

Analysis of the Variation on Earth Pressure by Addition of Construction Demolition Waste (C&D Waste) In Black Cotton Soil

Authors : Nirav Jadav, M. G.Vanza

Abstract : Black cotton soils mainly exhibit the property of swelling/shrinkage when they react to moisture variations. This property causes development of cracks in the structures resting on these soils, which poses instability to the structures. Soil stabilization is a technique to enhance the geotechnical characteristics of Black cotton soils by changing their properties. Due to rapid growth in construction industry, a lot of waste material is being generated every day, which poses the problem of its disposal. If the waste material can be utilized for soil stabilization, it will mitigate the problems of its disposal. The tests results evaluate that the strength of the Black cotton soils increased by the use of C&D waste material. This study determines various Index and engineering properties of soil and compare for different proportions of soil and C&D Waste. For finding properties of soil and C&D Waste, various test is carried out like sieve analysis, hydrometer test, specific gravity test, Atterberg's limit test, Standard proctor test and soil Triaxial unconsolidated undrained test. It also takes into account the characteristics alteration due to addition of C&D Waste in active and passive pressure. This study presents the efficacy for use of C&D Waste as a stabilizing material to be mixed with backfill soil in retaining walls. Standard proctor test was conducted at proportions S1W0 (soil = 100%, Waste = 0%), S7W1 (soil = 87.5%, waste = 12.5%), S3W1, S5W3 and S1W1. From these, S5W3 showed optimum results, so this proportion was considered for Soil Triaxial UU-Test. Also, S1W0 was considered too. When 37.5% of soil is replaced by C&D Waste, the Optimum moisture content (OMC) decrease by 11.48%, further, increase C&D Waste in soil OMC remains constant, and maximum dry density (MDD) were observed to be increased by 9.27%, further increased C&D Waste in soil MDD reduces. Carried out strength test, which shows cohesion decreased by 162% and the internal friction angle increased by 49.4% with compare to virgin soil. The study focuses on the potential use of C&D Waste as a stabilizing material in the retaining wall backfill. The active earth pressure decreases, and the passive earth pressure increases in the S5W3 mixture compared to the S1W0 mixture at the same depth.

Keywords : black cotton soil, construction demolition waste, compaction test, strength test

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