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PROCULTHER-NET 2

PROTECTING CULTURAL HERITAGE FROM THE CONSEQUENCES OF DISASTERS - NETWORK

TECHNICAL BULLETIN

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THE PROJECT

PROCULTHER-NET 2

PROTECTING CULTURAL HERITAGE
FROM THE CONSEQUENCES OF DISASTERS - NETWORK

PROCULTHER-NET 2 is co-funded by the Directorate-General for European Civil Protection and Humanitarian Aid Operations - DG-ECHO under the European Union Civil Protection Mechanism - UCPM, and implemented by a Consortium led by the Italian Civil Protection Department (Italy) in collaboration with the Ministry of Interior-Disaster and Emergency Management Authority - AFAD (Türkiye), the German Archaeological Institute – DAI (Germany), the Ministère de l'Intérieur - Direction Générale de la Sécurité Civile et de la Gestion des Crises (France), the Fondazione Hallgarten - Franchetti Centro Studi Villa Montesca, the Ministry of Culture and Tourism of the Region Government of Castilla y León (Spain), the Federal Agency for Technical Relief - THW (Germany), the University of Porto - UPORTO (Portugal) and the Suor Orsola Benincasa University - UNISOB (Italy).

Building on the experience and lessons learnt by the previous PROCULTHER EU-funded initiatives implemented under the framework of the Union Civil Protection Knowledge Network- UCPKN, PROCULTHER-NET 2 aims at implementing the pathway mapped out by the PROCULTHER-NET project to consolidate the inclusion of the protection of cultural heritage at risk in the Union Civil Protection Mechanism - UCPM processes and structures, so as to increase disaster preparedness capacities and knowledge at European and national levels.

The ongoing phase, running from January 2024 to December 2025, moves forward to consolidate and further expand the thematic community on the protection of cultural heritage at risk established within the UCPKN, namely for defining elements for its sustainable governance and functioning.

*Join the UCPKN and find out more on **PROCULTHER-NET**!*

FOREWORD

By Kamal Kishore, Special Representative of the United Nations Secretary-General for Disaster Risk Reduction and Head of the UN Office for Disaster Risk Reduction

Kamal Kishore © UNDRR

At the United Nations Office for Disaster Risk Reduction, we view cultural heritage protection as a core component of disaster risk reduction, which is why I am pleased to introduce this latest edition of the PROCULTHER-NET 2 Technical Bulletin. In the face of escalating disaster and climate risks, safeguarding tangible and intangible cultural heritage is a moral imperative and an investment to reduce economic and non-economic losses.

This is an area where UNDRR has been expanding its technical offerings. For example, as part of our support to the Making Cities Resilient 2030 initiative, we developed a Cultural Heritage Addendum to our Disaster Resilience Scorecard for Cities to help cities assess and strengthen their capacity to protect heritage before, during, and after disasters. Moreover, we recently supported the University of Florence in developing a postgraduate course on "Safeguarding of Cultural Heritage in Fragile Contexts," and are working with UN partners to develop methodological frameworks and toolkits to help countries better collect and track non-economic losses.

Fortunately, we are not alone, and there is a growing recognition of the importance of applying disaster risk reduction for the protection of cultural heritage assets. In 2024, cultural heritage protection was an important theme at the G20 Disaster Risk Reduction Working Group discussions [1], for which UNDRR is the Secretariat. And this issue of the PROCULTHER-NET 2 Technical Bulletin demonstrates this.

This edition highlights growing momentum and innovation in protecting cultural heritage in emergencies-from recovery efforts in Italy, Spain, and Mayotte, to national planning in Romania and Hungary, and joint capacity-building initiatives in Germany and during the recent EU MODEX exercise in Venice.

I welcome these efforts and call on countries to do more as part of their accelerated actions to implement the Sendai Framework for Disaster Risk Reduction by 2030.

We must embed cultural heritage protection more deeply into national and local risk reduction strategies and recovery plans, in addition to cooperation frameworks. By doing so, we not only preserve the legacies of the past but also build a more resilient future for generations to come.

I hope you find this issue insightful and inspiring, and I thank all the contributors and partners whose work continues to advance this vital agenda.

[1] ***https://g20drrwg.preventionweb.net/media/102125/download***.

INTRODUCTION

By Editorial Committee

Dear readers,

We are pleased to present the fifth edition of the PROCULTHER-NET 2 Technical Bulletin, which collects a new series of case studies on the latest developments and initiatives in protecting cultural heritage from disasters. How can we reduce risks and improve preparedness for increasingly frequent and diverse natural and human-induced hazards? Drawing on experiences gained in managing the impact of disasters on cultural heritage, this Technical Bulletin seeks to answer this question by presenting examples of training initiatives and field exercises at both European and national levels, the sustainable funding of preparedness actions, the transfer of specialised expertise developed during real emergencies, and the shaping of approaches and strategies to manage risks at international, national, and local levels.

This Technical Bulletin opens with the **PREPAREDNESS** section, featuring two examples of full-scale exercises. This training format typically concludes a preparatory phase before a new cycle begins, based on the insights gained from the exercise. The Italian Civil Protection Department (DPC) brings us the description of a European MODEX that took place in Venice last autumn. It was the first-ever Union Civil Protection Mechanism exercise to include a specific cultural heritage module and to feature two Cultural Heritage Advisors in the European Union Civil Protection Team. The second example is a national exercise organised by the German Federal Agency for Technical Relief (THW) and the German Archaeological Institute (DAI) as part of the KulturGutRetter project. The aim was to test the operational readiness of the Cultural Heritage Response Unit (CHRU) – which subsequently sent a skeleton team to participate in the MODEX in Venice. The last article of this section addresses a critical issue for cultural organisations of all sizes: the funding of preparedness measures. The German Coordination Office for the Preservation of Written Cultural Heritage (KEK) provides an example of a funding mechanism dedicated to emergency preparedness, enabling cultural organisations to acquire supplies and expertise.

The years 2023 and 2024, with new temperature records being broken in several parts of Europe, were marked by several catastrophic event whose impact on people and their heritage is becoming increasingly apparent.

EU MODEX Venice 2024 © European Commission.

In the **RESPONSE** section, first-hand accounts from the teams who provided emergency assistance to cultural heritage sites during three major crises are presented. In a related article, experts

from the Valencian Institute of Conservation, Restoration and Research (IVCR+i) recount their experience of rescuing collections, library and archive materials in the region of Valencia following severe rainfall and flooding caused by the DANA in October 2024. A second article from Valencia, focused on recovery, will be included in the sixth issue. A contribution from Blue Shield France (BSF) provides an on-the-ground report on the coordinated action undertaken with the French civil protection service in the aftermath of Cyclone Chido, which hit the island of Mayotte in December 2024. Finally, reflecting on the floods that struck Emilia-Romagna, Marche, and Tuscany in 2023, a team of conservators from the Opificio Delle Pietre Dure (OPD) and the Central Library of Florence provides a detailed analysis of the shortcomings that hindered the response efforts and the vital role of community involvement.

Technical staff during the Valencia flood
© IVCR+i

The final section of the Technical Bulletin, **FOCUS ON**, emphasises the importance of adopting inclusive and comprehensive approaches when addressing risks to cultural heritage. UNESCO details the central findings of its holistic approach to fire risks, as set out in its recently published *Fire Risk Management Guide for Cultural and Natural Heritage* and draws on case studies from a conference held in Valparaíso in 2024. The last two articles offer different perspectives - national and local - on establishing an operational and legal framework for the protection of cultural heritage in emergencies. The national strategy is presented by the National Institute of Heritage in Romania, while the local approach is shared by a civil protection expert from Hungary. Both contributions highlight the relevance of having a shared reference framework and tools, such as those proposed by the PROCULTHER initiatives.

We would like to thank our contributors and reviewers, who hail from 10 European countries, as well as the Caribbean and the USA, for their ongoing commitment. We are also honoured to feature a foreword by the United Nations Office for Disaster Risk Reduction (UNDRR), equally engaged in the protection of cultural heritage from disasters and in promoting international cooperation in this field.

We wish our readers an instructive time with this latest edition of the Technical Bulletin.

Cultural Heritage activities at EU MODEX Venice 2024

*Simona Papa, Veronica Piacentini and Gabriella Proietti, Civil Protection Department, Presidency of the Council of Ministers, Italy; Nadia Francaviglia and Tiziana Vicario, PROCULTHER-NET 2 Team**

Introduction

EU MODEX (short for EU Module Exercises) is a key component in preparing civil protection intervention teams (known as Modules) for international deployment within the Union Civil Protection Mechanism (UCPM).

It is a full-scale exercise designed to train self-sufficiency, interoperability, operational procedures, safety & security, communication, specific learning objects of the modules and coordination of civil protection modules. An exercise can simulate the entire cycle of a relief mission, from the mission preparation at the disaster site to the demobilization phase.

The host country is responsible for designing and conducting the exercise for the benefit of the participating modules.

For the first time, this EU MODEX featured a scenario and module, dedicated to the protection of cultural heritage, thanks to the active participation of the PROCULTHER-NET 2 project. The initiative invited Germany, as project partner to deploy their own module, called CHRU[1] (Cultural Heritage Response Unit). The CHRU, developed by the DAI (German Archaeological Institute), THW (German Federal Agency for Technical Relief) and LEIZA (Leibnitz Centre for Archaeology), was deployed as a skeleton team (team management, logistics officer, reduced number of specialized experts). The CHRU had the opportunity to work jointly in the field with the Short-Term Countermeasures (STC) Module from the Italian National Fire and Rescue Service, and the civil protection volunteers from Venice specialized in cultural heritage[2], which enabled a comprehensive test of response capacities in the field of cultural heritage protection. In addition, two cultural

* *In collaboration with: Johannes Dahl and Alicia Rehberger, THW, Germany; Marie Courselaud, Preventive Conservation officer, Centre for Research and Restoration of Musées de France - C2RMF, France.*

[1] Website of the project "KulturGutRetter" which developed the CHRU: ***https://www.kulturgutretter.org/en/chru_takes_part_in_a_major_european_exercise_in_venice/*** [Accessed 1 July 2025].
Web-page PROCULTHER-NET2 ***https://civil-protection-knowledge-network.europa.eu/news/proculther-net-brings-cultural-heritage-scenario-eu-modex*** [Accessed 1 July 2025].
More on the CHRU structure and procedures: ***PROCULTHER-NET Project. Technical Bulletin N. 1, March 2023***, ***PROCULTHER-NET Project. Technical Bulletin N. 2, June 2023*** and ***PROCULTHER-NET2 Project. Technical Bulletin N. 4, December 2024. ISSN 2975-190X***.

[2] ***https://www.protezionecivilevenezia.it/veaa/index.php***.

heritage experts from France[3] and Austria, trained through the PROCULTHER-NET initiatives, were integrated in the European Union Civil Protection Team (EUCPT).

EU MODEX Venice 2024 Scenario

The cultural heritage scenario was developed by the Civil Protection Department, within the framework of the PROCULTHER-NET 2 project, in collaboration with the Veneto Region, the Municipality and Metropolitan City of Venice, and the Provincial Command of the National Fire and Rescue Service. The cultural heritage scenario was set in the broader framework of the Exercise simulating a tornado of EF3 to EF4 intensity affecting the lagoon and surrounding areas, causing widespread devastation over approximately 60 km². The intensity of the violent tornado that struck the region in the evening of October 15th persisted for 45 minutes, hitting a vast area that included the Brenta Riviera, Porto Marghera and the mainland of Venice, causing severe damage to the population and buildings in a densely populated urban and tourist area.

Main simulated damages	Simulated response
• 1.500 buildings affected, 27 collapsed • 600 missing (including 150 under the rubble) • 180 injured • 10.000 evacuated • Destruction of infrastructure and disruption of essential services	• Activation of 75 reception areas and 150 volunteer teams (1.000 personnel) • Deployment of 36 ambulances (including 6 water ambulances) and 1 AMP (Advanced Medical Post) • Activation of 20 fire department teams and 1 USAR team (38 operators)

With local resources stretched to the limit, the Veneto Region activated the UCPM, 3 Urban Search and Rescue teams (2 medium and 1 light), 3 type 1 emergency medical teams (EMT) and the Italian STC team were deployed. The objective of the exercise was to test the joint emergency response, including medical assistance and cultural heritage protection. Alongside the mentioned modules, thanks to the involvement of the PROCULTHER-NET 2 project, it was decided to also include a dedicated cultural heritage protection team, represented by the German CHRU.

The EUCPT (composed of EU experts and 1 UNDAC member) played a central role in providing support to local authorities in their needs assessment and in facilitating coordination with international modules and stakeholders.

[3] The French expert was identified thanks to the French partner of PROCULTHER-NET2, DGSCGC (General Directorate for Civil Protection and Crisis Management).

Cultural Heritage activities

The PROCULTHER-NET 2 initiative, in collaboration with the National Civil Protection and the civil protection volunteers of the metropolitan city of Venice, the Italian Ministry of Culture, the Italian National Fire and Rescue Service and the Carabinieri Command for the Protection of Cultural Heritage, played a crucial role in integrating heritage protection in relief operations, providing a realistic scenario to test advanced methods of coordination with local authorities for a range of activities ranging from assessing, documenting, securing and relocating aimed at including cultural heritage protection in future UCPM operations.

Following needs and capacities expressed by the Ministry of Culture, Cultural heritage protection activities took place from 17 to 20 October at several sites in the metropolitan city of Venice. In particular, the premises of the cultural heritage scenario were the Celestia Municipal Archive, the Church of San Lorenzo and the Church of San Stae. The CHRU, in collaboration with the EUCPT experts, also had to identify temporary storage sites for the assets to be protected, selecting among those made available by the Ministry of Culture, namely: the Patronato of San Francesco, the Scoletta dei Calegheri and the headquarters of the Regional Secretariat of the Ministry of Culture.

1. Map of Venice with the sites involved in the exercise highlighted © DPC

Short timeline

17 October: Meeting at the Palazzo Ducale in Venice to coordinate actions with national authorities, the EUCPT, UNDAC, and other relevant module team leaders. Priority was given to the Municipal Archives, where the need for structural checks and the protection of archival assets was highlighted. An inspection was also planned for the following day at a potential site to be used as temporary storage: the Patronato of San Francesco.

18 October: Technical inspection of the Municipal Archives. After safety checks were completed, the CHRU skeleton team assessed the damaged archives and requested support in terms of materials and personnel. The Municipality provided volunteers, resources, and logistical support. The transfer of assets to the Patronato of San Francesco, set up as a temporary storage facility, was carried out and completed within the same day. On the same day, inspections were conducted at the Church of San Lorenzo (where movable assets were damaged by the storm), the Scoletta dei Calegheri, which was deemed unsuitable for temporary storage, and the regional Secretariat of the Ministry of Culture (Palazzo delle Colonne), where adequate spaces were identified for setting up temporary storage.

19 October: The CHRU module and further volunteers were tasked with assessing, cataloguing and packing the movable cultural goods in the Church of San Lorenzo. The assets were transported by boat to the regional Secretariat of the Ministry of Culture. At the end of the day, the Ministry of Culture reported the fall of the 'Virgin and Child' statue, from the façade of the Church of San Stae, an object of special worship strongly tied to the community's identity. This posed the additional challenge of addressing the impact on intangible cultural heritage.

20 October: An inspection of structural damage on the statue of the 'Virgin and Child', which fell from the façade after the storm, was carried out. Following the assessment, the statue was recovered, documented, and then transported to a safe location at the headquarters of the Venice civil protection volunteers.

2. Meeting with local authorities at Palazzo Ducale © DPC

3. Celestia Municipal Archives: CHRU personnel working alongside local civil protection volunteers to secure documents damaged by the storm © DPC

4. Transfer of archival assets to the temporary storage facility at Patronato San Francesco © DPC

5. Securing movable assets from San Lorenzo Church and transport to the temporary storage at Palazzo delle Colonne, Regional Secretariat of the Ministry of Culture © DPC © European Commission © DAI

6. Assessing and securing of the statue of the Virgin with the Child, San Stae Church © DPC

Exercise design and preparation

To ensure the integration of cultural heritage protection activities, the PROCULTHER-NET 2 team began coordinating efforts months in advance. Starting in May 2024, they conducted remote meetings and site visits to select locations and plan activities in coordination with all involved actors.

During the exercise, the PROCULTHER-NET 2 team was divided into subgroups to manage both field sites and EXCON operations, enabling real-time implementation of exercise injects. This was made possible through constant coordination with colleagues overseeing the broader EU MODEX exercise.

Another important aspect to highlight was the excellent cooperation in the preparatory phase of the various parties involved in the exercise: the Ministry of Culture, National Fire and Rescue Service and the Carabinieri Command for the Protection of Cultural Heritage, lent themselves to collaborate in the exercise, playing the role of "actors" and providing locations, means and tools that made the simulation as realistic as possible; the Municipality of Venice through its civil protection team, identified suitable sites for the activities and provided fundamental resources in terms of materials and means; The Municipality also contributed to define the engagement of local civil protection volunteers that provided fundamental support to the activities undertaken by the CHRU skeleton team. The National Fire and Rescue Service made itself available to cross-reference its scenarios with those envisaged for cultural heritage, in order to alternate STC with CHRU and local civil protection volunteers, thus making the activities as true to life as possible. In addition, the STC team of the National Fire and Rescue Service demonstrated

an incredible spirit of cooperation by hosting the CHRU team in their camp for the entire course of the exercise.

Teams in action on the field

The main task assigned to the CHRU during the exercise was the assessment and documentation of damage to both tangible and intangible cultural heritage assets. While the CHRU is normally structured for deployment with 43 experts, including two specialised units equipped for the protection of movable and immovable cultural heritage, only a skeleton team of 7 experts was mobilised for this EU MODEX. As a result, the team operated with a limited set of equipment focused mainly on assessment and documentation activities. Furthermore, the team also made sure to evacuate the assets and report to the authorities.

This configuration offered a valuable opportunity to test the modular and scalable nature of the CHRU, validating its ability to function effectively even with a reduced team. Despite the constraints, the team demonstrated high adaptability and was able to carry out all assigned tasks effectively, confirming the operational flexibility of the module under different deployment conditions.

The EU MODEX also served as a platform to test interoperability and coordination mechanisms with other response modules. In addition to being hosted by the STC in their Base of Operations (BoO), the CHRU benefited and contributed to a high level of interaction with other teams. This was particularly facilitated by the presence of the two cultural heritage experts embedded within the EUCPT, which enabled the following key achievements:

1. Enhanced coordination with the STC to evaluate the accessibility and usability of sites identified for damage assessment, and to jointly identify feasible solutions for the temporary protection of impacted cultural assets. This collaboration also contributed to reducing life threatening risks during emergency situations.
2. Improved coordination across modules, which helped avoid overwhelming national authorities with overlapping or uncoordinated requests.
3. Alignment of expectations with national institutions and local communities, promoting mutual understanding and realistic outcomes.
4. Enhanced effectiveness in the protection of cultural heritage, both tangible and intangible, in line with the scope of the CHRU's mandate.
5. These dynamics fostered constructive exchanges and meaningful cooperation, reinforcing the importance of joint preparedness and cross-module synergy.

An essential contribution was also provided by the local civil protection volunteers, whose members had received dedicated training in cultural heritage protection, in line with Italy's national minimum training standards. A team of 10 trained volunteers

was activated to support operations related to the protection of heritage at-risk . Working in close collaboration with the CHRU, the volunteers brought field-based experience and operational know-how to the response efforts. This collaboration enabled testing of several aspects:

1. Integration of diverse operational procedures, with both teams actively cooperating to achieve shared objectives. The interaction also proved to be an opportunity for mutual learning and exchange of best practices.
2. Application of cultural sensitivity and emotional intelligence, crucial in contexts where cultural assets hold not only practical but also symbolic and identity values. The exercise confirmed the need for responders to combine technical skills with a nuanced understanding of the local context and community sentiment.

Overall, the exercise offered a realistic and rich environment to test scalability, cooperation, and context-aware protection strategies, confirming the added value of modular approaches and inter-agency coordination in cultural heritage emergency response.

Successes and challenges

The Venice EU MODEX experience offered the PROCULTHER-NET community valuable lessons to further refine tools and approaches aimed at fully integrating cultural heritage protection into the operational framework of the UCPM.

