Strength and Stiffness of a Geopolymer-treated Clayey Soil for Unpaved Roads

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This study is conducted to investigate the strength and stiffness of clayey soil stabilized with fly ash-based geopolymer for unpaved roads. Two sodium hydroxide concentrations of 6 and 8M and two alkali solution ratios of NaOH:Na2SiO3= 1 and 1.5 were considered. Other factors such as fly ash replacement ratio (by mass), curing period, and curing temperature were held constant at 15%, 48 hours, and 65 □C, respectively. The unconfined compressive strength (UCS) and ultrasonic pulse velocity (UPV) tests were performed to evaluate the mixtures. Outcomes of this study revealed that the strength of the clayey soil could be increased by up to 94%. Additionally, increasing sodium silicate content in the alkali solution increased the solution's activity and yielded higher strength and stiffness. This study confirms the effectiveness of the geopolymer binder for the improvement of soil strength and stiffness.