Case study

ADDRESSING RISKS FOR CULTURAL HERITAGE IN RISK ASSESSMENTS - IS THERE ANY?

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Abstract: When talking about disaster risks, cultural heritage is usually not taken into account—either globally or nationally. Yet, heritage sites are increasingly affected by floods, fires, earthquakes, and other hazards. Despite growing awareness, very few World Heritage properties have developed proper disaster risk reduction plans. Policy-makers, both in cultural and civil protection sectors, tend to focus on what they perceive as "real" priorities, while the vulnerability of heritage is often acknowledged only after a disaster—when it is too late.

In Croatia, civil protection legislation includes cultural property protection, yet major strategic documents rarely engage with it meaningfully. This article examines the extent to which cultural heritage is addressed in disaster risk assessments by analysing three selected Croatian cathedrals—Dubrovnik, Rijeka, and Đakovo—and corresponding local risk assessments. Using ICCROM's Vulnerability and Capacity Assessment (VCA), adapted for the Croatian context, the aim was to highlight the gap between official planning and actual vulnerability. The results reveal consistent underrepresentation of cultural heritage in official frameworks and demonstrate the practical value of heritage-specific tools such as the VCA.

Keywords: Disaster risk management, Cultural heritage, Vulnerability and capacity assessment, Cathedrals, Survey

1. INTRODUCTION

Disaster risk assessments are essential strategic tools in modern risk management. However, cultural heritage – despite its irreplaceable historical, social, and symbolic value – is still largely absent from such assessments at both international and national levels. While the

frequency and intensity of natural and man-made disasters continue to grow, heritage sites remain critically vulnerable. Their risk exposure is often only recognized after damage has already occurred – too late for effective mitigation. The importance of protecting cultural heritage from disaster risks has been increasingly acknowledged in recent years by organisations and platforms such as the European Union Civil Protection Mechanism (UCPM), United Nations Educational, Scientific and Cultural Organization (UNESCO), International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), and others. Recent international and national initiatives — such as the EU-funded ProCultHer (2019–2021), its follow-up ProCultHer-NET (2022–2023), the ongoing ProCultHer-NET2 (2024–2025), and the Croatian project CPforHeritage (2024–2025) — illustrate the growing momentum to integrate cultural heritage into all phases of disaster risk management, from prevention to response. These examples do not stand alone, but reflect a broader trend of heritage-sensitive approaches emerging across Europe and beyond, consistent with international guidance (Sendai Framework, 2015; ICCROM, 2016; UNDRR, 2020). These initiatives have resulted in the development of new manuals and operational tools aimed at integrating cultural heritage into all stages of disaster risk management. Still, these efforts are inconsistently implemented, particularly at the national and local levels. In Croatia, civil protection legislation does recognize the protection and rescue of cultural property as part of its core mission. However, the Disaster Risk Management Strategy until 2030 did not include the Ministry of Culture in its development process. Inter-ministerial coordination remains weak, and the cultural heritage sector is often left without adequate representation in critical planning documents, such as major accident risk assessments produced by local and regional self-government units. This article investigates how (and if) cultural heritage is addressed in selected risk assessments through the lens of three Croatian cathedrals: in Dubrovnik, Rijeka, and Đakovo. These cathedrals were selected as case studies due to their representative character, cultural significance, and exposure to various disaster risks. These cathedrals are not only historically significant but also function as active public spaces. They regularly accommodate large gatherings during religious services, especially during major holidays, as well as significant tourist influx throughout the year. This human presence introduces an additional layer of vulnerability that should be accounted for in risk planning.Their value extends beyond their physical structures – they hold collections, rituals, and social meaning integral to community life. By comparing official local risk assessments with the Vulnerability and Capacity Assessment (VCA) tool conducted with cathedral representatives, the article aims to evaluate the depth, consistency, and presence of cultural heritage considerations in risk management.

Figure 1. Detail from the Treasury of Dubrovnik Cathedral – Reliquaries of St. Blaise illustrate the connection between movable sacred heritage and the Festivity of St. Blaise, recognized as UNESCO's Intangible Cultural Heritage List since 2009.

Photo by Ana Miličić

2. METHODS

This study employs a qualitative methodology based on case analysis and structured risk assessment tools. At its core lies the Vulnerability and Capacity Assessment (VCA) methodology developed by ICCROM, within its FAR (First Aid and Resilience for Cultural Heritage in Times of Crisis) programme, which was adapted specifically for the Croatian cultural and legal context. The original ICCROM VCA form, while comprehensive and internationally validated, required contextual adjustment in order to align with national terminology, legal frameworks, types of heritage classification, and local risk profiles. The adapted version was expanded to include references to the Croatian Register of Cultural Goods, regional variations in building types and materials, and locally relevant risk factors such as inappropriate restoration practices, structural neglect, and fire hazards associated with surrounding infrastructure (e.g., catering facilities). The localized VCA tool also added practical categories such as presence of emergency plans, availability of evacuation protocols for artefacts, and routine maintenance frequency – elements often missing in formal risk documentation. To enhance clarity, Table 1 summarises the main risk categories included in the adapted VCA questionnaire.

