

Local seismic cultures: a European research program for the protection of traditional housing stock

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Abstract

The research activity of the Ravello European Center for Cultural Heritage in seismic risk areas is part of the Council of Europe's Major Risks EUR-OPA agreement. The program aims to identify traditional antiseismic building techniques, with a view to subsequent revitalization, tapping know-how within the local community. This requires analysis of the techniques and methods that have developed over the years in local communities. The multidisciplinary research program set up for this purpose has adopted the archeological approach, thereby recognizing that physical and material assets provide a key source of information.

Key words *traditional housing stock – prevention – traditional antiseismic techniques*

1. Background

The European University Center for Cultural Heritage (EUCCH) for the safeguard of traditional building stock in seismic risk areas falls within the Major Risks EUR-OPA agreement (open partial agreement on the prevention, protection and organization of relief efforts to avert major natural and technological risks) stipulated in 1987 by various countries (Italy, France, Greece, Spain, Portugal, Turkey, Luxemburg, San Marin, etc.) under the aegis of the Council of Europe. The Governments of the Council of Europe member States have established an intergovernmental agreement, partial and open in the field of prevention, protection and organization of relief against major natural and technological disasters (EUR-OPA Major Hazards Agreement) by adopting Resolution (87) 2 on 20 March 1987 of the Council of Europe (Strasbourg). The Commission of the European Communities and Unesco, the

World Health Organization, the Department of Humanitarian Affairs of the United Nations participate in the agreement. The main aim of this agreement is to reinforce cooperation between member States by calling upon all present day resources and knowledge to ensure an efficient and interdependent management of major disasters. This agreement is named «open» because any non member-State of the Council of Europe may apply to accede to it. This, as indicate in the «Moscow Charter» adopted by the Minister of the agreement on the 2nd October 1993 in Moscow, this agreement represents «a platform for cooperation between Eastern Europe, the South of the Mediterranean and Western Europe in the field of major natural and technological disasters».

The EUR-OPA agreement is organized as follows: a conference of Ministers, a committee of permanent representatives and an executive secretary. The main objective of the agreement is to set up a special fund sustaining a network of research centers, located one in the country of each signatory to the agreement. Each research center is entrusted with a specific research brief and coordinates work in

this area for the other centers. The Ravello Center is truly European, being located in Italy, with a French coordinator (Bruno Helly) and scientific staff not based in Ravello but made up of a network of European specialists drawn from many disciplines concerned with the safeguard of cultural heritage.

The other European Centers are, for example, the Center for Geological and Morphodynamic Risks, with headquarters in Strasbourg; the Center for the Earthquake Forecasting, in Greece; the Center for the study of disasters and social behaviour in Ankara, Turkey; the Center for disaster medicine in the Republic of San Marino and the Center for Information on environmental disasters with headquarters in Madrid. More specifically, the partial agreement aims to set up an earthquake alarm system. This is already operational and proved its worth on the occasion of the earthquake in Erzincan (Turkey) in May 1992 and others. Such action programs cannot, however, be confined to the scientific field but have enormous ethical and political significance.

Research at the Ravello Center took its cue from the concept of *technical vulnerability*, a civil engineering concept defining the cost of restoring traditional housing stock after a destructive earthquake. In our view, however, vulnerability cannot be defined merely in technical terms. The social dimension is of equal importance. It is not simply the quality or solidity of a building that is at stake but rather its *dynamic* vulnerability, a concept which has social and historical connotations. Vulnerability must be defined in terms of the social fabric, available resources and traditional cultural values. This introduces a *historical dimension* to vulnerability. It thus becomes indispensable to examine the solutions and attitudes adopted by a given local community over the years if we are to understand social and human behaviour and beliefs leading to the adoption of specific building techniques for minor housing stock.

Research at the Ravello Center is concerned with the construction methods adopted in the past and pivots around one cardinal point: over the centuries, the local communities devastated by earthquakes faced two choices – to leave or to stay. History demonstrates that it was usu-

ally the second option that prevailed. From that consideration, five research areas were identified. These are:

1) defining the instruments with which to analyze a community's vulnerability and consequent behavioural patterns;

2) analyzing and defining, in strict terms, Local Seismic Cultures, their repair and rehabilitation modalities;

3) drafting an *Atlas of Local Seismic Cultures in Mediterranean Countries*;

4) defining traditional building and rehabilitation techniques and changes in antiseismic regulations incompatible with traditional housing stock and building techniques;

5) disseminating knowledge of Local Seismic cultures to operators in the field, administrative bodies and the community at large.

The first phase entails establishing the instruments with which to identify vulnerability and behavioural patterns in a given community. This means examining not only the construction techniques, materials adopted etc., but also *the degree of risk accepted* by the community both in terms of natural hazards and the behavioural consequence. In all cases, communities have responded to the event of an earthquake with so-called «construction anomalies» – strengthening procedures, discontinuous window sills etc. (Ferrigni, 1990). Consequently, a detailed list of local building techniques can be drawn up characterizing what has been called the Local Seismic Culture.

Phase 2 involves the analysis and detailed definition of these Local Seismic Cultures. A local culture is greatly influenced both by the extent of damage caused by an earthquake – expressed on a scale of intensity – and the frequency with which these events occur. Subsequently the origins and the persistence of a Local Seismic Culture can be determined by the prevalent physical conditions (frequency of destructive quakes, etc.) and the economic and social fabric (resources and cultural traditions).

