

## 2D Seismic Response Analysis Of Sites Improved With Piles

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### ABSTRACT

A series of numerical calculations have been performed to investigate the soil improvement effect on seismic site response. The improved site is composite and has more or less different mechanical properties than the natural soil. The influence of the elastic modulus of the pile, the pile distance ratio, ground motion input, distance to fault rupture and PGA of the earthquakes on seismic response characteristics are especially investigated. The results reveal that the values of the PGA and amplification factor on the surface of the natural soil and improved grounds depend on the period of the site, the period and intensity of the ground motion input. The acceleration response spectra depend on the ground motion input and changing the pile distance ratio doesn't have significant effect on seismic response of site.

**Key words:** Seismic site response, Soil improvement, Pile.

### 1 INTRODUCTION

The influence of local site conditions on ground motions has been observed since the early days of earthquake engineering. Observations from as early as the 1800s exist in the literature indicating the effects of local geology on ground motions (EPRI 1993). Traditionally, site amplification had been studied by seismologists as part of the larger problem of seismic wave propagation (e.g., Sezawa and Kanai 1932, Kanai 1950, Thompson 1950, Haskell 1960). Seismologists have traditionally treated soil as a linear material and rarely considered soil nonlinearity in their assessment of site conditions (Finn 1991). The pioneering work of Seed and Idriss (1969) brought attention to the nonlinear behavior of soils during seismic shaking. This work stemmed from observations of the earthquakes in Niigata and Alaska in 1964, and the 1967 Caracas earthquake. Since then, site response has become an integral part of geotechnical earthquake engineering [1].

Different site conditions are obtained in order to consider the impact of the earthquake response, the usual practice of the basis of past experiences in the field will be divided into several categories, and then classified according to site records of existing statistics of earthquake ground motion response spectrum. But about artificial foundation, because of its special boundary conditions and the diversity of treatment methods, have yet to see the relevant statistics [2].