

ABSTRACT

This research project was aimed at investigating the physical and mechanical properties of Black Cotton soil that cause it to compromise flexible pavements when used as subgrade soil. Heshima Avenue, Bahati, was utilised for the case study, a Class D roadway with a flexible pavement primarily built upon black cotton soil and therefore plagued with several instances of pavement failure. This pavement was selected not only due to its proximity to my local residence but also due to an ongoing rehabilitation exercise by the Kenyan Urban Roads Authority (KURA) that will facilitate research.

Flexible pavements support loads by essentially transferring the exerted loads into the subgrade soil. Therefore, by investigating the subgrade soil, pavement failures can be justified by the physical and mechanical properties of the subgrade soil. This was achieved by carrying out laboratory investigations. The soil was found to have an S1 class CBR value of around 5% and high plasticity index of around 40%. This indicated that the soil was not only poor in bearing and flexural strength but also prone to alternating swelling and shrinkage. These undesirable properties were therefore adjudged to be the main causes of the rampant pavement defects along Heshima Avenue. From this data, economically feasible measures such as soil stabilization via lime to lower plasticity and the cut-to-fill were recommended.