Using Strain Gauges to Measure Local Strain in Cyclic Triaxial Testing

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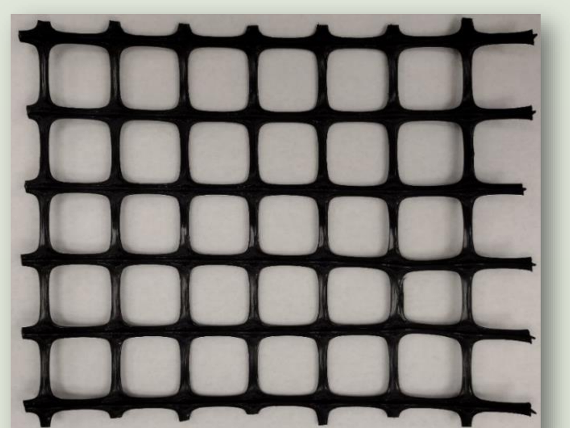
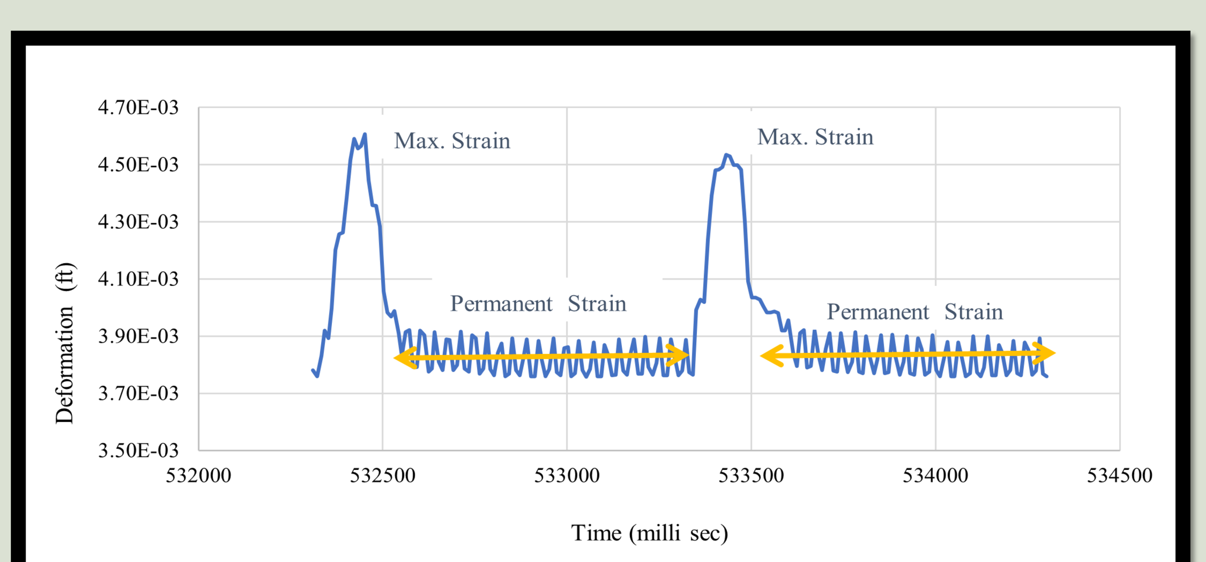
Introduction

- 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



Research Methods

- Conduct 6 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

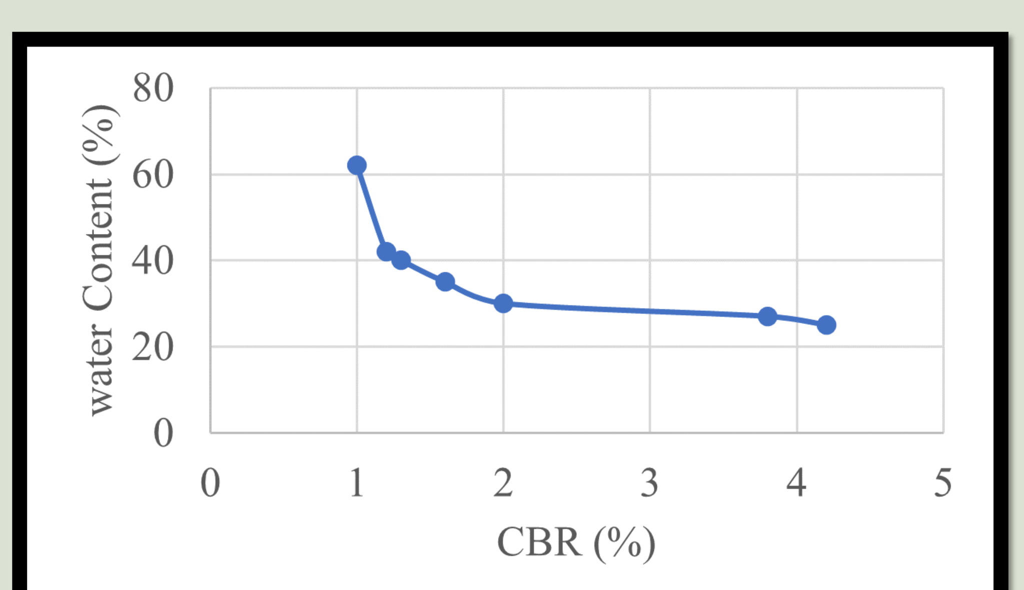


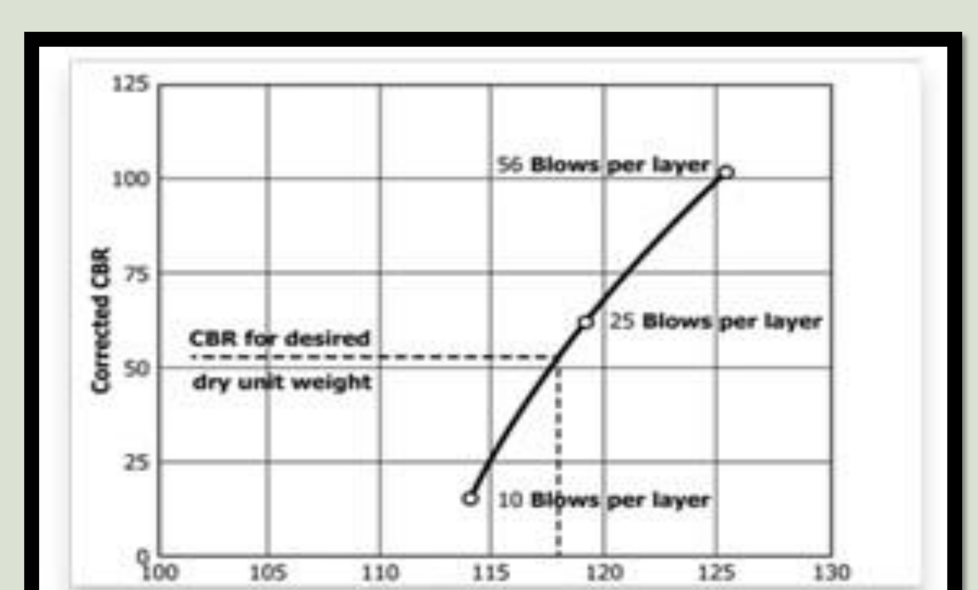
Tri-Axial Testing

- 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

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





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

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