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EVALUATION OF SEISMIC PERFORMANCE OF MID-RISE CONCRETE MOMENT FRAME BUILDINGS CONSIDERING THE EFFECT OF INFILLED FRAMES

Mohammad Khaki

Lameigorgani University of Gorgan, Master of Civil Engineering, Iran;

Corresponding Author Mohammad Khaki Email: khaki@aftermail.ir;

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ABSTRACT

In this study, an analytical study was conducted using the ABAQUS software on the effect of masonry infilled frame and the effect of opening in the seismic behavior of mid-rise reinforced concrete frame building. After modeling the four-story building frame and defining the plastic range for its materials, the structure is placed under the dynamic load of the earthquake from accelerogram and the horizontal and vertical load of the earthquake entered it. After receiving the considered outputs, the infilled frame load is removed and the infilled frame itself is placed in the structure after the modeling by micro-model method. Also, by comparing the hysteresis diagram between the first and second models, the energy dissipated by the wall was very high up to the moment before its failure and had a positive effect on the loading capacity. In addition, bracing the frame components by the wall prevents over limit deformation of the structural gradation and delayed the instable deformations in the structure. So that the structural components with ten-time more elastic capacity, in the frame without infilled frame, have been deformed in the time less than the considered analysis and instability has been created. The results show that the existing opening reduces the stiffness and strength of the composite frame and increasing the size of the openings more than the amount recommended in the regulation causes a more severe decline in the strength of the structure. Also, the deformation of opening from window type (increasing the opening dimensions in the vertical direction) as well as the irregularity in their position causes a severe decline in the strength and stiffness of the structure.

Keywords: Seismic Performance, Moment Frame, Concrete Buildings, Infilled Frame