Cyclic Triaxial Testing on 3-D Geogrids for Roadway Improvement

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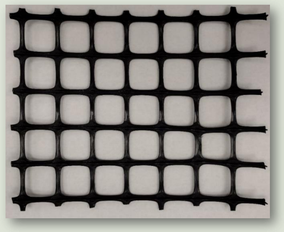
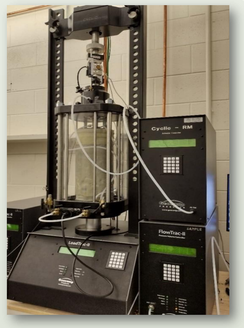
Introduction

•Roadways are crucial for infrastructure, with billions spent on annual maintenance
•A strong and flexible road base is essential for optimizing lifespan and stability
•Project aims to determine ideal soil mixture through cyclic triaxial testing



Tri-Axial Testing

- Load-controlled cyclic triaxial technique determines cyclic strength of saturated soils
- Cylindrical soil sample subjected to cyclic axial load in undrained state
- Loading stopped after 500 cycles or specified in testing program unless criteria met
- Cyclic triaxial results include time histories of load, deformation, and pore water pressure

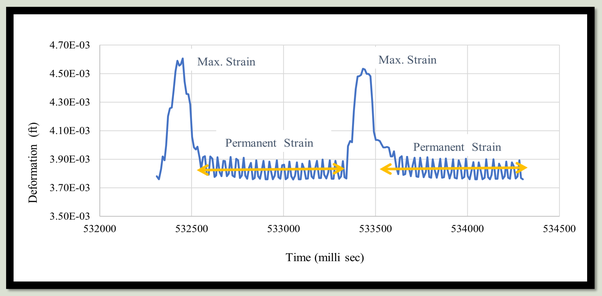


Future Research

- CT testing outcomes: Reinforced Improvement Ratio (RIR) and Resilient Modulus (MR) for control and composite sections
- RIR and MR used to fine-tune Layer Coefficient Ratio (LCR) in paved road design
- Also used to modify unpaved roadway design methodology
- Enables further testing, potentially with other soil types, for optimizing road bases

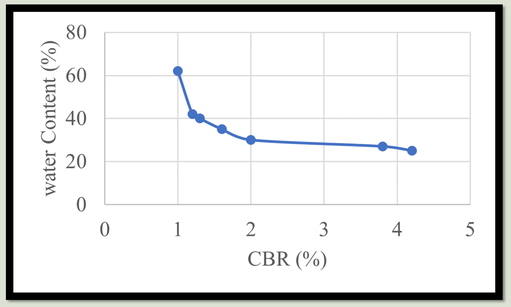
Research Methods

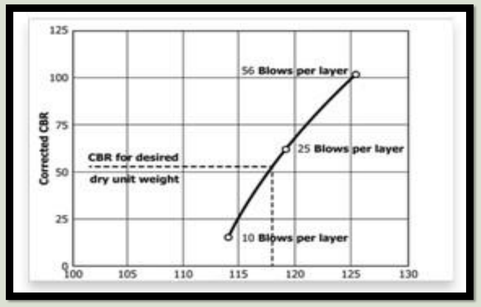
•Conduct 27 cyclic triaxial (CT) tests
•Test both control and reinforced samples
•Each sample: 150 mm diameter, 300 mm height
•Lower part: mix of clay and sand materials (subgrade)
•Upper layer: aggregate material (base course)
•Geogrid layer placed between subgrade and base course



CBR Test & Strain Gages

•CBR test in building materials labs evaluates durability of base course materials and soil subgrades
•Used by designers and engineers for highways, airport runways, taxiways, parking lots, and pavements
•CBR test data crucial for choosing pavement and base thicknesses
•Strain gages report strain at the applied location
•Enables individual assessment of base soils instead of as a whole





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