

Abstract

In this study, the investigation of the dynamic properties of reinforced concrete buildings in Bangkok, is conducted by the measurement approach to perceive their seismic hazard. The natural period, damping ratio and mode shapes of fifty buildings, varying in height from 20 to 210 meters and number of stories 5 to 54 were identified from ambient vibrations by a technique in frequency domain. The fundamental period of the buildings are found to be in the vicinity predominant period of the amplified ground motion of Bangkok soft soil layer. This concurrence illustrates potential of the subsequent resonance phenomena, which the amplification of building responses at this predominant period. The comparison of the fundamental period of buildings in Bangkok with the data from buildings under earthquake resistant design practices in other countries and the empirical formulas of buildings in Bangkok are presented in this study. From the results of mode shape analysis, the modal contribution factors of response characterize the deformation behaviors and represent the meaningful information to justify the seismic risk of these buildings. Moreover, the vertical plot of the measured vibration mode also reveal movement at base, which the effect are more pronounced in smaller buildings or the stiffness of the building with respect to the soil is higher. The results of this study show that, the natural period of the buildings, $T(s)$, could be expressed by linear regression analysis with height of building in meter, H , as $T = 0.019H$ and with the number of stories, N , as $T = 0.063N$.