

“Stabilization Of Black Cotton Soil Using Industrial Wastes”

A PROJECT

Submitted in partial fulfillment of the requirements for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

CIVIL ENGINEERING

Under the supervision of

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HIMACHAL PRADESH, INDIA, DECEMBER, 2016

CERTIFICATE

This is to certify that the work which is being presented in the project report titled **“Stabilization Of Black Cotton Soil Using Industrial Wastes”** in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Civil Engineering and submitted to the Department of Civil Engineering, Jaypee University Of Information Technology, Wagnaghat is an authentic record of work carried out by Nayan Rawat (131656) and Sagar Chaudhary (131204) during a period from July 2016 to December 2016 under the supervision of **Mr. Niraj Singh Parihar**, Department of Civil Engineering, Jaypee University of Information Technology, Wagnaghat .Himachal Pradesh , India.

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We hereby declare that we are the sole authors of this report. This is a true copy of the Report, including any required final revisions, as accepted by my examiners.

I understand that my report may be made electronically available to the public.

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List of Abbreviations

BCS – Black cotton soil

MDD- Maximum dry density

OMC- Optimum moisture content

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Abstract

Rising population and shortage of land are causing constructions of buildings and other structures to be carried out on weak soils. Such weak soils have poor shear strength and are prone to swelling and shrinkage when exposed to increase and decrease in moisture content and therefore pose the most problems from engineering point of view. For these reasons, certain ground improvement techniques such as soil stabilization or reinforcements are put into use to improve the behavior of soil, thereby enhancing the reliability of soil.

Black cotton soil covers more than 20% of the geographical area of India. Black cotton soil is common in states like Uttar Pradesh, Gujarat, Maharashtra, and Madhya Pradesh. Expansive soils contain high clay content which leads to unfavorable volume changes. Volume change occurs when soil faces change in the moisture content of. Presence of clay minerals like Montmorillonite, Kaolinite, Illite causes this expansive behavior. On the other hand ,huge amount of wastes are being generated in all parts of the world which pose as a great threat from both disposing as well as pollution point of view. However utilizing these wastes as soil stabilizers can be of great use.

This report presents the outcomes of experiments conducted on black cotton soil collected from Guna in Madhya Pradesh and reinforced with waste glass and Alccofine material 1109SS. The effect of both the materials in different percentages was studied on soil engineering properties, standard compaction and CBR value. Plastic limit increased and liquid limit decreased with increase in Alccofine material upto 9%. Shrinkage limit continuously increased on addition of the Alccofine material. Addition of waste glass lead to increase in plastic limit and shrinkage limit of the soil 8% and 15% respectively after which decrease in both the parameters was observed. Liquid limit continuously decreased with addition of waste glass. Both the materials increased the maximum dry density of the soil and decreased the optimum moisture content of the soil but only upto 9% after which the trends reversed.