Investigation of liquefaction hazard in Chiang Rai and Chiang Mai provinces of the Northern Thailand

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Abstract

Several buildings and infrastructures in Northern Thailand were damaged due to recent moderate and strong earthquakes such as the Mw 6.8 Tarlay Earthquake in 2011 and the Mw 6.2 Mae Lao Earthquake in 2014. Due to these earthquakes, soil liquefactions were reported in many area of Chiang Rai province. In this study, subsoil investigations were conducted in Chiang Rai and Chiang Mai. The investigation programmes included soil boring, standard penetration test and shear wave velocity measurement as well as index properties from laboratory tests. A preliminary evaluation of the probability of liquefaction can be performed based subsoil investigation report. As a result, this study provides an assessment of liquefaction utilising the empirical method in combination with probabilistic seismic hazard analysis. Peak ground acceleration was calculated using seismic hazard with 2 and 10 percent probability of exceedance in 50 years for each site. To determine the probability of liquefaction under earthquakes, the empirical technique was used. The findings of this study can also provide a liquefaction potential in Chiang Rai and Chiang Mai provinces in the Northern Thailand.

Keywords: liquefaction; seismic hazard; earthquake; Northern Thailand