This research has led to phase 3: the drafting of an *Atlas of Local Seismic Cultures of Mediterranean Countries*. Calitri, 1987 (Italy), S. Lorenzello, 1988 (Italy), (Ferrigni, 1990), Paestum, 1989 (Italy), Lefkas, 1991 (Greece),

Lisbon, 1992 (Portugal) (Mendes-Victor, 1995), Salon de Provence and Vernègues, 1993 (France) are examples of this mapping exercise while other communities are under study in France, Greece and Turkey. The construction choices made by the individual communities will be examined in detail and where possible, compared with attitudes prevalent in other seismic areas such as Latin America, the Maghreb, Asia, etc. The objective is to define the «quality» of traditional housing stock in these communities.

Phase 4 is largely concerned with the extent to which traditional local seismic cultures, their methods and techniques are compatible with current rehabilitation and safeguard techniques and regulations. This requires research into the rehabilitation techniques traditionally adopted and subsequently, assessment of the impact of current antiseismic norms imposed by central administrations on local communities, for the most part located in outlying rural areas. All too often current regulations do not take into consideration local building traditions, indeed incompatible with them. For example, forty years ago the people of Lefkas, one of the Ionian islands, refused to adopt the rehabilitation and protection regulations issued by the Ministry because they clashed with local building traditions. If the norms had been adopted, traditional building would have been stopped and the community would have been «poorer» as a result.

Phase 5 has still to be implemented.

2. Why has the archeological approach been adopted?

It is self-evident that an understanding of history is required before taking any measures to restore or rehabilitate historic buildings. While the historical approach is feasible in the case of famous historical monuments, this is not necessarily the case, however, for traditional housing stock. In this context the *archeological approach* can be defined as a reconstruction of a community's attitudes from the evidence provided by trace materials. Very often no texts or other written sources exist on

the history of a particular building or ancient residential nucleus. The only source of information is the physical standing buildings. In this case, the building is not only *the focus of restoration plans* but also the *source of information* on its history, and indirectly, on the behavioural patterns of successive generations of inhabitants (Ferrigni, 1990; Di Pasquale, 1987; Tocco, 1981).

Adding the archeological dimension to the technical one, architectural approach is fundamental. In this way, study of the building practices of local communities becomes investigation into traditional construction practices in seismic areas. Such survey must be flanked, however, by similar investigations on the administrative and social plane (Matacena, 1990).

The history of human sciences has shown that a science is only worthy of the name when it develops an overall complex of functions that apply not just to its own theoretical premises but also to fields beyond that specific discipline. By the same token, historians and archeologists working together are able to provide answers to questions coming from other disciplines. An epistemological study in archeology supplies a whole information *system* relating to «Local Seismic Cultures» and allows us to define the applications to which archeology may be put. In the same way theoretical physics is flanked by applied physics.

It follows therefore that work must be conducted on the micro-scale. Each building or community has its own particular story which is an amalgam of many factors: the available resources, the cultural values that have developed within a given community, the prevailing physical phenomena (earthquakes, geological or hydrogeological risks, etc.) and the techniques used to offset these.

This work requires a multidisciplinary team including engineers, specialists in the fields of antiseismic building and restoration, geologists, philologists to study the specific lexicon, archeologists to build up the history of the buildings and their construction techniques and historians to assess available information and provide an insight into the social fabric prevalent in former communities (Helly *et al.*, 1990, 1994).

The study of local communities bears fruit in the long term when disaster after disaster, earthquake after earthquake, a gradual picture takes shape of the technical solutions adopted, the psychological patterns that formed and the prevention measures enacted to mitigate the effects of these calamities. This in essence is what has been called the «Local Seismic Culture» of traditional communities. This joint effort must use a common language and be organized around concepts that are understood and accepted by all members of the group. The success of any multidisciplinary endeavour depends on providing a common basis for participants contributing with their specialist knowledge.

Finally it has been shown that a local seismic culture is founded not on economic principles such as cost, etc., but rather on ergonomic considerations, *i.e.* with the aim of minimizing the disadvantages and maximizing the advantages of a given natural and social environment. In fact Local Seismic Cultures have disappeared with the arrival of the centrally administered modern state. For example, compare the floods at Vaison-la-Romaine in 1992 and Nîmes in 1989. The small walls built in Roman times along rivers and small water courses were designed to minimize the effects of flooding. These constructions, no longer considered useful by the modern community, were removed over the last fifty years with the result that the flood waters found no check in their path when they came. Moreover, people had lost their collective memory of a flood-risk zone and had applied and obtained permission to build on these areas. Disaster is not wreaked just by the destructive force of natural phenomena but also in conjunction with changes in the behavioural patterns of our communities.

Our research is based on the concept of *polysemy*, or the many meanings that a phenomenon can have. Mere rational interpretation

(*a = a*) must be integrated with other approaches: a construction element or technique may exist for both decorative and structural purposes. To return to the above example, if a flood is considered the sole cause of a disaster, this excludes any implication in the disaster of those rural engineers who they wiped out the ancient flood prevention measures and allowed building close to the river banks.

The polysemic approach recognizes that man is not the mere victim of disasters but helps to bring them about. Protection and prevention of risks cannot be achieved by simply calculating the economic effects. This is why, in our opinion, study of the local culture is of such over-arching importance since it is an attempt to apply the principles defined long ago by Greek philosophy that man is the measure of all things.

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