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Effect of Semi Active Tuned Mass Damper on Seismic Response of Structure with Soil Structure Interaction

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Abstract

The seismic response of a five- storey building with soil structure interaction (SSI) utilising semi-active tuned mass damper (SATMD) is obtained. A magneto- rheological (MR) damper with friction type damping scheme is used alongside a tuned mass damper to constitute a semi active tuned mass damper. To study the effect of SSI, the seismic response of the building with a fixed base is compared with that of the building resting on soft soil. The soft soil is considered to have a shear wave velocity of 100 m/s. The optimum damper parameters of SATMD considering four different ground motions are obtained and these parameters are utilised to show the superiority of SATMD with friction type damping scheme in terms of efficiency and robustness. It was observed that the SATMD could significantly decrease the response of the building subjected to ground motions, but the reduction varied widely with the ground motion considered.

Keywords: Soil structure interaction, Semi active tuned mass damper, Seismic response