

INFLUENCE OF SOIL CHARACTERISTICS ON  
EMBANKMENT DAM FAILURE

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Several earth embankments have encountered problems due to internal erosion of the soils in countries such as Australia, Thailand and U.S.A. These are due to the presence of what are called dispersive soils. Many earth dams constructed using dispersive soils have experienced problems, specially during the stage when the reservoir is impounded. Internal cracks are formed in the embankments during construction or impounding. If the soils used are dispersive soils, the seeping water will remove the fine clay particles from the cracks leading to segregation and widening the crack. This can lead to piping and failure of the embankment. Hence the use of dispersive soils in the earth dams should be avoided. Dispersive soils are clayey silty soils which are highly erodible and have a higher content of dissolved sodium in the pore water than ordinary soils.

Some tests that can be used to determine the dispersive nature of the clay are crumb test, soluble salts in pore water, laboratory dispersion test (double hydrometer test) and pinhole test.

Tests were carried out on soil samples taken from different parts of Sri Lanka. Since most of these tests are qualitative methods for evaluating erodibility, all the test results are considered to determine whether the soil is dispersive or nondispersive. It has been found that for some soils, drying influences the results of the dispersiveness.

Liquid limits and plastic limits have been determined for these samples of soil. It has been found that dispersive clays cannot be differentiated from nondispersive clays from Atterberg limits tests.