Risk category	Examples of issues assessed
Fire-related risks	Proximity of catering facilities; electrical installations; indoor ignition sources; availability of fire protection systems
Earthquake-related risks	Structural integrity; absence of seismic reinforcement; known historical damage; vulnerability of vaults and decorative elements
Evacuation & emergency planning	Existence of emergency plans; evacuation routes; procedures for artefact evacuation; staff training
Movable heritage & storage conditions	Storage rooms; microclimate stability; accessibility; condition of relics and collections
Maintenance & restoration	Frequency of maintenance; quality of past restorations; inappropriate interventions; infrastructure-related risks
Human-induced / contextual risks	Tourist pressure; large gatherings; nearby urban development; operational constraints

Table 1. Overview of adapted VCA questionnaire categories.

The tool was applied to three major cathedrals located in different Croatian cities: Dubrovnik, Rijeka, and Đakovo. These sites were selected for their geographical and contextual diversity, cultural significance, and exposure to different types of disaster risks (e.g., earthquakes, fire, and urban development). The data collection involved direct engagement with cathedral staff and local heritage professionals. In parallel, the authors reviewed official major accident risk assessments produced by local self-government units for the same cities. These documents were analysed with respect to their inclusion (or lack thereof) of cultural heritage, the presence of expert input, and the quality of risk identification and prioritisation. A comparative analysis was then conducted between the insights derived from the VCA assessments and those presented in the official risk documents. This process allowed for the identification of conceptual, procedural, and operational gaps in how cultural heritage risks are recognized and managed in Croatia. However, the current VCA questionnaire does not explicitly inquire about the number of people regularly or occasionally present in the cathedral during peak periods. Including such a question could significantly improve the understanding of exposure in scenarios involving evacuation or human safety during disasters.

Figure 2. Cathedral of St. Vitus in Rijeka – exterior view embedded in a dense urban setting, illustrating spatial vulnerability.

Source: Mateja Jerman, used with permission

3. PROBLEM ANALYSIS

While the importance of cultural heritage is often proclaimed at the policy level, its actual inclusion in disaster risk assessments remains inconsistent and largely symbolic. The review of official risk assessments from Dubrovnik, Rijeka and Đakovo – compared with the data collected through Vulnerability and Capacity Assessments (VCA) conducted at the respective cathedrals – reveals significant conceptual and methodological gaps.

3.1. Superficial Integration and Conceptual Oversights

In all three cities, cultural heritage is acknowledged formally, primarily through listings of protected sites or references to international frameworks such as the Sendai Framework or UNESCO conventions. However, these references often lack contextual application. Rather than being analysed as risk-prone, heritage assets are named in passing, often in the form of copy-pasted inventories without connection to real-world vulnerabilities. One example of this contradiction is evident in the Dubrovnik risk assessment (2024), where several churches, including the cathedral, are simultaneously listed as evacuation shelters and as high-risk buildings in seismic scenarios. This lack of internal consistency reflects broader challenges in coordinating interdisciplinary planning and integrating expert knowledge.

3.2. Inadequate Valuation Methods

Perhaps the most significant methodological flaw lies in the way cultural heritage is valued. The official document titled „Criteria for the Development of Guidelines Set by the Leaders of Local (Regional) Self-Governments for the Purposes of Preparing Risk Assessments for Major Accidents at the Levels of Local and Regional Self-Governments“, adopted in 2016 and still in use, includes a standardised price list[1] – reconstruction costs calculated based on the functional use of buildings, not their historical, artistic, or symbolic value. For example, buildings categorised as “hospitals, libraries, and cultural facilities” are assigned a reconstruction cost of €300.5/m². While the term “cultural facilities” may include theatres or community centres, it does not specifically account for protected cultural heritage sites such as historic cathedrals. This flat-rate approach is applied across various categories – from schools to warehouses – with no adjustments for heritage designation, architectural uniqueness, or conservation-specific requirements. As a result, the estimated cost for rebuilding a Baroque cathedral may fall within the same pricing logic as constructing a modern library or municipal hall. As Durrant et al. (2023) observe, current policy frameworks tend to reduce cultural heritage to the built environment, neglecting its deeper social and symbolic dimensions. Moreover, the underlying price list, dating back to 2010, does not reflect present-day construction costs – which have risen significantly in the past 15 years – nor does it include the expenses related to the conservation of movable or intangible heritage. Restoration work on historic structures typically demands specialised materials, highly skilled craftsmanship, and strict adherence to heritage protection standards – all of which are entirely excluded from the current valuation model.