While several positive results emerged from the exercise, certain aspects still require further analysis to better highlight both the strengths and areas for improvement. Key elements include:

- The Venice EU MODEX provided a unique opportunity to test, for the first time in a real deployment scenario, the tools, methodologies, and training developed under the PROCULTHER-NET initiatives. These were applied in coordination with USAR teams, EMTs Type 1, and an STC module, demonstrating their relevance and potential effectiveness within UCPM operations.
- The actual use of the PROCULTHER methodology and damage assessment tools underscored the importance of:
    1. Establishing a common operational language shared among all involved actors, to avoid misunderstandings and ensure clarity.
    2. Providing adequate knowledge and specific training on assessment procedures and templates, which significantly reduces execution time.
    3. Simplifying and digitalizing assessment tools / templates to make them more effective
    4. Ensuring the presence of dedicated personnel or digital tools for timely data transmission and real-time information sharing across teams.

- The activities involved multiple actors: EUCPT, CHRU, USAR, STC, and local civil protection volunteers. As previously mentioned, finding a shared language and common working procedures posed a real challenge, as each actor brought its own operational culture and communication style. However, through close collaboration, particularly between the CHRU, STC and the trained volunteer group, a shared approach was developed, enabling effective coordination. Tasks were clearly divided, and information was exchanged efficiently, resulting in accelerated workflows and enhanced impact.
- The CHRU equipment had been pre-positioned at the Lido di Venezia lagoon by an external logistics provider and needed to be retrieved and transported to the BoO. Venice's unique geography and infrastructure, where water transportation is the norm, posed logistical complexities. While the Lido is accessible by ferry for vehicles, Venice itself requires the use of public or charter boats, and many buildings are reachable only on foot. The decentralised format of the exercise, with interventions at multiple sites, made it clear that greater attention should be given to defining the minimum essential equipment needed to document and secure cultural heritage. It raised key questions: What equipment is strictly necessary for the initial response? How can it be transported efficiently across challenging environments? Would it be more effective to deploy a preliminary assessment team to assess needs before moving heavier tools? Planning boat transfers in advance and accounting for the extended travel time proved critical and should be factored into future exercise planning.
- The experience confirmed the importance of ensuring the self-sufficiency and mobility of deployed teams, particularly when operating in territories already facing logistical breakdowns due to an ongoing emergency. All tools and equipment must be easily transportable and rapidly deployable, with minimal dependency on local infrastructure.
- Clear and timely communication flows between all the actors involved are vital. Responding to requests from affected countries or ERCC coordination must occur without delay and without interfering with technical field operations. Appointing one or more individuals specifically tasked with managing communication helps ensure smooth information exchange both within and across teams, while also maintaining alignment with the evolving needs of the overall emergency response. Moreover, it is crucial to always keep in mind the origin and relevance of each request, ensuring that the tasks performed are meaningful and aligned with real priorities on the ground.

Conclusions

In conclusion, this EU MODEX represents a significant milestone, offering valuable insights for assessing and further developing the potential of a cultural heritage module within the UCPM.

Achieving these ambitious results has indeed proven to be a challenging endeavor. The journey required not only technical but also political and outreach efforts by all the different institutions involved in the exercise, to ensure effective awareness within their respective national contexts. Furthermore, significant diplomatic efforts proved necessary to secure a sustainable and effective capacity to support the approach advocated by the PROCULTHER initiatives over the past five years.

The lessons learned have already proven to be crucial for the future definition of civil protection modules dedicated to the protection of cultural heritage, a reality that now more than ever can come true thanks to the approval of the EU Implementing Decision 2025/704 of 10 April 2025[4], which to all intents and purposes includes this capacity on a par with the others, initiating new future prospects.

[4] ***https://eur-lex.europa.eu/eli/dec_impl/2025/704/oj/eng.***

Establishing operational readiness in a cross-sectoral team

Constance Domenech de Cellès, Research Associate, German Archaeological Institute - DAI; Alicia Rehberger, Project Manager, International Division, German Federal Agency for Technical Relief – THW, Germany

International disaster relief is a complex operation that mobilises a wide range of technical, logistical, and operational skills. Disaster response teams are inherently multidisciplinary. They can be deployed in various areas, such as water purification (WP), search and rescue (USAR), pumping (HCP), IT and Communication (ICT/TAST), etc. International disaster relief operations for cultural heritage add another layer of complexity, as this field is rather new. Guidelines such as those developed jointly by INSARAG and UNESCO[1] show that additional, specific skills and knowledge are needed to preserve cultural heritage. This is where cultural heritage experts come in. These professionals are generally not used to working with civil protection experts in their daily tasks. They also represent a variety of disciplines, including restoration, architecture, conservation, and archives. Therefore, achieving interoperability for joint missions between these two groups of experts requires an analysis of needs, strengths, weaknesses, and complementarities, the definition of a common ground, and a well-designed, multi-faceted training curriculum.

In its efforts to establish an international operations response team for the protection of cultural heritage, namely the *Cultural Heritage Response Unit* (CHRU), the German project KulturGutRetter[2] has developed a cross-sectoral team, combining experts from the field of civil protection and cultural heritage. Together, they can be deployed worldwide to intervene at cultural heritage sites after disasters (caused by natural hazards or human-induced), for movable and immovable cultural heritage. Drawing on the expertise of its three founding partners – the German Federal Agency for Technical Relief (THW), the German Archaeological Institute (DAI) and the Leibniz Centre for Archaeology (LEIZA) – the KulturGutRetter project designed a specific team structure[3], defined expert profiles, developed new equipment, conceived a data management infrastructure, wrote Standard Operating Procedures (SOPs), launched a recruitment campaign and started a common training pro-

[1] Urban Search and Rescue at Heritage Sites, 2023, ***https://www.iccrom.org/sites/default/files/publications/2023-06/en_1_guidance_note_usar-cultural-heritage-safeguar_far_2023_iccrom.pdf*** [Accessed 6 May 2025].

[2] Supported by the Federal Foreign Office and the German Bundestag ***https://www.kulturgutretter.org/en/home-2/*** [Accessed 6 May 2025].

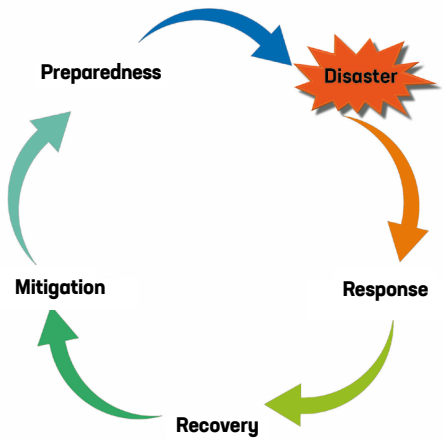
[3] Domenech de Cellès C., Jakubeit N., KulturGutRetter (KGR): technical characteristics of a cultural heritage response unit, in ***PROCULTHER-NET Project. Technical Bulletin N. 1, March 2023***, pp. 58-64. ISSN 2975-190X.

gramme. An important milestone was reached in September 2024, with the implementation of the first full-scale exercise to train the capacities of the CHRU during a simulated mission.

Following a series of articles on the development of the CHRU published in previous Technical Bulletins (global technical characteristics, modular equipment for emergency restoration of movable heritage, IT and data infrastructure)[4], this article describes the steps taken by the project to establish operational readiness in a cross-sectoral team for cultural heritage response missions in disaster relief.

1 Challenges of establishing a cross-sectoral team

The fields of cultural heritage preservation and civil protection pursue different approaches, and one should not overlook these differences when building a cross-sectoral team of cultural heritage and civil protection experts. The former is associated with long, meticulous processes of restoration or conservation measures of objects and sites, to preserve them for future generations. Everything is done to limit changes in the environment and to maintain stable conditions. The latter focuses on fast response during emergencies in order to save lives, to rescue humans, animals, and goods. Therefore, the timeframe is much tighter. The two groups of experts generally work on different phases of the disaster management cycle, such as recovery, prevention, and mitigation measures. In addition, each field has its own set of standards, procedures, and rules, which are not directly compatible in their approach to time, means, and resources or even wording.



1. Disaster Management Cycle ©THW

For civil protection the first aim is always: safety and security of the team. On the other hand, prioritising cultural assets is the main goal of cultural heritage experts. These two perspectives have to be combined on site, during missions and hold a potential for conflict. Standard Operation Procedures, which define processes and measures, help to prevent con-

[4] See ***PROCULTHER-NET Project. Technical Bulletin N. 1***, ***March 2023***, ***PROCULTHER-NET Project. Technical Bulletin N. 2, June 2023*** and ***PROCULTHER-NET2 Project. Technical Bulletin N. 4, December 2024***. ISSN 2975-190X.

flicts from the beginning and during a mission. Clearly defined processes, responsibilities and decision-making guide a team even when speaking two different languages. Bridging this gap and combining the different perspectives of the team members can be very fruitful and leads to a successful operation. Mutual understanding of each other's perspective and respect of their expertise needs to be the basis, which can be achieved with common training and exercises. The past has shown that joint experience in the team is the main catalyser to build a common spirit.

To protect and rescue cultural heritage from the effects of disasters, these strengths were harnessed in the development of the German CHRU. The three project partners of KulturGutRetter have worked on the following to reach this goal and to establish a common ground:

a. Defining MSPs (minimum standard procedures) and SOPs (standard operating procedures).[5]

b. Combining civil protection equipment with newly developed specialized cultural heritage protection equipment.[6]

c. Defining complementary profiles, embedded in one team with a common lead.

d. Defining the training curriculum and implementing exercises.

The first two aspects having been covered in previous Technical Bulletin articles, the current contribution focuses on the last two.

2 Defining complementary profiles, embedded in one team

Specific expert (f/m/d)[7] profiles for the CHRU have been jointly defined by the KulturGutRetter partners to ensure that all the needs for the protection of cultural heritage are met in the field during response missions.

a. In the field of cultural heritage – managed by the DAI

- **Documentation expert**: carries out comprehensive as-built documentation of buildings, equipment, and movable cultural assets on site. This includes the emergency

[5] Domenech de Cellès C., Jakubeit N., KulturGutRetter (KGR): technical characteristics of a cultural heritage response unit, in ***PROCULTHER-NET Project. Technical Bulletin N. 1, March 2023***, pp. 58-64. ISSN 2975-190X.

[6] Vallmer-Bardelli I., Providing first-aid to movable cultural heritage: a modular table system, ***PROCULTHER-NET Project. Technical Bulletin N. 1, March 2023***, pp. 19-23. ISSN 2975-190X, and Iacono E., Fritsch B., Data acquisition and data management for the emergency rescue of cultural heritage, ***PROCULTHER-NET Project. Technical Bulletin N. 2, June 2023***, pp. 35-39. ISSN 2975-190X.

[7] In the following all profiles are meant to include all genders.

documentation of endangered components, the detailed documentation of selected components or pieces of equipment as well as the documentary support of evacuation and salvage processes as well as security and protective measures. In addition to photo documentation and surveying work, the tasks also include data processing and the creation of 3D models and geo-referenced plan information using various tools and methods.

- **Assessment Expert for Immovable Heritage and Movable Heritage**: carries out the damage assessment and evaluation on site. This includes the digital recording of damage and hazards using QField, categorisation in assessment scales, and the determination of further measures within the assignment.

  Task description:

  - Damage assessment of movable cultural assets
  - Risk Assessment
  - Urgency assessment
  - Determination of first aid measures
  - Identification and determination of material categories after cleaning

- **Conservation Expert for Immovable Heritage and Conservation/Salvage Expert for Movable Heritage**: manages and carries out the emergency conservation care of cultural heritage on site and liaises with local experts. In the area of built heritage, this includes emergency conservation and stabilisation measures on the building and its furnishings, and the dismantling and salvage of cultural heritage if necessary. In the area of movable cultural assets, this includes rescue operations and initial conservation care (wet cleaning, drying, dry cleaning, packing).

  Task description:

  - Execution and management of rescue and first aid operations
  - Instructing Cultural Heritage Support during the first aid measures
  - Accompanying rescue operations

- **Salvage Expert**: carries out the salvage and dismantling of components or structural equipment on site as well as the evacuation of movable cultural assets, including simple object documentation. The manual and technical tasks range from chiselling, cutting, loosening, and lifting to the construction and assembly of protective and support devices, simple conservation stabilisation techniques (gluing, laminating, plaster protection, wedging), and basic knowl-

edge of rescue work and working at heights, as well as handling and moving loads.

- **IT Expert**: supports all areas of digital mission and cultural heritage documentation and is responsible in particular for data flow, data management, and troubleshooting in the field. This includes, partly in close cooperation with the THW-ICT Expert, the development of the digital ecosystem (server/cloud, hardware, QGIS/QField, data synchronisation and data management) and the management of the devices in use (tablets, cameras, surveying equipment, UAV if necessary) including user access to applications (network, ODM, device management).

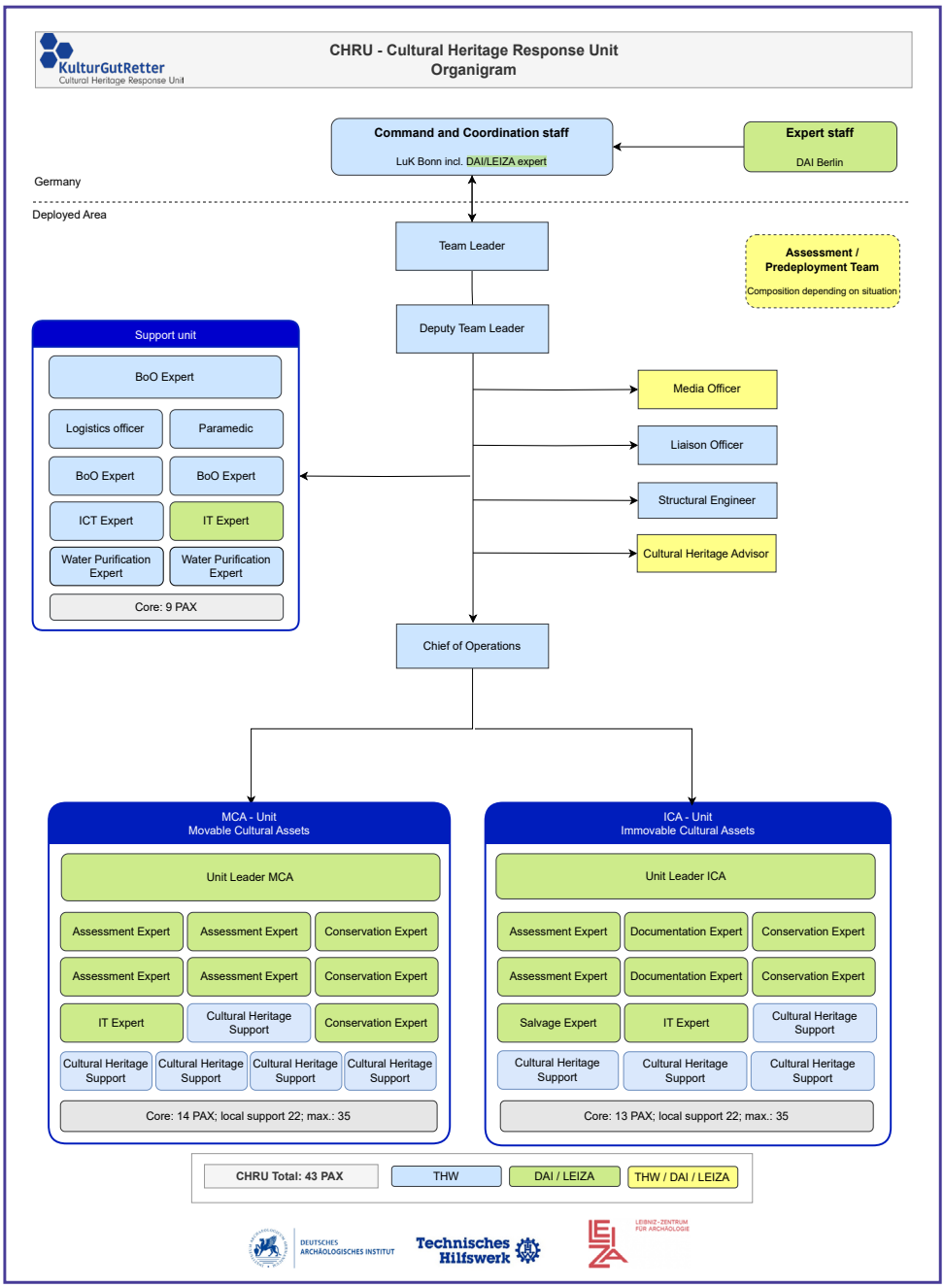
b. In the field of civil protection – managed by THW

- **Cultural Heritage Support CHRU**: works in a team with the other Cultural Heritage Supports CHRU and the cultural heritage experts from DAI. The person supports the entire process chain of emergency care for movable cultural heritage, e.g. documentation/cleaning of cultural assets as well as for immovable cultural heritage, by e.g. construction of wooden supports, assistance with the recovery and securing of cultural assets. Furthermore he/she supports the *Support Unit* in setting up and operating the Base of Operations (BoO), also assisting in the manual transportation and storage activities.
- **Other team functions**: Management profiles (Team Leader CHRU, Deputy Team Leader CHRU, Chief of Operations CHRU), Structural Engineer CHRU, Liaison Officer, Media Officer, Logistics Officer, Paramedic, BoO experts, ICT expert and Water Purification experts.

c. Mixed profile (can be filled by cultural heritage or civil protection experts)

- **Cultural Heritage Advisor CHRU**: advises the Team Leader on issues relating to movable and immovable cultural heritage. He/she works in close cooperation with the Liaison Officer and establishes contact between the local persons responsible and/or affected in the field of movable and immovable cultural heritage and the Team Leader CHRU. The expert also advises the Team Leader on deployment options. In consultation with the Team Leader and in cooperation with Liaison Officer, he/she is in direct contact with the affected cultural heritage institution. The advisor is also responsible for information gathering and evaluation, e.g. on affected cultural heritage, available local personnel, premises, technical facilities, etc.

These expert profiles are embedded in the CHRU team structure.



2. CHRU Team Structure © KulturGutRetter, DAI/THW/LEIZA

In the spring of 2024, KulturGutRetter launched a call for volunteers to recruit the future CHRU team members. For the civil protection sector, THW has access to its own expert pool of over 1,700 qualified emergency personnel for international missions. In order to become a THW expert with the qualification to be deployed abroad, one must first complete the national basic training. THW volunteers become members of one of the 669 THW local sections in Germany, where they gain national experience in civil protection and specific further training. The volunteers can then apply for an international profile, such as team leader, cultural heritage advisor, ICT-expert, etc. Each profile has basic prerequisites, such as a certain level of English-language skills or intercultural understanding, as well as specific requirements, such as knowledge and experience in a specific field of expertise. Once the application has been successful, specific training is mandatory before international deployment. From this international pool, experts were recruited for the CHRU. Information events were also offered for experts from the THWs national pool, in order to recruit even more people. They were then given the opportunity to take part in a special training course to prepare for international deployment and to become a member of the CHRU.

For the cultural heritage sector, the DAI and LEIZA mobilised a network of German cultural organizations and professional associations, which are regularly involved in the project to share best practices and exchange expertise to spread the call.[8] More than 200 people registered to take part in one of the two online information sessions to present the project and the requirements. Of those who submitted an official application, about 100 were selected to join the CHRU pool of experts once they completed a training programme. The selection criteria included:

- Being over 21 years old.
- Degree in a relevant field (depending on the profile).
- Professional knowledge and experience (if possible, experience abroad).
- Willingness and availability to participate in self-study e-learning courses, practical training, and national and international exercises.
- Good team and communication skills, intercultural empathy.
- Personal skills: responsible, reliable, ability to accept criticism, very high level of mental and physical resilience; ability to deal with new situations and react flexibly.
- Good English level, and if possible, another language.

A large pool of experts is necessary to ensure that the right skills and knowledge are available in case of an emergency. Building on the system implemented by the THW, nearly all CHRU team members are volunteers. Therefore not all may be available at short notice due to job obligations. It is therefore necessary to have a large

[8] ***https://www.kulturgutretter.org/mitmachen/*** [Accessed 6 May 2025].

variety of cultural heritage experts, and enough experts in each category to fill the same position at least three times. The exact profile of the team deployed will depend on the nature and extent of the damage, but also on the type of cultural heritage involved. New volunteer recruitment campaigns will be launched in the future to continue to expand and diversify the pool.

