Interreg
CENTRAL EUROPE
European Union
European Regional
Development Fund

ProteCHt2save

RISK ASSESSMENT AND SUSTAINABLE PROTECTION OF CULTURAL HERITAGE IN CHANGING ENVIRONMENT

NEWSLETTER #4

JANUARY 2019 - JUNE 2019

Disasters and catastrophes pose risks not only to the conservation of the cultural heritage assets with its cultural, historic and artistic values, but also to the safety of visitors, staff and local communities. Additionally, they cause undoubtedly negative consequences for the local economies due to the loss of tourism revenues, and for the livelihoods of local people who are dependent on it. ProteCHt2save contributes to the improvement of capacities of the public and private sectors to mitigate the impacts of climate change and natural hazards on cultural heritage sites, structures and artefacts. The project focuses primarily on the development of feasible and tailored solutions for building resilience of cultural heritage to floods and events of heavy rain.

WHAT HAPPENED IN THE LAST FEW MONTHS?

PROJECT MEETING IN SZCZYRK – POLAND

From **21-23 January 2019**, Poviat Bielski organised the **4th project meeting** in cooperation with the Regional Development Agency in Bielsko-Biala. The results of the project were presented with the summary of work being done, along with the planned future activities.

Finally, the **partners were presented to the pilot site**, a XVIth century historic church of the Exaltation of the Holy Cross in Stara Wies, an old cemetery and historic school building. During the visit, the parish priest, Grzegorz Then presented the problems encountered by the historic object and the hazards associated with intense rainfalls, which threatens this historical site.

1ST LOCAL FOCUS GROUP MEETING - POLAND

On **7th March 2019**, the Regional Development Agency in Bielsko-Biała organised a local focus group meeting, with the title **"Risk Assessment And Sustainable Protection Of Cultural Heritage In Changing Environment",** in line with the project.

During the event the following issues were discussed: growing problems of the rainwater flows caused by the progressing urbanisation; the current regulations for the safety and protection of the historical buildings; good practices of the preservation of the historical sites in the region and state-of-the-art renovation of the buildings.

The participants of the discussion talked about the best ways for the maintenance and protection of the Cultural Heritage (CH) sites and analysed briefly the threats and factors supporting the safeguarding of them. The **CH should be preserved to sustain our identity, to support education as a historical proof, as well as to represent aesthetic and inspirational values**. As main threats, the participants listed the fashion trends in architecture, the lack of funds and the high requirements of the historic preservation officers. The technical knowledge of the ways of CH-preservation needs to be increased and embedded in education. Furthermore, the protection of the CH should be popularised in an approachable manner, e.g. in the easy to read articles and other media platforms.

CROSS-FERTILISATION AND PROTECT IDEA DEVELOPMENT WORKSHOP – VIENNA

The event was held from **2-3 April 2019**, including the **Interreg CENTRAL EUROPE work** on closely related topics and challenges. Through their cooperation they contribute to making Central Europe a better place to live and work in. The aim of cross-fertilisation is to **further coordinate and better sustain these outputs** and results through exchanges between these projects. ProteCHt2save project was presented on a poster by LP Alessandra Bonazza.

1ST LOCAL FOCUS GROUP EVENT – PRAGUE/TROJA, CZECH REPUBLIC

On **7th May 2019**, ITAM together with Municipality Prague – Troja organised the 1st LFG event, taking place in the building of **Old School in Troja district**. The LFG event had 2 parts: one intended for **dissemination and presentation of the project to the local stakeholders** (politicians, crisis managers etc.) and one **open to the public**. The participants had a chance to visit a historical Troja Mill endangered by potential floods. The organisers believe that by presenting and discussing the outputs of the ProteCHt2save project, they can get a valuable feedback from the experts present. They also took advantage of this opportunity to coordinate future collaboration and inform the stakeholders about the international project conference.

