardous elements that can hamper response activities.

To complete the structural description, some information on the morphology of the building should be provided. In particular summary indications are requested concerning plan layout [F.7], as well as irregularity in plan and uplift [F.8]. In conclusion, although without taking measurements, it is possible to have an idea of the residual risk of the building if this has many irregularities, an articulated shape and many architectural elements that create voids or added volumes, all elements that worsen the global behavior of the building submitted to dynamic actions.

[SECTION G] Images and drawings

This section allows to insert in Template 2 pictures and drawings and to indicate any relevant attached documentation to be taken into account. In particular the free space corresponding to the description at point G.3 is useful to draw a planimetric layout of the site showing the label with the number of each building component of the complex site.

Template 3: Damage Assessment of Immovable Cultural Heritage

DAMAGE ASSESSMENT OF IMMOVABLE CH 3

H. Built heritage at risk

H.1 Name of building

H.2 SITE Reference CODE — *Code reported in C.2 and Number of the building* — building n.

H.3 Hazard identification — Note the cathastrophic event occurred and its related severity if known

Crisis	EARTHQUAKE	FLOOD	FIRE	VOLCANIC	AIR STORM	OTHER
Severity	.....	.....	.....	.....	.....	.....

H.4 Secondary hazard — Note any secondary hazard that has affected or can affect CH

specify .....

I. Damages observed

I.1 Table of reference for detailed damage reported

Extension Surface or quantity
- ●○○ <1/3
- ●●○ between 1/3 e 2/3
- ●●● >2/3

Damage level according to European Macroseismic Scale 1998 EMS-78
- 0 - □□□□□ absence of damage
- 1 - ■□□□□ light damage
- 2 - ■■□□□ moderate damage
- 3 - ■■■□□ severe damage
- 4 - ■■■■□ very strong damage
- 5 - ■■■■■ collapse

I.2 Non Structural elements — *Element separated from original settlements*

Chimneys (statues-pinnacles)	○○○	□□□□□
False ceilings	○○○	□□□□□
Roof covering (tiles, shingles)	○○○	□□□□□
Projecting/Suspended items	○○○	□□□□□
Pipes and tech networks	○○○	□□□□□
Wall ornamentation	○○○	□□□□□
Unhinged glass windows	○○○	□□□□□
Furnitures, timber items	○○○	□□□□□
Elevators (building automation)	○○○	□□□□□

I.3 Structural elements — *Cracks until shifting of structural part*

Concrete frame elevation	○○○	□□□□□
Masonry wall elevation	○○○	□□□□□
Metallic frame elevation	○○○	□□□□□
Timber frame elevation	○○○	□□□□□
Stairs, staircases	○○○	□□□□□
Slabs/ceiling/vaults	○○○	□□□□□
Roof, slab or structure	○○○	□□□□□
Open galleries/loggias	○○○	□□□□□
Projecting volumes	○○○	□□□□□

I.4 Overall degree of damage *(referred to building)*

NO damage ○ Light/Minor ○ Moderate ○ Severe ○ Collapse ○

I.5 Impact on intangible CH — ○ *No* ○ *Yes* *describe* .....

I.6 Type of inspection — *If inaccessible specify impediment reasons* .....

○ Complete ○ Partial ○ Only from outside ○ Remote inspection (drone/satellite)

L. Securing interventions

L.1 Reinforcement/building safety operations ⟹ ○ *No* ○ *Yes*

Where □ non structural elements □ external walls □ internal walls □ horizontal structures

What □ anchoring system □ shorings □ bracing □ tie beam

L.2 Temporary roofing revision and protective covering ⟹ ○ *No* ○ *Yes*

Define surface/area interested ○ Localized ○ <1/3 ○ between 1/3 e 2/3 ○ >2/3

L.3 Cataloguing and taking apart unsafe elements ⟹ ○ *No* ○ *Yes*

Define area interested ○ Extensive intervention ○ Limited intervention

L.4 Removal of debris ⟹ ○ *No* ○ *Yes*

Specify if selection is needed ○ *No* ○ *Yes* Define area interested ○ extensive ○ limited

L.5 To be cleared for presence of rubble and toxic waste ⟹ ○ *No* ○ *Yes*

Area mq □□□□ ○ <1/3 ○ between 1/3 e 2/3 ○ >2/3

L.6 Recovery of rain water drain systems ⟹ ○ *No* ○ *Yes*

Area mq □□□□ ○ <1/3 ○ between 1/3 e 2/3 ○ >2/3

L.7 Hurdles/fenced areas/shoring of hazardous areas ⟹ ○ *No* ○ *Yes*

Surveillance ○ *No* ○ *Yes* Sides concerned .....

L.8 Artworks: first measures suggested ⟹ ○ *No* ○ *Yes*

specify main interventions ○ collecting fragments ○ protecting ○ removing

Instructions to fill in Template 3: Damage Assessment of Immovable Cultural Heritage

Damages of immovable assets are directly linked to their vulnerability to a specific hazard (seismic, flooding, windstorm, fire, etc.). Therefore, in order to adequately assess the damage, it is necessary to identify the main causes of the damage reported, without forgetting that the related impact can be due to the combination of multiple adverse events. Therefore, while conducting the assessment, it is essential to take into account the damage that each hazard or a combination of hazards can produce on immovable assets.

[SECTION H] Built heritage at risk

Once noticed the name of building [H.1], with the aim to identify the cultural asset being surveyed, the "SITE Reference CODE" should be inserted in the boxes of the point H.2 as clarified in these instructions at section C.2 and C.3. In H.3 it is required to report the general description of the catastrophic event occurred, if any, including its degree of severity and magnitude. Consequently, in order to evaluate and prevent any other hazard induced by the main event, it is possible to identify any other potential hazards that could affect the heritage in addition to the initial event [H.4].

[SECTION I] Damages observed

The building's damages should be assessed using the "Table of reference for detailed damage reported" available at point I.1, classifying the assessment in terms of minor or higher severity. This table should include the damage assessed regardless of the cause. It takes into account the extension of damage, referring to the area or number of elements affected as well as the level of damage for the same elements, expressed by the "absence of damage" up to the extreme damage level that is "collapse". Different structural and non-structural components are analyzed in points I.2 and I.3 to quantify the elements of construction impacted by the disaster both in detail and globally. A remarkable consideration has been made in reference to damage to non-structural elements, specifically chimneys, statues, false ceilings, roof coating, freestanding walls (attic gables, ruins fencing walls), elevators and so on, as the fall of unstable objects can also make any recovery operations on site particularly dangerous.

Detailed level and consistency of damage, addressed in points I.2 and I.3, should also be observed in point I.4 where an overall judgment on damage should be provided, paying attention to the congruence with the connotation of the damage recorded in the previous points. The "Overall degree of damage" is a standard that the teams should use for categorizing damages as in the following graduation:

- NO damage = no damage is observed.
- Light/Minor = the building is considered affected, the damage is mostly marginal and easily repairable (e.g., missing shingles or siding, broken screens).
- Moderate = non-structural damage to roof components over essential living spaces. Non-structural damage to exterior components. Damage to chimneys with repairable non-structural damage.
- Severe = failure or partial failure of structural elements (columns, beams, frame, roof and/or exterior walls). Failure or partial failure or shifts to foundation with structural damage or other significant damage that requires extensive repairs.
- Collapse = total loss of building, complete failure of mostly structural components; requiring demolition or removal because of disaster related damage or confirmed imminent danger.

In point I.5 it is required to indicate if the impact on built heritage has caused any consequences for intangible heritage and if so to describe the type of damage. This is a crucial point to further explore in Template 7, dedicated to intangible heritage.

The final point [I.6] "Type of inspection" allows to specify under which conditions the assessment was carried out and to detail the reasons of impediment in case of inaccessibility of the building.

[SECTION L] Securing interventions

The section is organized in 8 different subjects, each one characterized by an indication of requirement of intervention through the single answer "No" or "Yes". In case of positive answer the actions are detailed to suggest suitable interventions.

Safety intervention measures should be indicated under the section L on the base of the damage assessment findings. This involves giving first indications about temporary measures to secure the building or parts of it, in order to ensure the safety of the public and operators, as well as to prevent deterioration of the building's condition. For these purposes reinforcement actions are divided according to "Where" they have been provided and "What" should be done to salvage the construction [L.1]. The following steps are aimed at the protection of roofs using temporary coverages [L.2] and at the cataloguing and removal of unsafe elements [L.3]. Prior to any securing work, debris removal and, if necessary, a selection of cultural interest debris to be salvaged is expected [L.4]. Likewise, the removal of rubble, or toxic waste [L.5] and drainage actions could be necessary to reduce the damage and protect cultural heritage assets [L.6]. In these interventions it is useful, in any case, to define the extension of the area interested and its estimation (<1/3 = minor of 30% – 1/3-2/3 = approximately 50% – >2/3 = major of 70%) in relation to the overall surface occupied by the building.

Consequently, the inspector may suggest protective devices such as hurdles, fenced areas and shoring of hazardous areas, including the need of surveillance [L.7].

Finally, first essential measures could be suggested to secure artworks in case of imminent hazard, such as collecting fragments, protecting or removing [L.8] to be decided according to need.

Template 4: Damage Assessment of Movable Cultural Heritage

DAMAGE ASSESSMENT OF MOVABLE CH 4

M. General information: single piece of artwork or a group of homogenous objects

M.1 Name of building

M.2 SITE Reference CODE — *Code reported in C.2 and Number of the building* — building n.

M.3 Category — ○ INDIVIDUAL WORK ○ SERIES ○ COLLECTION

SERIE/COLLECTION NAME

OBJECT/ARTWORK NAME

M.4 Assigned ID number — Series/collection Object Previous ID

M.5 Date — Original location ○ Yes ○ No

M.6 Type of object/s — *Listed or estimated* ⟹ ○ *removable* ○ *unmovable*

☐ Painting	☐ Coins	☐ Sculptures	☐ Mosaics
☐ Book	☐ Scrolls	☐ Canvas	☐ Tapestryes
☐ Document	☐ Manuscript	☐ Pottery	☐ Photograph
☐ Print	☐ Furniture	☐ Archeological Finds	☐ Emblem
☐ Altarpieces	☐ Precious metal craftwork	☐ Costumes	☐ Other

M.7 Number of objects — *Consistency listed or estimated*

☐ Fragment/s ☐ Single artwork Nr of pieces ☐ Set/series/collection Number of elements

☐ exact number UNKNOWN because everything is in a box/container/in a pile Height Length Width

M.8 Types of material — *Estimated*

Organic materials: ☐ Textile ☐ Papyrus ☐ Paper ☐ Ivory ☐ Leather ☐ Bone ☐ Wood ☐ Other

describe other .....

