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Effect of URM Infills on Seismic Behaviour of RC Frame Building: Part-2

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Abstract

This paper is the second part of the study conducted on a six storey (G+5) RC frame building to understand the effect of URM infill walls and its modelling techniques on the behaviour of RC frame buildings under the application of seismic forces. As mentioned in the first part of this study, the building has been modelled as bare frame (BF) and frame with infills modelled as equivalent compression only struts using three different configurations, i.e., EBIF, CBIF and ECBIF. Also, non-linear seismic analysis methods have been briefly discussed, along with their advantages and limitations. However, due to high seismic forces, non-linear static (pushover) and non-linear dynamic (time history) analysis procedures have been adopted in this work to evaluate the seismic performance of the building. While on one hand, infills help in lateral load resistance and increase the stiffness and strength of the structure. On the other hand, the diagonal strut behaviour of infills causes large shear forces at the end region columns where the strut action is taking place. Therefore, the effect of infills and their different modelling techniques and the response of different seismic analysis procedures have been estimated and compared, in terms of Inter Storey Drift ratios (ISD), storey displacements and column shear forces, to obtain more accurate behaviour. It has been observed that URM infills and their modelling configuration considerably affect the dynamic behaviour, distribution of plastic hinges and consequently alter the seismic performance of buildings.

Keywords: Infilled RC frame building, Unreinforced masonry walls, Braced infill frame, Non-linear pushover analysis, Non-linear time history analysis