TECTONICS AND LANDSLIDES

P W VITANAGE

ABSTRACT

The influence of structure and tectonics on the occurrence of landslides in any area may be on a local or regional scale. Locally, the changes in the hydro-geological conditions, e.g. increase in pore-pressure and oscillations of water-table regime as a result of the discontinuities, such as joints, faults - lineaments, shear zones and foliation shears may trigger landslides under favourable meteorological conditions (continuous heavy rain-500 mm to 1000 mm). Regionally, any tectonic disturbance along mega-lineaments may give rise to a series of mass-movement-slides, creep, rock and mud flows and rock falls - on a regional scale. Earthquakes and micro-tremors may induce landslides.

The recent landslide investigations in different areas, the result of engineering geological surveys of the hydro-project areas and the detailed geological and tectonic mapping of the lineaments in the Central Highlands strongly indicate considerable tectonic activity along the net-work of major lineament faults during the geological past as well as during the recent times (neotectonic movements).

Sri Lanka is considered to be an area of low seismicity, but there are records of 53 small earthquakes between 1891 and 1979. The Kotmale and Victoria micro-seismic network has recorded over 300 micro-seismic events (Richter scale 1 to 2.3), since 1982. In addition, several earthquake tremors (nearly 39) have been locally felt mainly in the hill country. It is observed that the onshore microearthquake epicentres are closely associated with the lineament fractures and the escarpment of the Central Highlands of Sri Lanka. The offsore seismic events (Richter

Scale over 5) appear to fall within two distinct zones - (i) NE-SW trending Palk Straits lineament and (ii) the subduction zone off the Great and Little Basses.

The relevelling of the bench marks along the highway triangle - Kandy-Kurunegala-Dambulla-Kandy- during 1926, 1937, 1951 and 1971 has shown independent geodetic evidence for recent vertical movements (Maximum of .9 inch: 2.3 cm during 15 year period). Another independent evidence for recent movements is the morphological changes in the drainage (water-shed) net of the Central and Eastern Highlands and Uplands.

The reported occurrence of tension fissures followed by sliding has been reported in Spring Valley estate on October 1979 during a locally felt micro-tremor with an intensity of MM scale II & III, recorded on seismograph in Colombo Meteorological Observatory. At Dartonfield rubber estate, Kalutara, and Gordon estate, Udapussellawa, the landslides in different areas have occurred more or less simultaneously. The cracks of the damaged buildings appear to be the result of low to moderate shaking and vibrations. This aspect of micro-seismicity and neotectonic movements should be considered in recommending preventive measures in areas prone to landslides.