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REVIEWER'S REPORT

Manuscript No.: IJAR- 58766

Title: Experimental and Numerical Investigation of the Shear Behavior of Jute Fiber-Reinforced Lateritic Gravel for Road Applications

Recommendation:
Accept

Rating	Excel.	Good	Fair	Poor
Originality	Yes			
Techn. Quality		Yes		
Clarity		Yes		
Significance		Yes		

Reviewer Name: Dr. Ashish Yadav

Detailed Reviewer's Report

Reviewer's Comment for Publication.
Acceptance Comment are mentioned below suitable for the paper titled "Experimental and Numerical Investigation of the Shear Behavior of Jute Fiber-Reinforced Lateritic Gravel for Road Applications"

Reviewer Comments: Accept

Reviewer Comments –

1. Introduction:

The manuscript addresses an important and relevant topic concerning the improvement of lateritic gravel for sustainable road construction using natural jute fibers. The introduction clearly establishes the limitations of lateritic materials under traffic and environmental loading and provides a reasonable justification for fiber reinforcement. The research objective is relevant and sufficiently connected to practical road-engineering applications. Overall, the introduction provides an appropriate foundation for the experimental and numerical investigation.

2. Literature Review:

The literature background is relevant to the subject and appropriately highlights the potential of natural fibers for improving soil and pavement materials. However, the review could be strengthened by incorporating more recent studies on jute-reinforced lateritic soils, fiber–soil interaction mechanisms, and numerical simulation of fiber-reinforced geomaterials. A clearer comparison with previous experimental findings would also help establish the novelty of the present work. Nevertheless, the existing review provides adequate scientific justification for the study.

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3. Solution Approach / Methodology:

The adopted methodology, combining UU triaxial testing with Mohr–Coulomb and Drucker–Prager numerical modeling, is appropriate for evaluating the shear response of reinforced lateritic gravel. The use of 0.75% jute fiber with a 1 cm length provides a clearly defined reinforcement condition and allows comparison with the untreated material. The experimental and numerical approaches complement each other and provide useful insight into changes in cohesion and frictional behaviour. Some additional details on specimen preparation, fiber distribution, testing conditions, and numerical-model calibration would further improve reproducibility.

4. Results and Discussion:

The results demonstrate a substantial improvement in cohesion following jute reinforcement, increasing experimentally from 115.8 to 188.0 kPa and numerically from 108.4 to 188.8 kPa. The corresponding reduction in internal friction angle is relatively small, and the numerical predictions show good agreement with the experimental observations. The discussion should further explain the mechanisms responsible for increased cohesion and reduced friction angle, particularly the interaction between jute fibers and lateritic particles. Overall, the results are technically meaningful and support the effectiveness of jute reinforcement for improving shear performance.

5. Conclusion:

The conclusion is consistent with the experimental and numerical findings and appropriately emphasizes the increase in cohesion and stiffness produced by 0.75% jute reinforcement. The study demonstrates that natural jute fibers can provide a technically effective and environmentally friendly approach for improving lateritic gravel used in road applications. The agreement between experimental and numerical results further strengthens the reliability of the findings. Subject to minor improvements in methodological details, literature coverage, and discussion of the underlying mechanisms, the manuscript is suitable for acceptance.