Inorganic materials: ☐ Glass ☐ Ceramic ☐ Metal ☐ Stone ☐ Sun-baked clay ☐ Other

describe other .....

Composite materials ○ *No* ○ *Yes* ☐ Organic-Organic ☐ Organic-Inorganic

M.9 State of the objects — *Referring to the pre-event situation*

Appearance: original ○ restored ○ added parts ○ reproduction ○

State of conservation: excellent ○ good ○ not so good ○ bad ○ deplorable ○

M.10 Level of protection — ○ *Unprotected* ○ *Local* ○ *National* ○ *International*

Insurance ○ *No* ○ *Yes* *Insured value*

M.11 Cultural interest — *significance*

☐ Religious	☐ Historical	☐ Archaeological	☐ Scientific
☐ Natural	☐ Ethnographic	☐ Bibliographic	☐ Numismatic

M.12 Dissociation — ○ *No* ○ *Yes*

description .....

M.13 Connection with intangible CH — ○ *No* ○ *Yes*

description .....

N. Damage assessment

N.1 Types of damage

☐ Burned	☐ Loss of material	☐ Cracks	☐ Tears
☐ Deformation	☐ Pest infestation	☐ Wet	☐ Soot
☐ Broken	☐ Loss or flaking	☐ Soiled	☐ Chemical

N.2 Level of damage — *Overall level of damage of artwork/s*

NO damage ○ Light/Minor ○ Moderate ○ Severe ○ Destroyed ○

O. Suggested interventions

O.1 ○ NO interventions ○ YES interventions

Removal and evacuation ☐ Observations

Salvage/Rescue ☐ Description

Protection on site ☐ Description

O.2 Obstacles to intervention — ☐ Weather adversity ☐ Inaccessibility ☐ Equipment deficiency ☐ Generic failures

Instructions to fill in Template 4: Damage Assessment of Movable Cultural Heritage

The Template proposes to gather data specifying which cultural heritage was impacted by the event and which type of damage it suffered or can suffer. The Template can be used for a single artwork, a series, and a homogeneous group of artworks or a small collection. It also includes general information about the building in which the movable cultural heritage is contained and the type and material of the object. Then, data regarding the damage assessment and suggested securing intervention are collected.

SINGLE ASSET ASSESSMENT

[SECTION M] General information: single piece of artwork or a group of homogenous objects

The Template is useful for a single artwork, or a group of homogenous artworks (small collection: e.g., coins, stamps, religious objects, etc.). Starting with the general information about the name of the building [M.1] and the "SITE Reference CODE" [M.2] to insert similarly at the previous Template 3 (points H.1 and H.2), the official name of the artwork or small collection is requested [M.3], as well as the assigned ID number by the team for the purpose of damage assessment, securing and transfer, if needed, and the previous ID number, if any, derived by catalogue or inventories [M.4]. The date of assessment and the information about its "Original location" [M.5] are requested to further verify that the object belongs to the inspected site or not because, for example, it could be just temporarily stored or hosted in a location for the purposes of an exhibit.

Point M.6 presents an estimation about the removability of the object and a reference list regarding the types of objects, in M.7 their numerical consistency, specifying if they are in a box or in a pile, and in M.8 their material divided into 3 categories, organic, inorganic and composite.

The state of the objects referring to the pre-event stage should be described by taking into account two aspects: appearance and maintenance [M.9].

To support priorities and action methods, the level of protection, the cultural interest, dissociation issues (no information about origin or separation of pieces) and connection with intangible cultural heritage are assessed in points M.10, M.11, M.12 and M.13. This information should also be supplemented by verifying the presence of any insurance coverage specifying the amount of insured value [M.10], if known.

[SECTION N] Damage assessment

This section provides for multiple-choice boxes with a list of possible types of damage that can be assessed [N.1] and the level of damage to describe the impact on artworks from "NO damage" to "Destroyed" [N.2]. The information provided should be consistent with the damage profile previously recorded so as to allow effective intervention measures.

[SECTION O] Suggested interventions

Securing movables assets involves immediate actions in emergency phase. In fact the situation can change rapidly, so the identification of appropriate measures of protection should be followed up promptly to avoid irreparable losses to cultural heritage. Considering overall hazards, the team in place should be able to select the interventions on site useful to protect movable cultural heritage. Point O.1 contains a list of 4 operational actions to carry on providing the protection of movable cultural heritage on site or/and evacuating. Suggested interventions move from "NO intervention" to "Removal and evacuation" after intervention of "Salvage/Rescue" or "Protection on site". The impossibility to perform interventions could be clarified in O.2 by for example: the obstacle to evacuation caused by weather adversity, inaccessibility, deficiency of equipment or generic failures.

Template 5: Securing Movable Cultural Heritage

SECURING MOVABLE CH 5

P. Emergency evacuation *Identification and listing of artworks removed*

P.1	Responsible of evacuation	
	Role and expertise	
P.2	Responsible of treatments	
	Role and expertise	
P.3	Name of building	
P.4	SITE Reference CODE	*Code reported in C.2 and Number of the building* ☐☐☐☐ building n. ☐☐
P.5	Documentation	
P.6	Priority	SIGNIFICANCE ◯ VULNERABILITY ◯

P.7	P.8		P.9	P.10		P.11	P.12	P.13				P.14		P.15			P.16	
Nr	Date/Time		Assigned ID number	Original location/ Grid number		Floor plan reference	Type of object	Dimension of object (cm)			Weight	Photo or drawing reference		Cautions for objects			Treat-ment given	
Ascending	dd/mm/y	hh:mm	See M4 Template 4	Site	Place	Building floor/Room	Description	Lenght	Width	Height	Load	Phot. nr	Draw. nr	Wet	Burnt	Broken	Yes	Not
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
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P.17	Additional information	

Instructions to fill in Template 5: Securing Movable Cultural Heritage

The evacuation decision is a crucial point in the process of securing movable heritage. It implies the involvement of human and material resources, with attention to operate safely, and the availability of a temporary storage. This Template is related to emergency evacuation of artworks located in a site. It is a list of the objects evacuated and moved in a safe place inside, outside or near the building premises.

The decision regarding rapid interventions to rescue movable cultural heritage involves immediate actions that need to be taken in order to secure and stabilize the artwork, the series or the small collection.

LIST OF REMOVABLE ASSETS

[SECTION P] Emergency evacuation

The responsible of evacuation, in coordination with the responsible of site, could decide to remove artworks considering priorities based on value, vulnerability and easy handling/transportation referring to previous Templates. Before relocating artworks in a safe area further information on single items should be provided.

Firstly, the Template requires to indicate the responsible authority for evacuation [P.1] and responsible expert for treatments to implement on site [P.2], followed by specific information regarding name of building [P.3], "SITE Reference CODE" [P.4] and the presence of documentation about the assets or small collection to be removed [P.5].

Indicate in P.6 the criterion of prioritization established for the evacuation. In detail follow the criteria of "SIGNIFICANCE" if there are data supporting it, otherwise the prioritization should be followed according to "VULNERABILITY" if data about significance are not available.

General data are requested to indicate "Original location" [P.10], "Floor plan reference" [P.11], "Type of object" [P.12], "Dimensions" (Size) and "Weight" (the load should be reported with the corresponding levels + = Light, ++ = Heavy, +++ = very Heavy) [P.13], reference number of photo (or drawing) [P.14], where the identification number of the photo or drawing reported should be clearly readable.

At point P.15 the "Cautions for objects" recommendation should be observed by checking the boxes indicating the state of the object (wet, burnt or broken).

In P.16 it should be specified if the object received a treatment before the evacuation checking the box corresponding to – Yes or Not.

In P.17 more details should be provided to specify the mentioned aspects.

Particular attention should be paid to the level of damage previously recorded. In fact, the damage should not increase when the object is handled as specified in the following:

- Less damaged objects: items can be moved and this does not require careful handling.
- Objects with moderate damage: removing cautiously and carefully handled; however, if the object is handled or treated roughly, there is a good chance that the damage will worsen.
- Objects severely damaged: even careful and painstaking handling of the object will result in aggravation of the existing damage.

The evacuation decision is a crucial point in the process of securing movable heritage.

It implies the involvement of human and material resources with attention to operate safely and the availability of a safe place (temporary area or storage) that should be nearby the original location.

Template 6: Transfer of Movable Cultural Heritage

TRANSFER OF MOVABLE CH 6

Q. Identification data

Q.1	Name of building	
Q.2	SITE Reference CODE	*Code reported in C.2 and Number of the building* ☐☐☐☐ building n. ☐☐
Q.3	Object/ArtWork	
Q.4	Type of object	description……
Q.5	Assigned ID number	*see point M4 of Template 4*

R. Transfer

R.1	Date/Time	*d/m/y* ☐☐☐☐☐☐☐☐ *hh:mm* ☐☐☐☐
R.2	Type of package	

○ *box* ○ *casing* ○ *envelope* ○ *other (specify)*……

R.3	Responsible of package	*Name, role and expertise*
R.4	Responsible of transfer	*Name, role and expertise*

S. Information for the restoration laboratory/storage

S.1	Conservation status	

○ *good* ○ *sufficient* ○ *bad* ○ *very bad*

S.2	Wet	

○ *Yes* ○ *No*

S.3	Requirements	

TRIAGE ○ NO URGENCY ○ MINOR URGENCY ○ URGENCY

S.4	Recommendations	*Precautions for opening packaging*

Precautions

S.5	On site treatments	○ *No* ○ *Yes* *Indicate method, products and proportions*

T. Storage/Warehouse

T.1	Temporary storage	*Name of the place where the CH has been transferred*
T.2	City/Town	
T.3	Address/Name of place	
T.4	Received by	*Name of Resposible of the temporary storage*
T.5	Floor plan reference	
T.6	New room/place	
T.7	New location code	

Instructions to fill in Template 6: Transfer of Movable Cultural Heritage

The Template, used in case of need of evacuation of movable cultural objects, aims at providing crucial information about the responsible body/entity for packaging and transferring, the conservation status and info about the temporary storage where the object will be transferred. For each cultural heritage asset that needs to be moved, a movable transfer Template will be filled.

SINGLE ASSET SHEET

[SECTION Q] Identification data

The Template named "Transfer of Movable CH" is aimed to track the transfer of a single asset (artwork) from the building to a safe storage or recovery location. The Template contains information about the name of building [Q.1], the same original location of the assessment of damage and securing, also specified by the "SITE Reference CODE" [Q.1] and the name [Q.3] and type of artwork [Q.4]. Finally, in Q.5 the previous assigned number at point M.4 of Template 4 on "Damage Assessment of Movable CH" to identify the object. This is very important because this code is the unique identification number to use during the emergency intervention and will ensure the transferred object's recognition by its label.

