

## **SYNOPSIS**

**ABHIJITH T K**

Roll No. 16210001 (M. Tech)  
Civil Engineering  
Indian Institute of Technology Gandhinagar  
Palaj-382355, India

Thesis Supervisor

**Dr. AJANTA SACHAN**

Month and Year of Submission

July, 2018

### **EFFECT OF STRESS HISTORY ON STRESS-STRAIN AND VOLUMETRIC RESPONSE OF LATERITE SOIL UNDER UNDRAINED AND DRAINED CONDITIONS**

Laterite soils are tropically weathered residual soils containing significant iron content and are known for their highly dispersive nature. The current study is focused on the effect of stress history on shear strength and volumetric behaviour of yellow laterite soil under undrained and drained boundary conditions. The soil for the current study was collected from the Right Bank Canal of Gosikhurd dam located in Nagpur at a chainage of 43290m away from the dam. The laterite soil specimens are prepared by moist tamping technique at in-situ density & water content. The laterite soil contains high fines content and falls under the category of CI (clay with intermediate plasticity) soil. The overconsolidation and overburden effects of laterite soil are yet to be explored. An experimental study has been performed to evaluate the effect of stress history and confining pressure on shear strength and volumetric behaviour of laterite soil by performing series of triaxial tests under undrained and drained boundary conditions. The effect of stress history on the shear strength behaviour of laterite soil is explored at overconsolidation levels of 1, 2, 5 and 10. The effect of overburden is explored by performing the triaxial tests at confining pressures of 100 kPa, 200 kPa, 300 kPa, and 400 kPa. An attempt is also made to improve the engineering behaviour of soil by treating laterite soil with lime. Various percentages of lime are added to laterite soil at its in-situ density and water content. These specimens are used to evaluate the improvement in strength and reduction in dispersiveness of the yellow

laterite soil. A series of unconfined compression (UC) strength and crumb tests are performed on the specimens at different lime contents (2%, 4%, 5%, and 6%) and curing periods (0days, 7days, 14days and 28days) to evaluate the effect of stabilization of laterite soil. The collapse behaviour of yellow laterite soil is also studied by performing double 1-D oedometer experiment.