

Improvement in Plasticity Index and Group Index of Black Cotton Soil Using Palm Kernel Shell Ash

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Abstract : Black cotton soil is problematic soil for any construction work. Black cotton soil contains montmorillonite in its structure. Due to this mineral, black cotton soil will attain maximum swelling and shrinkage. Due to these volume changes, it is necessary to stabilize black cotton soil before the construction of the road. For soil stabilization use of pozzolanic waste is found to be a good solution by some researchers. The palm kernel shell ash (PKSA) is a pozzolanic material that can be used for soil stabilization. Basically, PKSA is a waste material, and it is available at a cheap cost. Palm kernel shell is a waste material generated in palm oil mills. Then palm kernel shell is used in industries instead of coal for power generation. After the burning of a palm kernel shell, ash is formed; the ash is called palm kernel shell ash (PKSA). The PKSA contains a free lime content that will react chemically with the silicate and aluminate of black cotton soil and forms a C-S-H and C-A-H gel which will bind soil particles together and reduce the plasticity of the soil. In this study, the PKSA is added to the soil. It was found that with the addition of PKSA content in the soil, the liquid limit of the soil is decreased, the plastic limit of the soil is increased, and the plasticity of the soil is decreased. The group index value of the soil is evaluated, and it was found that with the addition of PKSA GI value of the soil is decreased, which indicates the strength of the soil is improved.

Keywords : palm kernel shell ash, black cotton soil, liquid limit, group index, plastic limit, plasticity index

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