

**Call for application for research scholarships
for post-graduate international candidates**

RESEARCH PROJECT N. 58

Title
Seismic Damage Assessment of a Virtual Large Scale City Model
Scientific responsible (name, surname, role)
Gian Paolo Cimellaro, Supervisor, Associate Professor (gianpaolo.cimellaro@polito.it)
Short description of the research activity (max 250 words)
Civil Engineering structural systems have been usually considered at standard scale level: e.g. the building one, even if of large dimensions. They are usually characterized by classical elements, forces and consolidated computational procedures for their analysis as well. However, recent social developments and economic transformations, related to globalization, with integrated people activities within large urbanized areas, also characterized by high-density living and working, all together has changed the conditions of the last century toward regional dimensions. The current trend involves not only expected standard forces (wind, earthquake, etc.) but also new hazard with higher level components and indirect effects related to inter-connections between static and dynamic systems. The resulting scenario leads to a new paradigm of vulnerability and, consequently, new analysis tools are expected to be developed with respect to the urban dimension. The need of approaching such complex problem with rational tools is the object of this research work. In particular, new approaches to urbanized systems and large-scale simulations within a seismic scenario are explored, by evaluating multipurpose codes for numerical simulations and also simplified numerical approaches. Different simplified approaches for damage assessment after earthquake strong motion will be compared. The same district of a virtual city model, called Ideal City, freely inspired to the city of Turin in Italy, will be considered for a coherent and consistent comparison between the approaches. It will be the starting step for further urban loss analyses (e.g. through agent-based models that can be updated online with the structural analysis).
Specific requirements (experiences, skills)
Computer skills (preferably) <ul style="list-style-type: none">• java, ANSYS, SAP2000 , C++• LATEX, Microsoft Windows, MathCad• Matlab,
Communication Skills <ul style="list-style-type: none">• Good English
Website of the research group (if any)
http://staff.polito.it/gianpaolo.cimellaro/index.html
Keywords (min 3, max 6)
Structural Dynamics, Earthquake Engineering, Structural Vibration Control Using Passive Control Systems, Tuned Mass Dampers, Nonlinear Analysis
Research Area (max 1)

Structural, Geotechnical and Building Engineering