

EAEE-ESC Task Group 3

Seismic risk and earthquake scenarios

Summary report of the activities

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The activities of the EAEE-ESC TG3 (Seismic risk and earthquake scenarios), convened by Mauro Dolce (EAEE) and Vladimir Schenk (ESC), have been carried out within the frame of ENSeRVES (European Network on Seismic Risk, Vulnerability and Earthquake Scenarios), a network project funded by the European Commission with 230000 ECU, within the INCO-Copernicus program (D.G. XII, 4th Framework).

ENSeRVES/EAEE-TG3 gathered teams of scientists of different disciplines (Seismologists, Geologists, Engineers, Architects, ...) involving 11 prominent Institutions working on Earthquake Engineering and Seismology from 10 EU and CCE countries (Italy, Greece, France, Bulgaria, Romania, Albania, Czech Republic, Slovak Republic, Hungaria).

Five meetings were held during the Project, to promote and monitor cooperation activities within the network. Place, deliverable and main activities relevant to the meetings carried out during the project are summarised in the following table.

Place	Time	Deliverable	Activities
Rome (IT)	January 1998	Report	<ul style="list-style-type: none"> - General information on ENSeRVES, activities, duration, etc.. - Report of the activities carried out in each Institution, by one representative.
Padova (IT)	June 1998	Report	<ul style="list-style-type: none"> - Comparison of results and databases. - Selection of the case studies. - Discussion on harmonisation of vulnerability/damage inspection procedures.
Paris (FR), 11 th ECEE	September 1998	Report	<ul style="list-style-type: none"> - Comparison of results and databases.
Prague (CZ)	April 1999	Report	<ul style="list-style-type: none"> - Comparison and integration of results. - Examination of the studies carried out on the selected case study.
Potenza (IT)	November 2000	Report	<ul style="list-style-type: none"> - Integration of results at the various steps of a risk assessment procedure. - Evaluation of the feasibility of a common database.

The meetings were also attended by representatives of Institutions other than the ones directly involved in ENSeRVES, to complete the membership of TG3, such as SSN-Italy (Sabetta, Goretti), CENDR -Russia (Klyachko), University of Naples – Italy (Zuccaro), University of Cambridge – UK (Spence).

In conjunction with the 2nd ENSeRVES Meeting, the International Workshop on “Measures of Seismic Damage to Masonry Buildings” was held in Padova (Italy) on 26 June 1998. The problem of harmonisation and standardisation of tools and procedures for vulnerability and

damage assessment was strongly emphasised during the Workshop. For this reason, during the Meeting, it was decided to select the city of Potenza as the case study to be treated in the Project. Also the need to set up a common damage and vulnerability inspection form was emphasized.

An International Workshop on the "Seismic Risk and Earthquake Scenarios of Potenza" was held in Potenza on 13-14 November 2000, in conjunction with the 5th ENSeRVES – EAEE/TG3 Meeting. It was devoted to the Potenza case study and to related aspects developed by the ENSeRVES members and by the other participants. The presentations covered several different aspects of a risk evaluation. The discussions that followed the presentations involved seismologists, structural and geotechnical engineers, architects, hydraulic engineers, geologists on a real problem, thus realising the main scope of EAEE-TG3 . Some of the papers were collected and published in the Proceedings of the Workshop, that will be presented at the 12th ECEE..

In short, the main results of ENSeRVES/EAEE-TG3 can be summarised as follows:

- study and comparison of the methodological aspects related to the quantification of earthquake severity, attenuation laws, hazard characterisation and site hazard characteristics;
- selection of reference earthquakes considering the concept of earthquake perceptibility;
- study and comparison of the methodological aspects related to the quantification of the seismic vulnerability of constructions and damage prediction;
- harmonisation of the different viewpoints and languages of engineers and seismologists;
- harmonization of procedures for evaluation of vulnerability on the basis of data of Potenza and comparison of the methodologies used in the various countries;
- development of analytical tools and software packages to obtain improved evaluations of seismic risk, preparation of earthquake hazard maps at regional and national scale;
- evaluation of earthquake losses through new purposely set up procedures for preparation of earthquake scenarios, making use of GIS technologies.

The common case-study of Potenza was of fundamental importance to make an effective comparison of procedures used in the different countries and institutions involved. The consideration of this case study was however made possible by the availability of a large amount of detailed data, independently of ENSeRVES, that could be put at disposal of the project at no cost. The experience of this project has shown that only the study of real cases permits to make stringent comparisons among different methods and procedures for seismic risk assessment. However the lack of data for a complete hazard-vulnerability-risk analysis, on one hand, and the low budget, mainly devoted to travel expenses, on the other hand, has lead to the impossibility of extending the comparison to other case studies.

An important outcome of the project is that the harmonisation of procedures is still a long way to go. Anyway, the road started in this project and to be continued in the frame of EAEE TG3, based on the applications of different procedures to the same case-study, is certainly a very good one. Due to the important differences found in terms of results among the different hazard and vulnerability assessment procedures, it is necessary to continue on this road, considering several case-studies and comparing results.