1ST LOCAL FOCUS GROUP EVENT – KAŠTEL SUĆURAC, HRVATSKA

On **10th May 2019** the 1st LFG, COK was organised in the **Bishop's palace** in Kaštel Sućurac. It is one of the activities carried out within the ProteCHt2save project that aims to involve stakeholders from the public, private and civil sector, and collect data from the field, which will assist in the design of planned documents within the project. This event took place in a **historic building** that is situated on the pilote site and **directly threatened by sea tide**. The building is currently used by the Kaštela Museum.

Representatives of local and regional stakeholders, policy makers and people responding to emergency situations are **introduced to the implemented and planned activities within the project** and the results through which Kaštela will improve the capacities for sustainable use of cultural heritage - development, testing, innovative management tools for protection and minimization the influence of harmful weather conditions.

During the discussion, **possible cooperation** in the protection of cultural heritage was mentioned. Representatives of the University of Split, of the Department of Physical Planning of the City of Kaštela, representatives of civil associations and firefighters of the City of Kaštela attended the LFG meeting.

The discussion was focused on four thematic units:

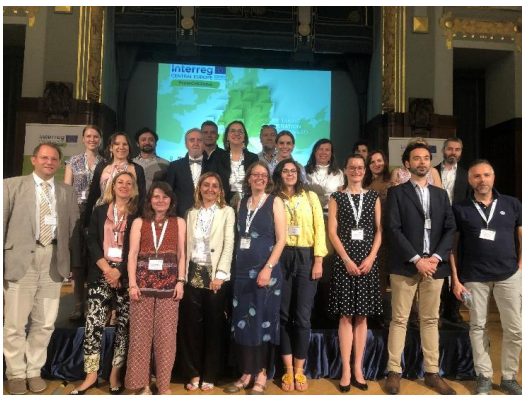
I. THE MOST ENDANGERED OBJECTS OF CULTURAL HERITAGE IN THE CITY OF KAŠTEL
II. THEORY AND PRACTICE
III. EXAMPLES OF GOOD PRACTICES
IV. PROPOSALS FOR CULTURAL HERITAGE MANAGEMENT MEASURES IN CRIMINAL CASES

The problem of the emergence of defined disasters or the planning of measures is **inconsistency and incoherence between** public authorities and other relevant **stakeholders** at the local level and between local, regional and national level governance bodies.

2ND INTERNATIONAL CONFERENCE OF PROTECHT2SAVE – PRAGUE

The international conference, organized within the framework of the Interreg Central Europe project ProteCHt2save, was held on the **27th of June 2019**. The main topic of the event was ***„Managing the Protection of Cultural Heritage in Changing Environment"*** (D.C.3.2), with particular insights on the challenges imposed by climate change on the risk management and protection of Czech cultural heritage. The conference was opened by doc. Ing. Stanislav Pospíšil, PhD director of ITAM CAS and doc. Ing. arch. Petr Hlaváček, deputy Mayor of the city of Prague.

The conference took place in the Municipal House, a historic conference hall in the centre of old Prague. The venue was especially fitting for the ProteCHt2save conference, as the **historic centre of Prague** is a Cultural Heritage (UNESCO) site at risk posed by climate change impacts (in this case floods from the Vltava river enveloping the city). After the conference a **technical visit** of Troja site was organized to show the interventions adopted after the flood events.



Three thematic technical sessions were held during this event, featuring local and international guests:

I. **PROTECHT2SAVE- OUTCOMES & IMPACT:** dedicated to the dissemination and discussion of the recent results of ProteCHt2SAVE project, included the presentation of the following: the risk assessment mapping with the GIS tool; the decision support tools implemented for vulnerability assessment; the evacuation plans and preparedness strategies and finally the presentation of the pilot site of Troja in Prague.

II. **CH MANAGEMENT IN CHANGING ENVIRONMENT- ONGOING RESEARCH PROJECTS:** dedicated to the presentation and discussion related to the recent developments achieved by other ongoing research projects in the field of risk management such as RAINMAN, RainBO and CHEERS.