3.3. Absence of Cultural Expertise and Updated Data

In none of the reviewed documents were cultural heritage professionals included in the assessment teams. This absence resulted in several oversights:

- Dubrovnik’s risk assessment included 237 heritage items but offered no prioritisation or analysis of actual risks to individual sites.

- Rijeka’s assessment (2022) referenced historical events such as the 1750 earthquake but failed to acknowledge the damage caused to the cathedral, despite evidence from the VCA.

- Đakovo’s document (2023) made no reference to cultural heritage risks at all, despite the prominence of the cathedral and the existence of related vulnerabilities.

[1] The cost figures were originally derived from: Bal I.E., Crowley H., Pinho R. (2010). *Displacement-Based Earthquake Loss Assessment: Method Development and Application to Turkish Building Stock*, Research Report Rose 2010/02, IUSS Press, Pavia, Italy.

In all three cases, there is extensive reliance on outdated documents, recycled text, and templated formats – rather than dynamic, site-specific assessments based on actual consultation and updated data.

3.4. VCA Results – Revealing the Hidden Risks

The adapted VCA tool used in this study, based on ICCROM's original methodology but adjusted to Croatian legal and cultural context, revealed a much deeper risk landscape. The VCA assessments, developed in consultation with cathedral representatives, uncovered the following (though not necessarily in all three):

- Absence of seismic reinforcement across all three sites
- Fire hazards related to nearby commercial and catering activities
- Inadequate or non-existent emergency protocols and evacuation plans for artefacts
- Poor storage conditions for movable collections
- Concerns over inappropriate restoration practices (notably in Đakovo)
- Lack of training and preparedness among staff for disaster scenarios

These findings point to the operational usefulness of VCA as a tool for heritage-sensitive risk assessment and demonstrate the extent to which official frameworks currently fail to capture the real vulnerabilities of cultural sites.

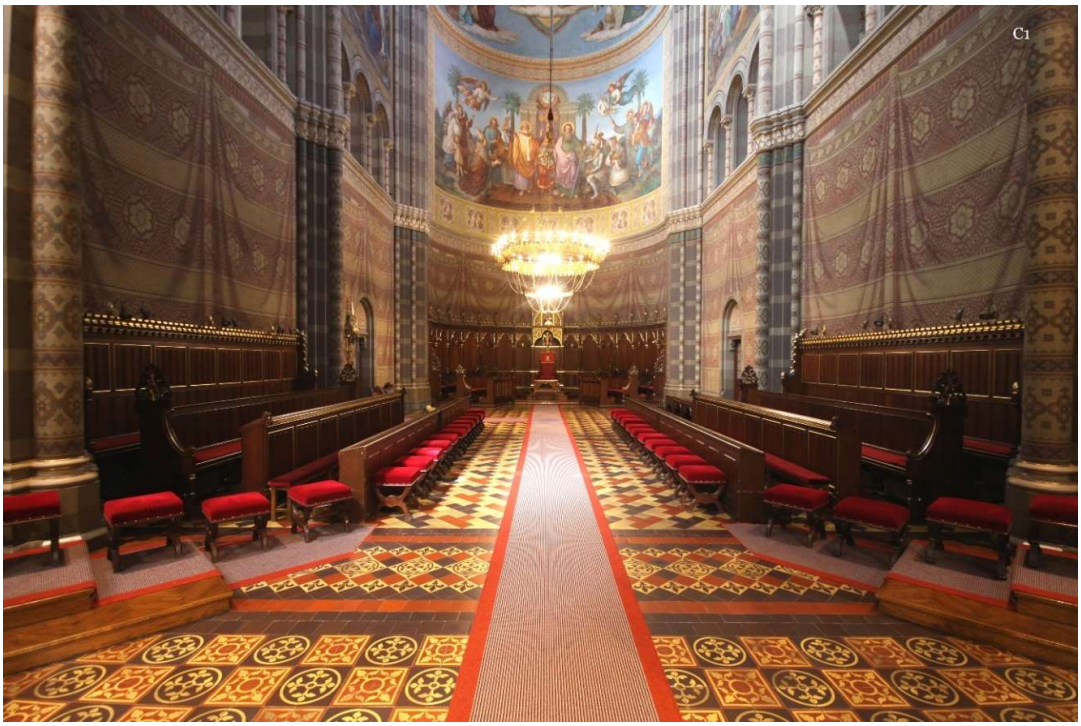

Figure 3. Đakovo Cathedral – view of the choir stalls and painted apse illustrates the richness of movable heritage embedded in sacred architecture and its potential exposure to risk.

Source: Ana Mutnjaković, used with permission.

