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Editorial

Ground Improvement

Editorial: Thematic issue – Transportation Geotechnics (ICTG 2024) – Part 2

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Welcome to Volume 179, Issue 3 of *Proceedings of the Institution of Civil Engineers – Ground Improvement*. This Part 2 Special Thematic issue contains the remaining six out of a total of 12 invited papers covering various ground improvement techniques, which were initially presented at the 5th International Conference on Transportation Geotechnics (ICTG 2024) held in Sydney, Australia, in November 2024. As for the Part 1 papers, they have been extended to the desired journal standard followed by rigorous peer-review, prior to acceptance and publication herein. A short summary of each of the six papers forming Part 2 is given below.

Anjos *et al*. (2026) carried out laboratory analysis to assess the inclusion of crumb rubber as a mitigation measure to address rail ballast degradation associated with modern faster and heavier trains. This incorporated packing of 1/3 scale ballast intermixed with crumb rubber sizes at 10% by weight and by volume of aggregate particles. A traditional two-phase framework (where crumb rubber is considered as part of the particulate skeleton) is compared with a novel three-phase framework (where crumb rubber is considered as separate from the aggregate particles and voids). The two-phase framework showed reduced maximum and minimum void ratios when crumb rubber was mixed with scaled ballast. The three-phase framework, however, indicated increased intergranular void ratios, suggesting that crumb rubber disrupts aggregate packing or an effective crumb rubber content different from the target value. Observations from transparent box tests provide useful insight into segregation and stratification of rubber particles within the matrix and it is recognised that both mixing methods and segregation mechanisms require further investigation.

The investigation by Vieira and Pereira (2026) addresses the mixing of ‘non-selected’ aggregates, resulting from construction and demolition waste recycling (10–30 mm), with natural aggregates (NAs) and tyre-derived aggregate (TDA), in the context of road pavement layer application and with focus on assessing and improving resistance to fragmentation (including across different aggregate sizes). Results of the investigation show that in order to achieve significant improvement in the fragmentation resistance of the recycled aggregate, mixing with very high-quality all-in aggregates is required. The addition of TDA to both recycled and NAs was found to markedly improve fragmentation resistance, although in the study, the concentration of zinc in the TDA leachate was found to exceed regulatory limits.

Neves *et al*. (2026) present the results of their evaluation of the use of reclaimed asphalt paving (RAP) in unbound granular mixtures for road pavements, by way of contribution to the development of sustainable road pavements. Investigation focused on a mixture of 70% NA and 30% RAP, with resilient and permanent deformation characteristics evaluated at different temperatures (20°C, 30°C, and 40°C) and densities (95% and 100% of the optimum proctor-modified value). The resilient behaviour was found to be influenced by temperature, showing a decrease as temperature increased, while density had a more pronounced effect, increasing with higher levels of compaction. An inventory of flexible pavements that incorporates NA and RAP mixtures in unbound layers for low (traffic) volume roads is also provided.

Continuing the road pavement theme, Sarma and Dey (2026) have investigated the role of geotextile in reducing road vehicle-induced rutting damage (and associated serviceability impacts) in unpaved roads constructed over weak subgrade. Useful insight into the development and pattern of rutting is gained from the use of both two-dimensional (2D) and 3D FE analyses. A geotextile reinforcement layer with high axial stiffness was found to reduce rutting by circa 60%–80%, when compared to an unreinforced, unpaved road. Through comparison of the finite element method approaches investigated, the authors highlight the importance of resorting to 3D quasi-dynamic analysis, as the 2D analysis is shown to provide a more conservative rutting magnitude.

John *et al*. (2026) investigate the breakage characteristics of construction demolition waste using 1D compression loading. Different sizes (20–30 and 30–40 mm) and proportions of recycled concrete aggregates (RCA) and recycled brick aggregates (RBA) (i.e. 100RCA: 00RBA, 90RCA:10RBA, 80RCA:20RBA, and 70RCA:30RBA) were considered. This was followed by examining the effect of different stress levels on gradation curves, mean grain size, uniformity coefficient, relative breakage, probability of active breakage, and volumetric strains. It was found that particle breakage is more pronounced in smaller sizes of aggregates, with the probability of active breakage found to continue to increase with higher RBA content. Based on the results obtained, the volumetric strain was proportionately higher beyond 20% of RBA content.

In the final paper, Ezeajugh (2026) captures the remediation measures adopted for three separate landslide-damaged road assets in Queensland, Australia. Of several solutions considered for remediating the three separate assets, the use of micropiles in an A-frame arrangement was adopted due to access issues and the need to keep the roads open during the execution of the remedial works. Concerns regarding the inability of micropiles to resist large forces; also the risk posed to the piles in the event of loss of soil material downslope on the passive side, are described as having previously mitigated their use in road asset landslide remediation, with large diameter piles (with or without tieback) having typically been the adopted default solution. However, these drawbacks are demonstrated to have been overcome on the three road asset affected landslide remediation projects addressed in the paper, through a rigorous approach to the investigation, design and construction (implementation) stages of micropiles (notably the managing of soil loss on the passive side), supplemented by (instrumented) monitoring, which over the three projects has been ongoing for between 5 and 12 years, with no adverse movements recorded to date, contributing to making micropiles a potential remedial option for future consideration.

We trust you will find the papers insightful and informative, particularly the important contribution of Ground Improvement to Transportation Geotechnics. We would encourage discussion on any of the papers presented in this issue to further enhance their contribution. Details on how you can contribute can be found on the journal website: www.emeraldgrouppublishing.com/journal/jgrim.

Finally, we would like to thank the authors, reviewers, members of the editorial panel, and the staff at Emerald Publishing for their collective contribution to this Part 2 special thematic issue of the *Ground Improvement* Journal.

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