

عنوان مقاله:

Near-fault pulse effects on building structures with nonlinear shallow foundation-soil interaction

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خلاصه مقاله:

This paper is intended for improving the current state of knowledge on simultaneous effects of near-field ground motions, as well as nonlinear soil-structure interaction (SSI) including foundation uplift and soil yield on seismic performance of soil-structure systems. To this end, an extensive parametric study is conducted in which medium-to-high-rise building structures with a wide range of slenderness ratio rested on shallow mat foundation with different vertical load-bearing safety factors located on soft-to-very dense soil are investigated. Finite element modeling of soil-structure system is employed in which soil is simply represented by a set of nonlinear springs and dashpots. Mathematical near-field pulse models of fling step and forward directivity are used as input ground motion. Effects of foundation uplift and soil yield on enhancing inter-story drift demands are investigated. The results show that beneficial effects of nonlinear SSI reduce when number of stories increases whereas, these effects amplify when pulse amplitude grows. The latter clause is due to more severely activation of nonlinear SSI mechanisms, i.e. foundation uplift and soil yield.

کلمات کلیدی:

soil-structure interaction, near-field ground motion, foundation uplift, soil yield

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