

## **Effects of alkali-activated waste binder in soil stabilization**

### **ABSTRACT**

Generally, alkali-activated binders have received much attention in recent years due to their energy efficiency, environmentally friendly process, and excellent engineering properties. With respect to this fact, this study aims to investigate the effects of alkaline activation reactions on residual soil by using different percentages of fly ash as a precursor. Precisely, fly ash was incorporated with potassium hydroxide (10M) in order to stabilize the soil and enhance its expediency for various forms of construction. In particular, this experimental study was focused on determining the mechanical performance of stabilized soil. Evidently, the results showed that the different percentages of fly ash (40%, 50%, 60% and 70% by weight) used to stabilize the residual soil affected the unconfined compressive strength of the soil matrix. Also, it was observed that the compressive strength of soil increased progressively with the addition of fly ash. However, the longer the curing period of the stabilized soils, the higher the unconfined compressive strength of the soil. In fact, the microstructural analysis which employed scanning electron microscopy (SEM) revealed the material modifications that can be related to the strength behavior.

**Keyword:** Alkaline activation; Fly ash, Residual soil; Soil stabilization; Unconfined compressive strength