

## Editorial

# Contributions to Earthquake Engineering

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This special edition of “The Open Civil Engineering Journal” presents a novel contribution to earthquake resistant engineering through twelve research papers that address different topics related to the study of the seismic vulnerability of structures and infrastructures.

This special volume is organized as follows:

1. Bendito and Gutiérrez recognize the diverse nature of risk vulnerabilities and highlight, what they consider a fundamental vulnerability in urban and rural environments, namely, outdated building codes or the non-existence of any codes at all. They present the pre- and post-disaster building performance and building codes for different countries and contexts to understand what the main problems are, what we are doing wrong, and what we can do to stop the vicious cycle of recurrent disasters.
2. The correct definition of the seismic action allows more precise studies of vulnerability and reasonable computational cost. Currently, the dynamic analysis used to evaluate the nonlinear response of structures is prescribed. Echezuría addresses in his paper the issue of seismic hazard considering the duration of strong earthquakes determined by the method of Arias intensity, applied to a case study in the central area of the City of San Francisco, United States.
3. Five articles with specific studies on structural typologies located on seismic zones follow next. A) López *et al.* describe the results of a numerical study on the seismic behavior of steel structures reinforced using concentric bracing with buckling restrained affected by earthquakes with near and long distant source. The results show how this type of reinforcement can reduce the dynamic response that helps to reduce the seismic vulnerability of framed buildings. B) Márquez *et al.* guide the structural designer in choosing a seismic design of energy dissipation of steel systems for optimal structural performance. C) Chacón presents a state of the art dealing with the behavior of concrete-filled tubes highlighting that the combination of low weight and high strength makes them reliable elements in reducing the seismic vulnerability aperticados building. D) Vielma and Cando results show that the building’s ductility is strongly influenced by the spans length and they would reach inadequate values if the second-order effect P–Delta occur. They also indicate that the structures considering this effect are more vulnerable than structures not affected by P–Delta effect. E) Bairán *et al.* present a study of the seismic behavior of framed buildings projected with concrete of medium and high strength. This issue is particularly relevant because of the emergence of high strength concrete in the current design of medium- and high-rise buildings, whose overall performance is acceptable, despite their unusual failure mode.
4. Hernández *et al.* describe a study of several seismic reduction coefficients of concrete buildings designed for low seismic design regions according to Mexico construction codes for serviceability and ultimate limit states. Results show that the final design is strongly dependent on allowed interstory drift and associated to lateral displacements, but the final design for different seismic behavior factors may have similar seismic vulnerability.
5. Three more articles show the results of different studies on the evaluation of the seismic vulnerability of reinforced concrete buildings:
  - A) In their study, Vargas *et al.* apply probabilistic methods based on the results of incremental dynamic analysis combined with a damage index incorporating relevant properties of materials and the definition of the seismic action uncertainties. B) Olteanu *et al.* consider the geometrical characteristics of the structure as variables in the nonlinear analysis. This study was conducted on medium- and high-rise buildings designed to achieve an intermediate ductility in Romania. Finally, they obtain fragility curves that allow direct assessment of the seismic vulnerability. C) Vacareanu *et al.* investigate the applicability of current assessment techniques in the process of explaining the damage occurred in buildings affected by the earthquake in Van (Turkey). The

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authors present several damage assessment techniques ranging from simple (for early implementation) to the most sophisticated, which have been applied on two buildings that were damaged during that earthquake.

6. Caiza and Sosa highlight a nonlinear behavior of a pile-deck connection. Advantages and disadvantages are determined by comparison between the numerical results of this study compared with experimental results ob-

tained in previous works. This study allows defining tools for the study of the seismic vulnerability of bridge piers.

The publication of this issue would not have been possible without the dedicated effort of the reviewers who provided valuable feedback to authors in a timely way. Their contribution to this special volume cannot be overstated.

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