As the team structure was developed in a modular way, it is possible, for example, to deploy only one specialised unit, either Movable Cultural Assets Unit (MCA) Unit or Immovable Cultural Assets Unit (ICA). The Team Lead profiles will always be deployed.

3 Defining training curriculum and implement exercises

A prerequisite for the admission of volunteers to the CHRU was the willingness to participate in further training and exercises. Parallel to defining the profiles needed in a cross-sectoral team, the KulturGutRetter project partners designed a training curriculum to ensure that the gaps and challenges identified between the civil protection and the cultural heritage sectors were bridged. The curriculum was designed based on lessons learned from existing training programmes in the field of cultural heritage[9] and from the THW expertise on training for disaster relief missions. The curriculum was designed to respond to the particular set-up of the CHRU: cultural heritage and civil protection experts are to be trained together, in the long-term, through a set of a series of online and hands-on training sessions, to be deployed together into a team, with procedures, tools and workflows specific to the CHRU. The goal is not to train individual cultural heritage first responders, but to build a team of complementary experts, with shared Standard Operating Procedures, working together in the field.

The training curriculum thus has several objectives:

- to provide cultural heritage experts with the basic rules and context of international disaster relief operations,
- to provide civil protection experts with basic training in handling movable heritage assets and approaching built heritage,
- to familiarise each group of experts with the procedures, workflows, and equipment developed for the CHRU,
- to ensure a common language and understanding,
- to foster a team spirit.

a. Online courses

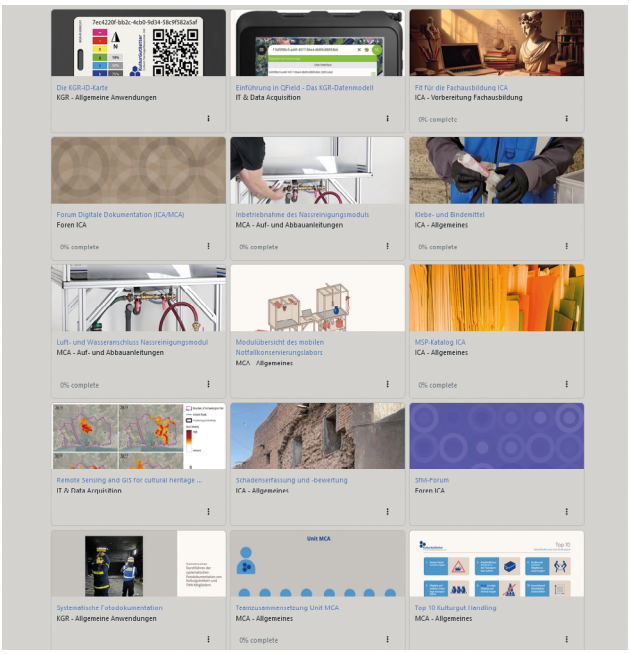
In May 2024, the online training for cultural heritage experts was launched using the learning platform iDAI.tutorials. The volunteers became acquainted with the equipment,

[9] E.g., PROCULTHER/PROCULTHER-NET projects, ICCROM-FAR.

standards, and workflows of the CHRU through short tutorials and videos. Not all profiles needed to attend all e-learning sessions. A specified curriculum defined the necessary e-learning units for each expert. However, all the training units were designed to be followed by both civil protection and cultural heritage experts. Examples include:

- Disaster relief missions content: What is cultural heritage and why should it be protected in crisis? Introduction to the EU Civil Protection Mechanism (UCPM) and international actors of international disaster relief; Use of the KulturGutRetter ID-Cards for data acquisition and management[10]; Living in a BoO; etc. Safety and Security trainings are provided by external actors as well as by in-house practical trainings.
- Movable Cultural Assets (MCA) Unit: How to assemble and dismantle the different stations of the emergency conservation laboratory designed by LEIZA[11] (basic module, service module, documentation station, wet cleaning station, dry cleaning station, packing station); Workflows and methods for photographic documentation, wet cleaning, packing of different types of objects and materials, etc.
- Immovable Cultural Assets (ICA) Unit: Content of the equipment boxes (for structural safeguarding, object safeguarding); procedures for damage assessment and documentation; use of Structure for Motion (SfM); online training scenarios; etc.
- For IT & Data Acquisition – use of QField and digital documentation; remote sensing and GIS; etc.

Further training material is regularly uploaded, based on the feedback from the volunteers and the needs identified.



3. Example of online courses available to CHRU volunteers on iDAI.tutorials

[10] Iacono E., Fritsch B., Data acquisition and data management for the emergency rescue of cultural heritage, ***PROCULTHER-NET Project. Technical Bulletin N. 2, June 2023***, pp. 35-39. ISSN 2975-190X.
[11] Vallmer-Bardelli I., Providing first-aid to movable cultural heritage: a modular table system, ***PROCULTHER-NET Project. Technical Bulletin N. 1, March 2023***, pp. 19-23. ISSN 2975-190X.

b. Hands-on training

In June 2024, 80 CHRU volunteers attended a two-day practical course in Hilden, at a THW logistics centre. The aim was to teach them how to use the special equipment developed for the CHRU (including the emergency conservation laboratory), but also to practice hand-in-hand work between civil protection and cultural heritage experts and to promote team building.

Members of the MCA Unit – experts in Assessment, Documentation and Conservation – practiced uncovering, documenting, and recovering lion statues, reliefs, and building fragments. Others used the various stations of the emergency conservation laboratory to photograph, professionally clean, and pack shards, bones, glass, paper, and other materials.

Members of the ICA Unit – experts in surveying, building research, architecture, conservation, and heritage management – learned about the Minimum Standards Procedures (MSP) for surveying using tachymeters, 3D laser scanners, and GNSS, and practiced transferring the data into the DAI's QField-based digital documentation system.[12]

While online training can provide a good foundation, a complementary hands-on training is essential to ensure that the team gain practical knowledge of the equipment as well as the opportunity to test the procedures. Face-to-face meetings also allow for better communication between team members, especially if they come from different professional backgrounds. For example, apart from the practical aspect, the assembly and disassembly of the mobile conservation laboratory also provided an opportunity for team building between civil protection and cultural heritage experts.

This type of training will in the future take place once a year, to train the CHRU team members who couldn't participate the first time. First time learners will be assisted by CHRU members that have already completed the course. This way, the team spirit can be further enhanced and more team members can meet each other.

4. Hands-on training © E.Goetting, DAI on iDAI.tutorials

[12] The CHRU developed a digital documentation system to document the objects themselves and the measures carried out during response missions. The unit is equipped with its own mobile IT infrastructure so that the documentation system can operate autonomously. To learn more: ***PROCULTHER-NET2 Project. Technical Bulletin N. 4, December 2024*** [Accessed 6 May 2025].

Additional advanced training is being offered to the volunteers in 2025. For each area of expertise – IT& data, immovable heritage, movable heritage – a 2- to 3-day specialised training was conceived to work on specific challenges in each field. For example, the CHRU-IT training in April 2025 brought together IT-specialized cultural heritage experts and THW ICT-experts (Information and Communication Technology). The focus was set on two main areas: Firstly, there was training on how to use all digital devices that could be used in the CHRU, including the digital documentation system. Secondly, participants practised setting up the planned network hardware and learned the basics of network technology. During the practical exercise, one group installed a local network in the basement of a neighbouring building to collect data on this site. The other group set up a measurement system with a GNSS receiver in parallel that georeferenced the collected data. Test data was then recorded using various devices - including a total station, a UAV, a 3D laser scanner and tablets with the QField documentation app, the CHRU's standard system. On the second day of the workshop, the exercise activities were then extended to a second location, set up around 500 meters away and connected to the local network. This made it possible to successfully document with tablets at two locations in parallel.

c. Testing capacities in a full-scale exercise

From 25 to 28 September 2024, a full-scale exercise was organised at the Renaissance castle of Demerthin (Brandenburg, Germany) to test what the CHRU volunteers had learned in their training and to assess the operational readiness of procedures and workflows.

At the beginning of the event, the CHRU received an operational briefing, which included an overview of the damaged area and the international request for assistance. The exercise scenario included a severe earthquake simulated in a fictional non-EU third country "Altengard". National and international relief teams had completed the life-saving phase, whereupon the international request for assistance was extended to include cultural heritage protection. The CHRU was then sent to Altengard via the UCPM.

The CHRU, consisting of THW emergency experts and volunteer experts from the DAI, carried out a damage assessment on and in the Renaissance castle during the exercise. The team assessed the damage and the statics and documented the building with its paintings, statues, sculpted works and other artefacts using the digital documentation system "QField", developed at the DAI. They built wooden structures for support, salvaged sculptures and historical decorative elements and other movable cultural objects. After recovery, these were stored in a mobile first aid laboratory, which was set up by the volunteer experts, in the park behind the castle. In this mobile laboratory, developed by LEIZA for emergency conservation, the CHRU photographed, documented, cleaned and packed the recovered movable cultural heritage assets and prepared them for handover to the affected institution.

5. The CHRU at the full-scale exercise © M.Pasternak, DAI

Civil protection experts were involved in all the work phases with several team members and provided at the same time the technical and logistical components of the unit. In addition, the provision and maintenance of a base of operations (BoO) was also ensured by these experts, which were especially training in the area of self-sufficiency. Civil protection experts continued to manage operations and, in the meantime, supported the specialized units (MCA & ICA) with the tasks related to movable and immovable cultural heritage, by coordinating the cultural heritage experts. The team structure, the special equipment and the workflows of the CHRU were tested for the first time in an operational scenario after a series of training events.

At the end of the event, high-ranking guests from the EU Commission, the German Federal Foreign Office, the German Federal Ministry of Interior, as well as local stakeholders and members of the press were given an insight of the new international response team CHRU and its capabilities.

Perspectives

This training cycle, culminating with the full-scale exercise, was evaluated thanks to systematic surveys sent to the participants on the online training, the hands-on training, and the full-scale exercise. Observers were also present during the entire duration of the full-scale exercise to provide independent feedback. The evaluation phase was closed a few months later with a lessons-learned workshop. The results

show that the exercise was a success and that exercises of this kind are necessary to prepare a team for deployment, especially when it comes to cross-sectoral teams, where team members usually don't work together in their daily business. It allowed to identify the elements from the online and practical training that need to be strengthened and completed, such as providing a common communication tool, reviewing minor processes of the SOPs or adding specific equipment.

In October 2024, the CHRU was involved in a EU MODEX exercise in Venice.[13] It was the first exercise of this type to include a cultural heritage scenario. The CHRU, deployed as a skeleton team was able to test the flexibility of its structure, its compatibility with the EUCPT, and the adaptability of its procedures in the context of the Venice Laguna. Participating in this exercise was particularly meaningful as, in the medium term, the CHRU aims to be registered as a Cultural Heritage Module within the UCPM. A collaboration with other international stakeholders in the field of civil protection and cultural heritage protection, within the UCPM, is part of the efforts of KulturGutRetter to foster exchanges between the European level (through the PROCULTHER-NET2 project) and the national level in Germany (with the cultural heritage network) to promote better preparedness and integration.

Training is continuing in 2025, with the goal to achieve team operational readiness by the end of 2025.

[13] See more in the article "Cultural Heritage activities at EU MODEX Venice 2024" in this issue of the PROCULTHER-NET 2 Technical Bulletin, pp. 10-20.

Funding and facilitating cultural heritage protection in Germany

Timm Wille, Research Associate, Coordination Office for the Preservation of Written Cultural Heritage - KEK, Germany

Introduction

Cultural heritage in Germany is spread across archives, libraries and museums of varying sizes and trusteeships. Emergency preparedness lies within the responsibility of these institutions. However, many – especially smaller ones – lack the necessary financial resources and practical expertise. This situation is exacerbated by the growing pressure on cultural budgets in recent years. In 2010, the German government and the federal states established the Coordination Office for the Preservation of Written Cultural Heritage (KEK).[1] Entrusted to coordinate and finance the preservation of written materials, KEK's objectives include strengthening of resilience across Germany's cultural sector through a comprehensive, multi-risk approach.[2]

Funding programmes

The KEK offers two funding programmes that contribute to this goal: the BKM Special Programme and the KEK Pilot Project Funding.[3] The most common measure in KEK-funded projects is the packaging of documents, with total project costs reaching €27.1 million by 2024. Packaging protects objects from light, dust and climate fluctuations and can also mitigate the negative effects of fire or water damage, as well as simplify rescue operations and transportation.

Within the KEK Pilot Project Funding, one category is dedicated to emergency preparedness. By 2024, the KEK had funded 78 projects in this category, with total costs reaching €1.2 million.[4] At their core is the nationwide provision of equipment, with almost two-thirds of projects focusing on material supplies such as emergency boxes. The remaining third covers risk and hazard assessments, disaster response exercises and other theoretical and practical frameworks. Examples include the de-

[1] The KEK is funded by the Federal Government Commissioner for Culture and the Media and the Cultural Foundation of the German Federal States. For more details, see: ***https://www.kek-spk.de/about-us*** [Accessed 13 May 2025].

[2] The KEK's multi-risk approach was officially recognized in Germany's national resilience strategy. See: Federal Ministry of the Interior and Community (BMI), 2024. Umsetzungsplan der Deutschen Strategie zur Stärkung der Resilienz gegenüber Katastrophen, 91. ***https://www.bmi.bund.de/SharedDocs/kurzmeldungen/DE/2024/07/resilienz.html*** [Accessed 13 May 2025].

[3] The BKM Special Programme uses federal funds to support large-scale procedures such as deacidification, packaging and cleaning. KEK Pilot Project Funding invests in particularly innovative approaches and best practices.

[4] The total number of projects funded by the KEK reached 1,159 in 2024, with total costs of over €47 million. Emergency preparedness is one of many areas within the KEK's funding portfolio.

velopment of a free e-learning course[5] and a manual for salvaging damaged materials.[6]

All projects are evaluated by the KEK's expert advisory council against strict criteria. Among other things, they must be cost- and resource-efficient, integrated into broader risk management strategies and show innovative or exemplary approaches.

1. Emergency boxes with essential supplies for initial treatment
© Anna Katharina Fahrenkamp, LVR-Archivberatungs- und Fortbildungszentrum

Through the KEK's Pilot Project Funding, cultural heritage institutions benefit from emergency supplies and expertise, enabling them to respond more effectively to damage events. The projects have a significant impact beyond the individual institutions as well, particularly with regard to so-called emergency associations, where several cultural institutions form a cooperative network to provide mutual support at the local or regional levels. Joint emergency drills and a close cooperation with local

[5] See: ***https://bestandserhaltung.eu/start/notfallvorsorge*** [Accessed 13 May 2025].
[6] See: ***https://www.kek-spk.de/projekt/anleitung-zur-rettung-von-archiv-und-bibliotheksgut*** [Accessed 13 May 2025].

fire brigade further consolidate effective and reliable emergency response structures.[7] The combined material supplies and expertise of the association's members are essential during major events, when smaller institutions in particular may be ill-equipped to respond quickly. In 2024, the majority of all newly established emergency associations in Germany had previously received KEK funding, demonstrating the programme's long-term leverage effect. The establishment and equipping of emergency associations will remain a central task in the coordinated protection of cultural heritage.

Other initiatives promoted by the KEK

In addition to funding measures, the KEK promotes initiatives and innovative developments in the field of cultural heritage protection. In 2022, the KEK launched an interactive map showing the locations of all emergency associations.[8] The map was recently updated to show supra-regional networks at the federal state level, as well as large-scale equipment. It serves both as a knowledge-sharing platform and a useful communication tool, highlighting structural 'blind spots' in Germany's emergency infrastructure for cultural heritage protection. Another important initiative was the development of recommendations on emergency preparedness in archives and libraries, co-authored by the KEK and the preservation committees of the Federal Conference of Municipal Archives (BKK), the German Library Association (dbv), and the Conference of Heads of Federal and State Archival Authorities (KLA) and published in 2024.[9]

Awareness of the fragility of cultural assets has been an essential part of KEK's mission from the outset. Its creation in 2010 was a response to two major damage events: the 2004 fire in the Herzogin Anna Amalia Bibliothek (Duchess Anna Amalia Library) and the 2009 collapse of the Historical Archive of the City of Cologne. The latter event in particular served as a wake-up call, leading to the KEK's establishment as a project jointly funded by the federal government and the federal states. While emergency preparedness has long been a feature of the KEK's Pilot Project Funding, additional funds were made available for this category in 2023 and 2024. Consequently, the number of applications increased significantly and remained high even after the additional funding ended, demonstrating both a sustained demand and growing awareness of cultural heritage protection.

This development can be attributed in part to challenging conditions faced by in-

[7] For more information on emergency associations, see: Dohrmann, A. and Siegel, A., Preparedness Networks Cultural Property Protection in Germany. In: ***PROCULTHER-NET Project. Technical Bulletin N. 3, July 2024***, pp. 41–46.

[8] ***https://www.kek-spk.de/notfallverbundkarte/*** [Accessed 13 May 2025].

[9] *Empfehlungen zum Notfallmanagement in Archiven und Bibliotheken* (Recommendations on Emergency Preparedness in Archives and Libraries), 2024. Drafted by the preservation committees of BKK, dbv, and KLA and the KEK. ***https://www.kek-spk.de/publikationen#empfehlungen-zum-notfallmanagement-2024*** [Accessed 13 May 2025].

stitutions in recent years – including a shifting security paradigm in Europe, technological risks and more frequent extreme weather events. Several major damage events amplified calls to strengthen resilience in Germany's cultural sector. The catastrophic floods of 2021 highlighted the limitations of the country's existing national disaster risk management.[10] The emergency associations in affected regions were overwhelmed with the initial treatment of damaged cultural assets. As a result, administrative assistance had to be brought in from other regions and federal states.

Large-scale and first aid equipment for cultural heritage

In the aftermath of the floods, the German government set up a special fund – separate from KEK programmes – enabling, among other things for the procurement of up to ten "emergency containers" for cultural heritage. According to the *German Strategy for Strengthening Resilience to Disasters*, this kind of large-scale rescue and first aid equipment represent essential "disaster response support components in the area of cultural heritage assets protection".[11]

2. The Cologne emergency container during its unveiling © Historisches Archiv der Stadt Köln

[10] Cuddy, A., 2021. Germany floods: How a country was taken by surprise. BBC News. ***https://www.bbc.com/news/world-europe-57867773?utm_source=chatgpt.com*** [Accessed 8 June 2025].
[11] Federal Ministry of the Interior and Community (BMI), 2022. German Strategy for Strengthening Resilience to Disasters Implementing the Sendai Framework for Disaster Risk Reduction (2015-2030) – Germany's contribution 2022-2030. 61. ***https://www.publikationen-bundesregierung.de/pp-de/publikationssuche/resilience-to-disasters-2248300*** [Accessed 13 May 2025].

Against the backdrop of the government's special fund, representatives from the affected federal states and cultural heritage experts discussed four different models of large-scale equipment, three of which stemmed from KEK projects. The first, an emergency container developed by the Cologne Emergency Association of Archives and Libraries and the Cologne Fire Brigade is probably the most prominent.[12] This roll-off container can be used as a mobile work environment, even in adverse weather conditions. Workstations for initial treatment like the cleaning of salvaged items are fully integrated, and storage space is provided for most required supplies. The container's development in a KEK project from 2019 to 2020 was informed by lessons learned from the Cologne archive collapse in 2009. During the 2021 floods, it was used for treatment of archival materials in the town of Stolberg – only half a year after its public presentation.

3. The Dresden emergency container and its contents
© Sächsische Landesbibliothek - Staats - und Universitätsbibliothek Dresden

The second model is an emergency container developed in a 2013 KEK project by the Saxon State and University Library Dresden (SLUB). It is designed to transport large equipment and materials needed to mitigate the damage of the rescued assets, such as power units and packaging supplies. It does not have fixed workstations but the empty container can be used for temporary storage and basic weather-protected tasks. Both the Cologne and Dresden containers are compatible with swap-body vehicles.

