

عنوان مقاله:

Investigating the effect of soil structure interaction on the seismic response of concrete buildings

محل انتشار:

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خلاصه مقاله:

For structural engineers, it is common in the analysis to consider a fixed base structure, which means that the foundations and the underlying soil are assumed to be rigid. This assumption is not correct because the underlying soil in the near field often consists of soft layers that have different properties and may behave nonlinearly, which results in a significant change of the seismic motion before reaching the structure foundation. In addition, interaction between the structure, its foundation and the underlying soil during vibrations can significantly alter the structure response. This change depends on the characteristics of the structure, the soil properties and the nature of the seismic excitation. As a result, accurate evaluation of inertial forces and displacement in structures requires a careful examination of soil structure interaction (SSI) effects. In this paper, a numerical study was conducted to investigate the seismic response of concrete buildings exposed to various seismic excitations with nonlinear SSI assumption using PLAXIS V8.6 software. Two types of two-dimensional moment resisting frames including a five-story frame and a ten-story frame have been analyzed. Three types of soil hard (type I), medium (type III) and weak (type IV) are considered with shear wave velocity of 1000, 270 and 90 m/s, respectively. The results of the analysis show that considering the effects of SSI on seismic design is essential. Generally, by decreasing the dynamic stiffness of the underlying soil (with decreasing shear wave velocity VS and shear modulus G), the base shear ratios decrease. In addition, a fixed .base assumption can lead to high overestimation of the structural design forces and seismic response

کلمات کلیدی:

Soil Structural Interaction (SSI), seismic response, Nonlinear Dynamic Analysis, Input motion

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