Abstract:

This experimental research assessed the engineering and geotechnical properties of Aluminum dross (ALDR). Glumly, this solid waste is usually open dumped with detrimental effect on the environment. In a bid to reduce solid waste in the environment and also improve pavement interlayer properties, this research utilized ALDR as a stabilizer for tropical lateritic soil. The lateritic soil was stabilized with the addition of this solid waste at 2% intervals from 2% to 16%. Response surface analysis was used in optimizing the strength and consistency of the stabilized soil sample. The addition of this non-conventional stabilizer helped in modifying the engineering properties of the soil sample, this had indications on the atterberg limit as the liquid limit, and the plasticity index increased from 43% to 54.61% and 28.02%- 40.8% respectively, while the plasticity index reduced from 15.1% - 13.8% signifying soil improvement. The load-bearing capacity of the sample increased from 51.22% to 62.41%. Additionally, the unconfined test showed that addition of ALDR residue improved the consistency of the stabilized soil sample. From the model equation, a positive relationship exists between CBR and UCS. R² value of 0.81 showed the robustness of the model developed. The research showed that aluminum dross is a suitable material for improving the engineering properties of the tropical lateritic soil towards a sustainable road construction.