[12] For more details on the Cologne container, see: Fischer, U. and Thiel, N., From vision to reality – the Cologne Container for the protection of cultural heritage. In: ***PROCULTHER-NET Project. Technical Bulletin N. 1, March 2023***, pp. 24–29.

4. Carts are being unloaded from the Goerlitz emergency trailer © Senckenberg Jacqueline Gitschmann

The third model funded by the KEK is a trailer developed in 2021 by the emergency association of Oberlausitz-Niederschlesien in the city of Goerlitz. Equipment for rescuing and implementing the initial treatment is stored inside on movable cage carts and the empty trailer can be used for temporary storage. It can be transported by a standard vehicle with towing capacity thanks to its tow hitch and is equipped for deployment in rural and off-road areas.

5. The Thuringia utility vehicle with equipment © Feuerwehr Weimar

The fourth model discussed in the context of the special fund is a motorised utility vehicle acquired by the state of Thuringia in 2019. It is designed to transport equipment stored inside on movable cage carts and is equipped with essential fire department gear, such as radios. With air-conditioning, it is suitable to transport damaged cultural assets and can also serve as provisional storage.

All four models were developed in close collaboration between fire departments and cultural heritage experts, enhancing standardisation and interoperability. Since the expected scenarios often involve large volumes of damaged cultural assets, the models are designed to support the setup of treatment lines for initial recovery. In most cases, they allow for the establishment of tented unheated treatment areas. The equipment and supplies are tailored by each institution based on risk assessments and the specific characteristics of the affected cultural assets – for example, oversized or three-dimensional objects may require the use of tents.

While the government's special fund is aimed at the flood-affected federal states, the need for nationwide, sustainable distribution of large-scale equipment has also been recognised in other states: in 2024, the state of Baden-Württemberg acquired a container based on the Cologne prototype using KEK funding.[13] The German Federal Archives acquired three trailers in 2023 based on the Goerlitz model. In 2024, the city of Zwickau followed suit in a KEK project. Other institutions are planning to do the same in the coming years. While these models enhance the federal states' ability to respond effectively to damage events, the possibility of nationwide deployment is increasingly being considered. At the same time, new supra-regional emergency associations spanning entire federal states have been established, for example in Bavaria.

Conclusions

Through its Pilot Project Funding, the KEK has helped create and sustain the positive momentum in the acquisition of various types of large-scale equipment. KEK projects have strengthened the resilience of the cultural sector in general, with both individual institutions and emergency associations benefiting from additional material supplies and know-how. Thanks to its cross-sectoral focus and integration into a broad network of cultural heritage experts, the KEK has built a unique knowledge base of practical approaches and tools. The long-term development of these measures depends on the institutional future of the KEK, which is currently not permanently established. That said, the KEK intends to maintain its important role for cultural heritage protection in Germany and beyond: at a 2021 conference,

[13] The container sparked interest in other countries. See, for example: Eriksson, T., 2025. Ambulans för böcker ska rädda tryckt kulturarv. Biblioteksbladet. ***https://www.biblioteksbladet.se/nyheter/internationellt/ambulans-for-bocker-ska-radda-tryckt-kulturarv/*** [Accessed 13 May 2025].

an international perspective on the KEK as a best-practice model was introduced, with plans to develop this perspective in the future.[14] Overall, KEK's activities may serve as a successful example of a publicly-funded facilitator of emergency preparedness at a national level, promoting effective collaboration between stakeholders at state, federal, and municipal levels.

[14] Preservation in Perspective: International Strategies for the Preservation of Written Cultural Heritage, 2024. Proceedings of the conference 'Preservation in Perspective' held at the James-Simon-Galerie in Berlin, 23–24 November. Edited by the Koordinierungsstelle für die Erhaltung des schriftlichen Kulturguts (KEK), 2024. ***https://www.kek-spk.de/publikationen#konferenzband-preservation-in-perspective-2024*** [Accessed 12 June 2025].

Rescue of movable assets and damage assessment after the 2024 floods in the Valencian Community - part 1

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Introduction

Climate studies indicate that extreme weather events such as heavy or abundant rainfall leading to flooding are becoming increasingly frequent. In this context, Spain is positioned as one of the most vulnerable countries globally, with some regions particularly exposed.

The Valencian Community, due to its unique climatic and geographical characteristics, is among the most vulnerable regions in south-eastern Europe to extreme weather events, such as torrential rains, which significantly increase the risk of flooding. This high vulnerability, that affects both infrastructure and invaluable cultural heritage, underlines the urgent need to design and implement adaptive resilience strategies[1].

On 29 October 2024, the south-eastern region of the Iberian Peninsula experienced a severe weather event, characterised by torrential and persistent rainfall associated with a DANA (*Depresión Aisladaen Niveles Altos*, i.e. an Isolated Depression at High Levels).This severe event that hit the region of Valencia, produced maximum rainfall accumulations in excess of 300 mm in large areas of the interior of the province. In particular, the Turís weather station recorded more than 700 mm, according to the report of the State Meteorological Agency (AEMET) of the Ministry for Ecological Transition and Demographic Challenge (MITECO).

The disaster caused by the DANA had a devastating impact on infrastructures, including communication networks, which directly affected the mobility of the population and Valencia's connections with other territories, both by road and rail. A total of 71 municipalities in the province were affected by this phenomenon, representing approximately 26.69 % of the total number of locations. Among the most impacted municipalities were those hosting important cultural assets, such as museums,

[1] Chuliá Blanco, Inmaculada. *La gestión de las emergencias en el Patrimonio Cultural: procedimientos de asistencia técnica en el Museo de Bellas Artes de Valencia frente a las catástrofes naturales y tecnológicas*. 2016. Tesis doctoral no publicada, Universitat Politécnica de Valencia. [***https://dialnet.unirioja.es/servlet/tesis?codigo=115269***] Accessed 7 July 2025.

places of worship, libraries and archives. The municipalities of Alfafar, Benetússer, Picanya, Paiporta, Aldaia, Sedaví, Catarroja and Massanassa, located in the so-called "zero zone", were the most severely affected by the floods. These areas are characterised by high density population and remarkable cultural heritage.

This event, considered the most intense flood caused by a DANA in the 21st century in Spain, has similarities with other major floods occurred in the Valencian Community in the past decades, particularly in the 1950s and 1980s.

In this context, the protection of movable cultural heritage, including works of art, historical documents, and other heritage assets, has become even more crucial given the magnitude of the damage caused by the 2024 disaster.

The objective of this first article is to analyse the strategies developed in rescue operations, highlighting the need for urgent and specialized intervention. The second part, to be published in the Sixth Issue of the PROCULTHER-NET 2 Technical Bulletin, will evaluate the most effective methodologies for addressing conservation challenges in emergency situations, assessing their suitability in the context of large-scale disasters.

The recovery of movable assets affected by a flood is a critical process for the preservation of cultural heritage. This type of disaster exposes objects to extreme conditions, such as high levels of humidity, mud and other polluting agents, which in turn provoke accelerated degradation processes.

The effects of these factors on the diversity of objects and the material complexity of cultural assets require the implementation of intervention strategies, adapted to each type of damage and object.

Initial on-site work is essential to assess the extent of damage and to carry out preliminary assessments of resource and equipment requirements since, as this experience has shown, procedures and treatments need to be constantly readapted according not only to the needs but also depending on the scale of the tragedy and the human and material resources available.

1. Timeline of the interventions

Three days after the disaster, once rescue and search operations had been completed and essential services for the population ensured, the Regional Secretariat of Culture of the Generalitat Valenciana (Valencian Government) activated a work plan to address cultural heritage, divided in two areas of intervention.

On one hand, the inspection of the immovable assets, hydraulic, and intangible heritage affected was undertaken by the General Directorate of Historical Heritage; in parallel, the assessment of the damage caused to movable assets was led by the Valencian Institute of Conservation, Restoration and Research - IVCR+i, given its extensive experience in conservation and restoration across various disciplines and its track record in research on cultural heritage risks and emergencies.

This institution is also part of the Sectorial Plans of the Territorial Emergency Plan of the Valencian Community (PTECV)[2], carrying out specific functions, such as the evaluation of damage to heritage assets after an emergency, the application of protection and shoring measures, and the coordination with other institutions for the restoration and conservation of affected heritage.

The first emergency response operations provided for the authorization by the responsible bodies of technical surveys aimed at the systematic assessment of the damage. This measure highlighted the inclusion of cultural heritage as a priority objective within the set of critical elements to be considered in the institutional response.

In the early stages, eight basic communications, known as "information pills", were issued, notifying the contact points in the Administration of the Generalitat Valenciana (GVA) and providing initial guidelines for the preservation of cultural heritage. Secondly, attempts were made to communicate with heritage site managers and owners in the affected areas to carry out a preliminary damage assessment. However, communication proved almost impossible due to technical difficulties at the beginning and to the relief managers' personal impediments. Access to heritage experts and coordination with Civil Protection teams were also limited due to the priority of providing the population's most urgent needs, given the widespread isolation caused by the severe infrastructure failure.

As of November 8, survey inspections were conducted by multidisciplinary teams made up of conservators, restorers, archaeologists, historians, librarians and archivists, all of them professionals from the Autonomous Secretariat of Culture. These teams included staff from the General Directorate for Culture and the General Directorate for Historical Heritage, together with staff from the IVCR+i, the institution in charge of managing and coordinating the inspections on the movable assets.

While some interventions had already begun in the first days following the event - such as the relocation and transfer of historical volumes from the Algemesí Library - the information gathered by technicians during each inspection helped quantify the extent of the damage and assess the need to move a considerable number of assets, especially archival material, to the facilities at the Valencia Fair premises. At that point, during the detailed damage assessment, the Generalitat Valenciana (GVA) requested that the Ministry of Culture activate the National Plan for Risk and Emergencies Management involving Cultural Heritage, of which IVCR+i is a member of the Monitoring Commission. This plan proved crucial during the first few weeks, both for the transfer of assets and intervention on the affected archival material.

[2] The PTECV is a technical document that defines the rules and implementing procedures that make up the response mechanism of the Public Administrations in the event of any collective emergency in the Valencian Community. For their part, the Sectoral Plans offer a specific response adapted to the different needs that may arise in the context of a disaster.

1. Municipal Archive Aldaia, 4 November 2024
© IVCR+i

2. Municipal Archive Catarroja, 12 November 2024
© IVCR+i

After several days of relocation in precarious conditions, the **Integrated Operational Coordination Centre** (*Centro de Coordinación Operativa Integrada*- CECOPI)[3] arranged for the collaboration of the Heritage Brigade of the Autonomous Police[4] to carry out the necessary actions for the relocation of the affected assets and their transfer to authorised facilities.[5]

Subsequently, the Brigade headed for the most affected archives, where they proceeded to open the compact storage systems that had become unusable due to the flood, which complicated the rescue of the documentation stored inside. The Valencia Provincial Council played an important role in the actions aimed at safeguarding cultural

[3] In the context of the Territorial Emergency Plan of the Valencian Community (PTECV), the Integrated Operational Coordination Centre (**CECOPI**) is the main inter-administrative coordination body for level 2 or 3 emergency situations.
[4] Toro Murillo, L., Gómez Morón, A. & Ortiz Calderón, P. (eds.) (2023). *Risk Analysis and Emergency Responses in Cultural Heritage*. Seville: Ministry of Tourism, Culture and Sport, Regional Government of Andalusia. Chapter 3: *Detection of Forgeries in the Organic Structure of the Generalitat Valenciana*, by Greta García Hernández.
[5] The Police of the Generalitat was created in 1992, by Ministerial Order 9/92, and began operating on February 1, 1993, assuming the competencies established in the Organic Law of Security Forces and Corps; it is currently a functional dependency of the Ministry of the Interior of the Generalitat and an organic dependency of the Ministry of the Interior through the General Directorate of the National Police Corps under the Secretary of State Security.

heritage, with special attention to the rescue and protection of the assets held in the Aldaia Palmito Museum, as well as in other institutions with ethnographic collections. Its participation was key in the tasks of preventive evacuation and transfer of the assets, which were carried out using its own logistical means, ensuring their safe preservation.

Once the immediate emergency phase was over, the Army deployed human and logistical resources, including transport trucks, to facilitate the massive transfer of documentary collections and archives. This intervention made it possible to guarantee adequate conditions for their transfer, contributing to the security of documentary heritage.

In the post-emergency phase, the Valencia Fair premises became a vital logistical centre. In addition to serving as a morgue, a counselling support centre for the victims' families, a distribution point for donations, as well as a base of operations and accommodation for the Army, it also played a key role in the protection of cultural heritage. Its facilities became an ideal space for the evacuation and storage of movable assets, with special attention to archives, works of art and textiles.

2. First measures adopted

2.1. Interventions in the Emerging Art Depot of the Generalitat Valenciana and other affected spaces: Strategies and actions developed

One of the main areas of intervention of the specialised teams was the GVA painting collection. The collection of works was stored in the basement of a building located in an industrial site which, according to the flood hazard and risk maps, was not classified as a vulnerable area. The affected assets belong to the emerging Collection of the Valencian Artistic heritage (PAV), of the Valencian Community Museums Consortium and of the Valencian Museum of Modern Art IVAM.

After access was granted and rescue operations began, the building was without electricity and covered in mud from 20 to 30 cm high.

3. and 4. State of the funds of the Generalitat Valenciana in the Ribarroja depot, 12 November 2024 © IVCR+i

During the action, in which various specialised teams took part, professionals from the IVCR+I undertook the intervention on the 698 works, including the Consortium's assets and the GVA depots and the PAV emerging modern art collection.

The PAV collection includes 128 pieces of art by emerging Valencian creators with works of diverse nature, including paintings, sculptures, drawings, engravings, photographs and multimedia installations, among others.

Preliminary assessments indicated that the state of conservation of most of the paintings showed a high degree of biological contamination, with significant fungal and bacterial growth. Damage was up to 50 cm high, and mud deposits were present on the entire surface of the frames. The thermal anomalies recorded after the rainfall episodes, combined with the high levels of humidity, accelerated biological contamination processes significantly hindered the drying of the collections.

To mitigate deterioration, the first responders implemented urgent on-site measures, including the draining of packaging systems and boxes of the art works to minimise residual moisture damage. Subsequently, the adhering mud was removed, followed by the classification and triage of the assets according to their state of conservation. Disinfection treatments were also carried out to eliminate potentially harmful biological agents and protective measures were applied in those areas with a high risk of detachment.

These actions not only sought to halt the immediate degradation of the affected assets, but also to guarantee their long-term conservation, thus contributing to the preservation of Valencian artistic heritage.

Relocation or transfer of the affected assets, preferably to areas with more stable environmental conditions, is a priority measure in the management of cultural heritage exposed to emergency situations.

In the case of the GVA building, the high levels of humidity, along with the accumulation of mud and sediment, represented a significant risk for the conservation of the materials.

For this reason, after the implementation of the first stabilisation actions *in situ*, the assets were urgently transferred to the provisional depot set up at the Feria Valencia and at *Store X*, where more suitable conditions were guaranteed.

Once the initial transfer phase was completed, a second triage was carried out to assess in greater detail the state of each single asset in order to identify those items requiring specialised treatment and emergency interventions.

Specific cleaning procedures were implemented in both depots, including controlled vacuuming of all surfaces to remove spores and other potentially harmful biological agents and mitigate the risk of microbiological growth.

5. and 6. State of the funds of the Generalitat Valenciana in the Ribarroja depot, 12 November 2024 © IVCR+i

2.1.1 Cultural and heritage sites: local museums and churches

Simultaneously, after authorisation was granted to access and start the rescue work, specialised teams were set up to manage the movable assets included in the General Inventory of Valencian Cultural Heritage (IGPCV) and, as a consequence, subject to the protection regime established in Law 4/1998 of 11 June on Valencian Cultural Heritage.

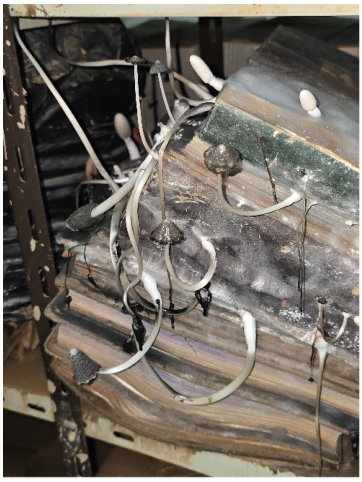
The assets are in various local museums and places of worship. In particular, the churches were supported by numerous volunteers without emergency training from the early stages of the intervention, which facilitated the recovery of these spaces.

These were temporarily set up as reception and distribution centres for basic needs. IVCR+i´s specialised intervention teams were responsible for moving the most damaged sculptural works, to relocate them to safer areas. Large-volume movable assets, such as altarpieces, presented considerable challenges in terms of stabilisation due to the conditions in which they were found and the high humidity in the buildings. A worrying case was that of the church of Nuestra Señora de Montserrat in Picaña, where the water reached up to 3.80 metres, causing irreparable damage to several heritage elements.

2.2. Documentary heritage and archives

Undoubtedly, one of the most catastrophic consequences for the affected area was the impact on documentary heritage. As a result of the inspections carried out in the field, it was confirmed that the number of archives and documents affected was substantial, especially in the municipalities of Aldaia, Alfafar, Paiporta, Massanassa, Catarroja, L'Alcudia, Picaña and Ribarroja. In most cases, these were municipal facilities located in modern buildings, either at street level or below ground level. This explains the enormous volume of damaged documentation.

In the early stages, the possibility of in situ interventions in each archive was considered. However, this idea was discarded in view of the magnitude of the disaster, the



means available in each locality and the need to transport all the assets to one single place.
The Fair of Valencia exhibition centre offered the possibility of unloading many documents thanks to its access ways for heavy vehicles and its modern technical infrastructure. Furthermore, the space is known for its excellent ventilation conditions and the possibility to be expanded according to the needs of the event.

6. (on the left) Appearance and growth of several fungal colonies in the Aldaia archive over the course of a week © IVCR+i

HERITAGE SITES AFFECTED	STRATEGIES AND ACTIONS DEVELOPED
Interventions in the Emerging Art Depot of the Generalitat Valenciana	**Recovery and unpacking**: Removal of movable assets from affected areas, with the use of protective materials to prevent further damage during transport. **Removal of frames and back frames**: the removal of assemblies favours the controlled drying of the structures. **Classification and grouping**: Organisation of objects according to their type, material and state of conservation to facilitate their subsequent treatment. **Mud cleaning**: Removal of mud and sediment adhering to objects to prevent further damage to surfaces and to avoid fungal growth. **Spot disinfection**: Application of specific treatments to eliminate pathogens and prevent the formation of mould or bacteria on the goods. Subsequent vacuuming of spores. **First stabilisation**: Humidity and temperature control to ensure that the objects do not suffer further damage during the intervention process. **Protection of polychromes and other elements**: Application of measures to protect surfaces and prevent loss of material on paintings and other delicate elements. **Second triage and relocation**: More in depth assessment of the objects and their transfer by specialised transport companies to facilities for long-term conservation.

HERITAGE SITES AFFECTED	STRATEGIES AND ACTIONS DEVELOPED
Cultural and heritage sites: local museums and churches	**Opening of retablos banks and removal of mud**: The retablos banks were opened to remove the accumulated mud, and the structures were ventilated to reduce residual moisture levels. **Removal of frames and backs**: the removal of certain structures contributed to the controlled drying of the structures. **Removal of sculptural elements**: Removal of sculptures from the affected areas, with the use of protective materials to prevent further damage during transport. **Disinfection** of structural elements and altarpieces.
Documentary heritage and archives	**Collection of the materials in the archive**: Extraction of the boxes or bundles with the documentation from the affected archives. Given the poor state of conservation of the documents, they were placed in plastic boxes to be grouped together and transferred to the Fair of Valencia. **Removal of the boxes**: the original cardboard boxes were eliminated, taking care, where possible, to preserve the external identification data. **Placement on the floor of the site**: The large volume of affected documents initially required placing them directly on the floor of the facility. To avoid direct contact with the surface and facilitate drying, a base layer of semi-synthetic paper and non-woven polyethylene sheeting was used. In addition, cardboard egg trays were interspersed between document groups to promote better air circulation and accelerate the drying process. **Buffering with absorbent material**: The contents of each box were kept grouped in a pile, with absorbent material interspersed between groups of documents to facilitate drying and prevent fungal growth. **Placement of fans**: Despite the enormous space available, the air ventilation in the lower part of the enclosure had to be increased with the help of dozens of fans. **Change of position**. Every 2 or 3 days, the stacks of documents were overturned to allow the parts less exposed to the air to dry completely. **Identification of sets of documents and triage**. Teams of archivists proceeded to review the documents, removing those that lacked historical or administrative value. This process was only possible when the documentary assets were free of moisture and mud that prevented their identification.

