



Preliminary study on soil to rock spectral ratio method of microtremor measurement in Taipei Basin, Taiwan

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Taipei city is the capital of Taiwan which located in Taipei basin and covered with hundreds meter of alluvial layer that might cause serious damage during huge earthquake. Prediction of possible strong motion levels occurred in the basin then became popular. Engineers most like to use Ground Motion Prediction Equation (GMPEs) as common tool for seismic hazard calculation but GMPEs were usually debated that it can only give one prediction value (PGA, PGV, Sa etc.) rather than time history or spectrum. Seismologists tried theoretical simulation (1D, 2D, 3D method) but could only give low frequency (usually less than 1 Hz) results restricted to that the shallow structures were not clear enough.

Resent years, wide frequency simulation techniques such as empirical green's function added stochastic simulation method (hybrid method) were applied to several different purposes but site effect still plays an important role that need to be considered. Traditionally soil to rock spectral ratio of shear wave (denoted as S/R) was widely applied to check basin effect for decades but the technique needs lots of permanent stations and several years to get enough records. If some site located within strong motion network but not close enough to the strong motion stations, interpolate or extrapolate results needed to be used. Wen and Huang (2012) conducted a dense microtremor measurement network in whole Taiwan and applied microtremor H/V to discuss dominant frequency with traditional transfer functions from earthquake shear wave and found good agreement between them.

Furthermore, in this study, the ability of soil to rock spectral ratio of microtremor (denoted as MS/R) measurement was tested in Taipei basin. The preliminary results showed MS/R had good agreement with S/R between 0.2 to 5 Hz. And distance from soil site to reference rock site should no greater than 8 to 10 km base on degree of spectrum difference (DSPD) calculation. If the MS/R works that site effect study from this technique could be applied for some region which distribution of strong motion stations were not dense enough after all.