

# Seismic Risk Assessment Studies of Prefabricated Buildings Located in Highly Seismic Regions of Turkey

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## **Abstract**

Precast concrete building structures are the main construction type applied in industrial areas in Turkey. Two major earthquakes, namely Marmara Earthquake (August 17th, 1999) and Duzce Earthquake (November 12th, 1999), occurred subsequently in Turkey. Excessive levels of damage were observed at precast concrete structures especially in the city of Izmit and its vicinity after these earthquakes. The observed damage was mainly destruction at column-girder connections or column failures. Investigation of seismic behaviour of precast concrete structures located at this highly earthquake-prone region in Turkey seems to be vital. Hence, seismic response of precast concrete industrial building structures representative of the current design practice in Turkey are examined. They are designed considering the current seismic code in Turkey and are subjected to ground motions from the recent earthquakes in Turkey. Seismic responses and the anticipated levels of damage for these buildings are evaluated in the light of results of dynamic analyses. In addition, the performance of investigated precast concrete buildings subjected to selected earthquake excitations are assessed.

## **Some of the Previously Completed and Supervised Scientific Work of the Author Related to the Subject:**

- (1)** The Author's Ph.D. Dissertation: 'Seismic Drift Response of Building Structures in Seismically Active and Near-Fault Regions', **Baki ÖZTÜRK**, May 2003, Purdue University, U.S.A. (Dissertation Supervisor: Prof. Mete A. SOZEN, Purdue University, IN, U.S.A.)
- (2)** Investigation of Seismic Behavior of Prefabricated Buildings Designed According to Current Standards in Turkey by using Different Analysis Methods, Fatih DEM\_RALAN, Nigde University, Nigde, July 2009 (Supervised by Dr. Baki ÖZTÜRK).

(3) Investigation of Damage Risks During Earthquakes by Using Capacity Spectrum Method for Prefabricated Buildings Designed According to Current Standards in Turkey, Melih SADAK, Nigde University, Nigde, August 2009 (Supervised by Dr. Baki ÖZTÜRK)

(4) Seismic Drift Response of Precast Concrete Building Structures Located in Earthquake-Prone Regions in Turkey Considering Nonlinear Analysis Procedures, **B.ÖZTÜRK**, F.DEM\_RALAN, Ö.C\_VALEK, 14th World Conference on Earthquake Engineering, Beijing, China, October 2008.

(5) Application of Capacity Spectrum Method for Performance Assessment of Industrial Building Structures Located in Earthquake-Prone Regions in Turkey, **B.ÖZTÜRK**, M. SADAK, F. DEM\_RALAN, International Earthquake Symposium, Kocaeli, August 2009.

(6) Yüksek Riskli Deprem Bölgesindeki Bir Prefabrik Yapının Farklı Yer Hareketleri Etkisindeki Sismik Davranışının İncelenmesi, **B.ÖZTÜRK**, F.DEM\_RALAN, 6. Ulusal Deprem Konferansı, İstanbul, September 2007.