

STUDY OF SHEAR STRENGTH PARAMETERS OF YAMUNA SAND MIXED WITH POND ASH AND LIME

A Project Report

Submitted by

ANKIT SONI

In partial fulfillment of the requirements for

the award of Degree of

MASTER OF TECHNOLOGY

In

GEOTECHNICAL ENGINEERING



**DEPARTMENT OF CIVIL ENGINEERING
DELHI TECHNOLOGICAL UNIVERSITY, DELHI
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Roll No. 2K14/GTE/05

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Under the guidance of

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Candidate's Declaration

I do hereby certify that the work presented in this report entitled “**Study Of Shear Strength Parameters Of Yamuna Sand Mixed With Pond Ash And Lime**” in partial fulfilment of curriculum of final semester of Master of Technology in Geotechnical Engineering, submitted in the department of civil engineering, DTU is an authentic record of my work under the supervision of Dr. Raju Sarkar, Professor in department of civil engineering.

I have not submitted this matter for the award of any other degree or diploma.

Ankit Soni

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Ankit Soni

ABSTRACT

Keywords: *Yamuna sand, pond ash, shear strength, shear strength parameters, direct shear test, standard proctor test.*

This study is to investigate the possibility of using pond ash in varying percentage as fine aggregate substitute in Yamuna sand. In India, Thermal power plants are the main source for production of energy and mainly coal is used to achieve this energy. Combustion of coal leads to production of fly ash, bottom ash and Pond ash as a waste product. Pond ash for this study is collected from NTPC BADARPUR, Delhi. From the construction point of view, there are many problems associated with Yamuna sand. So it is important to stabilize Yamuna sand.

The shear strength of the soil is one of the important aspects to be considered in any geotechnical activity. Bearing capacity, Slope stability of earthen embankment and design of retaining wall, all are related with shear strength characteristics of soil.

Previously In many places Pond ash is used as a stabilizing material. Pond ash with lime shows increase in the stability of mix by forming cementitious compound. There are several work carried out for the stability of Yamuna sand.

In this study, Geotechnical properties of Yamuna sand and Pond ash is find out. Pond ash in various proportions is blended with Yamuna sand and shear strength parameters of mix are find out. For this various UU triaxial tests, Direct shear tests are performed and MDD variation is studied. Various tests are performed for lime content determination. All the above analyses were carried on every mix to acquire an optimum mix. The outcomes are gathered in graphical form to observe the patterns in the different parameters.

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LIST OF NOTATIONS

The Following notations are used in this project:

OMC – Optimum moisture content

MDD – Maximum dry density

CBR – California bearing ratio

C_c – Coefficient of curvature

C_u – Coefficient of uniformity

D_{60} – Particle size corresponding to 60% finer

D_{30} – Particle size corresponding to 30% finer

D_{10} – Particle size corresponding to 10% finer

G_s – Specific gravity

ASTM – American Society for Testing and Materials

FA – Fly ash

KSD – Kota stone dust

SEM – Scanning electron microscope