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Risks and Securing activities

policy recommendations

**A new concept of
Civil Protection Plan**

A new concept of Civil Protection Plan

Emergency Plans are needed to make Civil Protection structures and territorial administrative bodies ready to cope with and manage hazards, disasters, and emergency situations, allowing them to prepare resources and strategies, involve people and means for intervention in peace time, so to enhance effectiveness and efficiency of the operational action on the field.

Cultural Heritage represents the foundation of people identity in the Alps and strongly contribute to the economies of the local communities. Therefore, it must be protected and safeguarded during emergencies, with special attention on those caused by natural disasters, whose frequency and severity are increasing due to climate change.

The work carried out by the CHEERS project confirmed a widespread critical issue: despite the existence of regulation frameworks and Civil Protection Plans in the Alpine countries, a lack of specific guidelines and rules specifically concerning the safeguard of Cultural Heritage involved in natural disasters has been highlighted.

This appears particularly critical in predictable risk scenarios (e.g. floods, landslides, or forest fires), when preliminary activities for enhancing the effectiveness of the safeguard of Cultural Heritage could be implemented, so to better deal with limited time spans, existing resources, intervention means, and stabilisation actions that are immediately needed after the event.

Planning action, in terms of being prepared to deal with emergencies involving cultural assets, means:

- the characterisation of damage scenarios, calculated using territorial exposure and vulnerability data, and based on reference events more likely to occur within selected time intervals;
- the elaboration of models of intervention which take into proper account the operational Civil Protection response schemes locally in force;
- the definition of operating procedures for the safeguard of Cultural Heritage at risk.

The CHEERS project has set up an innovative and inclusive “new concept of Civil Protection Plan”, with a synergic and complementary, effective involvement of experts and operators from both the Civil Protection structures and the Cultural Heritage management, in order to enhance their readiness by offering pre-hazard scenarios, structured information, data about the cultural assets potentially involved in disasters, and guidelines for better preparing and face operational intervention on the field during the emergency.

This is a method capable of increasing the capacity for prompt and immediate response thanks to the deployment of more coordinated intervention task forces of civil protection bodies, cultural heritage bodies, and local administrations through specific operational guidelines developed within the framework of a new concept of structured civil protection plans and to be regarded as decision-making support resources. The new concept is based on six interconnected and sequential phases:

- 1. Investigated hazards:** an accurate assessment of the hazards characterising the territory, their potential damaging impact, and possible preventive and mitigation interventions before, during, and after the event.
- 2. Cultural Heritage in the area:** accurate mapping of the Cultural Heritage sites and their relationships with the potential typologies of existent hazards in the territory.
- 3. Early Warning systems:** emergency planning requires integrated early warning systems in the territory and joint Civil Protection-Cultural heritage managers response to predictable natural hazards, and immediate action for unpredictable events.

4. **Risk scenarios:** it is the pillar of the Civil Protection Plan, with the assessment of predictable events that may occur in the future and following disaster response, planning the prioritised actions and response to be taken before, during and immediately after the events outbreak.
5. **Available sources:** the effectiveness of the Civil Protection response depends on the human resources, means, and materials available which may be adequate or not for the intervention required; hence, the need to prioritise the interventions, according to the cultural heritage sites existing in the area.
6. **Model of interventions:** it is the summa of the previous points, which concur to the conceptual simulation of how the intervention might unfold with the assessment of the necessary resource of rescue teams to be deployed, the operational outline of the safeguarding interventions, the activation of the command-and-control chain, and the consequent control of the activities carried out by the centres which coordinate the intervention.

The new concept of civil protection plan: enhancing knowledge and preparation to cope with natural disasters involving cultural assets

To describe the innovation that characterises the structure of this “New concept of Civil Protection Plan”, the sequence of the analysis method, complete with example of what has been experienced in one of the pilot areas of the project, the Autonomous Province of Trento (Italy), is here presented.

Investigated Hazards

The first step, “Investigation Hazards” consists of the characterization of the hazards that are going to be the object of the emergency planning document.