III. **CH MANAGEMENT IN CHANGING ENVIRONMENT- CASE STUDIES:** focused on case studies and lessons learnt from the Czech Republic, especially from Prague.

The **latest developments** of the Interreg Central Europe project were presented at the International Conference of ProteCHt2save, with **special accent on experiences in historic Prague** from the point of view of the management of cultural heritage protection in the changing environment.
The conference highlighted the **importance of deepening the research** in understanding the impacts of climate change on cultural heritage protection and the significance of resilience building strategies, such as those developed within ProteCHt2SAVE, for the implementation of a more sustainable management of risk. Furthermore, the event contributed to the strengthening of **local and interregional networks** of stakeholders as well as to the introduction of **new professional partnerships** for the sake of future collaboration.

OUTPUT: *DECISION SUPPORT TOOL FOR VULNERABILITY ASSESSMENT*

In the context of the project ProteCHt2SAVE, WPT2 (ITAM) Cultural heritage vulnerability in emergency situations targets the protection of cultural heritage assets through the individuation of appropriate resilience building strategies. In particular, activity **A.T2.1** aims at the **identification of the critical elements** (referred to as criticalities) which can be subject of improvement in the resilience and risk management of cultural heritage exposed to extreme events.
The concept of criticality has been purposely introduced for the sake of **simplifying the process** of vulnerability assessment and **making it more accessible** to different users from both technical and non-technical groups. Its definition revolves around the core topic of the project which is resilience.

Two main categories of criticality have been determined, namely physical and managerial criticalities:

I. **physical criticalities**: intrinsic characteristics of cultural heritage systems such as the material composition of an artefact or the structural conditions of a building
II. **managerial criticalities:** instead individuate those factors related to the operation, administration and care of cultural heritage. It is important to underline the fact that the criticalities here considered are only those controllable factors which can be manipulated by implementing appropriate interventions.

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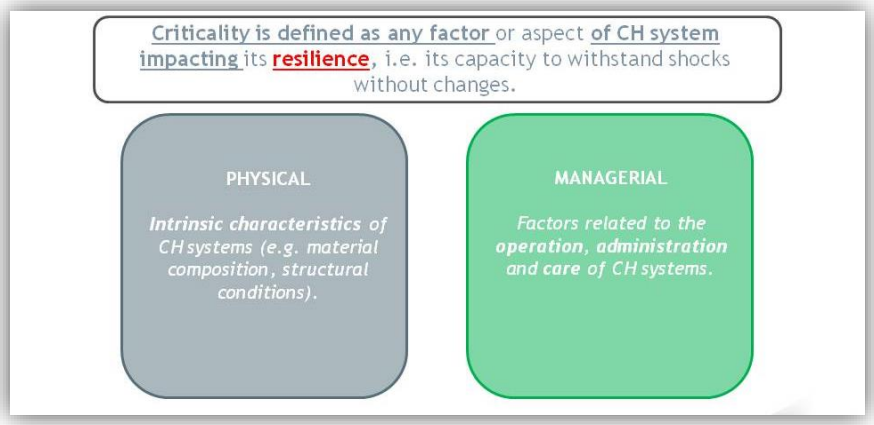


