Seismic Assessment of an Existing Dual System RC Buildings in Madinah City

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Abstract : A 15-storey RC building, studied in this paper, is representative of modern building type constructed in Madina City in Saudi Arabia before 10 years ago. These buildings are almost consisting of reinforced concrete skeleton, i. e. columns, beams and flat slab as well as shear walls in the stairs and elevator areas arranged in the way to have a resistance system for lateral loads (wind–earthquake loads). In this study, the dynamic properties of the 15-storey RC building were identified using ambient motions recorded at several spatially-distributed locations within each building. After updating the mathematical models for this building with the experimental results, three dimensional pushover analysis (nonlinear static analysis) was carried out using SAP2000 software incorporating inelastic material properties for concrete, infill and steel. The effect of modeling the building with and without infill walls on the performance point as well as capacity and demand spectra due to EQ design spectrum function in Madina area has been investigated. The response modification factor (R) for the 15 storey RC building is evaluated from capacity and demand spectra (ATC-40). The purpose of this analysis is to evaluate the expected performance of structural systems by estimating, strength and deformation demands in design, and comparing these demands to available capacities at the performance levels of interest. The results are summarized and discussed.