

## **Application of agricultural waste in residual soil for subgrade work**

### **ABSTRACT**

The inclusion of natural fiber in soil is widely used in geotechnical engineering as it improves the mechanical properties of soil. Moreover, it is cheap, abundantly available locally, biodegradable and eco-friendly material. In this study, agricultural waste fibers namely coir fiber and palm oil fiber were used as an additive to reinforce soil. The present work focused on mixing 1% by weight of fibers with residual soil. Soil samples were prepared at its optimum moisture content and were tested for their mechanical properties by conducting an Oedometer test, falling head permeability test, California Bearing Ratio (CBR) test and direct shear test. The results showed that the optimum moisture content (OMC) increased and the maximum dry density (MDD) values decreased by adding fibers. Inclusion of fiber increased the rate of compressibility and resulting in lower rate of consolidation. Fiber inclusion can also significantly decrease the cohesion and increase the internal angle of friction of soils. Interaction of fiber and soil has increased the permeability of natural soils by creating paths for water to escape. It was also observed that CBR values of the unsoaked and soaked materials increased up to 12% from the unreinforced soil. In conclusion, fibers did influence the mechanical properties of soil in terms of strength, settlement and drainage.

**Keyword:** Residual soil; Agricultural waste; Coir fiber; Palm oil fiber; Subgrade