

DTA testing for expansive characteristics of some local soils

Expansive soils and their related engineering problems have been reported in many countries. In recent years during the constructions of the one million housing programme, there were various complaints about cracking of buildings from the Kataragama, Ambalantota and Hambantota districts. Later it was realized that those sites contained expansive soils. Expansive soils found in Sri Lanka are probably those formed from the metamorphic rocks which have undergone considerable weathering to form the montmorillonite mineral.

Differential thermal analyses (DTA) are useful when the presences of deleterious materials, particularly the clay minerals are expected. The different temperatures required to extract structural water from the lattices of clay minerals reflect the clay-mineral types. In this test a curve of the temperature difference between the test material and reference material (alumina) is drawn on an automatic recording drum. Each type of mineral yields a typical characteristic curve.

DTA testing was carried out for soil samples collected from five sites, these being the Dambulla International Stadium Site and the landslide sites of Naketiya, Kahagalla, Walhaputenna and Beragala. The purpose was to investigate whether these are expansive soils or non-expansive soils, and classify them as such. When the DTA tests were carried out, the resulting DTA plots indicated that none of the samples contained the montmorillonite clay mineral. Therefore all these soils can be classified as non-expansive soils.