Table prepared by IVCR+i © IVCR+i

The situation caused by the DANA (Isolated Depression at High Levels) in Valencia revealed to be very complex for the archival collections. Although the effects of flooding on documentary materials are well known, the scale of the disaster, the volume of damage, and the challenges involved in the salvage operations far exceeded the available response capacities.

From the outset, it was deemed more effective to concentrate resources in a single location. While this strategy increased the need for document tracking to avoid disassociation, it significantly improved the efficiency of the intervention team. A single specialist could oversee all affected collections without the need for travel, and material resources (such as fans, blotting paper, vacuum sealers, etc.) could be used more rationally and effectively.

Simultaneously, an assessment of the available stabilization techniques was undertaken. Given the magnitude of the emergency, freeze-drying and vacuum freeze-drying initially appeared to be the most advisable options, as supported by extensive literature. However, these methods were dismissed from the outset due to a series of practical limitations. Firstly, it was not feasible to rely on commercial freezing services for temporary document stabilization, as these facilities had also been impacted or reserved for other high priority uses. Additionally, the evacuation of such a large volume of documents from multiple affected archives within a reasonable time frame and in a coordinated manner proved impracticable. Moreover, freeze-drying technology is not available within the Valencian Community, which would have required transporting the collections over long distances. Lastly, considerations regarding the availability of essential auxiliary materials (absorbent materials, packaging supplies, high-capacity equipment, personnel, etc.) further inhibited the feasibility of these approaches.

Ultimately, ventilation was selected as the most cost-effective and accessible method, enabling the treatment of large volumes of documents with minimal resource investment. The table below summarizes the advantages and disadvantages considered for each technique.

TECHNIQUE	ADVANTAGES	DISADVANTAGES
Freezing	• Secure biological control • Available technology	• Extremely contaminated material • High handling requirement • Preparation costs • Cold storage rental costs • Material dispersion • Risk of disassociation • Additional drying methods requirement

TECHNIQUE	ADVANTAGES	DISADVANTAGES
Freeze-drying	• High effectiveness • Proven international experience in similar cases	• High application cost • Technology not accessible in the affected area • Associated tasks • High logistical demand
Vacuum evaporation drying	• Effective • Proven international experience • Accessible technology • Low cost • Less deformation of documents	• Large volume of affected materials • High requirement for drying materials • Intense item handling • Need to repeat cycles to replace absorbent material • Limitations due to document size and type
Ventilation drying	• Low cost • Low technical demand • Document control • Real-time task monitoring	• Greater deformation of documents • Constant monitoring required • High space demand • Waste management (drying of working materials)

Air-drying, combined with a final cycle of vacuum-sealed drying during the last phase of the process, significantly reduced treatment times while also minimizing material deformation.

Conclusions

The analysis of the disaster's impact on movable cultural heritage revealed considerable vulnerability of the tangible assets, particularly those of historical and artistic value, but also, and very importantly, of the documentary heritage. The emergency situations exposed the lack of adequate preventive measures in some cases, highlighting the need to integrate more robust conservation strategies into risk management plans. The magnitude of the damage underscored the importance of having specific protocols for the protection of movable assets, with special attention to their evacuation and safe storage.

The evaluation of the human and material resources deployed during the state of emergency demonstrated the inter-institutional response capacity, although it also highlighted areas for improvement in terms of coordination and resource allocation. Cooperation between administrations and specialized agencies was key to the implementation of safeguarding strategies; however, the availability of qualified conser-

vation personnel and the optimization of available material resources proved to be limiting factors that must be strengthened in future emergency response plans.

Cooperation between administrations and specialized agencies was key to the implementation of safeguarding strategies; however, the availability of qualified conservation personnel and the optimization of available material resources proved to be limiting factors that must be reinforced in future emergency response plans.

Strengthening disaster response capacities represents a crucial strategic challenge for cultural heritage conservation professionals, given that the effective protection of cultural assets requires comprehensive planning and rapid response in emergency situations. Experience in the Valencian Community has shown that the creation of inter-institutional collaboration networks and the consolidation of specialized alliances are crucial factors in improving risk management and the protection of cultural heritage in the face of disasters.

The approach adopted in the Valencian Community, based on cooperation between public administrations, civil protection agencies, and conservation experts, proved that the development of coordinated protocols and the integration of the cultural heritage sector into emergency plans can generate more effective responses. This model has not only strengthened operational capacities in crisis situations but has also promoted greater awareness of the importance of preserving cultural heritage within the framework of risk management.

This collaborative approach, which has become a benchmark, points out the need for constant evolution in public policies related to cultural heritage protection. In this sense, the challenge ahead is to continue consolidating these networks and protocols and promoting the training of conservation professionals to ensure the continued and effective protection of cultural heritage in risk contexts.

Regarding resources, the activation of non-heritage spaces as support infrastructure has proven to be an effective strategy in the context of complex emergencies. Specific areas were set up for the reception, evaluation, classification, and temporary storage of cultural assets evacuated from various affected institutions, with particular attention to archives, paintings, sculptures, and textiles. This experience demonstrates not only the functional versatility of certain civil infrastructures in emergency contexts, but also the need to consider their strategic use within heritage protection plans.

Consequently, the coordination between civil protection, the armed forces, cultural managers, and citizen collaboration ensured minimum preventive conservation conditions for the relocated assets, in a safe and logistically controlled environment.

This action enhances the importance of including heritage criteria in emergency space planning and stresses the value of integrated and cross-cutting risk management.

Lessons learned from the response of Blue Shield France to Cyclone Chido in Mayotte

Marie Courselaud, President; Charlotte Goemaere, First Aider, Conservator of ethnographic artefacts; Emmanuel Lathière, First Aider, Firefighter in charge of securing collections; Anne-Laure Rameau, Emergency Response Service Administrator, Blue Shield France, France

Introduction

Mayotte is a French island and department located off the coast of Madagascar, near Réunion Island. On December 14, 2024, the region was struck by a powerful cyclone with winds reaching up to 220 km/h (137 miles/h), accompanied by heavy rainfall. The immediate consequences were devastating: 39 deaths (likely underestimated), over 5,600 injuries, 320,000 people left without drinking water, 15,000 homes without electricity, and severe damage to infrastructure, including roads, hospitals, and schools. In addition to this tragic toll, the cyclone caused significant damage to the region's cultural heritage. The preliminary assessment carried out by the Cultural Affairs Directorate, just over a week after the disaster, revealed that six major cultural heritage sites had been severely affected, including the MuMa museum. The MuMA (Musée de Mayotte) is a departmental museum located in Dzaoudzi, on the island of Petite-Terre, inaugurated in 2015 and housed in a former barracks dating back to 1845. It has held the status of 'Musée de France' since 2018.[1] Its collection includes about 1,700 objects, covering the ethnography, archaeology, history and natural heritage of Mayotte. Among the museum's highlights are a whale skeleton, 17th-century cannons and a mosque minbar.

This was the context in which Blue Shield France - BSF – an association recognized as being of public interest and accredited for civil protection since 2023 for its role in safeguarding threatened or damaged heritage - was asked to take part in a cultural heritage protection mission. This large-scale operation marked a turning point in the response capacities of Blue Shield France, but it was also an example of collaboration between national authorities, local officials and specialised intervention teams, particularly in the management of cultural assets in areas at risk.

Coordination of the mission with the national authorities

The day after the disaster, the Ministry of Culture contacted the Directorate of Cultural Affairs – the local authority in charge of cultural sites in Mayotte- to assess the extent of the damage and identify the needs on the ground. Blue Shield France was quickly involved in the discussions following this first contact, through the Centre for Research and Restoration of the Museums of France - C2RMF. On December 26,

[1] A designation granted by the French Ministry of Culture to institutions that meet specific standards in collection management, conservation, and public accessibility.

2024, the director of the MuMa museum officially requested assistance from Blue Shield France. In France, the Christmas period is one of the hardest times of year to reach volunteers or staff on short notice, since most people are on vacation with their families - often away from home - and many organisations and institutions are likely to be closed.

Once Blue Shield's crisis unit was activated, several immediate actions were taken mobilizing teams, launching a call for donations (both financial and material, based on the needs identified by the museum), and coordinating with national and local authorities.

Coordination played a crucial role in the success of the mission. As mentioned above, the association has held national civil protection accreditation since June 2023 (AASC: Association Agréée par la Sécurité Civile) specifically for its cultural heritage activities, joining thirteen other accredited organizations (such as the Red Cross and Civil Protection). This accreditation allows Blue Shield France to be recognized as a civil protection entity, eligible for deployment by the State for its expertise. As a result, its mission scope is well-known to the Ministère de l'Intérieur (French Ministry that handles domestic security, police, immigration, public safety, civil administration, etc.). This is how Blue Shield France has become part of the civil protection chain coordinated by the Interministerial Centre for Crisis Management Operations (COGIC) of the Ministère de l'Intérieur. The COGIC's focal point was essential throughout the operation, both by overseeing the deployment of a Blue Shield team to the site and integrating it into the ongoing rescue efforts, and by facilitating the dispatch of specialized equipment for the protection of cultural heritage. Thanks to this national coordination, Blue Shield France was then able to work closely with local authorities to prioritize actions and prepare for the arrival of first- aiders and equipment.

Three weeks after the cyclone's passage, the main advantage of Blue Shield France was its ability to leverage the systems already put in place in the aftermath of disaster, which were further reinforced and refined in the days that followed. The collaboration between COGIC, Blue Shield France, and local authorities enabled a clear identification of intervention priorities, the local context and specific challenges posed by the cyclone. It also ensured effective communication among responders to carry out operations in the best possible conditions.

One of the great successes of this coordination has been the establishment of clear communication between the different responders according to their areas of responsibility, through daily reports and intermediate meetings with the rescuers operating on the site. Precise and regular monitoring was ensured despite the severe impediments on the ground: intermittent electric power service, water supply problems, access problems with damaged or blocked roads and the second cyclone, Dikeledi, which struck during the mission.

Logistics coordination

Logistics posed a significant challenge during this mission, due to both the technical constraints and the aftermath of the cyclone. Transporting rescuers and donated equipment (14 pallets) was particularly difficult. The key challenge was finding a balance between the urgency of the situation - unfolding during the holiday season, when personnel availability was limited - added to the logistical difficulties of responding to a crisis several thousand kilometres from mainland France.

The Emergency Response Service - Blue Shield France emergency coordination unit - with the logistical support of the departmental council of Haute-Garonne (local authority) was mobilized to oversee all technical, material, and personnel operations, ensuring that the rescuers could carry out their mission under the safest possible conditions.

Damages, needs and actions

Following the passage of the cyclone, the museum's teams protected what could be saved, granting evacuation of the most sensitive collections. But space saturation and absence of electricity (including heating/air conditioning) aggravated the situation.

When the Blue Shield team arrived, the open-air archaeological reserve had just been flooded after an episode of intense tropical rains (*kashkazi*). The roofs had been covered but as the new cyclone Dikeledi approached, the assets that were too large to be evacuated from the barracks were again threatened by water damage (Islamic minbar, sperm whale skeleton).

The Blue Shield team began by protecting all the objects threatened by Cyclone Dikeledi on site using tarpaulins provided by the civil security: minbar and sperm whale skeleton, and tarpaulins inside organic collections storages.

After the passage of cyclone Dikeledi, damage assessment operations could begin. Archaeology was prioritized because it was wet. The museum team actively participated in the handling of the boxes, unpacking, display and drying: the 400 boxes (about 20 m^3) were diagnosed and dried when necessary.

Clearing and cleaning of outdoor spaces was carried out by the firefighter of the Blue Shield team with the local team.

While waiting for the protection of the roof of the barracks, the tarpaulin on the sperm whale was left in place. Despite a fastening system designed to allow air to circulate under the tarpaulin, mould appeared on the skeleton after 6 days. After the roof was protected, the tarpaulin was removed and the mould treated urgently by the conservator, who then trained the staff to continue the decontamination operations.

Finally, many recommendations for preventive conservation were given to the conservation team for the continuation of the collections project.

1. and 2. Protecting the whale skeleton © Blue Shield France 2025

Lessons Learned (after-action review) from the Field Mission

The lessons learned from this mission are an essential part of the review, particularly for the insights gained from the intervention on the ground. Several points have been identified, in terms of both operational management and improvement of practices for future missions:

1. Responsiveness and risk management

The mission stressed the importance of accounting for a pool of volunteers who were not only readily available but also responsive, able to intervene quickly with all the necessary requirements in place (such as vaccinations, up-to-date documentation, operational equipment, etc.).

It also highlighted the need for a diverse range of skills and expertise within the operational reserve. This includes professionals from fields like conservation, museums, and civil protection, to form teams that are best suited to the specific types of collections, crises, and missions they may be called to face.

Additionally, it clarified that the number of responders must increase to guarantee full-time availability, including during the Christmas holiday season, days off, and public holidays.

One other key to improve Blue Shield France's responsiveness is the management of urgent needs and first aid material. It would make the next mission easier to have basic equipment in stock, for protection both of people (gloves, overalls, masks) and cultural heritage assets, to speed up the shipping process. This stock could be replenished afterward by donations. In light of the above, Blue Shield France should definitely be endowed with storage facilities to stockpile this equipment, both on different mainland areas for short-range missions and near Paris for overseas missions. Blue Shield France should also be able to finance the field team for the supply of necessary resources on site with the funds raised via donation, made through the new Overseas section currently being set up within the BSF.

2. The need for operational assessment models

The PROCULTHER templates for assessing the condition of movable and immovable assets served as a useful basis, but were adapted to better fit the specific context. The conservator in the deployed team developed a customized, ergonomic, and dynamic spreadsheet with drop-down menus, drawing on information provided by the local guide-an approach that proved effective on the ground.

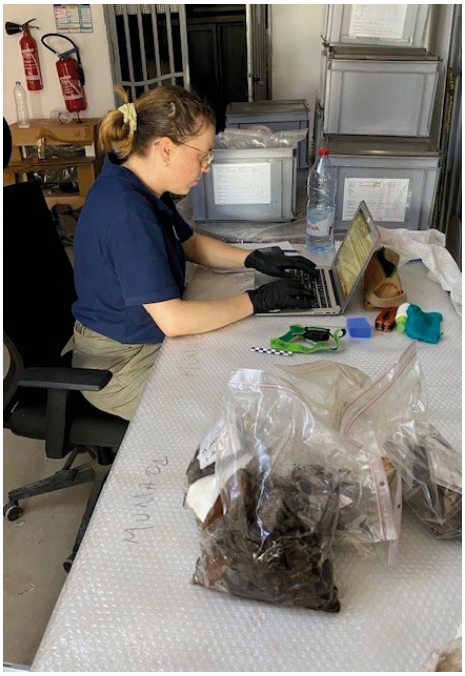
The eight PROCULTHER templates served as a useful reference, but proved too specific for the mission at Mumа - a small institution without dedicated teams for each department. Moreover, they were more suited to immediate post-disaster interventions than to the context encountered on site.

In MuMA's case, the local team had already relocated and logged a significant number of artifacts prior to the arrival of the Blue Shield team, which took place four weeks after Cyclone Chido struck.

The spreadsheet designed by the conservator was used to centralise all the information gathered on the collections. The PROCULTHER templates were used as a basis for the production of the spreadsheet used in Mayotte: the organisation of the sections was recycled, as was all the data that seemed relevant to the MuMA case.

The advantage of a single spreadsheet was also that the diagnostic work was almost finished after completing the spreadsheet, and there was no need to go through the dozens or hundreds of forms again after the mission to collect and process the data.

However, it is worth mentioning that this task would not have been possible if the elec-



3. Damage assessment using spreadsheets
© Blue Shield France 2025

trical power had not been restored in some places (for BSF: at the base camp), to charge the computer every day. We therefore need to continue thinking about the ergonomics of the multiple forms in very degraded situations, and about the flexibility required for any unique situation specific to each crisis. Like cultural heritage protection plans, the PROCULTHER sheets could, for example, be seen as models that each institution should adapt and integrate into its own protection plan. Very complete standard vocabulary grids could be proposed separately, so that cultural institutions use the same language during crises but with more flexibility to complete the sheets - which, by the way, is the original idea behind the PROCULTHER templates.

The damage assessment grids required translation upon return from the mission for better usability.

3. Human resources and local expertise

A key point was the integration of Blue Shield France first aiders into the local team, allowing them to train the local team in the entire collection processing procedure.

Blue Shield rescuers, in turn, could rely on the team's knowledge to help them assess and treat the affected collections.

Not having all the conservation and crisis management skills in-house, a wealth of advice on the sensitivity of the materials and the actions to be taken in the future were provided by the conservator of the Blue Shield France team. The conservator could also rely on other specialised colleagues of the Emergency Response Service (SRU) office for any questions on her area of expertise.

Besides, the mission highlighted the imperative need to be fully integrated into the civil protection system deployed on site. As Blue Shield is still little known, the team could have faced difficulties in travelling or accessing information and equipment. Fortunately, collaborating with the fire brigade and other civil protection staff made integration in the emergency response operations easier for the BSF team, as they met and spent time with professionals deployed on a variety of assignments.

4. Assessment of local infrastructure

Finally, the condition of local infrastructure at times impeded the smooth running of operations (e.g., the inability to deploy a tent, which was a priority need). The mission highlighted the need for better coordination with other organisations deployed on the field to streamline efforts in the most vulnerable sites. The lack of electricity during a major crisis of this type requires responsiveness and adaptation from the teams to carry out the mission and find solutions for both the assessment and safeguard of the artifacts at risk (long electrical extension cords, headlamps, portable generators, portable fans, portable lighting etc.).

Conclusion

The intervention of Blue Shield France in Mayotte last January, not only contributed to the protection of this precious cultural heritage, but also made it possible to identify several areas for improvement in future missions. Through coordination between national authorities, efficient logistics and experience gained in the field, this mission has enriched response practices and paved the way for new projects to ensure the effectiveness of future field operations.

The PROCULTHER evaluation grid could be adapted into a dynamic spreadsheet or other editable and more operational applications onsite (drop-down menus). In the event of power cuts, a paper equivalent could also be produced, together with common vocabulary grids. These evaluation documents could be translated into various languages to avoid the language gap in a crisis when handling technical documentation.

The 2023 floods in Italy - A test of preparedness for libraries and archives

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Introduction

The floods that hit Emilia Romagna, Marche and Tuscany in Italy in 2023 were a devastating event that severely impacted several cultural heritage institutions, particularly libraries and archives. Despite past disasters that had already revealed the vulnerability of these type of institutions, preparedness proved inadequate, and the response to the emergency was fraught with difficulties. The authors - conservators, and conservation scientists operating in the Ministry of Culture - were involved in the damage assessment, salvage, and restoration phases of archival, bibliographic, photographic, and digital materials. The article highlights how the lack of structured emergency plans, inadequate resources, and delays in institutional responses all contributed to further exacerbate the critical situation. Although the generous and meritorious participation of trained and civil volunteers helped in the recovery phase, the lack of preparedness and recovery plans impaired a cost effective and sustainable intervention.

Affected institutions

Among the most affected sites were about fifty Italian archives and libraries, some located in areas historically subject to flooding - as in the case of Tuscany[1] - but also institutions that never faced emergencies of this magnitude before, as in Emilia-Romagna.[2]

Below is a selection of case studies that highlight some of the most evident critical issues during recovery operations.

Both the Library and Municipal Archives of the town of Quarrata in Tuscany, as well as the Municipal Archives of Montemurlo, keep parts of their historical and current collections in storage areas at underground-level, which determined significant losses during the flooding, highlighting the risks associated with storing archival and library materials in areas built below river level. The entire book collection published from 1960 to 2023, irreparably damaged, had to be discarded. Very few exceptions were made for rare and autographed books. The library also kept a photo-

[1] A general insight about the flood that impacted Tuscany can be found in Davies, R., *Italy – State of Emergency After Storm Triggers Deadly Floods in Tuscany,* 3 November, 2023 [***https://floodlist.com/europe/italy-floods-tuscany-november-2023***]. Accessed 9 June 2025.