3.5. Summary

Projects like PROCULTHER (2021) offer practical guidance and tools for cultural heritage integration into DRM, yet such resources are rarely reflected in national frameworks. As highlighted by Durrant et al. (2023), mainstream DRR frameworks remain largely technocratic, with little integration of cultural values and priorities — a gap that becomes particularly visible when heritage sites are evaluated solely through cost-per-square-metre logic. The problem is not just technical – it is systemic. Cultural heritage is either broadly generalised, financially undervalued, or altogether omitted in risk assessment frameworks. Without adequate methodologies, professional inclusion, and updated valuation systems, risk planning becomes detached from the very assets it claims to protect.

4. DISCUSSION AND CONCLUSION

Prilog XIII - Približni jedinični troškovi izgradnje raznih kategorija građevina

Klasa	Opis	Cost (€/m^2)
Ia	Jednostavne poljoprivredne građevine, pomoćne građevine i slično	28,4
Ib	Spremišta (rezervoari) vode, trgovačka skladišta, štale i slično	49,5
IIa	Tornjevi, vodotornjevi, ostala spremišta	78,4
IIb	Uredi, trgovine, poljoprivredne građevine do visine jednog kata, jednostavna industrijska postrojenja i slično.	146,4
IIIa	Stambene zgrade do četiri kata, lokalne sportske građevine, parkirališta na kat, poslovne građevine i slično	175,8
IIIb	Stambene i poslovne građevine, složenije poljoprivredne i industrijske građevine, građevine javnih institucija, domovi zdravlja, hoteli niže kategorije i slično	200,5
IVa	Privatne kuće, uredske zgrade, veliki trgovački centri	226,3
IVb	Trgovački centri i hoteli viših kategorija	250,0
IVc	Bolnice, knjižnice i kulturne građevine	300,5
Va	Radio i TV postaje, oobrazovne institucije, trgovački centri s dodatnim sadržajima	372,6
Vb	Kongresni centri, zračne luke,	451,6
Vc	Kliničko-bolnički centri, hoteli najviših kategorija	513,3
Vd	Kazališta, operne i koncertne dvorane.	615,3

Bal I.E., Crowley H., Pinho R. (2010.) Displacement - Based Earthquake Loss Assessment: Method Development and Application to Turkish Building Stock, Research Report Rose 2010/02, IUSS Press, Pavia, Italy

Figure 4. Table of standard reconstruction costs (2010) used in official risk assessments – illustrates valuation shortcomings for heritage.

Source: Official document: "Criteria for the Development of Guidelines…" (2016), Government of Croatia

The findings presented in this paper indicate a persistent disconnect between the formal recognition of cultural heritage in policy documents and its actual treatment in risk assessment and planning. While legal frameworks in Croatia nominally include cultural heritage as a protected category in civil protection, this recognition is rarely operationalised in local risk assessment practices.

The reliance on outdated methodologies, the absence of interdisciplinary teams, and the mechanical reproduction of existing data result in assessments that are technically compliant

but strategically weak. Cultural heritage, when mentioned, is often listed without context, analysed without specificity, and valued without relevance.

Such an approach has practical consequences. Without realistic assessments of vulnerability and capacity, there can be no effective mitigation planning, no targeted investment, and no rapid recovery in the aftermath of disasters. The illusion of preparedness is, in this case, more dangerous than the absence of it.

In contrast, the application of the adapted VCA tool in this research showed that even modest engagement with local custodians and basic field verification can significantly improve understanding of risks to heritage assets. The VCA provided structured, heritage-specific insight into fire, earthquake, and human-induced risks, along with clear gaps in preparedness at all three case study sites. The broader implication is clear: without redefining how we understand and measure risk in relation to heritage, we will continue to plan for its loss instead of its protection.

Recommendations are to move toward more resilient cultural heritage protection in disaster contexts, the following steps are proposed:

1. Revise national guidelines and cost estimation methods to reflect current construction prices, conservation-specific needs, and the real value of cultural property – including movable and intangible elements.
2. Establish mandatory inclusion of cultural heritage experts in the development of disaster risk assessments at local and regional levels.
3. Institutionalise the use of adapted heritage-specific tools, such as the VCA, as part of standard risk assessment processes for sites of cultural significance.
4. Ensure regular updates of local risk assessments, incorporating recent data, site visits, and consultations with heritage stakeholders.
5. Strengthen inter-ministerial cooperation, especially between civil protection and cultural sectors, both in strategic planning and emergency response frameworks.

Protecting cultural heritage is not merely a symbolic act – it is a commitment to long-term identity, memory, and continuity. Risk assessments that fail to recognise this do not just miss technical points; they undermine the very essence of what civil protection is meant to safeguard.

This paper focuses on the development and application of risk assessments for cultural heritage in Croatia; future work could include a comparative analysis with good practices from other countries to further refine the methodology.

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