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# Preface to special issue

## "M.E.E.T.I.N.G. – Mitigation of the Earthquakes Effects in Towns and in INdustrial reGional districts"

In front of you is a special issue of Geofizika journal dedicated to mitigations of the effects of earthquakes. Most of the papers to this journal were completed as a result of research in the frame of the bilateral project "M.E.E.T.I.N.G. – Mitigation of the Effects of Earthquakes in Towns and in INdustrial reGional districts" which took place from 2007 to 2008. The M.E.E.T.I.N.G. project was granted by PHARE CBC/INTERREG IIIA – Adriatic New Neighbourhood Programme aimed at promoting socio-economic development and cooperation between countries of the Adriatic region (Phare 2005 Adriatic Cross-Border Cooperation between Croatia and Italy). The acronym M.E.E.T.I.N.G. was also selected to highlight the collaborative work that was developed in the project between researchers operating in the field of earthquake engineering at the University of Molise and the University of Salento (both in Italy), and the University of Zagreb in Croatia. The researches responsible for implementation of the project in Croatia were: Prof. Predrag Kvasnička, project manager, Prof. Snježana Mihalić, scientific coordinator and Prof. Želimir Veinović, project administrator. The aim of the project was to develop a set of actions for the mitigation of seismic risk in urban and industrial areas in the Adriatic region with the ultimate task of improving the quality of construction design, while introducing Eurocode 8 to Italy and Croatia. The project involved researchers from the fields of seismology, geology, geotechnical and structural engineering, and structural mechanics of the University of Molise (lead partner) and the University of Lecce, together with the University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering.

One of the common characteristics of the Adriatic region is that it has the history of seismic activity, known to be hazardous to structures and historic buildings that are not resistant to earthquakes. The aim of project M.E.E.T.I.N.G. was to define a series of intervention methods for the mitigation of seismic risk in urban, industrial and protected (UNESCO) heritage areas. It was a project thought for and directed towards public bodies in charge of delivering building codes, as well as towards building institutes, insurance agencies and finally, universities for dissemination of the research results in education processes.

We agreed to edit this special issue in hope that both we and our readers would learn more about the state of this practice as it moves from being new

and innovative to being established and a part of the methods of many practitioners. The submissions underwent the standard reviewing procedure of *Geofizika*, and those that were accepted are included in this special issue:

The first paper, Mihalić et al. (2011), gives an overview of various methodologies for seismic-geotechnical hazard zonation. The purpose of this overview is to illustrate the variety of methodologies currently in use for the preparation of seismic hazard maps. Described are two principal approaches to earthquake loss mitigation. The authors elaborate why the use of these approaches should be required and enforced by the municipal authorities.

The next two papers, by Herak (2011) and Ribičič (2011), treat local side effects. Herak describes some recent applications of the measurements of ambient vibrations (microseismic noise) in Croatia; the free-field measurements, as well as those done within buildings. Analyses of records from Ston and Dubrovnik suggest that soil-building resonance must be seriously considered. Measurements in buildings were analysed by a newly-developed software package FREDA – a suite of Matlab routines. Based on tests on synthetic and real data it is concluded that spectral methods are in general more robust and less dependent on parameters of the algorithm employed, than time-domain analyses. Ribičič coordinated site investigations after the 1988 and 2004 earthquakes in Slovenia where, in an attempt to analyse how local ground conditions increase seismic effects on structures, extensive geological and geophysical investigations were carried out. On the basis of the results of these investigations, he attempted to establish how reliably this influence can be defined. A forecast of local seismic effects was compared with actually established damage to structures. It was found that forecasts were more reliable if they were made with proper consideration of all relevant factors together.

Papers by Santucci de Magistris (2011), Kvasnička et al. (2011) and Matešić et al. (2011) discuss the implementations of Eurocodes in Italy and Croatia. Santucci de Magistris commented on three specific parts of the new Italian building code: definition of seismic action, analysis of liquefaction and analysis of slope stability. Seismic action is defined based on a recent careful study of the seismic hazard in Italy. For liquefaction analysis, some developments are given, keeping the same structure used in Eurocode. Finally, for slope stability, improvements are introduced to avoid overestimation of pseudostatic forces in conventional analyses. In Kvasnička et al. authors discuss several shortcomings associated with the Eurocode 8 (EC8) ground type definitions and propose their revision. The authors also present the ongoing work for the preparation of the Croatian National Annex to EC8 and explain the rationale for the improvement of EC8 ground type definitions. Matešić et al. describe how a geotechnical database may be generated from the information system (IS) of a geotechnical consulting company established in compliance with the ISO 9001, ISO 17025 QMS standards and Eurocode 7. The application of these principles is illustrated using a geotechnical consulting company Geokon of Zagreb, Croatia, as an example.

The characterization and analyses of structures was treated by Rainieri and Fabbrocino (2011), Conte et al. (2011) and Mandić et al. (2011). Rainieri and Fabbrocino discussed that the level of knowledge can be increased by experimentally evaluating a structure's dynamic properties, and the resultant data can be used to refine and update numerical models that are representative of real structural behaviour; the periodic monitoring of relevant parameters can help identify possible deterioration phenomena. Thus, dynamic tests, in conjunction with model updating, are becoming reliable tools for non-destructively assessing historical structures. In this article, a brief discussion of the basic principles of dynamic identification under operational conditions is presented. Conte et al. in their paper treat structural identification of a historical masonry building with ancient vaulted roof, located in Southern Italy. A series of experiments, including dynamic tests, were conducted on a number of the vaults to determine their dynamic response characteristics under operational conditions. Primary dynamic test results are reported and compared to the results of numerical modelling. The paper by Mandić et al. presents the results of behaviour of the reconstructed cable-stayed bridge under static and dynamic testing over the Danube River in Novi Sad. The results are compared to a finite element model of the bridge and good agreement is achieved between the experimental and analytical results. The results show that the bridge is in the elastic state under the code-specified serviceability load, which indicates that the bridge has adequate load-carrying capacity and can be safely put into service.

Finally, Abolmasov et al. (2011) analyze catastrophic losses due to earthquakes in the Balkan region, based on data on earthquakes collected from the OFDA/CRED International Disaster Database from 1900 to 2010. A brief review of the most catastrophic earthquakes recorded in databases throughout the last 110 years is given, based on the data from publicly available databases.

Additionally, the authors Rožić et al. (2011) submit their paper due to invitation extended by Prof. Zvjezdana Bencetić Klaić, Editor-in-Chief of *Geofizika*.

At last, but not least, guest editors would like to express their gratitude to Italian researchers from the M.E.E.T.I.N.G. project: Prof. Filippo Santucci de Magistris and Prof. Giovanni Fabroccino, from University of Molize and Luca de Seri, University of Trento, for fruitful cooperation. We would also like to thank Prof. Mihael Ribičič from the University of Ljubljana and Prof. Mladen Vučetić, from UCLA, for their participation and presentations at First Project workshop in Dubrovnik.

We would also like to express our gratitude to the following Croatian civil engineering and geotechnical companies: Institute IGH, Geokon-Zagreb and Geokod, which, with their donations, supported M.E.E.T.I.N.G. Project.

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