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The effect of beam-column connections and soil on the seismic behavior of intermediate steel moment-resisting frames

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Soil structure interaction expresses the difference of structural responses between the actual and theoretical rigid based conditions and depends on the stiffness, mass and damping of soil and structure systems. Nowadays, moment resisting frame is one of the most common structural systems. Ductility of these frames is due to the flexural yielding of beams, columns and the shear yielding of panel zone of columns. The influence of modeling beam column connections and soil-foundation-structure interaction on the seismic responses of 10-story intermediate steel moment resisting frames that located on the two various soil types (II and IV) is studied in this paper. Prequalified welded flange plate connections (WFP) are used in these buildings. For this purpose, several 2D finite element models are developed using OpenSees software by assuming three conditions such as models with considering soil and beam-column connection effects, models with considering soil and without connections, models with fixed based and without considering connections. The maximum responses of the studied frames are calculated and compared with nonlinear time history dynamic analyses under seven far-fault earthquakes. The numerical results show that in the models located on soil type IV, considered connections, SFSI or just soil, the maximum lateral displacement and maximum inter story drift are more, compared to models without connections and with fixed based conditions. In the models rested on soil type II, some of these parameters are reduced. The maximum base shear of structures is reduced in the mentioned models.

Biography

Hamed Rahman Shokrgozar has completed his PhD from K N Toosi University of Technology. He is the Assistant Professor of the Department of Civil Engineering in University of Mohaghegh Ardabili. He has published more than 10 papers in reputed journals and more than 30 papers in conferences. His area of research interest is Structural Engineering.

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