[SECTION R] Transfer

This section contains the main information about the date of intervention [R.1], the type of package [R.2], the responsible 'packing' expert identified by his/her name provided on the single asset [R.3] as well as the name of the operator who moved the object [R.4].

[SECTION S] Information for the restoration laboratory/storage

In this section it is requested to specify the data useful for the restoration laboratory receiving the assets. A brief description of the condition of the object is represented by a general record of the state of conservation (good, sufficient, bad or very bad) [S.1], as well as the indication on its wetness [S.2], followed by requirements in terms of "TRIAGE" (green, yellow or red corresponding to "NO URGENCY", "MINOR URGENCY" and "URGENCY") [S.3] and recommendations for opening the packaging [S.4]. Additional information is needed about "On site treatment" given to the items specifying the method applied the products used and their proportions [S.5].

[SECTION T] Storage/warehouse

In this section there is space to record the name of temporary storage [T.1], city [T.2] and address [T.3], the responsible of the storage or warehouse with the name of the recipient of the asset [T.4], further info about the new location in terms of floor [T.5], room and place [T.6] and "New location code" [T.7].

Template 7: Damage Assessment of Intangible Cultural Heritage

DAMAGE ASSESSMENT OF INTANGIBLE CH 7

U. Assessment identification

U.1 Date — *Form N°*

U.2 Team

Expertise — *Phone*

U.3 Site contact name

Role (owner/manager/other) — *Phone*

U.4 Hazard identification — *Note the cathastrophic event occurred and its related severity if known*

Crisis: EARTHQUAKE | FLOOD | FIRE | VOLCANIC | AIR STORM | OTHER

Name of the event: .....

U.5 Secondary hazard — *Note any secondary hazard that has affected or can affect CH*

specify: .....

U.6 Intangible heritage — *Name of intangible cultural heritage:*

TYPE OF INTAGIBLE HERITAGE

Aesthetic ☐ Historical ☐ Cultural ☐ Religious ☐

Scientific ☐ Economic ☐ Ethnic ☐ Other ☐

DETAILS ON INTAGIBLE HERITAGE	SIGNIFICANCE
Oral traditions/expressions (including language)	
Performing arts	
Social practices, rituals, festive events	
Festivals, masked dance, music	
Knowledge and practices concerning nature and the universe	
Traditional craftmanship	
Traditional markets	
Historical reenactments	

U.7 CH associated — *tangible assets associated with the intangible heritage (if any)*

☐ site(s) ☐ building(s) ☐ costume(s) ☐ stock of products/materials

☐ object(s) ☐ tool(s) ☐ machinery ☐ other

U.8 Describe CH associated

U.9 Ref. code of CH associated

U.10 Protection level — ○ *Unprotected* ○ *Local* ○ *National* ○ *International*

V. Impact

V.1 Reason of impact — *and effects of impact*

V.2 Function continuity	○ no disruption	○ partial disruption	○ total disruption	○ continued elsewhere
V.3 Social impact	○ local	○ regional	○ national	○ international
V.4 Community affected (%)	○ < 1/3	○ 1/3 – 2/3	○ >2/3	
V.5 Effects on people/community	○ minor	○ moderate	○ severe	
V.6 Effects on tangible CH	○ minor	○ moderate	○ severe	
V.7 Effects on cultural industries	○ minor	○ moderate	○ severe	

V.8 Institutions/organizations/associations concerned (contact reference)

V.9 Suggested interventions

Temporary location ☐ Shelters ☐ Cataloguing ☐ Psyco-social support ☐

Risk awareness ☐ Documenting ☐ Training ☐ Support local governement ☐

W. Intangible cultural heritage documentation

W.1	Photo description
W.2	Attached file name

W.3	Description

Instructions to fill in Template 7: Damage Assessment of Intangible Cultural Heritage

This Template focuses on how to identify and prevent the impact of emergency situations on intangible heritage in terms of programs and initiatives created to overcome their losses over time. The assessment should be conducted upon specific request and with the direct involvement of the reference communities. This Template is a valid support tool to carry out assessment activities on intangible assets, but it may not be exhaustive for the purposes of the activities required. The form includes a final section aimed at providing a more descriptive report of the asset, which allows for a more complete collection of the relative information and observations. In the case of intangible assets, in fact, the approach to the assessment is different from that of other assets as it is not only the material elements that need to be analysed but their intrinsic value and how these are connected with the community.

[SECTION U] Assessment identification

Starting from the date and number of the form, which represents the unique code of the intangible heritage assessed [U.1], the name of the team responsible is needed, including his expertise and mobile phone number [U.2], to identify the activity on intangible cultural heritage. Other main general information should be collected, at the same time, if intangible heritage is connected to a site or object, as shown in U.3, the name of contact references of the person responsible of the site should be provided. Even for intangible heritage, information on primary [U.4] and secondary hazards [U.5] should be collected to prevent its irreparable loss.

The point U.6 is crucial to represent the name and type of intangible heritage using the detailed list suggested. Starting from the name, the choice among aesthetic, economic, historical, ethnic etc. could be provided in multiple answers. Then, per each item there could be inserted a brief description of the significance in terms of relevance and period (e.g., summer national festival, 10 days long).

Points U.7 and U.8 serve to verify if intangible assets are associated to a tangible heritage, a site, a building or whichever material artifact. If any, insert in U.9 the "Reference CODE" of the site (C.2), the "SITE Reference CODE" of the building (C.2+C.3) or the code of the artwork (M.4). This will help to make measures of interventions on tangible and intangible assets as sustainable and holistic as possible.

In U.10 note if there is a 'protection of intangible cultural heritage' item in place for the assessment of its level of protection, if any, among local, national or international.

[SECTION V] Impact

The section allows to specify what is the reason of the impact [V.1] and the effects on several aspects: functional [V.2], social [V.3], communitarian [V.4][V.5], other cultural heritage [V.6] and cultural industries [V.7].

The person indicated at point V.8 is the recipient of the following point [V.9] where possible interventions are suggested among temporary location in another site, use of shelter, cataloguing, description and photo reporting in order to preserve memories.

[SECTION W] Intangible cultural heritage documentation

Insert the documentation gathered to identify the intangible cultural heritage with a photo [W.1] specifying the name of the file [W.2] attached and a description in the space [W.3]. In particular, W.3 should be used for including all relevant information which could not be given in the previous sections.


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PART E

TRAINING

E.1 Building Response Capacities to Protect Cultural Heritage at Risk

The management of crises impacting cultural heritage assets has allowed to reflect on how to strengthen and define appropriate response capacities aimed at protecting their inestimable value against the risk of disaster. Enhanced knowledge and experience have also focused on specific issues needed to improve preparedness measures, which can be adopted as part of capacity strengthening processes, prior to the occurrence of an emergency.

The provision of adequate training is considered a crucial and effective disaster risk management measure, based on increased human resources available when needed. In fact, staff such as technicians and experts, combining specific professional skills and competences with disaster risk management experience, as provided during training, are often not available when emergencies break out. Institutions themselves may not be equipped with adequate response capacities in terms of cultural heritage experts.

At the same time, it should be noted that cultural heritage experts and disaster risk management actors, involved in emergency activities, tend to act separately due to language barriers or different working methods. Therefore, training courses should aim at reducing these gaps by trying to define shared procedures and a common language, comprehensible to everyone and tested during tailor-made exercises so as to assess the effective capabilities developed to holistically include the cultural heritage safeguard in disaster risk management activities.

45. The EUCP Team during the site inspections for assessing damages on a cultural site damaged by the earthquakes of September 2017 in Mexico.

To ensure that the teams operate in an effective, compatible and complementary way when facing a crisis situation, training standards should be defined and optimized under the learning structures and interoperability criteria foreseen by the Union Civil Protection Mechanism (UCPM). In fact, the UCPM, besides pooling together and facilitating knowledge exchange also supports the Union's ability to deal with disasters in a coordinated and effective manner.

In this sense, this document provides a detailed account of the training standards requested for an effective solution to prepare for a rapid and successful involvement of technical staff/experts, within the UCPM or at national level, willing to support the institutions responsible for the protection of cultural heritage during emergencies.

The document's content, being the result of experiences gained by the PROCULTHER project partners in developing capacities for the protection of cultural heritage in emergencies, constitutes a first step to create and consolidate a common understanding at European level on the topics to be considered as training standards for the definition of a specific module dealing with the inclusion of the safeguard of cultural heritage in disaster risk management processes.


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E.2 Training Standards for Cultural Heritage Protection: the Course Programme

The course aims at reinforcing knowledge, skills and procedures for the creation of UCPM-driven modules or teams dedicated to the protection of cultural heritage at European level, as well as at strengthening resilience capacities at national level. This should be intended as an advanced course for those disaster risk management and cultural heritage experts working on the protection of both tangible and intangible cultural heritage during emergency; specific techniques for damage assessment and short-term countermeasures of structures and damage relief on tangible and intangible cultural heritage are further analysed in specific sessions dedicated to those aspects.

The course is composed of six parts, which last 7 hours each. The total duration of the course is about 42 hours. In order to ensure the effectiveness of the training programme, the course should not exceed 40 participants. Considering the peculiarity of tangible and intangible cultural heritage and the different skills required, the course should involve technicians (architects, engineers) – especially for the immovable cultural heritage issues – as well as conservators, restorers, art experts and of course specialists of disaster risk management operations. Considering the possible role exercised by volunteers to support experts in securing movable cultural heritage, the course could also include volunteers with a particular sensitivity towards cultural heritage.

47. Application of the training techniques for the rescue of damaged cultural heritage in Almenara de Adaja (Valladolid) 2020.

The course is organized as follows:

PART A - CIVIL PROTECTION AND CULTURAL HERITAGE: INSTITUTIONAL AND LEGAL FRAMEWORK (rules, actors, roles) defines the risk management cycle, focusing on cultural heritage emergency and the legal and institutional framework: it clarifies responsibilities and roles of the involved actors and how these operate in their respective precincts as well as how they cooperate with other components. This part also describes the UCPM and its functioning in international emergencies, the international coordination system and the main international actors. The course should be held by professionals with an emergency background and expertise related to the management of international crises.

PART B.1 - INTERNATIONAL MISSIONS: PHASES OF THE ACTIVATION PRACTICAL ISSUES prepares participants for missions, taking into account different aspects: safety and security, personal preparation, responsibilities and obligations as well as administrative issues. The course should be provided by professionals with an emergency background and expertise related to the management of international crises.

