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## **CRITERIA FOR THE VULNERABILITY ANALYSIS OF STRUCTURAL AGGREGATES IN HISTORICAL CENTERS**

**Sandra Tonna\***, **Maurizio Boriani<sup>†</sup>**, **Claudio Chesi<sup>‡</sup>**, **Maria C. Giambruno<sup>°</sup>**

\* Politecnico di Milano – DASTU Department  
Piazza Leonardo da Vinci, 32 – 20133 Milano, Italy  
e-mail: sandra.tonna@polimi.it

<sup>†</sup> Politecnico di Milano – DASTU Department  
Piazza Leonardo da Vinci, 32 – 20133 Milano, Italy  
e-mail: maurizio.boriani@polimi.it

<sup>‡</sup> Politecnico di Milano – A.B.C. Department  
Piazza Leonardo da Vinci, 32 – 20133 Milano, Italy  
e-mail: claudio.chesi@polimi.it

<sup>°</sup> Politecnico di Milano – DASTU Department  
Piazza Leonardo da Vinci, 32 – 20133 Milano, Italy  
e-mail: mariacristina.giambruno@polimi.it

### **ABSTRACT**

The need to define earthquake prevention and intervention strategies, in order to limit dramatic consequences for the society, has acquired a high priority in countries where, like in Italy, a large number of historic masonry buildings (listed or not) are located in areas with medium to high seismic hazard. From the point of view of the level of safety to be reached through interventions, the concept of improvement, as opposed to that of full strengthening, is nowadays widely accepted in the case of monumental heritage; what is still lacking, in many cases, is a procedure for the vulnerability analysis, as a synthetic evaluation tool for the definition of intervention priorities. In a modern perspective, where territorial planning is conceived as a safety project for the territory, the seismic vulnerability analysis should not be confined to specific technical documents, but should rather be considered at a general level; in this way only, indeed, the issue of seismic risk could acquire widespread knowledge and awareness in the population, also pushing urban planning in the direction of general programs for the increase of seismic safety. A priority list for the interventions could be easily defined and the overall safety levels of urban centers could be raised in a homogeneous way.

In the above perspective, revised criteria have to be developed for a global vulnerability assessment, to be introduced at a general level in territorial planning. Considering that seismic vulnerability analyses are strictly dependent on specific building typologies, attention has been focused, in the present study, on to the case of ancient structural aggregates in historical centers, thus following the needs of the Italian Civil Protection Agency in relation to seismic prevention activities in historical towns in the Lombardy Region, Northern Italy.

In line with the peculiarities of historical structural aggregates, vulnerability evaluations have to be based, first of all, on the recognition of typical building typologies; subsequently, also considering details related to the structural configuration, maintenance conditions, and local building traditions, vulnerability classes are defined with reference to the EMS98 classification.

The research, which is still in progress, will make reference to three sample villages, suitable for the experimental testing of procedures, with the aim of developing tools for seismic planning, covering both the theoretical-methodological phase and practical-technical aspects as well.