



THE ASSAM
ROYAL GLOBAL UNIVERSITY
GUWAHATI

CRITERION 1
CURRICULAR ASPECTS

METRIC NO.
1.3.3

M. Tech Civil Engineering

Field Work / Research Project / Internship



-THE ASSAM ROYAL GLOBAL UNIVERSITY

BETKUCHI, GUWAHATI – 35



PROJECT REPORT

ON

***'SUGGESTION FOR MODELLING THE RELATIONSHIP BETWEEN COMPRESSIVE AND
FLEXURAL STRENGTH IN STEEL FIBRE REINFORCED CONCRETE'***

Submitted in partial fulfilment of requirement for the degree of

Master of Technology

In

CIVIL ENGINEERING

Under



**ROYAL GLOBAL UNIVERSITY
GUWAHATI**

SUBMITTED BY:

CHINGLEN SINGH

PROJECT GUIDE

HOD/Coordinator

**Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University
Rishikesh Duarah**

Assistant Professor

ROYAL SCHOOL OF ENGINEERING AND TECHNOLOGY



ROYAL GLOBAL UNIVERSITY
GUWAHATI

Session 2021-2023

DEPARTMENT OF CIVIL ENGINEERING CERTIFICATE OF COMPLETION

This is to certify that Chinglen Singh of 4th semester, Department of Civil Engineering, Royal School of Engineering and Technology, Guwhati-781035 is carrying out the project work entitled 'SUGGESTION FOR MODELLING THE RELATIONSHIP BETWEEN COMPRESSIVE AND FLEXURAL STRENGTH IN STEEL FIBRE REINFORCED CONCRETE' under my guidance and supervision and submitted in partial fulfilment for the requirements of Master Degree in Civil Engineering under Royal School of Engineering and Technology. I hope this project will help in their future.

Project Guide

Rishikesh Duarah

**Assistant Professor, Department of Civil
Engineering**

Royal School of Engineering and Technology

HOD/Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University
Guwahati

ABSTRACT

The objective of this thesis report is to investigate the relationship between compressive strength and flexural strength of pavement concrete. Pavement concrete is becoming increasingly popular in Indian roads due to its durability and long lifespan. However, the compressive and flexural strengths of concrete are important factors that affect its performance and ability to withstand heavy loads. This thesis report aims to investigate the relationship between compressive strength and flexural strength of pavement concrete, despite some codes not allowing for a direct relationship. The objective is to identify alternative relationships between these two strengths that can be used to optimize pavement concrete mix designs and contribute to the development of durable and long-lasting Indian roads that meet the required codes and standards. To achieve this objective, a comprehensive literature review was conducted to identify relevant studies and researches that investigated the relationship between compressive strength and flexural strength. The review included studies that used different types of concrete mixes, testing methods, and environmental conditions.

The experimental study to identify the effect of different mix design and curing condition was conducted on pavement concrete samples using standard procedures to determine their compressive and flexural strengths. The study also investigated alternative relationships between these two strengths, such as indirect relationships or correlations with other parameters. The results of the study showed that there is a strong positive correlation between compressive strength and flexural strength of pavement concrete. The study also identified the mix design and curing conditions that produced the highest compressive and flexural strengths.

Understanding the relationship between compressive strength and flexural strength of pavement concrete is crucial for developing durable and long-lasting roads that can withstand heavy loads and harsh environmental factors. This study's findings can inform the development of pavement concrete mix designs that are optimized for both strengths while adhering to relevant codes and regulations. Ultimately, the study's results can contribute to the development of optimized pavement concrete mix designs that improve the performance and lifespan of Indian roads.

R. D. D. D.
Head/Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University
Guwanati

THE ASSAM ROYAL GLOBAL UNIVERSITY

BETKUCHI, GUWAHATI - 35



PROJECT REPORT

ON

'INVESTIGATION OF STRENGTH CHARACTERISTICS AND STRUCTURAL PERFORMANCE OF CONCRETE AND GLASS FIBER REINFORCED CONCRETE IN A CONCRETE BOX GIRDER'

Submitted in partial fulfilment of requirement for the degree of

Master of Technology

In

CIVIL ENGINEERING

Under



ROYAL GLOBAL UNIVERSITY
GUWAHATI

SUBMITTED BY:

LALTHANSANGA PAUTU

R. Duwal
PROJECT GUIDED BY
HOD/Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University
Guwahati
Rishikesh Duwal

Assistant Professor

ROYAL SCHOOL OF ENGINEERING AND TECHNOLOGY



ROYAL GLOBAL UNIVERSITY
GUWAHATI

Session 2021-2023

DEPARTMENT OF CIVIL ENGINEERING

CERTIFICATE OF COMPLETION

This is to certify that Lalthansanga Pautu of 4th semester, Department of Civil Engineering, Royal School of Engineering and Technology, Guwhati-781035 is carrying out the project work entitled 'INVESTIGATION OF STRENGTH CHARACTERISTICS AND STRUCTURAL PERFORMANCE OF CONCRETE AND GLASS FIBER REINFORCED CONCRETE IN A CONCRETE BOX GIRDER' under my guidance and supervision and submitted in partial fulfillment for the requirements of Master Degree in Civil Engineering under Royal School of Engineering and Technology. I hope this project will help in their future.

