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# Evaluation of Pile Performance in Different Layers of Soil

**Authors :** Orod Zarrin, Mohesn Ramezan Shirazi, Hassan Moniri

**Abstract :** The use of pile foundations technique is developed to support structures and buildings on soft soil. The most important dynamic load that can affect the pile structure is earthquake vibrations. Pile foundations during earthquake excitation indicate that piles are subject to damage by affecting the superstructure integrity and serviceability. During an earthquake, two types of stresses can damage the pile head, inertial load that is caused by superstructure and deformation which caused by the surrounding soil. Soil deformation and inertial load are associated with the acceleration developed in an earthquake. The acceleration amplitude at the ground surface depends on the magnitude of earthquakes, soil properties and seismic source distance. According to the investigation, the damage is between the liquefiable and non-liquefiable layers and also soft and stiff layers. This damage crushes the pile head by increasing the inertial load which is applied by the superstructure. On the other hand, the cracks on the piles due to the surrounding soil are directly related to the soil profile and causes cracks from small to large. However, the large cracks reason have been listed such as liquefaction, lateral spreading, and inertial load. In the field of designing, elastic response of piles is always a challenge for designer in liquefaction soil, by allowing deflection at top of piles. Moreover, absence of plastic hinges in piles should be insured, because the damage in the piles is not observed directly. In this study, the performance and behavior of pile foundations during liquefaction and lateral spreading are investigated. In addition, emphasize on the soil behavior in the liquefiable and non-liquefiable layers by different aspect of piles damage such as ranking, location and degree of damage are going to discuss.

**Keywords :** pile, earthquake, liquefaction, non-liquefiable, damage
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