

Introduction

This special issue of *Computer-Aided Civil and Infrastructure Engineering* (CACAE) is aimed at giving an overview of current scientific progress in modeling seismic risk of distributed utility systems, building portfolios, and lifelines. The management of the risk of these systems is emerging as one of the new and especially important challenges of earthquake engineering due to the disruptive potential of their seismic damage on affected communities.

The risk assessment of civil infrastructure, necessarily probabilistic, faces a number of issues that differ substantially from that encountered in assessment of individual facilities. On the hazard side, it must be considered that any earthquake affects the system in a way requiring that the ground motions are modeled as random fields. Permanent ground deformations may assume a role that is equally important as the oscillatory ground motions. On the damage and loss assessment side, the performance measures for infrastructure must be defined based on the impact on the served communities, which is related to the damage of single components and their impact on system-level performance. These issues have important ramifications on component-level vulnerability modeling, which must account for the systems' peculiarities.

A significant amount of recent research has focused on the risk assessment of civil infrastructure, focusing on the issues above. Therefore, we believed that there was a need to summarize some important and up-to-date research findings. Because the topic is multidisciplinary in nature, requiring advanced computational methods, CACAIE was an especially appropriate venue for these publications. As a highly reputed journal with a broad readership spanning across different scientific communities, CACAIE facilitates the cross-fertilization between the infrastructure and the computer science fields, which may enrich both.

Twenty-three papers were submitted for possible publication. Each paper was reviewed anonymously,

following the journal's rigorous review process, by four to six reviewers. A paper submitted by a guest editor was handled by the journal editor. After undergoing two rounds of review, six papers that met the high standards of the journal were finally approved for publication and inclusion in this issue.

This special issue features scientific papers with an international authorship, covering all the three categories of issues mentioned above. Esposito et al. and Argyroudis et al. address the system risk assessment of two spatially distributed and physically interconnected infrastructure systems: the gas distribution and road networks. Bisadi and Padgett and Sharma et al. consider the component-level vulnerability of a road network and tackle the time-variant and the impact-related fragility of bridges. Finally, Goda and Franchin and Cavalieri examine the management of consequences and impacts, looking at both financial and recovery issues.

Research on infrastructural risk assessment still has numerous ongoing and open questions and is far from mature; however, it has already produced a number of significant contributions, which form the basis for future research on this topic.

The guest editors thank all the contributors for their valuable effort and all the reviewers for contributing to the success of this special issue of CACAIE.

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