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PREFACE

Preface

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The Risk-UE Project was one of the most significant pieces of work related to earthquake engineering funded by the EC under its Fifth Framework (2001–2004). Taking its starting point from the unfinished business left over from the International Decade for Disaster Reduction 1990–1999, and to some extent inspired by the previous RADIUS project, and work in the United States to develop HAZUS, Risk-UE aimed to help create a structure for urban risk reduction in Europe, through the development of urban scenarios. The underlying idea was that these scenarios were to be designed to sensitize the city actors to the implications of a foreseeable earthquake affecting their community, and thus to assist them in defining long-term action plans to reduce earthquake risks.

As well as many leading academic institutions, seven European cities with different levels of earthquake risk were involved in this project, and one of the strengths of the project was that the administrations of these cities were not simply recipients of studies done on their behalf by the research community, but partners in the project. Of the seven cities (Barcelona, Nice, Catania, Thessaloniki, Bucharest, Sophia and Bitola in FYROM) the last-named three were outside the current EU, thus helping to create solidarity across the whole of the European earthquake-affected region. Each of the seven cities had a significant and important historical core, and an important goal of the project was to investigate the special features of these typically European centres.

Scientific objectives included the development of consistent earthquake ground-shaking scenarios to be used for the investigation of earthquake impact; defining the distinctive features of European towns which are exposed to earthquakes; developing an approach to measuring the degree of exposure of the urban system as a whole;

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studies of the vulnerability of lifelines, current buildings and historical buildings and urban cores; and application of the methods to the seven cities.

Not all of this work is reported in this Special Issue. In particular much of the work in the application of the methodology to the seven cities remains in progress, and it is hoped it will be possible to publish it in the future. Two important papers (Mouroux and Le Brun 2006; Masure and Lutoff 2006) deriving from the Risk-UE project also appear in the recent book "Assessing and Managing Earthquake Risk", (Oliveira et al. 2006). And the Risk-UE website (www.risk-ue.net) contains the papers produced for the final conference, the Handbooks, and the Action Plans developed in each of the cities.

The first paper in this Special Issue (Mouroux and Le Brun) presents an overview of the whole Risk-UE project, explaining its origin and antecedents, presenting its strategic and scientific objectives, detailing the contents of each of the separate work-packages and summarising its outcomes.

The second paper (Faccioli) presents the method adopted for defining the ground shaking (and related) hazards, for each of the seven cities. A challenge was to develop consistent criteria for the quantitative treatment of seismicity, despite wide differences in the amount and quality of the data available. For each city a geotechnical zonation of the urban area was performed. A deterministic ground-motion map was developed based on a "reference" earthquake (one which had historically been experienced). These varied in Magnitude from Mw = 5.1 for Barcelona to Mw = 8.1 for Bucharest. A probabilistic constant-hazard spectral analysis was also carried out, defining the severity of ground motion with a 10% exceedence probability in 50 years.

The third paper (Pitilakis, Alexoudi, Argyroudis, Monge and Martin) presents the approach developed in Risk-UE for the risk assessment of utilities and transportation infrastructure. Methods for the assembly and classification of the inventory, for vulnerability assessment of the components according to defined damage states, and for assessing the performance of networks are presented, and useful case-study examples are given from application to several of the seven cities.

The fourth paper (Kappos, Panagopoulos, Panagiotopoulos and Penelis) looks at the vulnerability assessment of reinforced concrete and unreinforced masonry buildings. The method proposed is a hybrid method in that it combines results from structural analysis of typical examples with statistical data on performance of buildings in previous Greek earthquakes (notably that of Thessaloniki in 1978). Vulnerability curves, based on peak ground acceleration for different damage states, are presented for a range of key European building typologies.

The fifth paper (Giovanazzi and Lagomarsino) also deals with the vulnerability of current buildings. Two alternative approaches are developed, one (Level 1) based on macroseismic intensity as the ground motion parameter, and derived from a statistical evaluation of observed performance, the second (Level 2), based on the development of pushover curves for the different typologies, and the use of spectral parameters of the ground motion. The two approaches are usefully compared.

The sixth paper (Lagomarsino) shows how the same Level 1 and Level 2 approaches can be used for the vulnerability assessment of monumental buildings, and presents an important case study of their application to the church of Santa Maria del Mar in Barcelona.

The great ambition of Risk-UE meant that inevitably it did not achieve all it set out to achieve; and what will not be found reported in these papers is the resistance

encountered in some of the cities to the idea of making public the existence of an earthquake risk, because of a perceived danger to that city's future popularity either for the location of new businesses, or the development of tourism. These are issues that have to be faced politically in any city trying to come to terms with and reduce its earthquake risk. The groundwork laid down in the Risk-UE project will provide a basis for a more informed public discussion leading to appropriate actions in due course.

Apart form their application to the seven Risk-UE cities, the vulnerability work done within the Risk-UE project will also have a lasting value through its application in other studies throughout the EU and beyond. It has been of value for instance in defining vulnerabilities to use in Sub-Project 10 (Urban Loss Scenarios) of the current LessLoss project, the major research project in earthquake engineering funded by the EC during Framework 6, and this vulnerability work and the approaches behind it will certainly become the standard in future all-Europe investigations of earthquake risk and its mitigation.

References

Masure P, Lutoff C (2006) Urban system exposure to natural disasters: an integrated approach. In: Oliveira CS, Roca A, Goula X (eds) Assessing and Managing Earthquake Risk, Springer

Mouroux P, Le Brun B (2006) RISK-UE Project: an advanced approach to earthquake risk scenarios with application to different European towns. In: Oliveira CS, Roca A, Goula X (eds) Assessing and Managing Earthquake Risk, Springer

Oliveira CS, Roca A, Goula X (eds) (2006) Assessing and Managing Earthquake Risk, Springer