PART B.2 - TYPES OF MISSION illustrates different mission types (assessment, advisory, post-re-

covery) as well as the available tools to define the mission accordingly. The course should be held by professionals with an emergency background and expertise related to the management of international crisis in the field of cultural heritage protection.

PART C - OPERATIONAL ISSUES (logistics, info management, media, ICT) illustrates the operational activities related to logistics, the information flow and the Information and Communication Systems and Technologies, also in relation to cultural heritage issues. This also addresses issues related to the creation and functioning of a Safeguarding Cultural Heritage Cell, by taking into account all the procedures that can allow the effective and coordinated inclusion of the protection of cultural heritage in disaster risk management processes. Case Studies and experiences related to the protection of cultural heritage in emergency will be presented as well. The course should be conducted by professionals with an emergency background and expertise related to the management of international crisis.

PART D.1 - SECURING CULTURAL HERITAGE. Part 1 (context, structural issues, forms, practice) contextualizes the protection of cultural heritage in the overall emergency system (actions and roles) and illustrates the main construction typologies/ material used in cultural buildings, their structural behaviour and the safety short-term countermeasures used to mitigate risks for cultural heritage buildings. It explains the immovable cultural heritage damage assessment form and it deals with safety and security issues related to unmovable cultural heritage operators. The course should be undertaken by professionals with an emergency background and expertise related to the implementation of short-term countermeasures and procedures for the support of buildings, such as: architects and engineers.

PART D.2 - SECURING CULTURAL HERITAGE. Part 2 (cultural heritage assets typologies, first aid, templates, practice) defines roles and actions for assessing and protecting movable and intangible cultural heritage. Main movable cultural heritage typologies and the techniques for securing and moving them in emergency will be illustrated. Templates for assessing damages in movable and intangible cultural heritage will be presented and tested through a laboratory. The course should be preferably delivered by conservators, restorers, art experts with experience in disaster risk reduction and crisis management.

PART E - EXERCISE AND EVALUATION (practical drill, final test) consists of a practical drill related to a cultural heritage emergency: the command-and-control chain is activated, and participants are requested to put into practice technical activities for securing and assessing movable and immovable cultural heritage, according to the attended course.

The validation of the course is ensured, together with the participation of the practical drill, by a final multiple-choice test consisting of questions related to the whole course.

The practical drill should involve all participants together, aiming at encouraging them to collaborate and compare their knowledge, as in a real emergency. Concerning the organisational procedures provided for by the drill and any further operational activities to complete the training course, reference should be made to Chapter F.2 "Outline and Processes for Preparing Cultural Heritage Exercise".

The training should also maintain a multi-risk approach as well as include examples of problems that may arise in the emergency management with the aim of creating the most plausible crisis scenario to be faced.

The programme, available in Annex E, aims at ensuring an adequate level of preparation and knowledge to participants who could be involved in emergency activities. Therefore, depending on the specific needs and peculiarities of the country/institution promoting the course, some topics of the programme could be extended, both in terms of duration and content.


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Annex E

Annex E Cultural Heritage Training Module

PART A – CIVIL PROTECTION AND CULTURAL HERITAGE: INSTITUTIONAL AND LEGAL FRAMEWORK

DURATION	TOPICS	CONTENTS
30'	**Course**	Welcome and course opening.
90'	**Team building activities**	Introduction of participants and course trainers. Team building activities.
60'	**Disaster Risk Management: focus on the protection of cultural heritage**	Differences between natural and man-made disaster risks. Type and frequency of disasters. Examples of disasters. The risk management cycle.
90'	**European legal and institutional framework and UCPM**	The European Union: organization and functioning. Main EU structures related to civil protection and cultural heritage protection. Most relevant content of the main decisions regulating the deployment of the European Civil Protection Pool and rescEU (1313/2013/EU, 420/2019/EU) and the respective implementing decision. Activation of the UCPM, the ERCC and the EUCP team.
90'	**International coordination: actors and structures**	International stakeholders. Main United Nations structures, organisations and agencies. Main international actors and structures for emergency coordination (LEMA, OSOCC, EUCP Team, Host Nation Support, Civil Protection structures). Main international governmental and non-governmental organizations. Civil-Military Cooperation.
60'	**International frameworks for cultural heritage**	International frameworks, treaties and laws for the protection of cultural heritage at international level (1954 Hague Convention and its two protocols, UNESCO Conventions, Sendai Framework for Disaster Risk Reduction, Final Report of the European Civil Protection Forum 2018, Work Plan for Culture 2019-2022, etc.) Main actors involved at national/international level (cultural heritage institutions and organizations, police forces, military forces, fire brigades, religious communities, voluntary organisations).

PART B.1 – INTERNATIONAL MISSIONS: PHASES OF THE ACTIVATION PRACTICAL ISSUES

DURATION	TOPICS	CONTENTS
60'	**International deployment inside and outside Europe**	Types of deployment and missions abroad, with a particular focus on cultural heritage protection missions.
60'	**Media and cultural sensitivity**	Role of media activities in emergency. Interaction between media and emergency response operators. Examples.
30'	**CH Team composition**	Roles and functions of CH Team members.
45'	**Personal and Team preparation**	Preparing for a mission. Official documentation.
45'	**Safety and security aspects**	Safety and security issues: rights and obligations.

PART B.2 – TYPES OF MISSION

DURATION	TOPICS	CONTENTS
45'	**Response missions**	Basic concepts and goals of response missions.
90'	**Post Disaster Needs Assessment**	Basic concepts and goals of Post Disaster Needs Assessment.
45'	**Advisory missions and other peer reviews**	Basic concepts and goals of peer review and advisory missions.

PART C – OPERATIONAL ISSUES ON THE FIELD

DURATION	TOPICS	CONTENTS
60'	**Logistics**	Basic concepts and terminology on logistics in humanitarian aid and civil protection interventions. Major challenges.
60'	**Information management**	Terminology; the info management process; distinction between reliability of sources and credibility of information; the dissemination process. Products of ERCC, UN and EUCP Team. Virtual OSOCC.
90'	**Database and informative systems on cultural heritage: main available tools and practice**	Using cultural heritage database and integrated informative systems in managing cultural heritage emergencies. Examples. Practical activity.
45'	**Contextualizing the protection of cultural heritage in emergency. The Cultural Heritage Cell. Part 1**	The inclusion of the cultural heritage issue in the Disaster Risk Management Process. Context, objectives, preliminary actions, first on-site actions.
45'	**Contextualizing the protection of cultural heritage in emergency. The Cultural Heritage Cell. Part 2**	The inclusion of the cultural heritage issue in the Disaster Risk Management Process. Main activities related to the protection of CH.
45'	**Temporary storages and warehouses for cultural heritage**	The identification and organisation of temporary storage facilities for the protection of cultural heritage at risk of disaster.
75'	**Laboratory: tabletop exercise related to a cultural heritage emergency**	Case Study of a cultural heritage emergency. Who does what? Activation of the UCPM, command and control chain and communication among involved actors.

PART D.1 – SECURING CULTURAL HERITAGE. PART 1

DURATION	TOPICS	CONTENTS
120'	**Construction typologies and structural behaviour of cultural buildings**	Description of main construction typologies and material used in cultural buildings. Analysis of their structural behaviour.
120'	**Safety countermeasures in cultural heritage buildings**	Techniques and examples of safety short-term countermeasures in cultural heritage buildings. Safety and security aspects related to cultural buildings.
60'	**Damage assessment forms for immovable cultural heritage (site/building)**	Filling the damage assessment forms for cultural heritage buildings.
120'	**Laboratory: examples and practice**	Case studies of damaged cultural buildings. Practice on the compilation of the immovable damage assessment form.

PART D.2 – SECURING CULTURAL HERITAGE. PART 2

DURATION	TOPICS	CONTENTS
90'	**Movable cultural heritage: paintings, statues, tissues, others; books, archives, others**	Types, characteristics and materials. First aid, handling and transportation. Safety and security aspects related to cultural objects.
45'	**Cultural heritage debris**	Selection and movement of cultural heritage debris in emergency.
60'	**Damage assessment forms for movable cultural heritage**	Filling the damage assessment forms for movable cultural heritage.
120'	**Laboratory: demonstration and practice**	Case Studies of damaged cultural heritage assets. Practice on the compilation of the movable damage assessment forms and on packing/handling objects.

45'	**Assessing intangible cultural heritage. Damage assessment form for intangible cultural heritage**	Significance of intangible cultural heritage. Filling the damage assessment form for intangible cultural heritage.
60'	**Laboratory: demonstration and practice**	Case studies of damaged cultural heritage assets. Practice on the compilation of the intangible damage assessment form.

PART E – EXERCISE AND EVALUATION

DURATION	TOPICS	CONTENTS
240'	**Practical drill**	Simulation of a cultural heritage emergency: - Activation of UCPM and of command and control chain - Communication among actors in emergency - Practical and technical activities: risk and damage assessment, first aid and securing cultural heritage assets.
60'	**Debriefing**	Debriefing: strengths and weakness.
45'	**Final exam: multiple-choice test**	Individual multiple-choice test.
45'	**Discussion of test results and course evaluation**	Class discussion of test results and course evaluation.
30'	**Conclusions**	Wrap up of the training sessions and closure remarks.


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PART F

EXERCISES

F.1 Testing Capacities on the Safeguard of Cultural Heritage

Exercises related to the protection of cultural heritage are essential to reduce the risk of disaster in this sector and aim to verify what is reported in the DRM planning at different territorial levels, by testing the validity of organizational and intervention models, as well as to promote the dissemination of the contents of the DRM plans to all those involved and raise awareness at community level about the importance of being prepared before a disaster strikes. Exercises are also a valid moment to deepen the knowledge of the vulnerability of the cultural heritage at territorial level, as well as provide the opportunity to verify whether the resources used to deal with the emergency are adequate and proportionate.

A recurring exercise activity helps to maintain high levels of professionalism, allowing to intervene more and more effectively and respond to the emergency quickly.

By providing for the involvement of different structures, the exercises also aim to enhance the quality of operational standards by developing technical and practical skills and facilitating mutual collaboration between the actors involved in the emergency.

The exercise process includes in its entirety the organization and planning of activities aimed at achieving not only the operational phase but also all related initiatives, including operational actions, training, dissemination of knowledge, evaluation and implementation of results.

Exercises, moreover, represent the conclusion of the training course addressed to all the operators involved in cultural heritage protection activities at various levels. The theoretical activity carried out in the classroom is thus implemented through the practical application of the operational contents imparted during the educational path.

