

ARCHITECTURAL HERITAGE AT RISK: A PROPOSAL FOR THE SITE OF PETRA

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1. INTRODUCTION

Architectural Heritage is spread all over the world and it is difficult to safeguard all at the same level and at the same time.

Some monuments and historic building, however, have risks much higher than others; these situations have, therefore, to be identified and a scale of priorities has to be established if we want to optimise the resources in order to achieve the maximum benefit.

The focus is therefore to define some criteria, as objective as possible, in order to establish the “priorities”, taking into account not only physical risks, but also cultural values, social consequences and economic aspects.

It isn't possible to take decisions of interventions only under the pressure of emergency, when the disaster has already happened, or to satisfy particular interests.

Architectural Heritage is threatened by two categories of risks:

- unpredictable risks such as wars, very strong earthquakes, etc.
- predictable risks related to the intrinsic characteristics of the buildings (typology etc.), the present situation of damage and decay and the environment conditions (pollution, earthquakes, etc.).

Little or nothing can be done to prevent damage and collapses from unpredictable risks and in this case “Risk Preparedness” (an organization ready to intervene in emergency situations) appears to be the only and most rational possible strategy.

As regards predictable risks, instead, it is possible to organise a strategy plan, which includes maintenance and preventive measures, as it will be discussed in the next paragraph.

2. A RATIONAL PLAN FOR THE SAFEGUARD OF ARCHITECTURAL HERITAGE

A strategy plan for the safeguard of “Architectural heritage at risk” (summarised in the diagram of Figure 1, which has to be followed more than one time with improved approximation) should include the following steps:

a) The “INTELLIGENT LIST”

The first step of the plan is the set up of a “preliminary list” (or inventory) of Architectural heritage - a survey and data collection of monuments and historic buildings.

This inventory should be graded highlighting the physical conditions (materials decay, structural damage), the legal framework, etc., obtaining a sort of “intelligent list”.

b) The “MAP OF RISK”

This map associates any asset of the “intelligent list” and establish a conventional risk index, that priorities probabilities that serious damage, collapse or irreversible decay might occur in the future. Such an evaluation, at least initially, has to be carried out at an approximate level, dealing with a great number of assets. Subsequent analysis will improve the reliability of the evaluations.

c) The “MAP OF PRIORITIES”.

The **map of physical risks**, although it represents a very important point for the safeguard of Architectural Heritage, is not sufficient to categorize the priorities, because there are other “values” that have to be considered, which regard three categories: cultural values, social values and economic values (which involve tourism, etc.).

The **map of priorities** is the result of putting together “physical risks” and “values”, also taking into account management aspects (legal framework, financial and human ownership, policies, etc.). The organization of such a map requires a very specific kind of cost-benefit-analysis, because the assessment is a very difficult task; the costs and benefits can only partly be measured in monetary terms. The map of priorities has also to balance, in relation with the financial availabilities, the resources to devote to preventive measures and to restoration works.

d) The INTERVENTION PLAN”

The “**interventions plan**” is the final step of the general strategy plan and refers to the measures to be undertaken, which include three levels.

I-The emergency actions (where immediate action is required to prevent further damage).

II-The preventive measures (to spend little money today to not spend a lot of money tomorrow)

III-The restoration works (to give further value to historic buildings).

The enforcement of the “intervention plan” requires appropriate Recommendations and Guidelines. The Committee of ICOMOS for “Analyses and Restoration of Structures of Architectural Heritage” has prepared a Document on this purpose.

