PREDICTION OF EARTHQUAKE INDUCED DISPLACEMENTS OF GRAVITY TYPE RETAINING WALLS IN SRI LANKA

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ABSTRACT

It was long believed that Sri Lanka is as an earthquake-free country. However, after the tsunami in 2004, there has been an increasing trend of seismic activities near Sri Lanka. This necessitates a thorough analysis on the performance of existing structures during earthquakes to identify their possible failure mechanisms and to propose guidelines to preserve them. During earthquakes, gravity retaining walls are likely to fail either by sliding away from the backfill or due to the combined effect of sliding and rotation. Thus in addition to the calculation of the factors of safety against failure in bearing, sliding and overturning under static conditions, care should be taken on the likely displacements of the gravity retaining walls during strong earthquakes . Therefore in this study it was attempted to estimate possible displacements of gravity retaining walls during earthquakes of different magnitudes and tried to recommend suitable shape for the gravity retaining walls to minimize displacements due to earthquakes. The above study was backed by Newmark's sliding wedge analysis and Mononobe-Okabe theory where earthquake induced translational displacements for different shapes of gravity type retaining walls were estimated using numerical integration of the expected earthquake acceleration data. Results of the analysis revealed that the wall with a sloped back gave the least displacement.