

Effect of Fill Material Density under Structures on Ground Motion Characteristics Due to Earthquake

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Abstract : Due to limited areas and excessive cost of land for projects, backfilling process has become necessary. Also, backfilling will be done to overcome the un-leveling depths or raising levels of site construction, especially near the sea region. Therefore, backfilling soil materials used under the foundation of structures should be investigated regarding its effect on ground motion characteristics, especially at regions subjected to earthquakes. In this research, 60-meter thickness of sandy fill material was used above a fixed 240-meter of natural clayey soil underlying by rock formation to predict the modified ground motion characteristics effect at the foundation level. Comparison between the effect of using three different situations of fill material compaction on the recorded earthquake is studied, i.e. peak ground acceleration, time history, and spectra acceleration values. The three different densities of the compacted fill material used in the study were very loose, medium dense and very dense sand deposits, respectively. Shake computer program was used to perform this study. Strong earthquake records, with Peak Ground Acceleration (PGA) of 0.35 g, were used in the analysis. It was found that, higher compaction of fill material thickness has a significant effect on eliminating the earthquake ground motion properties at surface layer of fill material, near foundation level. It is recommended to consider the fill material characteristics in the design of foundations subjected to seismic motions. Future studies should be analyzed for different fill and natural soil deposits for different seismic conditions.

Keywords : acceleration, backfill, earthquake, soil, PGA

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