



## **Estimation of empirical site amplification factors in Taiwan**

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Lots of infrastructures are under construction in metropolises in Taiwan in recent years and thus leads to increase-ment of population density and urbanization in those area. Taiwan island is located in plate boundaries in which the high seismicity is caused by active tectonic plates. The Chi-Chi earthquake (Mw 7.6) in 1999 caused a fatality of more than 2000, and the Meinong earthquake (Mw 6.5) in 2016 caused a fatality of 117 in Tainan city as well as damages on hundreds of buildings. The cases imply seismic vulnerability of urban area. During the improve-ments for seismic hazard analysis and seismic design, consideration of seismic site amplifications in different site conditions is one of important issues.

This study used selected and processed strong motion records observed by the TSMIP network. The site conditions considered as Vs30 used in this study were investigated at most stations (Kuo et al. 2012; Kuo et al. 2016). Since strong motion records and site conditions are both available, we are able to use the data to analyze site amplifications of seismic waves at different periods. The result may be a reference for future modification of seismic design codes to decrease potential seismic hazards and losses.

We adopted the strong motion and site database of the SSHAC (Senior Seismic Hazard Analysis Committee) Level 3 project in Taiwan. The selected significant crustal and subduction events of magnitude larger than six for analysis. The amplification factors of PGA, PGV, PGD, and spectra acceleration at 0.3, 1.0, and 3.0 seconds were evaluated using the processed strong motions. According to the recommendation of SSHAC Level 3 project, the site condition of Vs30 = 760 m/s is considered as the reference rock site in this study. The stations with Vs30 between 600 m/s and 900 m/s and used as the reference rock sites in reality. For each event, we find a reference rock site and other site within a certain distance (region dependent) to calculate site amplifications of ground motions. Relationships of site amplification factors and Vs30 are therefore derived for strong motions by regression analysis. Soil nonlinearity (decrease of amplifications) has to be considered at soft soil sites during a strong shaking. We also discuss amplification factors in terms of different intensities if data is available.