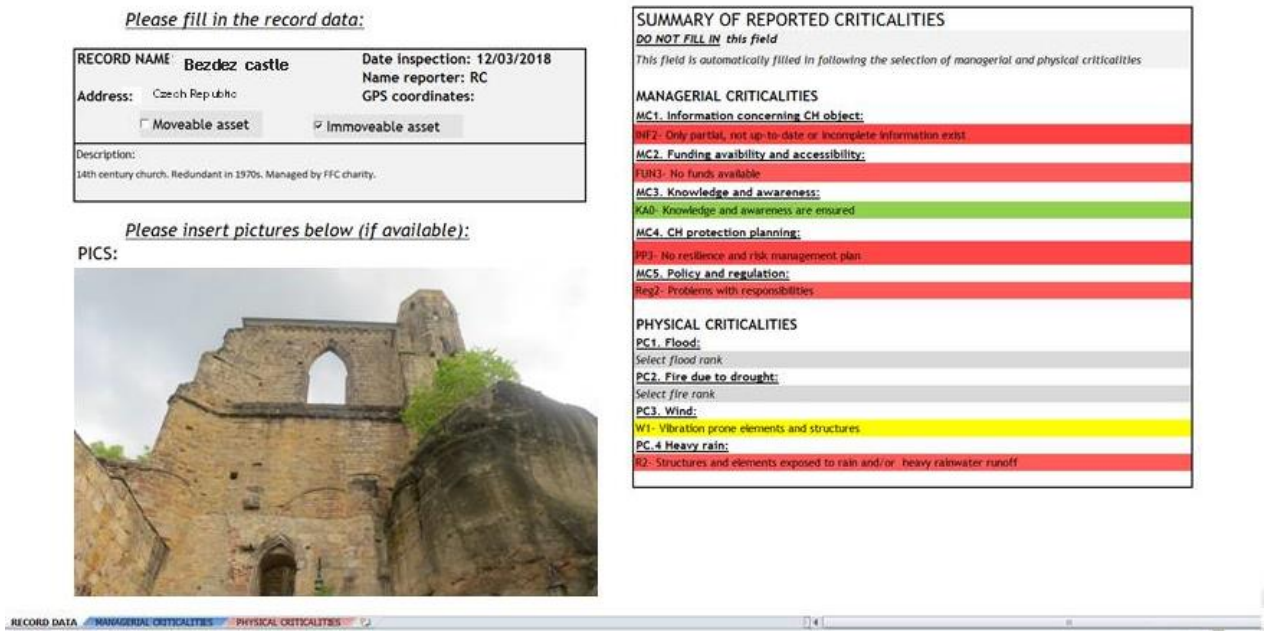
One of the main outputs of WPT2 is the **decision support tool** (DST) which is intended for the **harmonization of data** related to cultural heritage vulnerability and for a conscious **definition of procedures**, agreements and cooperation in an overall transnational approach. The goal of the DST is to allow for the **prioritisation of criticalities** which need to be addressed by the decision making process. It constitutes a guide for different stakeholders, managers in particular, which helps carrying out preliminary vulnerability assessments of cultural heritage objects. It only considers criticalities which are specific to Central Europe, referring only to those hazards which are characteristic of the same region such as floods, fire due to drought and heavy rain. More specifically, the following categories of criticality are considered:

	MANAGERIAL CRITICALITIES	PHYSICAL CRITICALITIES
1.	Information on CH assets	Flood
2.	Funding	Fire due to drought
3.	Knowledge and awareness	Wind
4.	CH protection planning	Heavy rain
5.	Policy and regulation	

For practical reasons, physical criticalities are categorised in relation to the disaster type employing a ranking system of structures, elements and situations into categories, according to the sensitivity of CH objects to the effects of disasters or long term harsh weather actions.

The DST is embodied by a **simple manual**, presented in the annex of the deliverable D.T2.1.3 (available: https://www.interreg-central.eu). It is provided with a series of tables, one for each category of criticality, ranking the level of the criticality and relating it to the impact on CH assets exposed to specific hazard situations and possible measures which can be adopted. A **digitalized version** of the DST has been also developed in Excel format. It allows a fast assessment and the digitalization of a large amount of data making it thus very useful for managers which usually deal with a vast stock of cultural heritage objects.

