NUMERICAL SIMULATION OF BEDROCK MOTION IN SRI LANKA

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Designing the structures against Earthquakes is always challenging for the Engineers. It is more difficult when the relevant peak ground acceleration values are not available. So far the Sri Lankan Engineers were using the Indian and Australian design codes to design the Earthquake resistant structures. Also, so far Sri Lanka is considered as a safe zone against earthquakes. But recent intra-plate earthquakes around the world alert engineers to design the important structures against earthquakes. The best example for a destructive, intra-plate earthquake in the region is the 2001 Bhuj earthquake in India with a magnitude of 7.6. So, the need of a local national annex was emphasised with the upcoming high rise structures in Sri Lanka.

This study is focused on producing the Peak Ground Acceleration (PGA) values for the important cities in Sri Lanka, which would be providing the base to develop the national annex to the Euro Code which is the current guideline in designing Structures. To investigate the threat of earthquakes and the recurrence interval, an earthquake catalogue for events around Sri Lanka was developed for the period from 1063 to 2012 and it revealed the possibility of a magnitude 7.4 earthquake with 475 year return period having an epicentral distance of 90 km around Sri Lanka. Due to the lack of local data records and to avoid the theoretical assumptions by using the attenuation relationships, a data set of 7 earthquakes with the magnitudes around 7.4 with a distance of 90 km was selected from the Pacific Earthquake Engineering Research Centre (PEER) database. A Software which uses the *Finite Difference* approach, *FLAC* was used for modelling. So, a 2D *FLAC* model of Sri Lanka was developed considering five cross sections parallel to the cross section connecting Colombo and Batticaloa. The profile was developed using the help of *Google Earth* with an element size of 100 m x 100 m. The depth of the model was selected as 15 km as the common focal depth of an earthquake is around 15 km. The model was then analysed, one cross section for each of the 7 earthquakes with a rupture length of 15 km as the rupture length of the 7 earthquakes are around 15 km. The resultant acceleration time histories were converted into Response spectrums and the average spectrum for each city was obtained. The PGA values for few cities for a 475 year return period earthquake are: Colombo = 0.12 g, Kandy = 0.05 g.