

A Comparative Study on Chemical Additives used in Soil Stabilization

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Abstract—Expansive soils are problematic because of the characteristics of their clay mineral constituent, this causes them to show the shrink-swell characteristics. Expansive soils are not suitable for direct engineering applications in their natural state due to the shrink-swell behaviors. As a result, using this type of soils for construction becomes challenging for a civil engineer. The goal of soil stabilization techniques is to increase the base soil's strength and stability to satisfy the demands of a particular application. Moreover, to connect the particles to increase resistance to softening when soaked or submerged, producing a durable product. In this study, nano materials like Terrasil, and Stabil Road and cement as admixture is used to improve parent soil's properties. It was discovered that adding nanoparticles improved the soil's compaction and hydraulic conductivity. Silica nanostabilizer hold promising prospective material for weak soil stabilization in view of economy, superior durability characteristics, and reliable stabilization. Because of its high surface energy, nano silica accelerates the hydration of cement and alters the physical properties of soil by improving the packing density through the filling of its particles. Engineering property tests such as California Bearing Ratio (CBR), Unconfined Compressive Strength (UCS) were performed on soil with different percentages of cement and these additives and then results were compared. As a result, the current study supports the usefulness of cement and these additives in subgrade stabilization, which has substantial economic advantages.