

## **Mexico's Earthquake: description, effects and reconstruction. A particular case.**

Manuel E. Ruiz-Sandoval <sup>1</sup>, Emmanuel Rivera <sup>2</sup> and Luciano Fernandez<sup>1</sup>.

<sup>1</sup> Professor, Universidad Autonoma Metropolitana, Azcapotzalco. [mrh@azc.uam.mx](mailto:mrh@azc.uam.mx), [lrf@azc.uam.mx](mailto:lrf@azc.uam.mx)

<sup>2</sup> Graduate student, Universidad Autonoma Metropolitana, Azcapotzalco.  
[emmanuel.2706@hotmail.com](mailto:emmanuel.2706@hotmail.com)

*Structural Health Monitoring, Earthquake engineering, system identification*

On September 19, 2017 an earthquake of magnitude of 7.1 occurred at 120 km south of Mexico City. In that region where it was not considered to happened earthquakes of that scale. The effects in the city affected a zone called transition, between rock and lake zones. The maximum accelerations reached 780 gals. Affecting mainly buildings of 7 to 10 floors.

The first part of this paper is described the location of the epicenter, the calculated earthquake response spectrum, and a map of the maximum accelerations presented in the region. Also, a list of the most important collapsed buildings and the possible cause of them.

The data base that it has been recollected of diverse reinforced projects of buildings that did not collapsed. A brief description of the present and future projects is presented.

The authors had the opportunity of study in detailed a building located in the transition zone. The structure has a rectangular layout with 3 floors. The building is of habitational use, structured with reinforced concrete columns and beams and planar slabs. Since there no exists structural plans a detailed description of dimensions, and reinforced steel distribution was obtained using no destructive methods.

The main damage was located in the base columns, since that floor was used as parking space (weak floor). No apparent damage is present in other locations. In order to evaluate the building condition, an ambient vibration test was done in the roof in 6 different locations. The first three frequencies were identified by the Eigensystem realization algorithm (ERA) along with stabilization diagrams.

A mathematical model was constructed with a commercial software. Results shown that a match with a error less of 7% with respect of experimental values.