Call for application for research scholarships

for post-graduate international candidates

RESEARCH PROJECT N. 35

Title
Fire Following Earthquake in urban regions

Scientific responsible (name, surname, role)
Gian Paolo Cimellaro, Supervisor, Associate Professor (gianpaolo.cimellaro@polito.it)

Short description of the research activity (max 250 words)
Post-earthquake fires have been a growing concern in recent literature as the total damage provoked by fires resulted in more damage than the earthquake itself. Several studies were performed on response of steel structures which concluded that in fact a certain reduction of the time until collapse can be observed.

Two interesting topics which could provide additional understanding of the post-earthquake fire behavior of steel frames are related to the structural system and creating a 3D model. A braced steel frame is designed in such a way that columns support the vertical loads, while most of the horizontal action is resisted by the bracing elements. This results in a high utilization factor, which could lead to a more significant decrease of the time until collapse, when compared to the MRF structures.

Most literature studies concluded that a 2D model would be sufficient to represent the response of a frame. However, not all collapse modes can be represented when performing a 2D analysis. Local buckling and torsional effects cannot be observed, which could influence the failure of the structure. In addition, a more realistic representation of the earthquake can be introduced, as it is acting on both horizontal and longitudinal directions. Even though this model would require a much greater computational capacity, it would be in concordance with the Eurocode design requirements, which states that at least 30% of the seismic action should be accounted for on the second direction.

Specific requirements (experiences, skills)
FEM software: SAP2000, Abaqus, Ansys,

Website of the research group (if any)
http://staff.polito.it/gianpaolo.cimellaro/index.html

Keywords (min 3, max 6)
Fire, steel structure, earthquake, seismic, collapse, resilience

Research Area (max 1)
Environment, Land, Infrastructure

The present form should be filled in English and sent to scudo@polito.it by 2nd October 2017