The exercise process is conceived as the organisation and planning of activities aimed at carrying out both the operational phase and all the initiatives that are part of the process, including operational actions, training, dissemination of knowledge, evaluation and implementation of results.

Exercise activities are developed on the basis of a document called the "Exercise Planning Document", composed of various sections and detailed in Chapter F.2.

Exercise types

Depending on the type of scenario envisaged, the exercises are classified as follows:

- **International exercises**, i.e., activities with the involvement of civil protection administrations at national and local coordination level and the administrations responsible for safeguarding cultural heritage of two or more Nations in the framework of European Union projects and initiatives or cross-border agreements.
- **National exercises**, in which national civil protection is involved and with scenarios that foresee the commitment and mobilisation of civil protection with the real or simulated use of extraordinary resources. National exercises are useful to verify emergency planning that includes cultural heritage protection, the direc-

tives and prevention measures, the response of the national level both of civil protection and of the Administrations dealing with the cultural heritage safeguard.

- **Regional or local exercises** involve civil protection structures operating at regional and local level; they are promoted and planned on the basis of regional or local scenarios or by any other administration dealing with the protection of cultural heritage.

Whether or not planned activities are actually carried out, the type of exercises ranges from:

- **Command post exercises – CPX**: the exercise takes place between operational centres at various levels with the aim of verifying relations and communications between and among the various centres, testing the decision-making process and the timing of activation of the coordination system as well as the intervention procedures for the protection of cultural heritage.

These exercises entail the simulation of real actions implemented on the field.

- **Field exercises – FX**: the exercise simulates the phases of activation, mobilisation, and operational deployment of teams on the field; in particular, the Cultural Heritage Protection Teams trained to secure movable and/or immovable assets. In addition to the verification of the Cultural Heritage Sector Plan, these exercises can be planned at the end of specific training courses on the protection of cultural heritage so as to test real actions on the field.
- **Full scale exercises – FSX**: the exercise serves to test and evaluate all the functions listed in the emergency operations plan to verify total coordination among policy makers, coordination officials, and field forces. The different activities of safeguarding cultural heritage are simulated, ranging from prevention and warning to emergency management, securing of movable and/or immovable assets, within the simulated scenario. In addition to the activation of the disaster management operational centres at all the territorial levels involved, in these exercises are carried out to test real actions in the field.

51. Cultural heritage asset evacuation during a field-exercise, Ponferrada 2016.

- **Table-top exercises – TTX**: an artificial environment reproducing the whole/a part of event scenarios in order to test the decision-making processes referring to sector plans on the safeguard of cultural heritage or existing intervention models. Participants, within a predefined time frame of a few hours or a day, examine or discuss together how they intend to, or can, solve or manage a variety of types of problems or tasks assigned to them.

These exercises don't foresee any real action on the field.

- **Discussion-based exercises – DBX**: similar to CPXs, DBXs are purely aimed at the evaluation and discussion of specific procedures and activities. Therefore, this type of exercise consists of a joint discussion and comparison activity among the participants to the simulation.

These exercises therefore do not require any real action on the field.

F.2 Outline and Processes for Preparing Cultural Heritage Exercise

The organisation of an exercise and particularly full-scale exercise requires a complex level of coordination, given the strong interdependence among the various activities in a system composed of numerous operators belonging to different administrations and bodies responsible for the protection of cultural heritage. The main objectives of the exercise on the protection of cultural heritage are to test the response of the components and operating structures at central and local level responsible for the protection of cultural heritage; to test the interaction between the different actors operating in the emergency scenario in order to identify priorities and organizational methods for securing the cultural heritage assets.

To reach such objectives, the exercise should always include, starting from the preliminary phase, the simulation of the activation of the command-and-control chain at local, national, and international level. Thus, in case of international exercises, the activation of UCPM and of the Host Nation Support should be integrated as an essential part of the exercise, giving the involved countries the opportunity to exercise their capacity to adequately assist international requests as well as to test the interaction and integration among different national disaster risk management systems into the European context.

The exercise activities consist of an ordered sequence of programming phases defined as: Conception Phase, Planning Phase, Management Phase and Evaluation Phase.

In the **Conception Phase**, the exercise is designed to define:

Objectives and exercise purposes (dissemination of knowledge, training, verification of specific procedures, etc.).

Reference risk (seismic, fire, hydrogeological, volcanic, nuclear, etc.).

Persons responsible for the exercise. Depending on which aspects are to be tested, the exercise may be led by the DRM authority or by the CH authority.

Actors to be involved, in addition to DRM and CH authority. For a list of concerned actors, see Chapter A.2.

The resources must take into account both the means and the tools needed (material needed for securing, suitable means of transport, etc.).

Levels of coordination involved.

Reference planning.

Exercise format to be applied.

In the **Planning Phase** the involvement of the various actors is clarified and detailed and the Exercise Planning Document is written. This is the phase in which the training topics, communication and organisation of the operational activities

are defined. Those who are part of the planning phase must also be involved in the implementation phases; it is also important to estimate the workload that participants can carry out.

In this phase, the Exercise Planning Document will be drawn up and shared among all the administrations involved in the exercise activity, as indicated by the following outline.

52. Trained firefighters placing protective covers on paintings in the Louvre Museum.

MAIN CONTENTS OF THE EXERCISE PLANNING DOCUMENT

Title, type (international, national, regional, local), date, hour and duration, field of reference and involved localities, the events calendar.
Reference to the territorial body or administration in charge of the planning and management of the exercise.
Objectives, aims, scope.
Description of the organisation of the exercise management team.
Roles and responsibilities.
Participating components and operational structures.
Identification and description of a reference historical event (if known).
Definition of a risk scenario.
Description of the coordination and early warning system (coordination centres/operational rooms, activation procedures, communication flows).
Administrative management part (human and financial resources).
Exercise sites.
Logistics, safety and security and access to the exercise site.
Communication modes among the exercise participants (radio, mobile, WhatsApp groups, etc.).
Maps.
Training programme.
Civil protection knowledge dissemination initiatives.
Operational response (definition of operational scenarios).
Activities time schedule.
Outcome and results assessment (post-exercise debriefing).

In particular, in order to carry out operational activities correctly, it is necessary to identify:

A place for carrying out the activities concerning the operational scenario management and interface with the higher level of coordination.

A place for teams' registration.

A place for the briefing and debriefing (possibly with a video-projector, microphones, flipcharts, etc.).

A storage area identified as a repository of the movable assets recovered from the operating scenario.

A warehouse/temporary storage, prior to the exercise, for storage of the movable assets to be used during the exercise, the first aid material and packaging material, material for the setting up of the operational scenarios and for the exercise work areas.

Packaging material (see Annex F.I).

Material for intervention on fragments/rubble/archaeological sites (see Annex F.II).

Material for the setting up of the exercise work areas: tents, tables, gazebos, signs (see Annexes F.I and F.IV).

Material for the setting up of the operational scenarios (further objects and furniture) according to the type of risk to make them more realistic, for example it is necessary to use water and mud or rubble and rubble or burnt material and coal (see Annex F.IV).

Movable assets to be removed, in proportion to the number of participants in the exercise. In order to avoid damages to cultural objects, the use of reproductions of movable cultural property will be prioritized, if possible.

53. PROMEDHE International field-exercise 2018: briefing with teams before their deployment.

Each participant must be provided with:

- Personal protection devices (helmets, safety shoes, work gloves)
- Uniforms or recognition clothing (waistcoats, caps, etc.)
- Personal badge.

Each team will receive a folder containing copies of the tangible and intangible cultural heritage damage assessment Templates (see Chapter D.1), site and building plans; in addition, each participant must be skilled to ensure an adequate and integrated composition of the teams.

Annexes F.IV, F.V and F.VI contain images of exercises with examples of movable and immovable cultural assets to be recovered, the setting up of exercise scenarios and a sequence of images relating to the operational phases of the exercise.

During the **Conduction Phase**, the various activities planned in the exercise programme are launched through the implementation of actions involving all the participants into the exercise.

EXERCISE OPERATIONAL ACTIVITIES

1. Composition of the mixed teams according to previously assessed professional competences; CH and DRM experts should always be included in the team.

2. Identification of a team leader for each team.

3. Initial briefing addressed to the Team Leaders, in which the actors engaged in the emergency command and control centre explain the event that occurred and the task assigned to each Team.

4. Assessment of the safety/security conditions in the exercise site by the competent authorities (Firefighters).

5. Assessment of damage to tangible and intangible cultural heritage, by filling in the relative Templates.

6. Securing of immovable and movable cultural heritage, by filling in the relative Templates (first securing measures, packaging of the movable assets).

7. Transport of movable cultural heritage to the previously identified warehouse.

8. Delivery to the coordination centre of reference of the Templates filled in by the teams at the end of the simulation.

The **Evaluation Phase** must foresee a debriefing at the end of the exercise. The debriefing is a particularly important moment because it is aimed at identifying strengths and weaknesses arisen during the exercise activity and useful for the future.

The debriefing must involve both the organisers and the exercise participants (teams and actors) and must be structured in such a way as to leave room for everyone's comments and feedback. In particular, there will be a set time for comments and observations by:

- Teams involved, through the Team Leader
- Actors involved
- Organisers.

The aspects of the exercise to be evaluated:

- Logistical organisation of the exercise
- Setting up of operational scenarios
- Coordination of activities
- Performance of the actors involved
- Performance of the teams involved
- Performance of exercise coordination.

Finally, all feedback collected during the debriefing shall be included in the final report, to be disseminated among all the exercise participants.

Annex F

Annex F Preparing a Cultural Heritage-Focused Scenario

In order to support the preparation of scenarios dedicated to the protection of cultural heritage at risk of disaster, a series of lists of useful materials is provided herewith. These have been adapted from tools produced by the PROCULTHER partners[1] to ensure a field-based conception of the materials needed for the smooth organization of cultural heritage focused exercises.

Their utilization should be adapted to the objectives of the exercise, as well as to the types of scenario and number of teams involved in the activity. In particular, the lists can serve for activities such as:

a. Preventive evacuation, e.g., in case of early warning for volcanic risk or flooding or in case optimal conditions for conservation and security of cultural heritage are not guaranteed.

b. Rescue and recovery, e.g., rescue and recovery of objects and fragments from a damaged building.

c. Stabilization and first aid activities.

The following lists should be considered as reference tools. They have been conceived on the basis of the deployment of three teams of 60-70 people covering three of the mentioned scenarios. In particular, the estimate is intended to enable evacuation, rescue, recovery, and stabilisation activities in emergencies caused by fire, flood and seismic hazards.

The teams are generally composed of:

- 25-30 actors belonging to the emergency services (Fire Brigade, Military, and Police)
- 20 actors from the field of cultural heritage protection
- 15-20 civil protection volunteers as support staff.

