

IMPROVEMENT OF SILTY SOIL AS SUBGRADE MATERIAL BY STABILIZING WITH BITUMINOUS EMULSION

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Abstract

This research is to investigate physical and mechanical properties of silty soil in order to improve the bearing capacity, Shear strength and density of the soil. The first part of investigation was to identify the soil classification of the selected soil according to USCS (Unified soil classification system) by conducting Atterberg limit test, after soil is classified sieve analysis was done to know the Coarse fraction and Fine fraction of the soil to determine whether the soil is well graded. The second part of the investigation was to identify the specific gravity of the soil which helps to determine the dry density of the soil, by using modified proctor test the maximum dry density (MDD) of the soil is concluded with different concentrations of water and optimum moisture content is observed by plotting a graph between dry density and moisture content. Free swell index was also conducted to know the expansive property of soil. California bearing ratio test (CBR) was conducted to know the bearing capacity of soil all the physical and direct shear test was conducted to know the mechanical characteristics of soil i.e. Cohesion and Internal shear angle. Slow setting type Cationic bituminous emulsion (CSS) is being used in the present study. In the third part of the investigation bituminous emulsions with different concentrations was added to the soil and Modified proctor test was conducted to determine the maximum dry density (MDD) and optimum bitumen content (OBC) of the stabilized soil. The Atterberg limits of the stabilized soil is carried out to identify the significant increase in three parameters (liquid limit, plastic limit and plastic index).the CBR and Direct shear test is also conducted on stabilized soil. The final part of the investigation was to discriminate the changes in General, physical and mechanical properties of soil. Correlation of Cohesion, Internal shear angle and Atterberg limits with increased bitumen emulsion concentration was done. Primary studies on Original soil and stabilized soil will be done by using a simple chemical method. SEM (scanning electron microscope) was coupled with EDX (Energy dispersive x-ray) analysis used to generate high resolution images to show the chemical properties of the soil. The first part of investigation showed that the soil lied below the A-line of USCS classification proved that this soil belongs to silt category (MH or OH) and sieve analysis indicate that the percentage of fine fraction is more than Coarse fraction and well graded and can be used for construction. The second part and third part of investigation found that soil physical and mechanical properties of stabilized soil are improved with reference to, CBR and Maximum dry

density. In final investigation the correlation with different emulsion concentrations with cohesion, internal shear angle and three parameters of Atterberg limits are increased.