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Modification of SM Soil Material Mixed with SC Soil material for Use of Dam Construction**Kithsiri D.M.P.****Irrigation Department, Colombo 10, Sri Lanka***prdpgunasekara@gmail.com***Abstract**

Soil is a very important construction material in civil engineering. A suitable type of soil should be used for good quality constructions. The lack of suitable materials (soils) closer to work site is a common problem. In this research, Kuda Oya dam constructing under Uma Oya project and the worksite which is situated at Aluthwela village in Haldummulla divisional secretariat was selected. For dam construction, clayey sand (SC) type soil and high/linear plastic clayey soil are required. According to investigation reports, tank bed area contains so many soils but there are not required quantities of suitable SC type soil. The silty sand (SM) type soils are available in large quantities but SM is not a suitable soil for dam construction. The main objectives of this research are to check the ability of the use of SM type soil with mixing (manually) SC type soil and the study of variation of some physical properties of soil when mixing. The Maximum Dry Density (MDD), Optimum Moisture Content (OMC), Liquid Limit (LL), and Plastic Index (PI) are the properties that I considered in this study. The three numbers of different SM samples and a SC type sample collected from the relevant area. SC soil mixed with SM soil in different proportions and the mixed (modified) soils were tested for standard proctor compaction test and Atterberge limit test and results were analysed using Microsoft excel. The MDD of modified soils does not have a considerable difference. The MDD of all samples is in the range of SC type soil. The OMC is decreased when SM percentage is increased.

The relationship of OMC can be expressed as $OMC_m = (-0.048p) + 0.5(OMC_a + OMC_b) + 0.1LL_b$, where OMC_a -OMC of SC soil, OMC_b -OMC of SM soil, P -percentage of SM, m -modified soil. Liquid limit and Plastic index are the two important properties that change with the cohesion of soil. The LL of mixed soil linearly decreased than the LL value of SC. The relationship is $LL_m = (-0.113p) + LL_a$, (LL_m -Liquid Limit of modified soil, p -mixed SM percentage, LL_a -liquid limit of SC). The relationship regarding the plastic index of soil can be expressed as $PI_m = (-0.082p) + PI_a$, where PI_m -Plastic index of modified soil, p -percentage of SM, PI_a -plastic index of SC soil. The test results and analysis prove that the unsuitable soil can be used for the construction after mixing with suitable soil (SC). The percentage is varying with raw soil properties and it can be found using the above equations.

Keywords: Soil developing, Relationship of mixing soil, Soil for dams.