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| Project Title: | Investigation of Seismic Performance Factors Through Analytical Studies for Precast Concrete Buildings Designed According to Strength-Based Approach |
| Project Type: | Ulusal Deprem Araştırma Programı (UDAP) Projesi |
| Project Executive: | Doç. Dr. Sadık Can GİRGİN |
| Proje Özeti: | Precast concrete structures are in demand with the advantages they provide in terms of low cost, high quality and fast production; and precast reinforced concrete buildings with single storeys and intermediate floors constitute a large part of the industrial buildings built in our country since 1990. In most of the precast buildings with mezzanine, the load transfer between the building elements is ensured by hinge connections at the roof level and moment-resisting beam-column connections at intermediate floor levels. Nowadays, multi-storey precast concrete building applications also increase depending on the connection and element details that can transfer the moment developed.  In the consideration of the developments in the earthquake codes in our country during the last 20 years, important arrangements have been made within the scope of the conditions related to the design of precast concrete buildings. It can be said that the force-based design approach in the earthquake-resistant design has a quite common application in the engineering practice for precast concrete buildings design. However, for the response modification factor (or structural system behavior factor) (R), which is the basic parameter in design according to strength, has been observed to be significant differences between previous and recent earthquake codes. For example, the R coefficient for buildings with high ductility level, frame-type moment-resisting prefabrication is 6 for the Regulation on Buildings to be Built in Disaster Areas (ABYBHY (1998)); is 7, for the Code on Buildings to be Built in Seismic Zones (DBYBHY 2007); and in the Turkish Earthquake Building Code (TBEC-2018) depending on the connection type are 5 or 7. Besides, in TBEC (2018), building height classes (BYS) have been defined and restrictions have been introduced according to the connection type to be implemented in precast buildings.  In the project to which the application is made, it is aimed to determine the (R) and (D) coefficients, which are seismic performance factors, for the design of precast reinforced concrete buildings strength-based designed, according to the commonly applied connection types and building height classes. In the study, FEMA P-695 method will be taken into consideration for determining seismic performance factors for the industrial type moment-resisting post-tensioned, and wet-welded connections and multi-storey precast building frames. In this context, the column test and beam-column connection test data in the literature will be studied and detailed with finite element models and moment-rotation envelope curves will be established for different parameters. Performance evaluations will be evaluated by applying incremental dynamic analysis for prototype frame models of different heights obtained from three-dimensional industrial and multi-storey precast concrete buildings. It will be determined whether the R coefficients envisaged for the design of the precast buildings will be accepted according to the calculated margin ratios. |
| Projede yer alan öğrenci isimleri: | * 2 Scholarship students (Dokuz Eylül University) |