[2] Davies, Richard, *Italy – (Updated) 8 Dead After More Flooding in Emilia-Romagna,* 17 May, 2023 [***https://floodlist.com/europe/italy-floods-emiliaromagna-marche-may-2023***]. Accessed 9 June 2025.

graphic collection of significant historical relevance for the local community. To be transferred to the freezing facility, an urgent authorization needed to be issued by the Superintendency.

1. Quarrata (PT): Preparing the photographic collection for freezing © Barbara Cattaneo

The Municipal Archive of Forlì, located on the ground floor and on the mezzanine floor, suffered extensive damage due to its proximity to the river- only 400 meters. Overnight, the water rose above 3.5 meters in height, and staff were unable to implement even basic preventive measures, partly due to the absence of an evacuation plan for the most valuable assets. A substantial portion of the over 7 linear kilometers of documents housed in the facility was affected. The situation was further complicated by the fact that materials stacked for periodic disposal had been placed directly on the floor and became mixed with records intended for recovery, making the salvage operations even more difficult.

Another example was the Library of the Bishop's Seminary in Forlì, severely damaged by both water and mud. One of the main obstacles to the recovery process was the absence of an updated complete catalogue and a topographical inventory, which made the identification of all items impossible. The collections, ranging from early printed books to modern volumes, were arranged by subject, a system that hindered the retrieval of the oldest items, present across most of the shelving units and scattered by the water on the floors.

Beyond immediate damage, the floods caused significant infrastructural problems: historic buildings housing libraries and archives suffered severe damage to the walls, shelving, electrical systems, and climate control systems. Repair efforts often exceeded the financial and logistical capacity of the affected institutions, delaying the reopening of many locations, such as in Campi Bisenzio, where Villa Montalvo remains still to this date closed, and the library and archive partially accessible only via a Bibliobus.

2. Forlì (FC): Firefighters remove collapsed shelving © Giuseppe Zicarelli

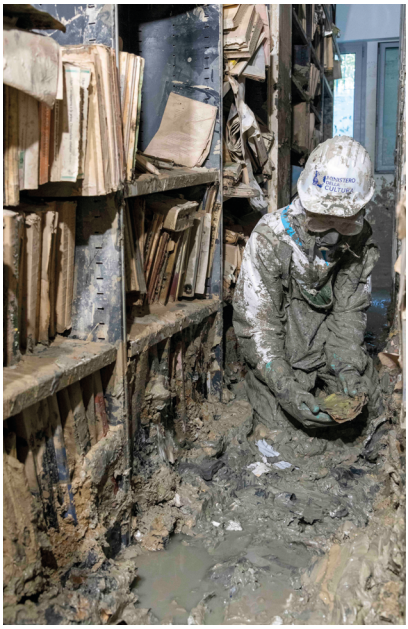
Challenges in immediate response

The main critical issue for the affected institutions was the lack of systematic emergency protocols. Many libraries and archives had generic disaster plans, but few were specifically designed to address the recovery of cultural heritage assets from flooding scenarios. As a result, responses were often uncoordinated.

One major challenge was the limited access to essential recovery equipment: water pumps, fuel leak containment systems, and other gear were not readily available, in part due to widespread damage to civil infrastructure. Even institutions equipped with emergency kits quickly found their resources insufficient. In this context, notable differences emerged between the two regions. In Tuscany, the presence of a dedicated cultural heritage unit within the regional civil protection mobile unit - equipped with two refrigerating units for the initial freezing of damaged assets - significantly enhanced the effectiveness of the early response. In contrast, in Emilia-Romagna,

the Archival and Bibliographic Superintendency due to the scale of the damage, called upon the civil protection volunteer units trained in cultural heritage recovery both from within and outside the region (from Friuli and Piemonte), who brought additional water pumps and equipment. As the Superintendency lacked refrigeration units, it facilitated agreements with automated refrigerated warehouses operated by frozen food companies. Local facilities lacked temporary storage, refrigerated chambers, or state-owned equipment for vacuum drying or freeze-drying. Following the 1966 flood, the National Central Library of Florence allocated resources that, after the 2004 law mandating emergency plans[3], enabled the development of a specific emergency response plan. This Library - unaffected by the 2023 floods - is the only Italian Ministry of Culture institution to be equipped with a small freeze-dryer for drying water-damaged books and documents.

At the Forlì Library of the Bishop's Seminary, a work agenda was organized to ensure that a librarian and a restorer were always present. Nevertheless, in many locations, most volunteers lacked experience in recovering water-damaged books, documents, or audiovisual materials, sometimes causing additional damage to objects. Recovery teams entering storage areas to extract water and mud, disable fire suppression systems, and dismantle doors and shelving dislodged by floodwaters also unintentionally harmed fallen materials. However, not all civil protection teams deployed were previously trained in cultural heritage rescue: only some teams and a few civilian volunteers had received prior training, while many untrained volunteers were trained directly on site. This situation sometimes led to improper handling, as items meant for disposal were often piled within the same storage areas, damaging fragile materials still submerged in mud. Handling wet paper, soluble graphic media, and glass slides was particularly complex and required specific expertise that was not always immediately available.



3. Forlì (FC): Recovery of book material covered in mud © Giuseppe Zicarelli

[3] Ministerial Circular No. 132 of 8 October 2004, issued by the Ministry of Cultural Heritage and Activities – Department for Research, Innovation and Organization, concerning: Emergency Plans for Cultural Heritage ***https://dgspatrimonioculturale.beniculturali.it/wp-content/uploads/2020/08/Piani-di-emergenza-per-la-tutela-del-patrimonio-culturale_SG-Circolare-N.-132-08_10_2004.pdf***. ***https://dgspatrimonioculturale.beniculturali.it/wp-content/uploads/2020/08/Piani-di-emergenza-per-la-tutela-del-patrimonio-culturale_SG-Circolare-N.-132-08_10_2004-Allegato-1.pdf***.

Italian regulations prescribe a rapid damage assessment phase, followed by subsequent interventions. However, in the initial hours after the flood, there was no coordinated national strategy to support affected institutions, and procedures for accessing disaster sites and information exchanges between teams were neither clearly defined nor standardized. Workflows were appropriate for inorganic materials and other types of cultural heritage but unsuitable for archival and bibliographic collections, which are inherently vulnerable to water damage and must be promptly recovered - especially during the warmer seasons. Also, the cultural heritage damage assessment forms provided by the Ministry of Culture, and similarly item movement, and emergency response forms were primarily designed for immovable heritage and tested during the latest earthquake scenarios, proving less effective for flooded library and archival materials.

There are no established protocols for managing health risks and biodeterioration during the recovery of flood-damaged cultural heritage. However, it was possible to conduct analyses to assess the presence and activity of biological contaminants on salvaged artifacts using bioluminescence-based quantification technique of adenosine triphosphate (ATP).[4]

This research, limited to a few case studies, confirmed that freezing slows microbial proliferation but does not eliminate it, informing the planning of subsequent interventions such as controlled drying and the selective use of biocides.

Community support and grassroots efforts

Despite institutional shortcomings, one of the most positive aspects of the response was the resilience of local communities. Volunteers played a crucial role in helping libraries and archives preserve cultural assets. Cultural workers, students, and citizens collaborated with professionals to remove damaged books, set up drying and freezing stations, and provide technical and logistical support.

Although invaluable, these spontaneous efforts revealed gaps in formal preparedness. Many volunteers had to rely on improvised methods and ad hoc training, highlighting the urgent need to integrate community contributions into institutional emergency planning.

One of the most pressing challenges is the drying and cleaning of the waterlogged and mud-covered materials. In many cases, due to the sheer volume of wet items, freezing and vacuum freeze-drying were chosen to prevent mold growth and further deterioration, incurring significant costs.

Several institutions were able to fund their recovery thanks to donations and fundraising campaigns launched through *Art Bonus*, a 2014 Ministry of Culture initiative

[4] Rakotonirainy & Dubar 2013. ATP bioluminescence-based quantification is a sensitive and rapid technique used to measure the presence of adenosine triphosphate (ATP), an indicator of biological activity and cellular viability.

4. Forlì (FC): Volunteer restorers prepare the volumes for freezing © Rita Capitani

offering tax incentives to donors. The Ministry also temporarily increased ticket prices to Italian state museums by one euro (while preserving legally mandated exemptions) to support post-flood reconstruction. Restoration work is still ongoing and, in some cases, has been stalled pending the arrival of necessary funding.

As we move forward, it is evident that the response to the 2023 floods has been a learning experience for many. The resilience demonstrated by affected communities and professionals has been remarkable, but the event has also highlighted critical gaps in preparedness and response mechanisms.

Lessons learned and the path forward

One of the most pressing lessons learned was the need for proactive disaster planning. Many institutions lacked comprehensive emergency response protocols, leading to confusion and delays in implementing protective measures. In some cases, collections could have been protected if evacuation procedures and designated safe storage areas had been established in advance. The absence of detailed inventories, and topographical catalogues in multiple archives and libraries further complicated salvage efforts, making it difficult to assess the full extent of the damage and prioritize recovery actions. In this regard, technology proved to be both

a strength and a weakness during the crisis. Digital records and inventories were invaluable in tracking losses and prioritizing recovery, but institutions that had not fully digitized their catalogues struggled to assess the damage quickly. The reliance on paper-based records in some cases meant that critical documentation was lost or severely damaged. This reinforces the need for widespread cataloguing and digitization initiatives, not only for preservation purposes but also to facilitate continuity in the aftermath of disasters.

Another key takeaway is the importance of training and capacity-building. Many institutions found themselves unprepared to handle large-scale water damage, relying on external experts and ad-hoc solutions. Staff members who had previously received disaster response training were better equipped to manage the crisis, underscoring the need for up-dating workshops and simulation exercises.

Funding and institutional support remain major obstacles to effective disaster preparedness. The financial strain of recovery efforts has demonstrated that relying solely on emergency aid is not sustainable. Many institutions struggled to secure immediate funding for restoration work, with some relying on temporary grants and public donations. Insurance coverage for cultural heritage collections proved to be insufficient in many cases, emphasizing the need for revised policies that reflect the true value of historical materials.

Community engagement played a crucial role in the response to the 2023 floods, demonstrating the potential of grassroots initiatives in disaster recovery. Volunteers, students, and residents provided invaluable assistance in salvage operations and fundraising efforts. Strengthening ties between cultural institutions and local communities can help build resilience by fostering a shared sense of responsibility for heritage preservation. Initiatives such as citizen training programs and public awareness campaigns can further enhance disaster preparedness at both institutional and societal levels. It is crucial that all institutions involved in the management of emergencies affecting cultural heritage actively collaborate at a supra-provincial and supra-regional level, facilitating the prompt resolution of practical issues through the drafting of operational and administrative protocols during peacetime. Emergency response times can be further reduced if command leaders, managers and team members share common knowledge and procedures, know how to manage and train volunteers, and regularly review and update the relevant documentation, including inspection authorization forms, damage assessment forms, reports, and handover procedures.

The experience of the 2023 floods has made it clear that archives and libraries need to be proactive in the face of climate-related disasters. The growing frequency of extreme weather events calls for a fundamental shift in the way cultural institutions approach risk management. This includes integrating disaster preparedness into institutional policies, investing in resilient infrastructure, and advocating for stronger governmental support in heritage protection. Moving forward, comprehensive

emergency plans must be widely adopted, with clear evacuation procedures, prioritized salvage strategies, and coordinated institutional networks. Risk assessments should be routine, ensuring collections are stored in safer locations and protected by preventive measures such as waterproof storage facilities and raised shelving.

Finally, there is an urgent need to integrate disaster preparedness into broader cultural heritage policies. The 2023 floods made it clear that archives and libraries cannot rely solely on institutional-level planning; national frameworks must be strengthened to provide consistent guidelines, emergency support mechanisms, and long-term recovery strategies. This includes updating building codes for heritage sites, investing in flood-resistant infrastructure, and ensuring that cultural institutions have a voice in broader disaster response discussions.

5. Forlì (FC): Volunteer prepares the volumes for freezing © Giuseppe Zicarelli

Strengthening fire resilience for heritage in a changing climate: reflections on UNESCO's recent efforts in fire risk management for heritage

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Introduction

Globally, cultural and natural heritage are increasingly affected by fires, a situation further exacerbated by climate change. The intense wildfires associated with extreme temperatures and drought conditions have been a cause of high emissions at numerous cultural and natural sites. Since the mid-2010s, we have witnessed with grave concern the wildfires in the Russian Federation's Lake Baikal in 2016, and in Australia's Tasmanian Wilderness and Greater Blue Mountains Area in 2019 and 2020, as well as fire disasters in Rapa Nui in Chile, Los Alerces National Park in Argentina[1], the Pantanal National Park in Brazil[2], and South Korea[3] more recently.

The loss of tangible and intangible heritage, negative impacts on local communities, and extensive adverse environmental effects, including on vegetation, wildlife, water resources, air quality, and biodiversity, are often long-lasting and sometimes permanent.

Limited awareness, planning, implementing, and monitoring of risk management plans, coupled with the loss and limited integration of traditional knowledge and practices into fire risk management policies, as well as the lack of community participation, pose considerable challenges to an effective fire risk management of cultural and natural heritage.

However, rather than the mere protection of assets in the context of fire disasters, it is important to note that heritage plays an important role in mitigating fire risks and strengthening resilience. This includes engaging traditional ecological knowledge, skills, and practices to mitigate fire related disaster risks which can significantly contribute to the preservation and restoration of the ecosystem in which heritage exists.

[1] [***https://www.unesco.org/en/articles/unesco-funds-fire-prevention-efforts-world-heritage-site-los-alerc-es-national-park-argentina***]. Accessed 7 July 2025.

[2] Some examples of UNESCO reports and actions on wildfires can be found here: [***https://articles.unesco.org/sites/default/files/medias/fichiers/2024/05/uns-ranororaraku_informe-03.pdf***]. [***https://articles.unesco.org/sites/default/files/medias/fichiers/2024/05/uns-ranororaraku_diagnostico-04.pdf***] and [***https://www.unesco.org/en/articles/unesco-heritage-emergency-fund-hef-valparaiso-chile***]. Accessed 7 July 2025.

[3] [***https://whc.unesco.org/en/news/2766***]. Accessed 7 July 2025.

A holistic approach to fire risks - UNESCO Fire Risk Management Guide

In response to these increasing challenges, UNESCO has scaled up efforts to safeguard cultural and natural heritage from fire hazards and leverages them for resilience building. It is in this context that the ***Fire Risk Management Guide for Cultural and Natural Heritage*** was developed, with the aim to create awareness on the challenges in mitigation, preparedness, response and recovery to help strengthen the capacities of relevant stakeholders in the management of fire risks impacting on cultural and natural heritage. This guide also addressess how to leverage living heritage and traditional knowledge to mitigate fire risks and enhance disaster resilience.

The process of developing the Fire Risk Management Guide was grounded in thorough analysis and dialogue. In-depth research and consultations were undertaken to gain a comprehensive understanding of the fire-related risks to cultural and natural heritage. This included examining the specific vulnerabilities of heritage sites, identifying recurring patterns in fire incidents regarding ignition sources as well as why fires developed so quickly and created the consequent damage, and assessing the extent of stakeholder awareness and preparedness. The analysis also reviewed existing documents, codes, standards, and research tools to pinpoint critical gaps in knowledge and practice. The question of how to address fire hazards more effectively and help reduce both casualties and damage to heritage sites in a cost-effective, risk-informed and sustainable manner was also a priority of the analysis.

As a result, four central findings emerged, each pointing to critical areas for action and shaping the structure of the guide itself.

The first and perhaps most fundamental insight was the **importance of awareness**. Time and again, fire incidents have shown that awareness is the cornerstone of prevention. Fires can start anywhere, at any time, and limiting detection and response time prior to intervention is often the decisive factor in reducing as much as possible the damage. Yet, awareness is not only about urgency, it's also about knowing where the risks lie. Construction and renovation activities, for example, introduce temporary but serious vulnerabilities that are often overlooked. Encouragingly, many solutions are low-cost and high-impact, provided they are informed by a realistic understanding of fire and risk and the impact these solutions may have on reducing these risks at a specific site. Tailored Fire Risk Management Plans are essential tools for translating this awareness into action, including prevention, mitigation, preparedness, response and recovery related actions.

Second, **communities** play an irreplaceable role in reducing and responding to fire disaster risks. Local populations possess knowledge that has been passed down for generations, insights shaped by long-term interaction with landscapes, climates, and resources. This traditional knowledge, embedded in community norms, customary laws, and lived experience, provides a crucial layer of wisdom that modern risk

frameworks often disregard. Meaningful engagement with communities not only enriches the planning process but also fosters a sense of ownership that is essential for long-term sustainability.

The third finding stressed that **resilience** is built not on plans alone, but on their effective implementation, on-going monitoring and regular updating. Too often, well-intentioned strategies remain on paper. To be effective, Fire Risk Management Plans must be living documents,updated regularly, adapted to evolving risks, and shaped through inclusive collaboration, and then implemented properly. These plans should address the full disaster risk management cycle: prevention, preparedness,response,and recovery. Developing them requires a multidisciplinary approach, including technical input from fire engineering experts who understand fire dynamics, life-safety systems, structural vulnerabilities during restoration, and relevant codes and regulations. Without this breadth of expertise, plans are unlikely to effectively address risks, nor hold up under real-world pressure.

Finally, the fourth key finding highlighted the critical importance of **working with emergency responders** from the outset. Firefighters and civil protection personnel bring vital operational knowledge to the table-knowledge that can dramatically affect outcomes during a crisis. Understanding their challenges, protocols, and on-site resource needs helps avoid false assumptions and ensures smoother, faster interventions when time is an essential factor. Pre-planning with emergency responders through site walkthroughs, mapping of key areas and artefacts, and installation of early detection systems that automatically notify the ememergency responders, can significantly enhance both preparedness and response by reducing the time needed to reach the site to begin relief activities, as fires typically grow exponentially with time, which of course is crucial in fire emergencies.

These findings formed the backbone of the Fire Risk Management Guide's structure. From lessons learned in past fires, to tailored approaches for wildfire-prone landscapes or construction-heavy sites,the Guide provides a flexible yet coherent framework along with strategic concepts to reduce fire related risks that can be applied to any natural or cultural heritage site and able to be readily adapted to the specific needs, challenges and local resources available. It moves step by step through identifying risks,developing and implementing fire risk management plans,and tailoring actions to the specific needs of built heritage, archaeological landscapes, and natural heritage ecosystems.

From a practical standpoint,the involvement of Fire Engineering Experts in the development of Fire Risk Management Plans is essential. Their expertise spans across a wide range of critical areas,including fire behaviour, fire safety systems, hazard and risk assessments, human behaviour, emergency preparedness, firefighting, forensics, regulatory frameworks, and construction site safety, as well as the special challenges and needs related to cultural heritage and natural sites. When integrated early and collaboratively with stakeholders,these experts play a key role in

designing and implementing robust, context-specific, risk-informed, cost-effective plans. They are also instrumental in ensuring that Fire Risk Management Plans are effectively integrated into broader Disaster Risk Management strategies.

The Guide also highlighted the particularly pressing issue - the high incidence of fires during construction, restoration, and renovation works - phases when heritage sites are especially vulnerable. This challenge must be met through targeted awareness-raising, staff training, and the development of tailored fire risk plans specifically drawn up for the high-risk periods. Risks are often heightened by the presence of ignition sources such as temporary electrical wiring, lighting, and hot works (e.g., welding, cutting, cooking, or smoking), as well as by increased fuel loads from materials like wood scaffolding and combustible construction materials and packaging of equipment and materials.

