Session ID: GRM-2

Title
CHARACTERIZING SEISMIC INPUT FOR ENGINEERING APPLICATIONS

Convenors
E. Zuccolo [1], G. O'Reilly [2]

Description
Nonlinear response history analysis is the most accurate seismic performance assessment method in earthquake engineering numerical simulation. It requires the use of acceleration time-histories as input for numerical simulations. Since the results from the seismic assessment of structures and geotechnical systems are highly sensitive to the adopted ground motion input and the way they are characterized, the selection of appropriate seismic input is critical, having an impact on the final results sometimes larger than structural/geotechnical modelling itself. The seismic signals used for this purpose can be either artificial, synthetic (i.e. simulated) or real (i.e. natural).

The superiority of natural accelerograms over artificial and synthetic records is widely recognized, even if the selection of proper natural accelerograms suffers from the limited availability of recordings consistent with the expected earthquake scenarios and the local characteristics of the considered site. Recent developments are focusing on advanced means to select and identify natural accelerograms from existing databases and on using synthetic accelerograms to supply the lack of ground motion recordings. Synthetic seismograms are time-histories generated from physics-based ground motion simulations (i.e. through a kinematic and/or dynamic model of the seismic source coupled with an elastodynamic idealization of the Earth's crust from the source to the site of interest), which can also include local site effect.

This session aims at bringing together seismologists and engineers to discuss the advances of various techniques proposed to identify suitable seismic input for the problem at hand. Topics to be covered, but not limited to, are:
- Selection of real accelerograms and scaling techniques
- Artificial acceleration time histories
- Seismic input from physics-based ground motion simulations
- Seismic input from advanced site condition modelling, including 2D-3D and non-linear site effects

Invited Speakers
R. Paolucci [4], J. Baker [3], J. Crempien [5]

Affiliations
[1] OGS National Institute of Oceanography and Applied Geophysiscs - Seismological Research Centre, Udine, Italy, [2] IUSS University School for Advanced Studies, Pavia, Italy, [3] Stanford University - Civil and Environmental Engineering, Stanford, USA, [4] Politecnico di Milano - Dipartimento di Ingegneria Civile e Ambientale, Milano, Italy, [5] Pontificia Universidad Catòlica de Chile - Departamento de Ingeniería Estructural y Geotécnica, Santiago del Cile, Chile