

Modeling of Masonry In-Filled R/C Frame to Evaluate Seismic Performance of Existing Building

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Abstract : This paper deals with different modeling aspects of masonry infill: no infill model, Layered shell infill model, and strut infill model. These models consider the complicated behavior of the in-filled plane frames under lateral load similar to an earthquake load. Three strut infill models are used: NBCC (2005) strut infill model, ASCE/SEI 41-06 strut infill model and proposed strut infill model based on modification to Canadian, NBCC (2005) strut infill model. Pushover and modal analyses of a masonry infill concrete frame with a single storey and an existing 5-storey RC building have been carried out by using different models for masonry infill. The corresponding hinge status, the value of base shear at target displacement as well as their dynamic characteristics have been determined and compared. A validation of the structural numerical models for the existing 5-storey RC building has been achieved by comparing the experimentally measured and the analytically estimated natural frequencies and their mode shapes. This study shows that ASCE/SEI 41-06 equation underestimates the values for the equivalent properties of the diagonal strut while Canadian, NBCC (2005) equation gives realistic values for the equivalent properties. The results indicate that both ASCE/SEI 41-06 and Canadian, NBCC (2005) equations for strut infill model give over estimated values for dynamic characteristic of the building. Proposed modification to Canadian, NBCC (2005) equation shows that the fundamental dynamic characteristic values of the building are nearly similar to the corresponding values using layered shell elements as well as measured field results.

Keywords : masonry infill, framed structures, RC buildings, non-structural elements

Conference Title : ICCSEE 2015 : International Conference on Civil, Structural and Earthquake Engineering

Conference Location : Barcelona, Spain

Conference Dates : October 26-27, 2015