As a reference, the following number of pieces is established:

ACTIVITIES	NUMBER OF PIECES
EVACUATION	25-30 pieces of varying size, weight, shape, and material and located in different spaces and heights.
RESCUE AND RECOVERY	20-25 pieces with priority given to small and medium-sized, both organic and inorganic, opting for new and not very valuable objects that can be subject to breakage, dirt and various types of damage (see pictures F1, F2, F3).
STABILISATION	work is carried out with the pieces from the rescue and recovery scenario.

[1] In particular these lists have been adapted from the *First Aid to Cultural Heritage in times of Crisis*, Toolkit developed by ICCROM in close partnership with the Prince Claus Fund and the Smithsonian Cultural Rescue Initiative in 2018 and based on the experience of cultural heritage protection exercises developed in Spain within the framework of the annual Joint Combined Exercises, carried out by the Military Emergency Unit (UME) in coordination with the National Plan for Emergencies and Risk Management in Cultural Heritage (PNEGRPC).

The evacuated and rescued pieces will arrive at the storage place, located in a safe area near the scene, cordoned off areas supervised by police personnel for safe custody and to facilitate the workflow. If possible, provided with tents or tarps to carry out the necessary work with differentiated and contiguous areas (see pictures F5 and F6). In particular, the areas set up for the management of cultural heritage emergencies usually include the following:

- Reception area of cultural heritage goods (documentation, photography, registration, etc.)
- Triage area
- Stabilisation area
- Packing and transport area, where the transport vehicles are located.

The lists are not intended to cover all possible areas of intervention. For example, they do not provide information on the materials needed to dry wet structures or to remove ash from the impact of a volcanic eruption.

Since these activities do not require any specialized training, it is generally preferred to focus the exercises on the specific tasks needed to safeguard cultural heritage at risk of disaster.

It is worth also mentioning that all PPE should be selected accordingly, based on the type of emergency to be faced. In particular:

- Working in debris (safety boots, gloves and protective clothing, helmet, goggles are essential for any type of activity).
- Working in a post-fire scenario of a building – church type – full protective coveralls type are generally indispensable to avoid contact with the ash which can be very toxic. In the same way protective goggles and masks are very important to avoid inhaling combustion products produced by the event. It is important to work with latex or nitrile gloves (grease from hands can fix smoke stains and catalyze chemical reactions in metals).
- Working in a post-flood or other wet scenario requires the use of gloves and masks to protect against molds, yeasts and bacteria that are activated in 48 h. with high humidity levels on cultural heritage materials.
- Cotton gloves are discarded, they cause problems because they get caught, etc.

Take into account that the material left over or to be reused will serve as the basis of an emergency kit in case of a real emergency.

Annex F.I List of Materials and Equipment for Evacuation

TYPE	DESCRIPTION/NOTE	QUANTITY
IDENTIFICATION MATERIALS		
Screen-printed reflective waistcoats	Identification of participants who do not have a working 'uniform', e.g., heritage staff.	One per person.
PERSONAL PROTECTION EQUIPMENT		
Safety boots, gloves and protective clothing, helmet, goggles	Participants who do not have PPE, e.g., heritage staff, etc.	Inform and verify that all participating personnel have them.
Protective coverall	For scenarios with presence of pollutants.	
Latex or nitrile gloves		Box of 100 pcs. Medium size. Box of 100 pcs. Large size.
Masks	Type and quality depending on the scenario and expected pollutants.	FP3 box of 100 pcs.
EVACUATION MATERIALS AND AUXILIARY EQUIPMENT		
Tents or tarps	Check if they can be provided by emergency teams or civil protection volunteers for the installation of the site reception post/area for reception of cultural heritage assets.	3 to 5 depending on size. See pictures F5 and F6.
Portable tables	Check if they can be provided by emergency teams or civil protection volunteers for the installation of the site reception post/area for reception of cultural heritage assets.	5-7 tables depending on size.

TYPE	DESCRIPTION/NOTE	QUANTITY
	FOR DOCUMENTATION	
Drones	For evaluation and documentation of the area, obtaining zenithal images, etc. Depending on the property, it can be used indoors.	Optional.
Camera, with spare batteries	For photo documentation.	One per working team.
Binoculars	For viewing distant objects/details.	One per working team.
Helmet camera	For video documentation.	One per working team
Sketch pads, grid paper and notepads/ notebooks, clipboard		1 sketch pad, 1 pad of graph paper, 2 notebooks and 2 clipboards.
Pencils and waterproof pens in multiple colours		One lot.
Laboratory markers	Designed for writing on wet or dry surfaces of disposable plastic material, glass material, porcelain. The ink dries instantly and allows immediate handling of the material. Do not apply to works of art.	Optional.
Measuring tapes		2 pcs. of 50 m and 2 pcs. of 2 or 5 m flexometers.
2 m range poles	For documenting large-scale objects and providing a scale for context photos.	Two 1-meter sections that can be mounted together for extension to make two 2-meter sections.
10 cm scale	For documenting small objects or taking close-up photographs.	2 units.

TYPE	DESCRIPTION/NOTE	QUANTITY
Laser Meter		Optional.
Rigid cardboard and tape		10 pcs. of 1 m2 and packing tape 2 pcs. of 50 m.
Plastic cable ties	To tie labels.	Package of 100 pcs.
Twill and cotton string	To tie labels and packages.	100 m spool.
Self-adhesive labels	To be used on packing supports, to write down the identification numbers of the objects. Such labels should not be attached to the surface of the object.	1 roll of 500 labels of 10x10 cm, small sizes will be cut if necessary.
Perforated labels	Tools for labelling objects such as jars, jewellery. Tools for labelling plastic boxes.	3.5x6.5 cm (100 pack), otherwise they can be made with cardboard.
Zip bags (self-closing, best with writing strip)	To insert labels in wet conditions.	1 package (100 units of 6x8 cm). 1 package (100 units of 10x15 cm).
FOR PACKING AND TRANSPORT OF MOVABLE GOODS		
Acid-free tissue	Used to wrap paper and textile artworks and delicate objects.	10 m.
Polyester film	A transparent and colourless plastic sheet used to store photographs, or other paper documents.	1 roll 25 m.

TYPE	DESCRIPTION/NOTE	QUANTITY
Roll of non-woven fabric	Non-woven fabric used for packaging, transport and dust protection of works of art. It is preferable to use 100% polyethylene fibers, very soft and flexible, breathable, abrasion resistant, anti-static and chemically inert.	1 roll 25 m.
Large tarpaulin of strong, flexible, water-resistant or waterproof material	Often fabric such as canvas or polyester coated with polyurethane or made of plastics such as polyethylene. Sometimes it is necessary to protect historical debris from rain or use them to insulate the ground if tents cannot be installed.	One 2x3 m unit, one 6x4 m unit and one 10x15 m unit (the latter is optional).
Tarpaulin Polyethylene foam	It is preferable to use polyethylene foam as a cushioning material, as it can be easily cut to embed an object that is being packed into it, in order to absorb shocks.	Sheets: 8 units of 60x50x5 cm and 4 units of 60x50x8 cm.
Polyethylene foam in rolls	Serves as a bubble wrap and it is more practical.	1 roll of 1.20x25 m.
Bubble wrap	A short-term solution, bubble wrap can be used as a shock-absorbing material. However, the bubbled surface should not be in direct contact with the object.	A spool of 1x100 m.
Cushions/pillows	Ordinary cushions and pillows to pack fragile objects.	Optional, to use if available.
Towels and sheets	In the event of major disasters, towels and sheets can be recycled: they should be white so that they do not produce transfers of inks and dyes and are very useful for supporting old fabrics.	For use in drill: 4 large towels and 2 bed sheets.

TYPE	DESCRIPTION/NOTE	QUANTITY
Polyethylene bags	Food grade bags, better zip type with writing stripes to pack fragile or small objects and it may be useful to perforate them beforehand with a punch to avoid moisture condensation.	Packs of 100 units - 40x30 (1 unit) - 12x18 (2 units) - 7x10 (2 units)
Cardboard boxes	Ordinary cardboard boxes as containers for objects. However, as they age, they can give off acidic vapours, which can be harmful for objects. In order to safeguard the objects, it is recommended that the inside of the cardboard box be lined with unstarched and undyed cotton, or pure rag paper.	Optional, use according to availability, recycle.
Wooden fruit crates	Usually made of poor-quality wood, such crates can be used to transport inorganic materials, such as stone or clay. However, they must be lined with paper or cotton. Use of such crates is essentially a short-term solution.	Optional, use according to availability, recycle.
Plastic boxes	Transparent containers made of plastic and ordinarily used to store food can serve as containers for fragile or small objects.	
Plastic crates	Stackable plastic fruit or bread boxes: If recycled, wash and disinfect before use in heritage to avoid transfer of mould or bacteria. Very useful for rescue of wet or soaked objects. Normally subject to European standards to make them easily stackable.	Eurocontainers of grid: 60x40x7,5 cm grid 5 pcs. 60x40x22 cm grid 5 pcs. 60x40x42 cm grid 5 pcs.
Plastic trays	Normally used in museums and archives, shallow plastic trays made of polyethylene can safely be used to store and transport objects.	5 units.

TYPE	DESCRIPTION/NOTE	QUANTITY
Transparent containers and trays	Made of plastic normally used to store food-stuffs.	10 units of various sizes.
Rolling/poster tubes	Wide diameter rolling tubes used to pack canvases and paper and textile artworks. Where inserting it into the tube can be risky, it can be used to roll the foil or fabric on the outside and used as a support.	- 120x10 cm (2 units in different sizes) - 65x10 cm (2 units)
Pallets	Plastic or wooden pallets to store boxes containing objects and keep them on the ground. However, if using wooden pallets, make sure that they are insect-free and are covered with polyethylene sheets or tarpaulin to prevent direct contact with the boxes containing heritage objects.	8 units.
Porespan cylinders	For large formats such as very delicate carpets and rugs, we will have to manufacture supports for their packaging and transportation or use properly conditioned porexpancylinders.	Optional: some are available on the market with a diameter of almost 50 cm.
Packing tape with security sealer		3 units with 100 m coil and 3 units with 100 m coil as spare parts 3 spools of 100 m as spare.
Scissors		4 units.
Box-cutter knives		4 units.
Self-adhesive stickers	For labelling boxes and storage.	1 roll of 500 labels of 10x10 cm, small sizes will be cut if necessary.
Rope		Coil 50 m.

