

EUROPEAN MACROSEISMIC SCALE (EMS-92);
INNOVATIONS ESPECIALLY WITH RESPECT TO ENGINEERED BUILDINGS
AND EXPERIENCES IN ITS WORLDWIDE APPLICATIONS
(*Special Theme Session*)

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SCOPE OF THE SESSION

In 1993 a new updating of the MSK Macroseismic Scale, proposed by the Working Group on Macroseismic Scales of the European Seismological Commission (ESC), was published (Grünthal, 1993). This scale update, called European Macroseismic Scale (EMS-92), was adopted in its draft version in the 1992 General Assembly of the ESC.

Macroseismic scales are as ever important to engineers and disaster protection agencies as well as to seismologists not only for studying recent but also with respect to the reliable assessment of historical key earthquakes. In case of lacking strong-motion instrumentation isoseismal maps are widely used for defining local seismicity, for developing damage and loss scenarios, for risk assessments for insurance purposes and for disaster planning measures. These needs, in connection with the limitations of previous scales, their relatively poor definitions of many scale points in relation to currently used building types, lead to the development of the EMS-92 scale which is not at all intended to be restricted to Europe.

It was published with the intention for its parallel use with the last versions of the MSK or MM scale for gathering experiences on the more experimental parts of the EMS-92; i.e. in particular two important innovations for overcoming the inadequacies of previous scales:

- 1 The categorization of buildings by vulnerability classes; i.e. an indirect association with types of buildings and structural systems. The range of vulnerability allows moreover the assignment with any particular material of construction.
2. The incorporation of engineered constructions with different levels of antiseismic design into the scale; i.e. the possibility of using a much wider range of buildings in the intensity evaluation.

In 1993 the EMS-92 has been distributed worldwide and applied since that both for recent as well as for earlier earthquakes.

During the seminar it is intended to present and to review

- (i) in detail the EMS-92 with all innovations especially those which are of interest and importance for earthquake engineers;
- (ii) the experiences in applying the updated scale in practice, the result of damage surveys, and checks of the new Scale against previous scale versions to determine its consistency;

- (iii) further classification and subdivision of building types also with regard to applications outside of Europe; specification of the most likely vulnerability classes and their probable ranges especially with regard to engineered structures;
- (iv) the behavior of buildings under earthquake shaking, with a view to refining the assessment of probabilities of damage given for engineered buildings in the scale;
- (v) the evaluation of the level of earthquake resistance provided by seismic codes to select the appropriate level of quality or define the code-consistent level of antiseismic design in Annex B of the scale.

SPEAKERS OF THE SESSION

- G.Grünthal: Motivation for the elaboration for an updated macroseismic scale and the essential innovations introduced with the EMS-92.
- J. Schwarz: Engineering aspects of the EMS-92: innovations and experiences from its worldwide applications since 1993.
- J. Dewey: A comparison of assignment of EMS-92 intensities versus assignment of U.S. Geological Survey Modified Mercalli intensities: a case study for the Northridge, California, earthquake of January 17, 1994.
- R. Musson: The comparison and evaluation of intensity scales, with special reference to the European Macroseismic Scale.
- M. Stucchi: Assessing intensity from historical earthquake records by means of the EMS-scale.