The emergency planner should provide a detailed description of elements such as the data sources available to investigate the hazards, the affected areas, and the expected impacts.

The use of hazard maps and data to safeguard cultural heritage from natural hazards is a key feature. The field experiences acquired during the CHEERS project have shown that maps and data commonly used in emergency planning processes are only partially effective when used to design risk scenarios for Cultural Heritage.

By way of example, data related to the expected head of water in alluvial areas can be cited: although strategic in evaluating the exposure of works of art, these data are often unavailable in widely used alluvial hazard maps.

To provide emergency planners with useful information on the strengths and limits of the maps and hazard data available, the document “Knowledge base concerning natural hazard mapped in the Alpine area”, created as part of the CHEERS project, integrates the survey on existing information sources with evaluations aimed at describing their applicability in the field of protection of cultural heritage.

Cultural Heritage in the area

The second step specifically features and assesses the cultural assets existing in the territory, thus acknowledging the available data sources to get an overall picture of them and know their distribution in the critical areas, which may be affected by predictable and unpredictable events.

As in the first phase, the available information on the cultural heritage should be integrated to make the evaluation of the actual exposure to hazards possible.

In addition to the need to precisely know the location of the cultural heritage in the area, it would be necessary to know, for example, on which floor a certain work of art is placed, the height from the ground, its dimensions, weight, etc. The activities carried out within the framework of the CHEERS project have shown that the existing cultural heritage catalogues – in most cases for inventory purposes – rarely reach this level of detail. In the emergency planning process, disaster managers are therefore called to integrate the available catalogues with dedicated analysis aimed at completing the existing knowledge base. Aside from providing an overview of the currently available main inventories, the CHEERS document called “Knowledge base on geo-spatial catalogues in the Alpine area” critically assess their range of applicability for emergency purposes and provides hints on how to integrate the available data.

Early warning systems

Natural hazards can be assigned to two main categories, clearly distinguishing between predictable (events for which precursors can be identified, such as floods, landslides, forest fires, or avalanches) and unpredictable events.

While in case of unpredictable hazards the Civil Protection deploys its activities immediately after the events outbreak, with the aim to manage the emergency, in case of predictable scenarios Civil Protection can progressively activate its response and implement prevention activities of growing intensity as alert levels increase.

To ensure that the Civil Protection structures can face and manage alert situations, emergency planning must include a complete integration of the early warning systems in the overall risk management process.

The innovative component of this phase consists of making a survey of the existing early warning systems, understanding their typology and what kind of alert communications is provided, their timeframe, and to whom they are addressed.

Starting from the pilot case of Trento, which did not provide for any warning system concerning the protection of Cultural Heritage, specific protocols and activation of internal procedures have been set up; they could represent an inspiring example for other locations that might experience similar scenarios. Another innovation was also the active involvement of the public cultural body in the dissemination of the hazard alerts through a specific internal chain of command aimed at activating of the operational phases of intervention.

Risk scenarios

The innovative component of the fourth step called “Risk scenarios” consists of its holistic approach, which includes five intertwined elements:

1. Reference risk elements,
2. Time span for interventions,
3. Exposed items,
4. Priorities of intervention,
5. Safeguarding intervention.

It stresses the importance of the time span between the raising of the alarm and the occurrence of the hazard event, which is pivotal to implement the intervention plan in the area and the following priority of intervention, after having assessed which cultural assets

are endangered, calibrating the actions needed in terms of human resources to be deployed, means, and materials to be utilised effectively.

To provide planners and operators with useful information while planning intervention, the CHEERS publication “Portfolio and application guidelines of cultural heritage protection reference techniques” makes available a screening of possible alteration to cultural assets exposed to natural hazards, with details on: i) type of damage and ii) likelihood of damage and of permanent loss of value. It also makes available a reference scheme of prevention and stabilisation techniques related to different materials and deterioration agents.