TYPE	DESCRIPTION/NOTE	QUANTITY
Rulers		4 units.
Buckets		3 units.
Ladders		1-2 units.
Trolleys		1-2 units.
Wheelbarrow		1 unit.
Stretcher(s)	Very useful for transporting certain heavy or large items where wheeled vehicles are not feasible.	Request availability from participating emergency services.

Annex F.II List of Materials and Equipment for Salvage

TYPE	DESCRIPTION/NOTE	QUANTITY
FOR SECURING A SITE		
Warning/caution tape	To delimit unsafe areas, or areas with restricted access.	Usually provided by emergency services; check for their availability.
Wire mesh	Basic or heavy-duty galvanised fencing. You can use it to prevent access to specific areas.	
Safety signage with commonly used signs	To indicate dangerous areas, or restricted access zones. Signage should be large, clearly visible, and easily recognisable by all personnel.	
Strong sticking tape	Water-resistant, scrim-backed and pressure-sensitive tape.	
Wooden sticks	To fix the safety signage and warning tape.	
Timber planks	To secure weakened floors during the assessment.	
Stepladder	To reach overhanging objects that can be easily handled.	
RESCUE AND RECOVERY OF MOVABLE ASSETS		
Cotton rope or elastic cord	For the realization of grids when they can be nailed to the ground/pavement.	Coil 100 m.
1 to 2 cm wide polyester webbing-sling or webbing-type webbing	The grid will be previously marked every 50 cm in order to have a mobile and adaptable grid for surfaces where it is not possible to anchor or with large irregularities.	6 tapes of 10 m each.

TYPE	DESCRIPTION/NOTE	QUANTITY
150x100 cm prefabricated grid-frame	It can be made of wooden slats of 4x4 cm, installing cords every 20 cm vertically and horizontally, useful for recovering small fragments – e.g., fallen mural paintings, plasterwork.	1 unit.
Waterproof tarpaulin (large construction tarpaulins)	Protection of rescued goods from other impacts (rain, wind, etc.).	One 2x3 unit, one 6x4 unit and one 10x15 unit – the latter is optional.
Post-it notes and stickers		10 units.
Pencils and waterproof markers for labelling		5 lots.
FOR STABILISATION OF DAMAGED OBJECT		
Soft flat brushes in multiple sizes		10 units.
Toothbrushes	To clean pottery and ceramics.	6 units.
Sponges in multiple sizes		20 units.
Smoke sponges/erasers made of vulcanized natural rubber	These are available from conservation suppliers and selected arts and craft stores.	152x76x19 mm (60 grs.) 8 units. 152x76x44 mm (150 grs.) 12 units.
Paper towels	Industrial roll towels.	3 units of 100 m.
'Ziplock' plastic bags	In packs of 100.	40x30 (1 unit). 12x18 (2 units). 7x10 (2 units).

TYPE	DESCRIPTION/NOTE	QUANTITY
Shallow trays		340x340x190 mm 3 units. 540x380x80 mm 3 units.
Polyester mesh or netting		400x210 cm.
Vacuum cleaner with HEPA filter	If available.	
Buckets		3 units.
Shelved trolleys	If available.	
Clothes drying racks		Can be manufactured on site.
Heavy-duty cardboard and plastic boxes		(See packaging and transport).

Annex F.III List of Materials and Equipment for Emergency Stabilisation of Structures and in Situ Protection of Decorative Elements

The list provides an estimate of materials for the following activities:

- Consolidation of 1 tower or bell tower in height
- Shoring of 1 wall (1-2 m)
- Shoring of 4-6 columns
- Shoring of 4-6 arches
- Protection of structures or elements of interest that may have been left out in the open.

A safe area will be set up near the area of action to establish a work and preparation area – wood cutting, preparation of material, etc. (see pictures F5 and F6) – with the necessary machinery and tools to be supplied by the emergency teams (inventoried material such as hammers, etc.). Indeed the exercises of stabilisation of structures and protection in situ, are generally carried out during 2 days with the participation of 30 emergency services (fire brigade, military...) and 8 heritage technicians (4 architects and 4 restorers).

TYPE	DESCRIPTION/NOTE	QUANTITY
FOR BASIC SHORING AND FOR TYING A STRUCTURE WITH CONFINING BELTS		
Hammers, saws, screws, screwdrivers, wood chisels and bolts		Usually provided by emergency services; check for their availability.
Measuring tapes, plumb lines and spirit levels		
Timber poles and planks of good quality	For example Douglas fir or Southern pine.	50 wooden planks of 20x5x350 cm. 50 wooden planks of 10x10x350 cm. 60 planks of 10x25x250 cm. 80 slats of 25x18x300 cm.
Nails and lag screw		1 kg of 9 cm nails. 1 kg of 7 cm nails. 1 kg of lag screw of 9 cm. 1 kg of lag screw 7 cm.
Standard metal adjustable height props		Usually provided by emergency services; check for their availability.
Sandbags		

Rubber or foam	For example, polyethylene foam to protect surfaces, or to improve the contact between a wall plate and the wall.	1 roll of 50 m.
Unstarched and unbleached muslin, or white cotton	To protect surfaces from scratching.	1 roll of 50 m.
Synthetic belts with ratchet handles		Minimum 2 mm thick and 50 mm – 75 mm wide They are usually made available by the emergency services and should be limited to the dimensions of the element selected for the exercise.
Steel plates	To place between the belt and the wall/column to spread the loads.	Optional.
Timber planks	To place between the steel plate and the wall/column.	Optional approximately 3 cm thick.

SUPPLIES AND EQUIPMENT FOR IN SITU PROTECTION OF DECORATED SURFACES

Tarpaulin	To protect surfaces from water.	Optional depending on the type of exercise designed.
Sandbags	To backfill decorated surfaces and protect them from shocks (make sure the sandbags do not trap humidity).	
Rubber or foam	For example, polyethylene foam to improve the contact between the surface and timber, or steel plates, if necessary.	
Unstarched and unbleached muslin, or white cotton	To protect decorated surfaces from scratching.	
Timber or steel plates	To spread the loads, in case you need to shore/confine an element with decorated surfaces (floor, ceiling, wall, columns, etc.).	

Annex F.IV **Reference Pictures**

F1: Flooding scenario, use of new leaflets and modern fabrics, exercise CANTABRIA, 2017. © UGRECYL

F2: Rescue wet documentation (newspapers and waste material used) Salamanca, 2017. © UGRECYL

F3: Disaster scenario: new material such as pots to be broken and waste material to be recycled (chair, blanket) as well as worthless reproductions made by arts and crafts schools, Aragon, 2019. © UGRECYL

F4: Clothesline built to process documentation in a demonstration exercise, Salamanca, 2017. © UGRECYL

F5: Exercise course, work tents, Ponferrada, 2016. © UGRECYL

F6: Installation of inflatable tents, Salamanca, 2017. © UGRECYL

F7: Shoring activities, Cantabria, 2017. © UGRECYL

F8: Shoring activities, Salamanca, 2017. © UGRECYL

F9: Contact surface protection, Salamanca, 2017. © UGRECYL

F10: Arch stabilisation works, Salamanca, 2017. © UGRECYL

F11: Column reinforcement, Salamanca, 2017. © UGRECYL

F12: Exercise at height, belfry protection, Salamanca, 2017. © UGRECYL

Annex F.V Reference Pictures – Example of Different Types of Exercises and Types of Events

National full-scale exercise, TWIST, tsunamigenic risk, Minori (Campania), 2013. © DPC

National full-scale exercise, seismic risk, Belice (Sicily), 2018. © DPC

International Flood Exercise, NEIFLEX, Treviso (Veneto), 2018. © DPC

Combined Joint Exercise on Cultural Heritage, Aragon, 2019.
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International Flood Exercise, EXE FLEGREI, volcanic risk, Bacoli (Campania), 2019.
© DPC

Annex F.VI Reference Pictures – Operational Phases

Registration of teams and briefing with the emergency structure

Team briefing

Briefing with Firefighters and Carabinieri Command for the Protection of Cultural Heritage

On-site inspection and identification of the materials and means required

Preparation of the work area

Transportation of goods

© DPC

First securing action

Record and photos

Packaging

Delivery of form to cell

Transport to the warehouse

Debriefing

© DPC

Training pre-event

Preparation of tent as a working area for packing

Preparation scenario 1: rescue of flood damaged and washed away assets

Preparation scenario 2: museum evacuation

Rescue operations with grids

Evacuation activities

Documentation

Triage

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MANIRA

PART G

CONCLUSIONS AND RECOMMENDATIONS

G. Conclusions and Recommendations

The document "Key Elements of a European Methodology to Address the Protection of Cultural Heritage during Emergencies" has been designed to provide technical and operational inputs to achieve a sustainable, coordinated, and holistic inclusion of cultural heritage protection in disaster risk management processes. Many recommendations have been included in the Chapters dealing with specific disaster risk management topics. These have been confirmed during the Second International workshop "Defining European Technical and Operational Capacities for the Protection of Cultural Heritage at Risk of Disaster", organized by the PROCULTHER consortium on 7 and 9 June 2021, that has allowed to discuss key findings with many European and extra-European cultural heritage and disaster risk management experts. This part provides a brief overview of the main recommendations considered crucial to reinforce the protection of cultural heritage at risk of disaster.

A. Institutional framework

An effective risk governance specifically dedicated to cultural heritage should be established at each national level to define mechanisms, strategies, plans agreed with all the actors involved in disaster risk management phases and based on adequate risk-informed processes. All cultural and natural assets should be protected by law and their management and protection ensured through adequate law enforcement measures and made operational via constantly updated and tested sectoral and site-specific security plans.

Collaboration between disaster risk management and cultural heritage authorities should be guaranteed in all the phases of disaster risk management and at each territorial level by the elaboration of official procedures or legal directives. Relevant actors from both public and private sides should be involved in all disaster risk management phases, including local communities, civil society organisations, volunteering associations, professional orders, Universities/research centres. Adequate risk transfer procedures should be envisaged also by involving insurance companies.

National legal frameworks should also be synergistically combined and optimized at both European and international level, taking as reference international frameworks such as the Sendai Framework for Disaster Risk Reduction and other international legal structures, such as those foreseen by the UCPM. This will enable an effective and sustainable protection of cultural heritage at risk of disaster and ensure a coordinated approach also in emergency that can cross over national borders.

B. Planning

Developing specific operational procedures and technical guidelines for protecting and securing cultural heritage in emergency: the general Disaster Risk Management Plan (DRM Plan) should include, among the other sectors dealing with emergency operations, also a specific session dedicated to the protection of cultural heritage at risk of disaster sector.

