World Academy of Science, Engineering and Technology
International Journal of Geotechnical and Geological Engineering
Vol:8, No:04, 2014

Shock Response Analysis of Soil-Structure Systems Induced by Near-Fault Pulses

Authors : H. Masaeli, R. Ziaei, F. Khoshnoudian

Abstract : Shock response analysis of the soil–structure systems induced by near–fault pulses is investigated. Vibration transmissibility of the soil–structure systems is evaluated by Shock Response Spectra (SRS). Medium–to–high rise buildings with different aspect ratios located on different soil types as well as different foundations with respect to vertical load bearing safety factors are studied. Two types of mathematical near–fault pulses, i.e. forward directivity and fling step, with different pulse periods as well as pulse amplitudes are selected as incident ground shock. Linear versus nonlinear Soil–Structure Interaction (SSI) condition are considered alternatively and the corresponding results are compared. The results show that nonlinear SSI is likely to amplify the acceleration responses when subjected to long–period incident pulses with normalized period exceeding a threshold. It is also shown that this threshold correlates with soil type, so that increased shear–wave velocity of the underlying soil makes the threshold period decrease.

Keywords : nonlinear soil–structure interaction, shock response spectrum, near–fault ground shock, rocking isolation
Conference Title : ICEGSE 2014 : International Conference on Earthquake, Geological and Structural Engineering
Conference Location : Istanbul, Türkiye
Conference Dates : April 22-23, 2014