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Editorial

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Editorial

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Research in the area of modification of asphalt materials has taken a leap forward in the past decade. This is not surprising considering the fact that asphalt materials have a dominant role in controlling the performance of flexible pavement systems. Also, performance of the flexible pavement system is closely related to the sustainability of the pavements as lots of virgin material is used and its early failure may lead to increase in carbon footprints in road construction. With several new techniques emerging in the area of modification, it has become necessary to understand the benefits and challenges involved. Therefore, the editorial panel feels it worthwhile to provide special attention to this topic.

In this themed issue on the subject, Mansourkhaki and Aghasi (2021) proved that using carbon nanotubes (CNTs) can improve the fracture resistance of asphalt binders and mixtures. They incorporated 0.5% and 1.2% CNTs in the asphalt binder and studied the performance using bending beam rheometer and semi-circular beam apparatus.

With the aim of conserving natural aggregates, Zachariah *et al*. (2021a) utilised crushed kiln brick aggregates in asphalt mixtures reinforced with polypropylene fibre (PPF). Two types of brick aggregates (crushed overburnt and crushed first class) with seven dosages of PPF were studied in this research work. The PPFs were introduced through two mixing process: wet mixing (with the asphalt binder) and dry mixing (with the aggregates). Tests such as those for Marshall stability and flow, indirect tensile strength, resilient modulus and wheel rut were carried out. It was concluded that PPF-reinforced non-conventional aggregates can be used for production of asphalt mixtures and dry mixing gives better results in comparison to wet mixing.

In another work using crushed overburnt brick and crushed first-class brick aggregates, Suresh and Pal (2021) evaluated the moisture sensitivity of asphalt mixtures modified with centrifuged natural rubber latex polymer. This modifier, named as Cenex by the authors, was mixed with the asphalt binder at concentrations of 0, 2, 4, 6 and 8%. Moisture sensitivity was studied using parameters such as tensile strength ratio, resilient modulus ratio, retained Marshall stability, boiling water and wheel tracking tests. Cenex was found to improve the moisture resistance of asphalt mixtures prepared using both burnt brick and crushed first-class brick aggregates. Additionally, use of this natural rubber latex enhanced the rutting resistance of asphalt mixtures.

Zachariah *et al*. (2021b) investigated the fatigue life of a polypropylene-modified crushed brick asphalt mix. From the laboratory beam fatigue test, they assessed two different fatigue models using regression analysis and an artificial neural network (ANN). The ANN was found to give better prediction than regression-based models.

Anwar *et al*. (2021) found that 1.5% CNTs in asphalt binder can improve the physical and rheological properties. They also found that CNTs have good compatibility with the base asphalt binder and can be uniformly dispersed without phase separation.

Suresh *et al*. (2021) evaluated the performance of polymer-reinforced asphalt concrete mixtures prepared from natural and recycled coarse aggregates. They concluded that recycled coarse aggregate can produce cost-effective asphalt mixtures with better performance than the control mix.

Overall, the modification of asphalt materials and mixes is a wide, challenging area with lots of scope for research for better and more fundamental understanding. We hope that these papers can help in better understanding the efficacy of modifiers in improving the performance of hot-mix asphalt mixtures.

REFERENCES

Anwar W, Ahmad N, Khitab A *et al.* (2021) Performance augmentation of asphalt binder with multi-walled carbon nanotubes. *Proceedings of the Institution of Civil Engineers – Transport* **174(2)**: 130–141, https://doi.org/10.1680/jtran.20.00001.

Mansourkhaki A and Aghasi A (2021) Low-temperature fracture resistance of asphalt mixtures modified with carbon nanotubes. *Proceedings of the Institution of Civil Engineers – Transport* **174(2)**: 78–86, https://doi.org/10.1680/jtran.18.00165.

Suresh M and Pal M (2021) Effect of centrifuged latex on moisture damage of hot-mix asphalt with brick aggregate. *Proceedings of the Institution of Civil Engineers – Transport* **174(2)**: 99–109, https://doi.org/10.1680/jtran.19.00095.

Suresh M, Pal M and Sarkar D (2021) Performance of polymer-reinforced bituminous mixes using recycled coarse aggregate. *Proceedings of the Institution of Civil Engineers – Transport* **174(2)**: 142–156, https://doi.org/10.1680/jtran.20.00093.

Zachariah JP, Sarkar PP and Pal M (2021a) Effect of mixing polypropylene fibre in reinforcing non-conventional bituminous concrete. *Proceedings of the Institution of Civil Engineers – Transport* **174(2)**: 87–98, https://doi.org/10.1680/jtran.19.00041.

Zachariah JP, Sarkar PP and Pal M (2021b) Fatigue life of polypropylene-modified crushed brick asphalt mix: analysis and prediction. *Proceedings of the Institution of Civil Engineers – Transport* **174(2)**: 110–129, https://doi.org/10.1680/jtran.19.00146.