A
MAJOR PROJECT
ON

STRENGTH BEHAVIOUR OF JOINTED ROCK MASS THROUGH MODELLING WITH PLASTER OF PARIS

SUBMITTED IN FULFILLMENT OF THE REQUIREMENT
FOR THE AWARD OF THE DEGREE OF

MASTER OF ENGINEERING
(Structural Engineering)

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2010-11

CERTIFICATE

This is to declare that the dissertation entitled **"STRENGTH BEHAVIOUR OF JOINTED ROCK MASS THROUGH MODELLING WITH PLASTER OF PARIS"** is a bonafide record of work done by me for partial fulfillment of award of degree in M.E. Civil Engineering (Structural Engineering) at Delhi college of Engineering, Delhi.

This project has been carried out under the supervision of **Dr. A.K.SAHU**, Associate Professor, Department of Civil and Environmental Engineering, Delhi College of Engineering, Delhi.

The work embodied in this minor project has not been submitted to any other Institute/University for the award of any other Degree or Diploma.

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ACKNOWLEDGEMENT

It is distinct pleasure to express my deep sense of gratitude and indebtedness to my supervisor **Dr. A.K.SAHU** Associate Professor Department of Civil and Environmental Engineering, Delhi College of Engineering, Delhi for his invaluable guidance, encouragement and patient reviews. His continuous inspiration only has made me complete this dissertation. Without his help and guidance, this dissertation would have been impossible. He remained a pillar of help throughout the project.

I am also grateful to **Prof. A.K.Gupta** Head Department of Civil Engineering, for providing the experimental facilities in various labs of the Department.

I am also thankful to the Sh.G.C.Bhatt, Sh.Miraj and Mr. pushkal of concrete technology laboratory of the department college to help me.

I express my sincere gratitude to the faculty and non teaching staff of Civil and Environmental engineering department and the library of Delhi College of Engineering for providing the relevant information and help when needed during the course of this project work.

I am also thankful to my classmates and my friends for their unconditional support and motivation during this work.

(RAHUL CHAUDHARY)

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ABSTRACT

Several massive, complicated and difficult to design structure are under construction or planning stages under very complex geological condition in India and around the world. Even small variation in appraisal and design can cost millions. Hence initial development of understanding under control condition is very important and desirable for characteristic and prediction of behavior. It is essential to have a clear understanding of strength and deformation behavior of jointed mass for realistic analysis and rational designing of engineering structure. Rock, like soil, is sufficiently distinct from other engineering materials that the process of design in rock is very complex. In rock structures, the applied loads are often less significant than the forces deriving from redistribution of initial stresses. Hence, the determination of material strength requires as much judgement as measurement. A thorough review of literature on different aspects of jointed rock mass indicate that the behavior of jointed rock mass is influenced by many factors such as location of joints, joint frequency, joint orientation and joint strength. In the present study, an effort has been made to find out the strength of jointed rock mass with different gouge material. The most important factors which govern the strength of rock mass are type of rocks, bedding planes, stress condition, presence of cracks and fissures, nature of joint surfaces and presence of minerals in bedding planes. As the in situ determination of jointed rock mass is costly and time consuming, attempts are being made to predict the strength of rock mass through model test under controlled laboratory condition.

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NOTATIONS

J_n = Number of joints per meter length.

n = Joint inclination parameter.

r = Roughness parameter.

β = Orientation of joint.

i = Inclination of the asperity

σ_{cj} = Uniaxial compressive strength of jointed rock.

σ_{ci} = Uniaxial compressive strength of intact rock

σ_{cr} = Uniaxial compressive strength ratio

E_j = Tangent modulus of jointed rock

E_i = Tangent modulus of intact rock

E_r = Elastic modulus ratio

τ = Shear strength

Φ = Angle of friction

UCS = Uniaxial compressive strength

IS = Indian standard

ISRM = International society for rock mechanics.