

Effects of Soil-Structure Interaction on Seismic Performance of Steel Structures Equipped with Viscous Fluid Dampers

Authors : Faramarz Khoshnoudian, Saeed Vosoughiyan

Abstract : The main goal of this article is to clarify the soil-structure interaction (SSI) effects on the seismic performance of steel moment resisting frame buildings which are rested on soft soil and equipped with viscous fluid dampers (VFDs). For this purpose, detailed structural models of a ten-story SMRF with VFDs excluding and including the SSI are constructed first. In order to simulate the dynamic response of the foundation, in this paper, the simple cone model is applied. Then, the nonlinear time-history analysis of the models is conducted using three kinds of earthquake excitations with different intensities. The analysis results have demonstrated that the SSI effects on the seismic performance of a structure equipped with VFDs and supported by rigid foundation on soft soil need to be considered. Also VFDs designed based on rigid foundation hypothesis fail to achieve the expected seismic objective while SSI goes into effect.

Keywords : nonlinear time-history analysis, soil-structure interaction, steel moment resisting frame building, viscous fluid dampers

Conference Title : ICCSEE 2014 : International Conference on Civil, Structural and Earthquake Engineering

Conference Location : Istanbul, Türkiye

Conference Dates : June 19-20, 2014