National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Conference Return Seminar : Effect of Moisture and loading conditions on the volumetric behavior of Bentonite- Sand Mixtures
Speaker	: Rachana Gharai
Supervisor	: Dr. M. Gattu
Venue	: CE Seminar Hall
Date and Time	: 08 Jan 2025 (04:35 pm)
Abstract	: Expansive soils, known for their significant volume changes in response to moisture fluctuations, pose substantial challenges to geotechnical engineers by causing foundation heave, settlement, and structural damage. Accurately predicting the behavior of these soils is crucial but challenging due to their high volume change potential. This study investigates the volume change behavior of laboratory-prepared bentonite-soil mixtures to enhance the understanding and prediction of settlement under varying conditions. Three distinct soil-bentonite mixtures were selected to evaluate their volume change properties under imposed loading and varying moisture conditions through a comprehensive series of laboratory tests. Consolidation and Shrinkage tests were conducted at different moisture contents to examine the effects of moisture content, clay content, and imposed loading on settlement behavior. The experimental data revealed that the interaction between bentonite and soil particles, along with moisture content, significantly influences the settlement behavior of these mixtures. Based on the experimental findings, semi-empirical equations were developed to predict the settlement behavior of these specific mixtures, considering variations in clay content, moisture content, and imposed loading. Additionally, a numerical parametric study was conducted to illustrate further the settlement behavior of expansive soils under various loading conditions and moisture variations. This study provides valuable insights into the behavior of expansive soils, highlighting the critical factors that affect their settlement characteristics. The results contribute to the improved prediction and management of settlement in expansive soils, thereby enhancing the design and stability of geotechnical structures. The findings underscore the importance of considering the complex interactions between soil constituents and environmental conditions in geotechnical design and assessment processes, offering a robust framework for addressing the challenges of expansive soils.