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Ground Motion Prediction Equation (GMPE) for Vertical-to-Horizontal (V/H) Ratios of Ground-Motion in Taiwan

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Vertical-to-horizontal ratios of ground-motion are important for developing vertical design spectra compatible with the horizontal design spectra. In this study, we develop ground motion prediction equations (GMPEs) for the vertical-to-horizontal (V/H) ratio of ground-motion using the data from Taiwan Strong Motion Instrumentation Program (TSMIP). A model for the prediction of V/H ratio for peak ground acceleration and spectral accelerations from 0.01 to 10.0 s is developed with a functional form consider the V/H ratios as a function of magnitude, distance, and site characteristic by using Vs30.

The model shows that the vertical-to-horizontal ratio has strong dependence on the period of response spectra, Vs30, and distance. The dependence of V/H ratios with magnitude is stronger in the short period. The model shows highest V/H ratio is around the period of 0.06 sec and very with magnitude. For short periods, the V/H ratio decreases with increasing of Vs30, but increases with Vs30 at long periods. The V/H ratio model is also compared with other available models.