Rank	Type	Flood Vulnerability	Examples	Preventive measures and priorities
F0	Flood-resistant structures and buildings	No structural or material damage apparent during and after flood. Typical impacts: water saturation and high moisture of materials and structures, soiling, infection by microorganisms, unhinged doors and similar.	Robust objects made of water resistant materials (e.g. granite or similar stone, metals, good stone masonry, concrete).	No hard measures necessary - only some recommended preparedness facilitating cleaning and drying after the flood,
F1	Structures made of materials with a high volumetric change due to moisture	Damage associated with volumetric change - usually irreversible - change of shape, cracks, and deflections. Spalling of surface layers. Moisture expansion may cause damage of masonry - origination of cracks or even shifting structural parts. Bowing of wooden floors. No dangerous loss of strength and load carrying capacity reduction.	i) timber structures and elements, ii) combined structures made of materials with different moisture expansion - e.g. combined timber - masonry objects, iii) some soils	Prevention of contact with water - if possible (plastic wrapping, protective coats etc., creation of dilation gaps between timber and masonry, evacuation of moveable objects.
F2	Structures made of materials that lose their strength to a great extent when subjected to moisture	Materials fast degrading and losing their mechanical characteristics due to high moisture or water saturation which induces significant reduction of load carrying capacity of structural elements or subsoil and may cause fatal failures during flood or after it.	i) dried brick (adobe) masonry, ii) masonry of burnt bricks or some sensitive stones (sandstone) with clay mortars (with a low lime or cement content), iii) decayed timber structures and elements, iv) infill subsoil and fine particle subsoil.	Critical structural elements require assessment of their load carrying capacity by professionals and the structures usually need temporary supports or permanent strengthening before flood situations.
F3	Structures susceptible to partial damage due to flooding	Damage is very sensitive to the condition of such objects. Partial loss of cultural heritage is a consequence of water action.	i) timber parts prone to uplifting and floating away, ii) parts of large bridges, namely parapet walls or piers, iii) pavements	Regular inspection and repair of found deficiencies; Provide temporary strengthening and additional supports; Take measures to decrease loads (dismantle bridge parapet walls, make openings to balance the water pressure); Improve the anchoring of sensitive structural parts into supporting structures; Remove floating objects and "dams" from the stream.
F4	Structures and elements vulnerable to overall collapse or displacement due to flooding	Sudden failure and overall collapse of elements due to the static and/or dynamic actions of water.	i) small bridges and walkways, ii) free-standing walls, iii) light, improperly anchored objects (summer houses, etc.), iv) small dams	



The DST is a tool for reference only and **limitations of its application** apply. Due to the large number of combinations of hazards, CH object typologies and critical elements, professional support is still strongly suggested in the perspective of the elaboration of an accurate vulnerability assessment and for the design of appropriate interventions.

Furthermore, the DST proposed, in order to preserve its clarity and accessibility, does not consider the effect of synergies among multiple actions involving CH objects as well as synergies among multiple critical elements co-existing in the CH system which may necessitate different sets or levels of measures to be implemented. In fact, elements which may not adversely influence alone the vulnerability of an object can in synergy with other elements provoke very dangerous situation. In this context, the possible

combined effects should be closely assessed and a tailored solution should be implemented.

WORK PACKAGE 3 AND 4

Four deliverables have been completed in Work package 3 which deals with the **elaboration and implementation of plans** for the protection of cultural heritage in emergency situations.

A **SWOT analysis of the existing plans** for managing cultural heritage in emergencies was conducted. The strengths - in all the partner countries - are sound systems of civil protection and emergency planning against all kinds of man-made and natural catastrophes. A weakness is that in most partner countries preparatory measures are not mandatory. Preparedness lies within the owners and curators of the cultural heritage and thus depends mainly on individual commitment. The prime opportunities are the well-established systems of civil protection, which enable an easy and sustainable incorporation of preparedness measures for cultural heritage and training for emergency first responders, whereas the biggest threat that was identified lies within the realm of communication: People's lives always come first, that is no question. But the importance of cultural heritage needs to be emphasised. Cultural heritage is identity; it defines the societies of every single country and is an integral part of the self-conception of the partner countries.

