STUDY OF SUSTAINABLE CONCRETE WITH BASALT ROCK FIBRES AND RECYCLED AGGREGATES

A PROJECT REPORT

Submitted by

ANUSHA B M (ID NO: 20192BCT0003)

In partial fulfillment for the award of the degree

of

MASTER OF TECHNOLOGY

in

BUILDING CONSTRUCTION TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

SCHOOL OF ENGINEERING

Under the Guidance of

Dr. NAKUL RAMANNA

PRESIDENCY UNIVERSITY

2020-2021

PRESIDENCY UNIVERSITY

Itgalpura, Rajankunte, Yelahanka, Bengaluru 560064

DEPARTMENT OF CIVIL ENGINEERING

BONAFIDE CERTIFICATE

Certified that this report "DEVELOPMENT AND STUDY OF SUSTAINABLE CONCRETE WITH BASALT ROCK FIBRES" is a bonafide work of "ANUSHA B M (ID NO: 20192BCT0003)", who has successfully carried out the project work under my supervision.

Dr. Nakul Ramanna	**Dr. S. B. Anadinni**	**Dr. Surendra Kumar A M**
Project Guide	HODCivil *and*	DeanSOE *and*
Civil Engineering	Associate Dean	Pro-Vice Chancellor
Presidency University	Presidency University	Presidency University

Name and Signature of the Examiners

1) Dr. Nakul Ramanna

2) Mr. Harshith Gupta

REGISTRAR

PRESIDENCY UNIVERSITY Registrar BANGALORE

DECLARATION

Myself, ANUSHA B M, pursuing M.Tech in Building Construction Technology, in the Department of Civil Engineering at Presidency University, Bengaluru, hereby declare that the project work titled **"**DEVELOPMENT AND STUDY OF SUSTAINABLE CONCRETE WITH BASALT ROCK FIBRES**"** has been independently carried out by me and submitted in partial fulfillment for the award of the degree of Master of Technology in Building Construction Technology during the academic year2020-21. Further, the matter embodied in the project has not been submitted previously by anybody for the award of any Degree or Diploma to any other institution.

ANUSHA B M (ID NO: 20192BCT0003)

PLACE: BENGALURU

DATE: 06 – JAN - 2021

REGISTRAR

PRESIDENCY UNIVERSITY Registrar BANGALORE

ACKNOWLEDGEMENT

For completing this project work, I have received support and guidance from many people whom I would like to mention with deep sense of gratitude and indebtedness.

I would like to sincerely thank my guide Dr. Nakul Ramanna, Associate Professor, Department of Civil Engineering, Presidency University, for his invaluable guidance, motivation and keen interest throughout my project work.

I am grateful to Dr. Nakul Ramanna and Ms. Sowmyashree Project Coordinators, Department of Civil Engineering, for facilitating project activities and timely assessments.

I am thankful to Dr. S. B. Anadinni, Head of the Department of Civil Engineering, and Associate Dean, Presidency University, for his moral support and encouragement throughout the project.

Cordial thanks to the Management of Presidency University for providing the required facilities and intellectually stimulating environment that aided in the completion of my project.

I am also grateful to Teaching and Non-Teaching staff of Department of Civil Engineering and also staff from other departments who have extended their valuable help and cooperation.

Last but not the least, I wholeheartedly thank my family and friends for their constant encouragement and support without which the work would not have been complete.

Anusha B M

ABSTRACT

Concrete is one of the world's most widely used construction material. However, it has been known that concrete is good in compression and weak in tension. Weak tensile strength combined with brittle behaviour of concrete, results in sudden tensile failure without warning. This type of failure is not desirable for any construction material. Thus, concrete requires some form of tensile reinforcement to compensate its brittle behaviour and improve its tensile strength and strain capacity to be used in structural applications. Steel has been widely used as the material of choice for tensile reinforcement in concrete. Conventionally, reinforcing bars, which are specifically designed, are placed in the tensile zone of the concrete member to carry the tensile forces imposed on the member. Apart from the conventional reinforcing bars fibres can also be used for tensile reinforcement in concrete. In the 1950s, the concept of composite materials came into being and fiber-reinforced concrete was one of the topics of interest. As years passed steel, glass, and synthetic (such as polypropylene) fibres were used in concrete. Basalt rock is a volcanic rock and can be divided into small particles which are used to make continuous or chopped fibres. Basalt rock fibres have higher tensile strength as compared to steel fibres. Utilization of fibres in concrete results in better crack control and improvement in compressive strength and flexural strength.