These innovative elements were tested in the pilot area of Trento with the achievement of the assessed identification of which components of the Cultural Heritage would be exposed to a catastrophic flooding of the Adige River. In particular, nine buildings have been identified as exposed to the flood and split into three different categories a) buildings protected by law; b) archives and libraries which perform activities of conservation; c) museums. For all these buildings, structural elements and movable items assumed to be exposed to the reference flood event of the Adige River have been identified. Thanks to the integrated application of two tools developed by the CHEERS project – ATTACH (evaluation Tool for Alpine Cultural Heritage) and THREAT (cultural Heritage Risk EvaluATIion) – emergency responders have been able to plan the priorities of intervention, with a specific investigation on each singular asset and the definition of the necessary safeguarding intervention, the human resources needed for their implementation, and the time needed.

Resources available

The fifth step, “Resources available”, is an accurate assessment of the overall amount of human resources, means, and materials which should be activated in order to manage the interventions on Cultural Heritage during the forewarning time.

In situations of alert or emergency, the response of the Civil Protection is primarily aimed at ensuring the safety of people as top priority. Safeguarding actions on Cultural Heritage can be long, complex, and require a large deployment of forces.

While the step called “Risk scenarios” outlines the overall amount of resources whose activation could allow for protection or securing of the entire Cultural Heritage exposed to a given scenario, effective emergency planning requires defining the resources on which, in case of need, the Civil Protection could actually count.

The total amount of resources available could, in fact, be lower than the theoretical requirement, therefore strengthen the need to work on the concept of priority of intervention. Therefore, the Plan should structure a realistic estimate of the resources that the Civil Protection could rely on in the event of an emergency.

Furthermore, prevention activities could consist of handling operations, aimed at securing mobile items in safe storage warehouses. The Plan must identify the storage warehouses locally accessible and, if they are not available in the area, the emergency planning could favour their activation by the competent authorities.

The test carried out in the Trento pilot area is innovative and truly inspiring: notably, here the task force needed to activate the intervention and their operational coordination has been identified for each Civil Protection and Cultural Heritage management bodies.

Interventions model

The six and last step, “Model of interventions”, has its innovative component in the synergic implementation and execution of the following components: i) rescue teams; ii) deployment of interventions; iii) Command-and-control chain; and iv) operating procedures.

Once again, this scheme was tested in the pilot area of Trento. Four rescue teams have been activated and have been entrusted with the safeguarding interventions of a territorial context rich in cultural sites exposed to risk.

The exposed sites have been classified into two categories: complex sites with large amount of assets, with presence of both structural elements and movable items.; non-complex sites, where the interventions do not require handling activities.

CHEERS's innovative contribution in this last phase was the proposal of a layout of the interventions, based on the following sequential and intertwined elements:

A) forewarning time; B) priorities of interventions; C) safeguarding interventions; D) time needed for their implementation; and E) human resources, means, and materials assumed to be in fact available. In addition, a series of recommendations, that suggest dialogue and interaction between the representatives of the cultural heritage sector and the Civil Protection department, have been developed.

Then, the operational procedures, which involve the definition of who is doing what, for increasing levels of alert (when), are the sum of these steps.

This step-by-step process can be considered as reference guidelines, to be declined at different territorial levels, according to the existing Civil Protection operational schemes at the local level.

The integration of elements coming from the field of cultural heritage is an important step to enhance local capabilities, thus providing new resources and skills to cope with disasters and reduce damages and losses, thanks to the improvement of knowledge and preparation in peace time.

Moreover, the new concept of civil protection plan will contribute to identify and implement tools that are able to increase knowledge, integrating the fields of natural hazards with that of cultural heritage in a stable and more effective way, also working on the hazards themselves and the characteristics they develop in these specific environments according to the peculiar features of the exposed cultural assets.

Finally, the approach proposed by the CHEERS project could trigger a deeper understanding of the damaging dynamics produced by different events on different cultural assets, also allowing operators to know how to slow down the degradation process of cultural assets, according to their specific characteristics. Furthermore, innovation can be found in the fact that new civil protection plan includes the stable cooperation and knowledge sharing between a system of subjects involved, which, until now, were not used to communicate and interact in peace time.