A hierarchical order should be respected among the existing plans. At local/regional/national level the structure of the DRM Plan should include the CH Sector Plan (DRM-CH Sector Plan)

whose operational elements will guide the definition of actions in this field at each territorial level.

The plans must maintain a multi-risk approach and be flexible enough to adapt to different emergency situations. These should be based on an adequate assessment of the vulnerabilities that could increase the impact of hazards, as well as on the capacities that could minimize the impact of natural and man-made events. Their functioning should be constantly tested by involving all concerned actors, including local communities.

Priorities for protection/extraction/removal of cultural heritage at risk should be defined according to the 'significance' (aesthetic, historic, scientific, social, or spiritual value) the cultural heritage assets are to the community and based on the operational needs that could arise during an emergency. In particular, risk of public safety, risk conditions of cultural building/asset, accessibility conditions, capacity and complexity of the intervention, storage capacity to recover the assets should be considered as crucial criteria to allow the protection of cultural heritage at risk of disaster in a timely, safe and effective way.

Storage areas, warehouse and temporary storage rooms should be identified in advance and their location and capacity specified in the plan. These should have adequate capacity to recover cultural heritage at risk and ensure maximum protection in terms of both safety and health of the environment. At the same time, these should be far enough from the emergency premises but easily accessible also to heavy vehicles.

Early warning systems should integrate actions in terms of risk knowledge, monitoring and warning system, response capabilities and dissemination and communication to allow, in a timely and coordinated way, the evacuation and protection of cultural heritage at risk. These should be included in the DRM-CH Sector Plan and coordinated with the general DRM Plan.

C. Coordination structure and supporting teams

Establishing and institutionalizing a coordination structure focused on cultural heritage protection at each territorial level: the establishment of a "Safeguarding Cultural Heritage Cell" is crucial to coordinate disaster risk management activities also in the field of cultural heritage and guarantee the involvement of all the involved actors for an effective and coordinated management of emergency situations.

Reinforcing interoperable capacities within the UCPM framework: to provide effective support to affected or disaster-prone countries, the operational and technical capacities of the UCPM should be strengthened to ensure the protection of cultural heritage at risk of disaster. These should foresee the inclusion of a trained cultural heritage management expert as a member of the EUCP Team and the registration of modules/other response capacities focused on the protection of cultural heritage.

In order to adequately strengthen technical and operational capacities and to allow for high quality performance in line with European stand-

57. 2016 Central Italy earthquake: securing affected cultural heritage in Castelluccio (Umbria).

ards, each country should dispose of well-trained and equipped teams.

Meanwhile to ensure a rapid and effective identification of experts to possibly be involved in a mission related to cultural heritage protection, a dedicated multidisciplinary expert pool should be established and constantly updated. Experts should be selected and recruited among technicians with a specific background and trained in courses such as the one described in Part E.

D. Tools and data management system

Developing and testing damage and risk assessment reporting instruments and Templates for securing and safeguarding cultural heritage in the event of an emergency affecting movable, immovable, and intangible assets is crucial to allow a coordinated and comprehensive collection, analysis and reporting skills in the cultural heritage protection sector.

Establishing interoperable and integrated information and data sharing systems focused on cultural heritage protection at European level. These should incorporate georeferenced data and geographic tools in an online platform and their functionality and availability should be tested at regional, national and local level.

E. Training

In order to ensure that the teams operate in an effective, compatible and complementary way, training standards should be defined under the UCPM training programme. This should provide for disaster risk management exercises and training activities to test and constantly adapt the procedures and interoperability of the structures involved in safeguarding cultural heritage, as well as to improve the response capacity of all the actors operating on the field.

Collaborations with the scientific community, international organizations, NGOs, civil society organizations, volunteering associations and private sectors should be strongly encouraged to improve know-how transfer capacities and increase research and innovation in this field.

Further developments in the cultural heritage protection sector should be also sustained through the collection and capitalisation of lessons learned and best practices at each territorial level and intensifying knowledge transfer through training programmes, seminars, meeting, symposiums.

Increasing the number of awareness-raising activities to allow a wider understanding of the risks that could affect cultural heritage, as well as of the measures to be undertaken in case of emergency.

F. Exercise

Disaster risk management exercises should include activities related to the protection of cultural heritage at risk of disaster. In particular, these should aim at testing the response of the components and structures operating at central and local level responsible for the protection of cultural heritage, as well as to test the interaction between the different actors involved in the emergency scenario in order to identify priorities and organizational methods for securing the cultural heritage assets.

Further actions to promote international cooperation, interdisciplinarity and exchange of experiences should be envisaged to reinforce technical and operational capacities, as well as the provision of common standards in this field. In this sense, these recommendations should be considered as a first step to create and consolidate a common understanding at European level. Constant up-scaling and capitalisation on the knowledge, practices, lessons learnt that can make the European disaster risk management approach more effective should be considered within the scheme of the UCPM Knowledge Network to reinforce cultural heritage protection in emergency.

GLOSSARY AND REFERENCES

GLOSSARY

The definitions in this section are adapted from the UNISDR publication Terminology of Disaster Risk Reduction (UNISDR, 2009)[1] and from the glossary available on the ICCROM's First Aid Handbook (Tandon, 2018)[2].

Build Back Better – The use of the recovery, rehabilitation and reconstruction phases after a disaster to increase the resilience of nations and communities through integrating disaster risk reduction measures into the restoration of physical infrastructure and societal systems, and into the revitalization of livelihoods, economies and the environment.

Capacity – The combination of all the strengths, attributes and resources available within an organization, community or society to manage and reduce disaster risks and strengthen resilience.

Cultural heritage – Cultural heritage may be defined as the expression of the ways of living as developed by a community that are passed on from generation to generation, including customs, practices, places, objects and artistic expressions and values. Often, cultural heritage is characterised as either tangible or intangible. (ICOMOS, 2002).

Cultural heritage asset – A cultural heritage asset is an item or place whose value is based on its significance within a community or nation's society, knowledge and culture. Its significance is derived from its aesthetic, historic, scientific, social or spiritual value. A heritage asset may be tangible or intangible. (Resource Planning and Development Commission, 2003).

Damage – Physical harm that impairs the value, usefulness, or normal function of something. (Oxford Living Dictionary, 2017).

Damage assessment – A damage assessment is a preliminary on-site evaluation and documentation of damage or loss caused by an accident or natural event. A damage assessment records the extent of damage, and what can be replaced, restored or salvaged. It can also be used to estimate the time needed for repair, replacement and recovery. It is integral to facilitating an effective and efficient response by emergency responders. (Office of Disaster Management and Preparedness, 2013).

Disaster – A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts that exceed the ability of the affected community or society to cope using its own resources.

Disaster risk management – Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses.

[1] For more details see: *https://www.undrr.org/publication/2009-unisdr-terminology-disaster-risk-reduction#:~:text=The%20UNISDR%20Terminology%20aims%20to,authorities%2C%20practitioners%20and%20the%20public*.

[2] For more details see: *https://www.iccrom.org/it/publication/first-aid-cultural-heritage-times-crisis-handbook*.

Disaster risk reduction – The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, reduced vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Early warning system – The set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.

Hazard – A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Intangible cultural heritage – Intangible cultural heritage encompasses the practices, representations, expressions, knowledge, skills, instruments, objects, artefacts and cultural spaces that a given community, group or individuals recognise as part of their cultural heritage. It is transmitted from generation to generation and is continually redefined by communities in response to their interactions with their surrounding environments and history; thus, forming a sense of identity and continuity that promotes respect for cultural diversity and human creativity. Such heritage is expressed through oral tradition; customs; language; performing arts; ritual and festive events; popular sports; food and culinary arts; traditional medicine and pharmacopeia; traditional crafts and associated skills of production; and knowledge and practices that concern the natural environment. (ICOMOS, 2002; UNESCO, 2003).

Mitigation – The lessening or limitation of the adverse impacts of hazards and related disasters.

Preparedness – The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from the impacts of likely, imminent or current hazard events or conditions.

Prevention – The outright avoidance of adverse impacts of hazards and related disasters.

Public awareness – The extent of common knowledge about disaster risks, the factors that lead to disasters and the actions that can be taken, individually and collectively, to reduce exposure and vulnerability to hazards.

Recovery – The restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and "build back better", to avoid or reduce future disaster risk.

Rehabilitation – The restoration of basic services and facilities for the functioning of a community or a society affected by disaster.

Resilience – The ability of a system, community or society exposed to hazards to resist, absorb, adapt and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions; the positive side of vulnerability.

Response – Actions taken directly before, during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

Risk – The probability of an event and its negative consequences.

Risk assessment – An informed judgement, based on a methodology to determine the nature and extent of risk to cultural heritage by analysing potential agents of deterioration and damage and evaluating existing conditions of vulnerability that, together, could potentially harm exposed people, property, services, livelihoods and the environment on which they depend, and the corresponding heritage values. (Abarquez & Murshed, 2004; UNISDR, 2015).

Risk management – The systematic approach and practice of managing uncertainty to minimise potential harm.

Shore – A prop for preventing sinking or sagging. (Merriam-Webster.com, 2017).

Shoring – The process of supporting a building, or sections of a building with shores (props) that deviate building loads that have lost equilibrium, safely transferring them to the ground without affecting the existing assemblage of building parts and systems. Shoring may be vertical, angled or horizontal. (el-Habashi, 2017). Alternative definition: it is defined as a temporary support for instable structures, which can be damaged, collapsed, or partly collapsed, providing the stability necessary to protect the property, workers and the public. "A shoring system is like a double funnel. It needs to collect the load with headers/sheathing, deliver it into the post/struts, and then to distribute it safely into the supporting structure below". (FEMA, 2009).

Significance – The meaning and values of an item, collection, or tradition and what makes it important. Significance is the historic, aesthetic, scientific and social values that a cultural heritage asset has for past, present and future generations. (Russell & Winkworth, 2009).

Stabilisation – An intervention or action intended to maintain the integrity and minimise further deterioration of unsafe, damaged, or deteriorated cultural heritage. It may be used as an interim measure or involve long-term preservation. (US National Park Service, 2015).

Tangible cultural heritage – Tangible cultural heritage is composed of the physical manifestations of culture produced, maintained and transmitted within a society. Imbued with cultural significance. Tangible cultural heritage may refer to:

- **Immovable cultural heritage**: places of human habitation including buildings; villages; towns and cities; and structures.
- **Movable cultural heritage**: documents and archives; works of art; handicrafts; musical instruments; furniture; clothing items of personal decoration; religious, ritual and funerary objects; tools and mechanical equipment; and industrial systems.

Vulnerability – The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

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A cultural asset affected by the earthquake in Central Italy (2016) © Ministry of Culture – Italy

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