This research deals with development of sustainable fibre reinforced concrete using basalt rock fibres, PPC and M-Sand. Inclusion of recycled concrete aggregates for partial replacement of coarse aggregates Study of effect of basalt rock fibres on compressive strength, flexural strength and split tensile strength of concrete sample. Ultrasonic pulse velocity test (NDT) has also been used for qualitative assessment of Basalt rock fibre reinforced concrete. Further thermal performance of Basalt rock fibre reinforced concrete is also studied.

EFFECT OF MAGNETIC WATER ON PROPERTIES OF CONCRETE

A PROJECT REPORT

Submitted by

MEKHALA R (20192BCT0005)

In partial fulfillment for the award of the degree

of

MASTER OF TECHNOLOGY

in

BUILDING CONSTRUCTION TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

SCHOOL OF ENGINEERING

Under the Guidance of

Dr. NAKUL RAMANNA

PRESIDENCY UNIVERSITY

2020-2021

REGISTRAR

PRESIDENCY UNIVERSITY Registrar BANGALORE

PRESIDENCY UNIVERSITY

Itgalpura, Rajankunte, Yelahanka, Bengaluru 560064

DEPARTMENT OF CIVIL ENGINEERING

BONAFIDE CERTIFICATE

Certified that this report "**EFFECT OF MAGNETIC WATER ON PROPERTIES OF CONCRETE**" is a bonafide work of "MEKHALA R (20192BCT0005)", who has successfully carried out the project work under my supervision.

Dr. Nakul Ramanna	**Dr. S. B. Anadinni**	**Dr. Surendra Kumar A M**
Project Guide	HOD Civil *and*	Dean SOE *and*
Civil Engineering	Associate Dean	Pro-Vice Chancellor
Presidency University	Presidency University	Presidency University

Name and Signature of the Examiners

1) Dr. Nakul Ramanna

2) Ms. Divya Nair

REGISTRAR

PRESIDENCY UNIVERSITY Registrar BANGALORE

DECLARATION

Myself, MEKHALA R, pursuing M.Tech in Building Construction Technology, in the Department of Civil Engineering at Presidency University, Bengaluru, hereby declare that the project work titled **"EFFECT OF MAGNETIC WATER ON PROPERTIES OF CONCRETE"** has been independently carried out by me and submitted in partial fulfillment for the award of the degree of Master of Technology in Building Construction Technology during the academic year 2020-21. Further, the matter embodied in the project has not been submitted previously by anybody for the award of any Degree or Diploma to any other institution.

MEKHALA R (20192BCT0005)

PLACE: BENGALURU

DATE: 06 – JAN - 2021

REGISTRAR

PRESIDENCY UNIVERSITY Registrar BANGALORE

ACKNOWLEDGEMENT

For completing this project work, I have received support and guidance from many people whom I would like to mention with deep sense of gratitude and indebtedness.

I would like to sincerely thank my guide Dr. Nakul Ramanna, M.tech, PhD, Department of Civil Engineering, Presidency University, for his invaluable guidance, motivation and keen interest throughout my project work.

I am grateful to Dr. Nakul Ramanna and Ms. Sowmyashree T, Project Coordinators, Department of Civil Engineering, for facilitating project activities and timely assessments.

I am thankful to Dr. S. B. Anadinni, Head of the Department of Civil Engineering, and Associate Dean, Presidency University, for his moral support and encouragement throughout the project.

Cordial thanks to the Management of Presidency University for providing the required facilities and intellectually stimulating environment that aided in the completion of my project.

I am also grateful to Teaching and Non-Teaching staff of Department of Civil Engineering and also staff from other departments who have extended their valuable help and cooperation.

Last but not the least, I wholeheartedly thank my family and friends for their constant encouragement and support without which the work would not have been complete.

Mekhala R

ABSTRACT

In this project, the effect of magnetized water on workability and compressive strength of concrete was studied. In order to obtain operative concrete with high resistance, data were collected from previous studies and researches. The magnetized water was prepared using magnetic treatment system. These concrete mixes were prepared, one without magnetized water and other two with.

In other two mixes one with ordinary Portland cement and pozzalanic Portland cement with magnetized water. Slump and compressive strength test were carried out on all three mixes and it was found out that concrete produced by the magnetic technology is easy to operate without affecting the compressive strength of concrete. Results also showed that the workability of concrete has increased compared with normal water mixed concrete.