Based on this analysis, a **transnational strategy for sustainable and feasible preparedness measures** was developed, which then was adapted to the single partner countries and the seven pilot sites: i) Flood events in large basin (Czech Republic, Austria, Hungary); ii) Fire due to drought (Austria, Croatia); iii) Extreme events of heavy rain (Italy, Croatia, Slovenia, Poland). The **strategies for the pilot sites will be tested in Work package 4** which stared in **June 2019**. The results of the pilot actions will be evaluated in collaboration with the associated partners by analyzing the experiences and lessons learnt from all pilot actions. Finally, the findings will be used for issuing transnational recommendations on measures for further improvement and final adoption of the emergency plans, moreover, their deployment and transfer to other regions in Central Europe and beyond.

A **"Memorandum of understanding"** (MoU) will be drafted by all 7 Municipalities, on the after-project cooperation in the field of disaster management, mutual assistance and support in CHRT development. The developed recommendations for rescuers will assist the emergency responders and cultural heritage personnel in conducting the pilot testing activities; they include information and do-s and don't-s concerning material handling and evacuation procedures.

Guidelines for Cultural Heritage Rescue Teams, which shall be implemented in the single partner countries, top off the quartet of deliverables in Work package 3. In order to allow an off-site training of team members and especially to raise awareness for the

general public, a **video game for mobile devices** is being developed within this work package. The player will build their own Cultural Heritage Rescue Team and tackle different challenges in order to protect important cultural heritage during a flood scenario. For more information: http://www.vltavarising.com/

FUTURE EVENTS

SUMMER UNIVERSITY CULTURAL PROPERTY PROTECTION JOINS ENVIMAT IN 2019 - AUSTRIA

The annual Summer University Cultural Property Protection 2019 is held together with the International Summer School ENVIMAT 2019 at Danube University Krems from **8 - 13 July 2019**.

Climate Change and Cultural Landscapes

The one-week programme is based on **state-of-the-art research and EU funded projects on climate change and risk assessment** for natural and cultural heritage.

Austrian Pilot Testing

On **12th July 2019** the Austrian pilot testing takes place in the medieval city of **Stein,** which today forms an integral part of the municipality of Krems. The main threat posed to Stein are **floods from the Danube**.

NEXT LOCAL FOCUS GROUP MEETINGS

AUSTRIA - 3rd LFG (DUK) 12 September 2019 (18:00-19:30)**, 13 September 2019** (10:00-12:00)
Topic: Protecting cultural heritage from water and fire
Event: Joint Summer University Cultural Property Protection and International Summer School ENVIMAT 2019

ITALY - 2nd LFG (MUF & CNR-ISAC) 18 September 2019 – 2.30 – 6.00 pm
Topic: THE ANALYSIS OF CULTURAL HERITAGE VULNERABILITY
Event: FERRARA FIERE – Restoration Museum and Cultural Business International Trade Show XXVI Edition

POLAND - 2nd LFG (BBD) - 30 September 2019 - connected to the evacuation exercise

POLAND - 2nd LFG (ARRSA) - end of November, early December 2019

ProteCHt2save key facts

Project duration: 01.07.2017 - 30.06.2020

Project budget: 2,150,549 €

ERDF funding: 1,787,110 €

Website: http://www.interreg-central.eu/Content.Node/ProteCHt2save.html

LEAD PARTNER

National Research Council of Italy - Institute of Atmospheric Sciences and Climate

PROJECT PARTNERS

Institute of Theoretical and Applied Mechanics of the Czech Academy of Sciences

Bielsko-Biala District

Municipal of Ferrara

Government of Baranya County

University for Continuing Education Krems Danube University Krems

Regional Development Agency Bielsko-Biala

Municipal District Praha – Troja

City of Kaštela

Municipal of Kocevje