PROCEDURE FOR THE ORGANIZATION OF A MAP
OF RISK AND PRIORITIES

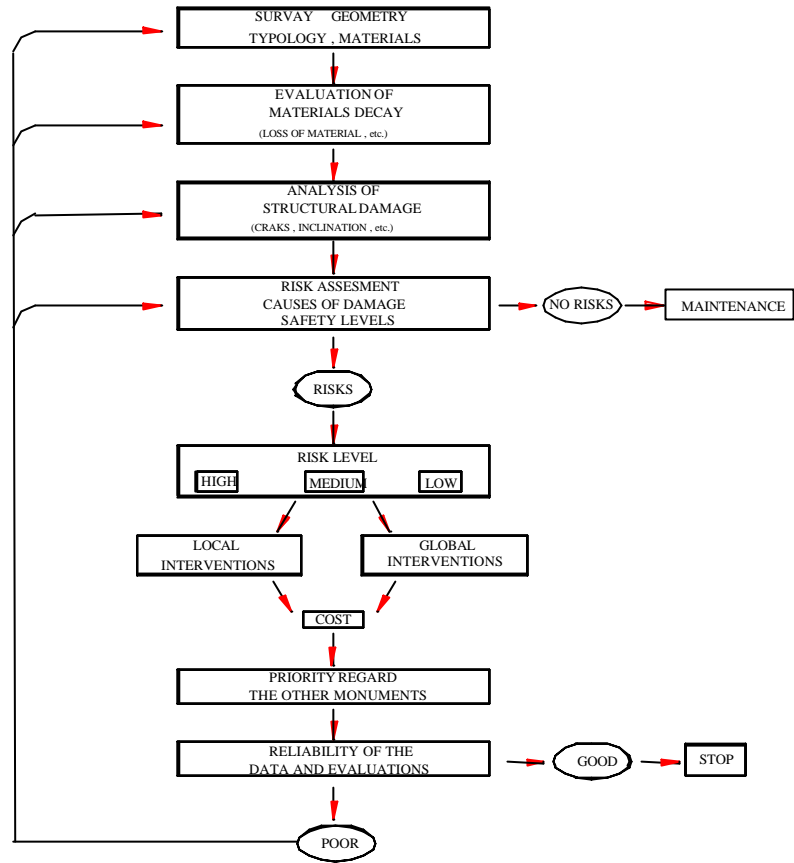


Fig. 1

3. THE SITE OF PETRA



Fig. 2

The site of Petra could become an emblematic example of application of the strategy presented above.

The site of Petra, besides the risks due to uncontrolled tourism, suffers damage and large processes of decay of the natural stone, which represents the bearing structure of the carved temples (Fig. 2).

Lack of maintenance and of a general survey to individuate the most serious decay and damage situations (map of risk) have allowed danger and decay to progress everywhere.

Beginning from the Siq which represents the main gate to Petra, immediately large cracked rocks dangerously hanging on the narrow passage appear (Figures 3, 4); the continuity of the Structure is interrupted and separate blocks remain in precarious equilibrium with serious risks for the tourists below.



Fig. 3



Fig. 4



Fig. 5

The Qasr al Bint temple, one of the most important of the site, was heavy damaged and partly destroyed by earthquakes; the survived structures are in a very dangerous situation (Figs 6, 7). In the Urn Tomb the rock on the left side of the façade is affected by large cracks (Fig. 8); the situation appears to be potentially very dangerous because the rock structure is there thin and deteriorated, as also clearly results looking at the external side of the structure. Decay phenomena affect the main columns of the façade as well, which present large cracks and whose base has been completely eroded (Fig. 9); urgent measures have to be undertaken here too.



Fig. 6



Fig. 7



Fig. 8



Fig. 9

In the Palace Tomb, the situation is dramatic; a huge portion of the façade is becoming detached from the body of the rock (Fig. 9). The area has been closed to the public. Consolidation works and the anchorage of the structure are urgent.



Fig. 10

All the temples in different ways suffer from stability problems, mainly concentrated on the pillars or walls, which often are affected by vertical or inclined cracks that, when completely extended into the mass, may become very dangerous (Fig. 10). The progressive erosion produced by wind and rain has dangerously reduced the section of the bearing structures (Figures 11, 12).



Fig. 11



Fig. 12



Fig. 13

The ceilings are often made of slabs made up of harder strata separated by thin softer horizontal ground layers; when the dimension of the slab is too large, or a pillar collapses, the stability is at risk and a mechanism of progressive detachment and collapse of the layers begins (Fig. 13).

The resistance of the ceiling is also influenced by the global movements of the rock: those movements produces vertical cracks that interrupt the continuity of the slabs; in addition the percolation of the rain, associated with the wind, progressively erodes the materials.

If measures are not urgently taken this incomparable Cultural Heritage will be lost. Interventions, however can't be carried out random, but it is firstly necessary to complete the general survey and risk analysis that we have began in occasion of the UNESCO mission of May 1999.

Having completed the MAP OF RISK it is necessary to individuate the most appropriate measures, taking into account the available equipment in the region and the cost of each intervention, so that the MAP OF PRIORITIES AND PLAN OF INTERVENTIONS could be prepared.

Finally, in the frame of the general plan, the schedule of the works will be decided.