



Development of a Reference for Seismic Amplification: The Case of Metro Manila

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Abstract

The evident seismicity of the Philippines has brought about a need to account for all possible factors that dictate the intensity of ground shaking during earthquakes. Ground shaking can be significantly increased by the local soil conditions that exist in a particular site, generally known as soil amplification. The lack of a reference for soil amplification hinders the proper consideration of the effect of local soil conditions in ground shaking during earthquakes. Shear wave velocities, V_s and other soil characteristics were utilized in order to analyse the effect of soil conditions in ground motions. Probabilistic Seismic Hazard Analysis was performed incorporating the effects of soil amplification in order to estimate values of peak ground acceleration with a Probability of Exceedance of 10% in 50 years. The obtained values range from 0.27 g to 0.49 g, generally attributed to the variability of the soil conditions that exist at the site considered.

Keywords: earthquakes; ground motion; soil amplification; shear wave velocity; peak ground acceleration; probabilistic seismic hazard analysis.

1 Introduction

The Philippines is a seismically and volcanically active region where damaging earthquakes have struck numerous times within the 400-year historical period [1]. Metro Manila's susceptibility to seismic hazards has been empirically proven time and again and with its variable geology and relatively flat terrain, these hazards need to be evaluated on the basis of the influence of the subsurface conditions on the ground surface motion that buildings may expect to experience in an earthquake in order to properly be accounted for its effects in the intensity of ground motions [2]. There are lot of factors which dictate the extent of effects brought about by the ground motions, due to earthquakes. The effects of

earthquakes are not only dependent upon the magnitude of the earthquake and the distance from the source, but they can vary considerably due to local geological conditions [3]. The absence of a reference for soil amplification hinders the proper consideration of the effect of local soil conditions and characteristics and ultimately neglects its significance and effect in the intensity of ground motions during the occurrence of earthquakes.

The development of a reference for amplification of ground motions provides a basis for concerned individuals or groups with regards to how much the local soil conditions can amplify ground motions during earthquakes as well as the expected ground motions that have taken into