Mobilizing a global voice for fire resilience for heritage

To continue the momentum on strengthening cultural heritage resilience to fire risk, in November 2024, in partnership with the Ministry of Culture, Arts and Heritage and the Ministry of Environment of Chile, UNESCO organized the international conference ***"Fire Resilience for Cultural and Natural Heritage in a Changing Climate"***.[4] Bringing together policy makers, heritage professionals, experts, site managers, emergency responders and stakeholders from different regions of the world, the conference explored **four thematic panels** focusing on: "Fire risks and heritage as a source of resilience", "Response and recovery of fire disasters affecting heritage", "Engaging local communities and mainstreaming indigenous knowledge", as well as "Policy coherence and inter-sectoral cooperation". Several key messages emerged from the invaluable insights brought by the participants.

First and foremost, **Climate Change** has significantly increased the threats of fire disaster risks to cultural and natural heritage, as well as to communities. As highlighted by several speakers and local community representatives, Climate Change has led to longer dry seasons in many regions, affecting food production and biodiversity, and leading to more devastating fires due to faster spread, more intense and longer heat waves, as well as minimum wildland interface protection in urban areas. The need to further acknowledge the influence of Climate Change on cultural and natural heritage has also been stressed.

The participants also noted that ***although fire disasters are destructive, they are amongst the most manageable hazards that can be addressed including through proactive risk reduction measures*** – to reduce the frequency, intensity and duration of fires, thus reaffirming the significance of effective fire risk management plans and disaster preparedness actions on reducing risks. It is further noted that effective disaster preparedness should adopt a ***multi-hazard, locally led, and integrated***

[4] See more on the Valparaíso conference: [***https://www.unesco.org/en/articles/unesco-strengthens-fire-resilience-heritage-era-climate-change***]. Accessed 7 July 2025.

approach. For example, in the Trogir World Heritage site in Croatia local actions have also been undertaken to strengthen operational capacity and coordination with emergency responders and suppliers for effective disaster preparedness. The local and operational initiatives complement policy-level efforts.[5]

However, while fire poses risks, the expert panels also reminded everyone that fire ***is a vital energy source and a cultural tool*** that have been long present and used in rituals, cultural practices and landscape management. For example, in the Pacific, fire is used as an important component in the construction of canoes and carvings. In Guatemala, fire, wind, water and earth are identified as the four sacred elements in traditional culture. These cultural dimensions must be acknowledged and respected when addressing fire risk. A culturally sensitive approach is essential: rather than banning practices such as the use of candles or butter lamps, efforts should focus on managing and mitigating the associated risks, including for instance stabilizing them so they cannot tip or be knocked over, as well as locating them away from combustible materials. This means working with communities to preserve meaningful traditions while preventing such uses from escalating into larger, uncontrolled fires.

Indigenous communities play a vital role in protecting cultural and natural heritage and must be supported, engaged, and empowered. For example, case studies presented during the meeting have shown that, in Australia, the loss of access by indigenous peoples to the land and disruption of traditional land management methods contributed directly to the start of major wildfires since the 1850s. However, the reintroduction of *indigenous fire risk management practices* has proven effective in reducing fire risks, with 30% of destructive fires reduced over the course of 8 years. In other places, such as in the Xingu Territory, the indigenous community serve as primary actors in safeguarding the natural heritage and biodiversity of the region, including through dedicated monitoring teams. There are also traditional mechanisms of community mobilization/engagement for heritage protection against fire, looting, etc., These mechanisms are usually embedded in communities'traditional governance system, and need to be better understood, revitalized and integrated with contemporary disaster risk management practices for heritage.

Lastly, the conference underscored the **importance of policy coherence between Culture, Climate and Emergency sectors** as the foundation for sufficient resource allocation, institutional strengthening, long-term planning and effective coordination. Several initiatives have been taken at regional and subregional level for the integration of Culture into Disaster Risk Reduction and Climate Change Mitigation and Adaptation frameworks. Such work requires a strengthened coordination and the adoption of an "all-stakeholder" approach, including to ensure the effective engagement of local communities and mainstreaming local and traditional knowledge.

[5] PREVENT: Mitigating Fire Risk for the Historic City of Trogir. You can find more about it at the following link: [***https://hrcak.srce.hr/file/447692***]. Accessed 7 July 2025.

Transforming tools into actions

Following the international conference in Valparaíso, a regional training program had been organized by UNESCO to empower heritage professionals and site managers from 17 countries from the Latin American and Caribbean region.

The training initially focused on sharing the inputs from all the countries' participants working on the sites and structures on the challenges faced, as well as the opportunities and means they considered effective in managing fire related risks both at natural and cultural heritage sites. The methodology elaborated in the Fire Risk Management Guide, including the integration of traditional knowledge, as well as the numerous aspects including fire risk management for museum collections were also addressed. Additionally, the workshop benefited from a cross-sectoral approach where several emergency responders shared their insights, including the challenges they experienced as well as the opportunities and practices undertaken to help enhance their operations and make them more effective.

At Valparaíso, the Seaport city declared a UNESCO World Heritage Site in 2003, heritage and creativity are the very core of the city, which has long suffered from high fire risks, including the devastating fire in February 2024. In response, a pilot initiative was launched by the UNESCO Office in Santiago in close partnership with the National Service of Cultural Heritage of Chile, and the municipal management of the Valparaíso World Heritage Site. Using the methodology of the UNESCO *Fire Guide* as a cornerstone for building fire resilience, the initiative included the development of a tailored Fire Risk Management Plan (FRMP) through a participatory process. Emergency equipment was distributed to 10 neighbourhood associations, and local training was conducted. A citywide drill, coordinated with all emergency institutions and held at the Santa Ana School, involved over 500 participants—demonstrating increased local coordination and readiness.

A distinctive and powerful aspect of the Valparaíso pilot was its strong community and educational engagement. Fire preparedness activities were brought directly into schools, including teacher training, child-friendly workshops, and infrastructure upgrades. For example, storytelling sessions at Santa Ana School used narrative and artistic methods to explore the cultural role of fire, inspired by interventions on the role of indigenous knowledge in fire risk management shared during the UNESCO Valparaíso Conference. These efforts fostered a more caring and respectful relationship among communities both in reference to the fire hazard and their surrounding environment. A city-wide audiovisual campaign, supported by local institutions, disseminated key fire prevention messages through social media, screens in public spaces, and printed materials. Together, these actions equipped the residents of Valparaíso with the practical knowledge, tools, and culturally rooted understanding needed to face fire risks and protect their heritage—making the pilot a replicable model for urban heritage sites facing similar threats.

At global level, fire disaster risk, which is further exacerbated by Climate Change, remains acute. Such challenge requires constant policy support, investment and

efforts at international, as well as the local level. From the **policy perspective**, policy coherence between culture, disaster and climate change will be key, which means the establishment of sector-specific and site-specific disaster risk reduction (DRR) and climate change adaptation (CCA) strategies, but also the integration of culture into national disaster planning and climate adaptation plans to enable effective institutional, financial and operational arrangements.

Another important aspect is that rather than merely looking at heritage risks, it is critical to recognize that heritage plays an important role in mitigating impacts and strengthening resilience. **Traditional ecological knowledge**, skills, and practices can mitigate disaster risks and contribute to the preservation and restoration of the ecosystem in which heritage exists. Greater efforts are needed to systematically integrate this knowledge into fire risk management as well as broader disaster risk governance and implementation.

Last but not least, **disaster preparedness** remains the most effective way to protect communities and their heritage. Unlike other hazards such as typhoons, floods, earthquakes or Tsunamis, as destructive as fire disasters can be, they are among the most preventable and manageable through proactive measures tailored to each site by better understanding the vulnerabilities, challenges, resources and risks**.** Strengthening preparedness requires not only international cooperation and technical expertise, but also the meaningful engagement and empowerment of local communities. **Disasters are ultimately experienced locally, even when their causes and consequences are global**. It is therefore essential to ensure that community voices, experience, knowledge, expertise and priorities along with other stakeholders including emergency responders, are fully integrated into both policy frameworks and operational actions to help significantly reduce risks related to fire.

UNESCO's pilot initiative in Valparaíso engaged schools and local communities in strengthening fire resilience.
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Key steps taken to protect cultural heritage. Elements of specific legislation in Romania

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2024 has been a significant and positive year for the preservation of heritage in Romania, despite the numerous geopolitical, economic and social challenges posed by the current international and national context. Over the course of several years, this field has gradually evolved in a way that has enabled the country to direct its focus towards the appropriate level of attention. The purpose of this article is to emphasise two aspects that are considered to be extremely relevant for the future of the activity, and which are poised to act as notable turning points.

Despite the existence in Romania of a regulatory framework concerning the protection of cultural heritage, as well as a framework addressing disaster risk reduction, both of them have been subject to fragmentation. This fragmentation has resulted in the issuance of numerous laws, technical norms and guidelines by various ministries and specialised authorities. A lack of coordination between laws was identified, particularly by specialists working with these frameworks, but also by the legal system, given the high number of trials it generates. These inconsistencies include technical concepts, important roles and responsibilities, particularly at local level. The existing legal and institutional framework, both for disaster risk reduction and heritage protection revealed to be inadequate in its capacity to address multiple hazards and address cross-sectoral issues. Rarely during disasters was the heritage component taken into account, not to mention specific intervention measures, which tend to be improvised. In order to provide a comprehensive overview of the legal framework governing these two domains, a number of sources were selected to ensure a comprehensive overview. These can also be consulted in the list of references of this article.

Furthermore, despite the ratification of several significant international conventions by Romania, their implementation at the national level has been inadequate or even absent over time. This was the case of the 1954 Hague Convention on the Protection of Cultural Property in the Event of Armed Conflict, with both Protocols ratified by Romania. Although the Convention and Protocol 1 were ratified in 1957 and Protocol 2 in 2006, they had never been incorporated into a practical and legal framework until recent attempts were made.

National Strategy for Disaster Risk Reduction 2024-2035

In this particular context, two significant steps were taken in the direction of enhancing the previously mentioned aspects, which were successfully achieved in 2024. The first of which saw Romania's adoption of the National Strategy for Disaster Risk Reduction 2024-2035. The National Strategy for Disaster Risk Reduction aims to

provide a comprehensive framework to mobilise various public and private stakeholders, stimulating and accelerating efforts to increase Romania's resilience to disasters.The Strategy was launched by the Ministry of the Interior, which coordinated both actors[1] with decison making capacity and those involved by virtue of their interests or activities in this field. The preparation of the document was a challenge for all participants, particularly as some of them were working together for the first time, each bringing their own tools and approaches while aiming for a common objective, revealing that productive dialogue among different parties requires a good understanding of vocabulary, terminology, procedures, resources and needs. Fortunately, the European experience[2] and previous projects proved very helpful, as some of the professionals involved had been colleagues in common trainings, ensuring consistency and a harmonious interoperability. During these training sessions the participants acquired a common language explaining the specific terms. At the same time different meanings given to the same terms became the subject of debate and clarification. Thus, working on the strategy was easier, and disseminating the knowledge acquired by the two sectors was also beneficial for other related areas.

The Strategy also focused on cultural heritage, thanks to the involvement of the Ministry of Culture and the National Institute of Heritage, as well as other key sectors such as the social protection system, healthcare, essential services and the private sector. Before the Strategy was published, these sectors were all listed under the same management of risk types. This did not account for their specificity, or how they fit into the bigger picture of sustainable development. There were also missed opportunities to include non-governmental actors in the actions to reduce their associated disaster risks. A good example is the impact on professional entities in different sectors or NGOs working in the heritage field.[3] The recently approved National Strategy for Disaster Risk Reduction suggests a step-by-step plan for dealing with different types of disasters in these areas, so that they can become safer and more capable of dealing with disasters in the future.In order to enhance the resilience of cultural heritage, it is necessary to address challenges across all priority areas and multiple hazards.

The Ministry of Culture, through its subordinate bodies like the National Institute of

[1] The list of involved institutions is extensive and diverse, but among the most relevant to the heritage sector are the Ministry of Development, Public Works and Administration; the Ministry of Environment, Water and Forests; the Ministry of Investments and European Projects; the Ministry of Research, Innovation and Digitalisation; the Ministry of Education; the National Agency for Cadastre and Land Registration, among others.

[2] One of these programmes was the ProCulther-Net training, in which two Roamanian teams participated. The opportunity to work in multidisciplinary teams, as well as to share experiences with others, proved to be of significant benefit to the approach adopted in Romania.

[3] There are NGOs operating at a very local level that have created jobs and rely on the smooth functioning of their immediate environment. For example, it is difficult to imagine how an NGO based in the historic centre of Bucharest could remain resilient in the aftermath of a catastrophic earthquake causing major damage to the area's heritage. These NGOs also hold a wealth of valuable information that could support the development of concrete local action plans.

Shielding the Past: 70 Years of the Hague Convention, Bucharest 10-12 September 2024
© National Institute of Heritage

Heritage or County Directorates[4] (42 in Romania including Bucharest), is in the process of establishing an information system that will serve to centralise information on cultural heritage assets. In the interest of safeguarding cultural heritage, it has become imperative that the databases and information systems devised encompass data related to cultural heritage assets, including their vulnerability, exposure, and cultural heritage value. It is also proposed that the system incorporate elements relating to the vulnerabilities of the objectives. The system will be designed to collect primary data on all the risks to which cultural heritage assets are exposed, thereby facilitating the development of specific methodologies for assessment, including disaster damage. At the same time it is strongly recommended to establish closer links between Disaster Risk Reduction (DRR) and cultural heritage.

[4] The National Institute of Heritage (INP) is Romania's main public institution operating under the authority of the Ministry of Culture. It is responsible for implementing public policies in the field of cultural heritage. Its mandate includes the research, inventory, protection and enhancement of all categories of cultural heritage, immovable and movable, tangible and intangible as well as digital, and it maintains the official inventories related to htese areas.
Among its legal duties, INP manages the National Restoration Programme, the main state funding tool for the protection, conservation, restoration and enhancement of immovable heritage. The Institute also acts as the National Aggregator for Europeana, prepares nominations for the World Heritage List, coordinates the nomination process for the European Heritage Label and oversees the professional accreditation process for the immovable heritage.

Training Course at Palatul Mogoșoaia "Risk assessments for conflict", Romania, 11 September 2024
© National Institute of Heritage

As the Ministry of Culture is a constituent element of the National Platform for Disaster Risk Reduction, part of Strategy, it is also imperative that technical advisory groups include cultural heritage conservation experts in situations requiring their expertise. The development of a collaborative action plan between the Ministry of Culture, General Inspectorate for Emergency Situations and other key actors operating for the protection of cultural heritage in case of disaster is recommended through the Strategy, which of course must include other intervention plans and strategies, such as Risk Analysis and Cover Plans.

By this Strategy, there are a number of opportunities to consider. For example, the document highlights that research on cultural heritage should be encouraged and taken into account in research funding when appropriate. In practice, this kind of research will provide the tools for prevention and intervention. For example, more accurate and complete inventories of hitorical centers, accompanied by appropriate risk assessments, will help determine intervention priorities. The private sector can also be involved and private funding can be mobilised by providing dedicated guidelines and resources at the Ministry of Culture level. There may be an opportunity to set up a special fund to help solve problems at cultural heritage sites in terms of preventive conservation or in the event of disaster. This fund could be set up with clear rules on its implementation and management by teams made up of experts in different fields. In case of emergency plans that include cultural heritage protection, the heritage community and civil protection organisations can work together to

protect and recover as much cultural heritage as possible after a disaster. To implement the Strategy and its Action Plan, authorities responsible for specific risk types, as well as other central public authorities responsible for other sectors or areas potentially affected by disasters, will develop dedicated sectoral plans. These plans will either be new or integrated into existing sectoral strategies, plans and processes. The measures outlined in these plans will align with the actions proposed in the 2024-2035 Action Plan. In parallel, the cultural sector will activate its own structures to respond to specific needs related to prevention and protection.

Four specific objectives were defined, taking into account the various actors involved, such as understanding disaster risks, strengthening disaster risk management governance, investing in disaster risk reduction, improving preparedness for effective response and applying the BBB (Build Back Better) principle in recovery, rehabilitation and reconstruction. Action line no. 7 of the fourth specific objective is dedicated to the improvement of resilience in immovable and movable cultural heritage, as well as other assets of cultural significance. This is further stressed by acknowledging that cultural heritage plays a fundamental role in sustainable and inclusive development, and can contribute to the revitalisation of cities and regions. It is recognised as an invaluable resource that demands protection. The Strategy records and reinforces that the loss of movable and immovable cultural heritage and other assets of cultural value following a disaster can have long-term consequences, including a decline in cultural and tourist attractiveness for citizens, potential investors, and visitors, which in turn, may result in a slowdown, or even halting, of the sustainable development of the area. In this particular context, it has become necessary and urgent to develop dedicated evacuation plans of cultural assets and to establish dedicated systems for their protection and conservation. This approach will facilitate the subsequent restoration and reconstruction of damaged cultural heritage assets.

Significant importance is attributed to this document, which is congruent with the National Strategy for the Protection of Historic Monuments[5], another strategic law that promotes an integrated framework of interventions to reduce seismic risk and improve the climate crisis risk behaviour of buildings and historical monuments, ensuring the preservation of cultural heritage.

Establisment of Blue Shield Romania

The second relevant step was a significant event hosted by the National Institute of Heritage from Romania in partnership with Blue Shield International, which took place on the occasion of the anniversary of the Hague Convention (1954). The three-day international conference, entitled, *'Shielding the Past: 70 Years of the Hague Convention'*, was held in Bucharest from the 10th to the 12th of September 2024. It

[5] The National Strategy for the Protection of Historic Monuments is a document initiated by the Ministry of Culture is currently awaiting approval. It is hoped that there will soon be an opportunity to further elaborate on its content.

featured a diverse programme, including the General Assembly of the Blue Shield International Committees, a field training session on the safeguarding and protection of cultural heritage in crisis, as well as various panels and workshops. Additionally, the conference included discussions on the establishment of Blue Shield, peer mentoring, and the promotion of new national committees. The event also offered an opportunity for those creating new committees to learn from their peers. The event, which was conducted in a hybrid format and attracted participants from across the globe, brought together professionals specialising in both cultural heritage and civil protection. Delegates from the four founding members – ICOM, ICOMOS, IFLA and ICA – participated in the conference.[6]

For the Romanian team of the National Institute of Heritage, the privilege of hosting such a significant event was complemented by the notable success of their mentoring efforts in establishing the Romanian National Committee of the Blue Shield. Consequently, with assistance from our partners and the collective experience gained during the event, the initial procedural step of establishing a National Committee was completed in December. The Romanian Blue Shield Committee's mission and objectives are in line with the work and areas promoted by Blue Shield International. These are carried out through the six areas of activity - legal compliance, policies and their implementation; capacity building, education and training in support of Blue Shield's areas of activity; coordination among members and with partner organisations; proactive protection and risk preparedness; emergency response; stabilisation, post-disaster recovery and long-term/ongoing support activities. Considering that cultural heritage is a vital and inseparable part of communities and not a luxury, Romania is committed to become proactive in advocating for its protection. As a young committee, building this agenda in these uncertain times has become an absolute priority. It is also evident that one of the primary functions of this position is to serve as an intermediary between the cultural heritage community and civil protection specialists. This role has been identified as a crucial gap that requires addressing within the framework of established institutions.

Final remarks

As previously stated, these examples constituted only a small part of the more intense activities and training experienced in 2024 by Romanian teams of cultural and civil protection professionals. Two exercises took place recently: one focused on cultural heritage protection, and the other was a full-scale Exercise with a heritage component. Reports on these exercises and our feedback will shortly be completed and may be shared in a future article. However, as previously mentioned, these examples marked a turning point towards a more consistent effort to safeguard cultural heritage. It is now up to the heritage community to continue building and strengthening partnerships with Civil Protection Departments. Meanwhile, the new legal framework and the emerging Blue Shield Committee may provide the nec-

[6] A more detailed and comprehensive account of the activities and the report of the event may be consulted at: [***https://theblueshield.org/shielding-the-past-event-success/***]. Accessed 7 July 2025.

essary tools to address existing gaps in this field. Lessons from other countries highlight the importance of specialised, trained personnel and a dedicated legal framework to ensure correct intervention across all type of heritage. More exercises will surely be planned in the future, alongside the development of specific plans or refinement of the ones in place for every cultural institution, that will greatly benefit from experiences on the field such as this one.

