

INFLUENCE OF INEXTENSIBLE STEEL STRIPS AND EXTENSIBLE TYRE STRIPS ON MECHANICALLY STABILISED EARTH WALL BEHAVIOUR

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Volume: XXII

No: 4

Pages: 191-211

Date: December 2025

DOI: <https://doi.org/10.35453/NEDJR-STMECH001.R2>

Abstract:

Geotechnical and transportation engineers use mechanically stabilized earth (MSE) walls extensively, and how well they work depends on the type of reinforcement used in the backfill. Sustainability and material efficiency have become increasingly significant in the last few years. This has encouraged researchers to explore into other ways to reinforce structures that are both cheaper and better for the environment. This research investigates the stabilization of mechanically stabilized earth (MSE) walls using both extensible and inextensible reinforcements, focusing on sustainable alternatives. Conventional MSE walls typically employ geosynthetics or steel, which, though effective, are costly and resource-intensive. To address this, the study explores waste tyre-derived strips in combination with steel bars to enhance performance while promoting sustainable waste utilization. Four wall models were tested to evaluate settlement and displacement behavior. Peak vertical settlements ranged from 3.85 to

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9.31 mm, while maximum horizontal displacements varied between 1.73 and 4.88 mm. The alternating single-row reinforcement model exhibited the most favorable performance, achieving the lowest vertical and lateral movements under applied stresses. The results provide insights into the interaction mechanisms of different reinforcement types and highlight the potential of waste tyre-derived reinforcements as a low-cost, environmentally friendly alternative for MSE wall construction.

Keywords: MSE wall, Concrete blocks, Scrap tyre strips, Backfill, Stabilisation, Displacements

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