SUMMARY OF THE RULES AND LAWS RELATED TO CULTURAL HERITAGE
• *Law no. 422/2001 on the Protection of Historical Monuments* ***(https://legislatie.just.ro/Public/DetaliiDocument/76993)***
• *Law no. 182/2000 on the Protection of Movable Cultural Heritage* ***(https://legislatie.just.ro/Public/DetaliiDocument/24761)***
• *Law no. 311/2003 on Museums and Public Collections* ***(https://legislatie.just.ro/Public/DetaliiDocument/76769)***
• *Law no. 26/2008 on the Protection of Intangible Cultural Heritage* ***(https://legislatie.just.ro/public/detaliidocument/90098)***
• *Government Ordinance no. 43/2000 on the Protection of Archaeological Heritage* ***(https://legislatie.just.ro/Public/DetaliiDocument/20778)***

SUMMARY OF THE RULES AND LAWS RELATED TO DISASTER RISK MANAGEMENT
• *Law no. 481/2004 on Civil Protection* ***(https://legislatie.just.ro/Public/DetaliiDocument/56923)***
• *Law no. 307/2006 on Fire Protection* ***(https://legislatie.just.ro/Public/DetaliiDocument/73657)***
• *Law no. 50/1991 on the authorization of construction works* ***(https://legislatie.just.ro/Public/DetaliiDocument/1515)***
• *Government Decision no. 846/2010 National Strategy for medium and long-term flood risk management* ***(https://legislatie.just.ro/Public/DetaliiDocument/121991)***
• *Government Decision no. 1491/2004 committees and operational centers for emergency situations* ***(https://legislatie.just.ro/Public/DetaliiDocument/55462)***
• *Government Decision no. 557/2016 on the management of risk types* ***(https://legislatie.just.ro/Public/DetaliiDocument/180860)***

Experiences in capacity building of cultural heritage rescue in Pécs, Hungary

Lt. Col. Gábor Domján, Inspector General of Civil Protection, Disaster Management Directorate of Baranya County, Hungary

Introduction

In Hungary climate change-induced extreme events and the altered civil security environment are factors increasingly perceived as significant risks to cultural heritage. The local relevance of this topic was highlighted in 2010 by a vulnerability assessment, carried out by the Disaster Management Directorate, of sites associated with Pécs, then European Capital of Culture. That year, the region experienced heaviest rainfall records, resulting in water infiltration, flooding, landslides, and other damages.

There are no uniformly established national professional protocols for the emergency rescue of heritage assets. However, international initiatives (such as the ProteCHt2save[1] and PROCULTHER projects), aimed at developing operational capacities for the protection of cultural heritage, have achieved results in a pilot area (Pécs – Baranya County). Thanks to the ProteCHt2save program, local communication was initiated between monument and heritage protection authorities, museum maintainers, and responding firefighters. This led to the development of emergency rescue and evacuation plans, the training of professionals, and the establishment of common guidelines and cooperation models.

The article, therefore, does not report on a specific project and its solutions, but rather highlights the outcomes that could be achieved through the involvement of local professionals, without any targeted financial resources or guidance from legislative or other supervisory bodies. Furthermore, the aim of this voluntarily undertaken local initiative was also to draw attention to the shortcomings and needs in the field. Ensuring sustainability requires that central decision-makers acknowledge the results and establish the necessary conditions for repetition and ongoing operation.

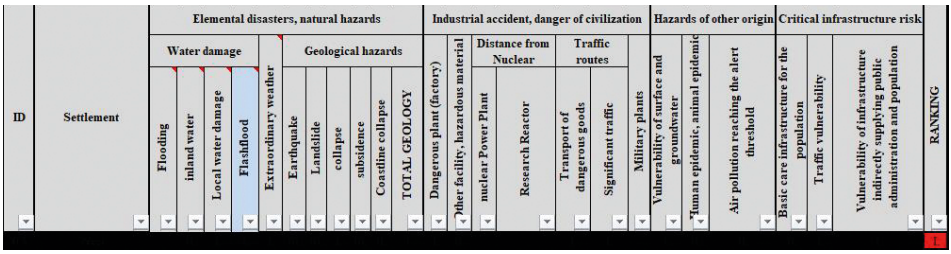
Risk and vulnerability assessment of the pilot area of Pécs

The assessment, compiled in consultation with experts from the above-mentioned professional partner authorities, includes recommendations in line with the Sendai priorities and facilitates the integration of cultural heritage protection into national disaster risk reduction strategies. The first phase, besides ensuring clarity and transparency among the different stakeholders and organizations engaged in CH protection – focused on the preparation of a comprehensive exploratory assessment of cultural heritage sites: the types of cultural heritage forming the basis for

[1] ***https://programme2014-20.interreg-central.eu/Content.Node/ProteCHt2save.html*** [Accessed 9 June 2025].

rescue planning, relevant legislation, supervisory bodies, and their responsibilities.

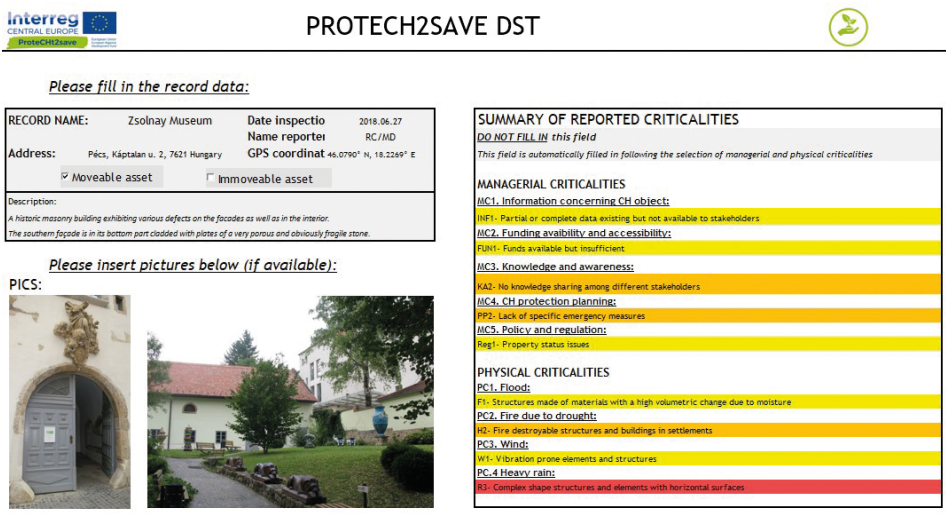
Pécs is a historic city in southwestern Hungary with a population of 140,000, located at the foothills of the Mecsek Mountains. Its primary vulnerabilities range from hydrogeological risks to incidents related to industrial and transportation infrastructure. Pécs, as our pilot site belongs to the following national classification according to the disaster protection class (Hazardous effects):



ID	Settlement	Elemental disasters, natural hazards										Industrial accident, danger of civilization					Hazards of other origin			Critical infrastructure risk			RANKING
		Water damage					Geological hazards							Distance from Nuclear		Traffic routes								
		Flooding	inland water	Local water damage	Flashflood	Extraordinary weather	Earthquake	Landslide	collapse	subsidence	Coastline collapse	TOTAL GEOLOGY	Dangerous plant (factory)	Other facility, hazardous material	nuclear Power Plant	Research Reactor	Transport of dangerous goods	Significant traffic	Military plants	Vulnerability of surface and groundwater	Human epidemic, animal epidemic	Air pollution reaching the alert threshold	Basic care infrastructure for the population	Traffic vulnerability	Vulnerability of infrastructure indirectly supplying public administration and population	

1. National Risk Assessment Table - Prepared by the author

During risk assessment, critical elements were identified in a "Decision Support Tool (DST)" matrix[2] linking risks to potential impacts, and recommendations were made for applicable measures.



PROTECH2SAVE DST

Please fill in the record data:

RECORD NAME: Zsolnay Museum
Date inspectio 2018.06.27
Name reporte RC/MD
Address: Pécs, Káptalan u. 2, 7621 Hungary
GPS coordinat 46.0790° N, 18.2269° E
☑ Moveable asset ☐ Immoveable asset
Description:
A historic masonry building exhibiting various defects on the facades as well as in the interior.
The southern façade is in its bottom part cladded with plates of a very porous and obviously fragile stone.

Please insert pictures below (if available):

PICS:

SUMMARY OF REPORTED CRITICALITIES
DO NOT FILL IN this field
This field is automatically filled in following the selection of managerial and physical criticalities

MANAGERIAL CRITICALITIES
MC1. Information concerning CH object:
INF1- Partial or complete data existing but not available to stakeholders
MC2. Funding availability and accessibility:
FUN1- Funds available but insufficient
MC3. Knowledge and awareness:
KA2- No knowledge sharing among different stakeholders
MC4. CH protection planning:
PP2- Lack of specific emergency measures
MC5. Policy and regulation:
Reg1- Property status issues

PHYSICAL CRITICALITIES
PC1. Flood:
F1- Structures made of materials with a high volumetric change due to moisture
PC2. Fire due to drought:
H2- Fire destroyable structures and buildings in settlements
PC3. Wind:
W1- Vibration prone elements and structures
PC.4 Heavy rain:
R3- Complex shape structures and elements with horizontal surfaces

2. Summary sheet of the "Decision Support Tool" matrices for the Pécs Zsolnay Museum location

[2] ***DST Matrix - Implementation manual Interreg CE_word_template https://programme2014-20.interreg-central.eu/Content.Node/D.T2.1.3-Decision-support-tool.pdf*** [Accessed 9 June 2025].

When organizing protection, it is important to plan both for resilience enhancement, primarily the responsibility of cultural heritage sites managers, and for the operational response and evacuation activities, which fall under the responsibility of rescue operators. From a civil protection perspective, the role of civil protection, though not yet defined by legal authority in Hungary, would be to organize preparation for potential damage events, as well as to coordinate safety and recovery efforts after an incident occurs. In complex situations, such as the protection of cultural heritage, it is essential to identify the specific responsibilities of all the actors involved, including institutions, authorities, police, firefighters, local governments, owners, volunteers, and other experts, and integrate these roles within a coordinated plan or set of measures. To date, planning efforts have largely focused on post-event response, outlining sequential procedures and clearly separated competencies. It is also necessary to establish the legal framework for protection, which delegates the tasks of rescuing cultural heritage to state administration actors (authorities, law enforcement agencies) and defines the obligations of cultural heritage managers.

Previously, in the event of armed conflict, plans aligned with the national defence and mobilization system ensured the evacuation planning for heritage assets. Replacing these now-obsolete (withdrawn) plans is justified.[3]

Implementing Disaster Management Plans

Disaster Management Plans are structured according to a risk-based classification of settlements, with planning levels as follows: workplace, municipal, regional, and central (national) disaster management plans. These plans are developed by the relevant stakeholders, such as workplaces, local governments, or protection centres, in coordination with the professional disaster management authority. Institutional plans, prepared as models by museum experts (i.e., the internal plans of institutions that present, store, or manage cultural heritage), are typically tailored to the institution's own resources. These can be adapted and integrated at the site level within the broader disaster management planning framework. In the future, dedicated sub-sections on cultural heritage, when applicable, may be incorporated into higher-level disaster management plans.

During disaster relief operations involving cultural heritage, it is the responsibility of the incident commander to determine operations and tactical order (primary goal: saving lives, then firefighting and technical rescue-saving assets). For each site, the most relevant information supporting the organization and management

[3] The aforementioned withdrawn plans were prepared due to the events of the Cold War before the regime change. After the South Slavic War, Hungary's external threat was consolidated, and no attention was paid to the maintenance of the plans, making them obsolete. In the meantime, a structural change took place in the Hungarian defence administration system, and a new planning system was developed, which currently does not include the development of documents replacing the previous plans (despite the proximity of the Ukrainian war).

of operational rescue is contained in laminated plan sheets available in all mobile fire engines, as well as at the on-call services (receptions), which support on-site operations with information. This means that all responders have access to it 24/7. The **Firefighting and Technical Rescue Plans** (in Hungarian abbreviation: TMMT)[4] are developed for high-risk locations and consist of detailed information sheets prepared by the competent Fire Brigade Department in collaboration with the relevant institution. As established by national regulations, these plans are mandatory for sites considered to pose greater risks, such as high-density buildings, hazardous facilities, and complex locations from a rescue perspective (as referenced in footnote no. 4).

There is no obligation to prepare such a plan for cultural heritage sites, this was only implemented in the pilot area of Pécs (this means a total of 27 sites; for example, the UNESCO World Heritage Site Cella Septichora, City History Museum, Vasváry House, Zsolnay Factory and Family History Exhibition, Csontváry, the Vasarely Museum, Basilica Pécs and Bishop's Treasury, Zsolnay Museum and Stone Warehouse, National Theatre, Szerecsen Pharmacy, and other rural castles). Due to their simple structure, they are suitable for immediate access as part of the equipment of every responding fire engine. Plan sheets for cultural heritage sites were prepared in the pilot area, as well as in other important locations.

An internal working document was issued to the firefighters of Pécs drafted in collaboration with museum experts from Pécs indicating the possible workflows of cultural heritage rescuing activities (supporting, strapping, stabilization, covering, protection, reinforcement, securing, localization, collection of debris and remains, evacuation, extraction, documentation, packaging-special operations, security measures). Future planning must in fact consider guidelines, standards, and recommendations that provide detailed assistance and guidance for operations, tools, and materials applicable during CH rescue operations (e.g., The Key Elements of a European Methodology to Address the Protection of Cultural Heritage during Emergencies).[5]

Human resources and equipment

When planning human resources, the establishment of professional rescue teams is critical. Cultural Heritage Rescue Teams (CHRT) are national emergency groups that can also be deployed internationally. Professional and volunteer firefighting units, as well as specialized urban search and rescue (USAR) teams, under the direction of a supplementary expert staff (conservator, restor-

[4] General rules for firefighting and technical rescue activities by the fire department: Decree 39/2011. (XI. 15.) BM, point 18.

[5] ***PROCULTHER Project. Key elements of a European Methodology to Address the Protection of Cultural Heritage during Emergencies***, Città di Castello: LuoghInteriori, 2021. ISBN 978-88-6864-370-6.

er, structural engineer, art historian, data manager, logistician), are suitable for the protection and rescue of cultural heritage assets in the event of disasters caused by natural or human-induced hazards. The national qualification system in Hungary, based on the UN INSARAG principles, enables volunteer rescue teams to develop capacity and prepare. Such a volunteer team that also exists in Baranya County can be compared to a light-medium international USAR team. They represent a potential rescue force alongside professional firefighters. The local initiative was implemented under the guidance of museum experts and a static engineer.

Equipment must also be specified, so the managing institution is responsible for all devices necessary for moving and preserving the condition of on-site heritage assets (e.g., lifts, dryers, cooling machines, special storage units, binding and packaging materials, etc.). An alternative solution could be to set up containerized kits, equipped with technical and specialized materials for heritage interventions, at the seven disaster management technical rescue bases across the country, including the one located in Pécs.[6] The collective equipment of the units ensures effective team operation, as each member is fundamentally equipped with personal tools and protective equipment. The quantity of materials required for protection must be stocked according to the protection mode of the heritage assets. The limited quantity of the initial stock only allows for the earliest phase of works; therefore, ensuring sufficient material on-site requires significant logistical effort. It is advisable to plan for tools and materials that are widely available (e.g., from construction depots) in the procedures.

Response and damage assessment

Emergency management starts after the detection and reporting of damages, using protocols developed during the planning phase. Rapid response is essential; thus, alerting responders is a priority. The intensity and scale of events determine the level of response and management, so information from initial and ongoing processes is crucial. Upon alerting (firefighting) units, responders have access to verified report data and the quick-reference information included in the previously mentioned TMMT related to cultural heritage sites. Delayed reporting reduces rescue opportunities (e.g., when the facade of the Bikal church collapsed, only dismantling could save the remaining intact parts and other elements of value).

[6] Due to financial resources it could only be implemented in parts, the city provided containers, but not the auto lift system used by the fire department, and packaging material to, but not in the quantity that would be needed. The rescue base operates in Pécs, also in 24/7 and with a 6-minute alert readiness (with flood, chemical, forest fire and technical rescue type containers). The carrier truck lifts the container of the type needed - this could also be a CH rescue (this is currently a theoretical possibility).

3. Rescue of intact parts of the Bikal church © Baranya County Disaster Management Directorate, Pécs Branch 2023

In the case of extensive disasters (damage over a large area - multiple settlements), reconnaissance is carried out in several phases. First, the impacted area is delimited (identification of affected settlements and the cultural heritage located there)-internationally, this is the "ASR1" (Assessment Search and Rescue) level. The next step is the identification of damage sites and the approximate extent of the damage (damage assessment). This data is suitable for establishing sectors representing the unity of on-site rescue management and for setting up rescue priorities (triage). On-site reconnaissance means a detailed survey of the damage site, for which the PROCULTHER-NET Methodology (damage assessment criteria found in the PROCULTHER publication "The Key Elements of a European Methodology to Address the Protection of Cultural Heritage during Emergencies"[7]) can be taken as a basis, as there is no similar detailed methodology for this in Hungary. In the case of the above damaged church, the monument protection authority supervised the works and made commitments, although this cannot be considered *strictu sensu* a damage assessment.

In large scale disasters, alongside measures to ensure public protection, economic, and critical infrastructure operations, the need to rescue cultural heritage arises simultaneously. In such cases, the disaster management system is activated (in Hungary, this means the combined operation of various state administration sectors - authorities at local, regional, and central levels), within which a disaster man-

[7] See note 5.

agement working group delegated from professional organizations responsible for decision making and sectoral coordination operates. International cooperation is required not only for cross-border events. When the resources of a disaster-affected country are insufficient to manage damages at the required level, an appeal for assistance must be made to the international community (i.e. the UCPM).

The establishment of information management is essential. One of the most important conditions for the survival of cultural heritage is access to verified information recorded and preserved from historical periods. To support decision-making processes, the assessment phase must be based on three successive steps: collection of baseline information, assessment of impact and damage (secondary), identification of protection measures. The identification of numerous remains collected from devastated areas is enabled by the establishment of a grid system. For the operational staff directing operations it is fundamental to ensure the flow of information necessary to support the decisions to be taken. Post-Disaster Needs Assessment (PDNA) is a rapid assessment that collects the most important information, provides a comprehensive overview of the situation, and determines the need for detailed technical evaluations. It aims at a comprehensive assessment of the consequences of the disaster, establishing the needs for protection, temporary, and final restoration. An effective management methodology is key to enabling a coordinated and comprehensive data collection, analysis, and reporting capabilities, ensuring that appropriate resources reach the right place in time-even in the cultural heritage protection sector. The ArcGIS Survey123 data collection system is used by domestic INSARAG teams, but currently, no questionnaire is available for cultural heritage assets; the goal is to develop digital data collection and processing capabilities.

Comprehensive training is important not only to ensure that participants gain greater expertise in cultural heritage-related tasks, but also to understand each other's perspectives. Based on individual preparation, the training of teams and cooperating organizations requires a modular training and exercise system. Currently, there is no unified national curriculum for CH rescue procedures in the training of firefighters and volunteers. Field exercises based on a hypothetical scenario should be conducted in full-scale mode with scenarios as realistic as possible, where cooperation conditions, professional intervention, timeliness, available resources, and the usability of existing plans are also tested. The experience gained during such exercises or drills must be processed, evaluated, and procedures improved by exploiting opportunities.

Conclusion

The article primarily presented the preparation and planning processes for the safeguarding of cultural heritage in the event of potential emergency incidents. At the same time, a broader approach to the subject also encompasses the planning and development of measures aimed at preventing risk events. However, this latter aspect falls predominantly within the responsibilities of operators and the supervisory authorities overseeing them.

The comprehensive study on the tasks required for the rescue and safeguard of cultural heritage has been recently and repeatedly shared with Hungarian professional circles involved in civil protection and the management and supervision of cultural heritage. Future tasks should be planned as a central measure within the framework of an Action Plan, utilizing previous experiences.

As a next step, a short-term plan can be implemented, and the transferability of the results achieved in the pilot area can be demonstrated if similar initiatives are undertaken in other cities as well to protect and rescue cultural heritage. The long-term maintenance of these results and the sustainable implementation of further developments require a well-grounded and solid strategic approach within an appropriate legal framework, supported by the allocation of adequate financial and human resources.

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