Project Guide


Rishikesh Duan

Assistant Professor, Department of Civil Engineering

Royal School of Engineering and Technology

Head/Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University
Guwahati

ABSTRACT

The aim of this study is to investigate how fiber glass can offer several benefits in improving concrete girders and bridges. Concrete girders play a crucial role in bridge infrastructure, providing support and stability to the overall structure. However, they face various challenges that necessitate continuous improvement. This abstract highlights the reasons why concrete girders in bridges need to be enhanced. This paper particularly focuses on analysis of a bridge, which will be done by a software known as CSi Bridge, developed by American based company Computers and structures Inc.

Firstly, aging infrastructure and increasing traffic loads place significant demands on bridges. Concrete girders must be improved to withstand heavier loads and ensure the safety of commuters. Reinforcement against corrosion, enhanced load-carrying capacity, and improved fatigue resistance are essential aspects of such improvements.

Secondly, advancements in construction materials, techniques, and design methodologies present opportunities for optimizing girder performance. Incorporating innovative materials, such as high-performance concrete or fiber-reinforced polymers, can enhance strength, durability, and structural efficiency. Optimized design approaches can result in lighter and more cost-effective girders without compromising structural integrity.

Thirdly, climate change and environmental factors pose challenges to bridge durability. Concrete girders should be improved to withstand the effects of harsh weather conditions, temperature variations, and exposure to corrosive elements. Enhanced resistance to cracking and degradation will prolong the service life of bridges, reducing maintenance costs and ensuring long-term sustainability.

The improvement of concrete girders in bridges is crucial to accommodate growing traffic demands, enhance durability, and ensure the long-term safety and sustainability of bridge infrastructure. Therefore, this study provides valuable insights into how fiber glass can be used in concrete girders or bridges, further highlighting the need for further research in this area.

A DISSERTATION

On

Estimation of Reservoir Capacity and Sediment Transport of Karbi Langpi Hydro-electric Project using Remote Sensing

Submitted on partial fulfillment of requirements for the award of

Masters in Technology (M.TECH)

In

WATER RESOURCES DEVELOPMENT AND MANAGEMENT



ROYAL GLOBAL UNIVERSITY
GUWAHATI

Submitted by – ARJUN BARUAH

Roll No – 214021014

Registration no. -1211316

M.TECH WRDM , 4th SEM

ROYAL SCHOOL OF ENGINEERING AND TECHNOLOGY (2021-2023)

Under the supervision of

Dr. ARNAB SARMA

HOD of CIVIL ENGG. DEPARTMENT, THE ASSAM ROYAL GLOBAL UNIVERSITY,

GUWAHATI-35 , ASSAM

Arnav
HOD/Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University
Guwahati



CERTIFICATE OF APPROVAL

Certified that this dissertation titled "*Estimation of Reservoir Capacity and Sediment Transport of Karbi Langpi Hydro-electric Project using Remote Sensing*" undertaken by ARJUN BARUAH (214021014) of 2nd year (M.TECH) in Water Resources Development & Management of ROYAL SCHOOL OF ENGINEERING AND TECHNOLOGY, is a bonafide work carried out by him during the academic year 2022-2023. This report is evaluated by Dr. Arnab Sarma, Head of Civil Engineering Department, Royal Global University, Ghy-35. The matter embodied has not been submitted to any other university for the award of any degree.


Dr. Arnab Sarma

Project Supervisor

Professor, Dept. of Civil Engineering

Head Coordinator
Dept. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University
GUWAHATI

ABSTRACT

In this study the reservoir capacity and sediment transport will be estimated using remote sensing data. The satellite images will be synchronized with water level and storage capacity to find out the change in sediment transport due to soil erosion and transport by stream flow. The water bodies spread area will be estimated using vegetation indices, e.g., normalize differences vegetation index (NDVI) and normalize differences water index (NDWI). There will be reservoir bathymetry model done by integrated water level calculation.

Keywords: Satellite data; NDVI; NDWI; Reservoir capacity; Sedimentation;

R. Dharal
Head/Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University
Guwahati



ROYAL GLOBAL UNIVERSITY
GUWAHATI

THE ASSAM ROYAL GLOBAL UNIVERSITY
DISSERTATION (PHASE-II)
ON

**“FLOOD HAZARD MAPPING USING REMOTE SENSING
AND GIS TECHNIQUES- A CASE STUDY OF MAJULI RIVER
ISLAND, ASSAM INDIA”**

SUBMITTED IN PARTIAL FULFILLMENT OF REQUIREMENTS FOR
THE AWARD OF DEGREE OF MASTER OF TECHNOLOGY IN
WATER RESOURCES DEVELOPMENT AND MANAGEMENT

Submitted by

MAYURI NATH

(Roll No: 214021021)

(Registration No: 1211323)

Under the guidance of

MR. BHABATOSH HAZARIKA, ASSISTANT PROFESSOR

DEPARTMENT OF CIVIL ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

ROYAL SCHOOL OF ENGINEERING AND TECHNOLOGY

THE ASSAM ROYAL GLOBAL UNIVERSITY

Betkuchi, NH-37, Guwahati-781035, Assam, India

Mayuri Nath
Head/Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
Royal Global University

CERTIFICATE FROM THE PROJECT GUIDE

This is to certify that the thesis entitled "Flood Hazard Mapping Using Remote Sensing and GIS-Techniques at Majuli River Island: A case study of Assam: A case study of Assam, India" submitted by Mayuri Nath, 4th semester student of Department of Civil Engineering to Royal Global University for the requirement of Master Degree in Civil Engineering is a record of genuine project work, under my guidance and supervision.

I have found her as sincere and hardworking. I wish her success in her future endeavour.

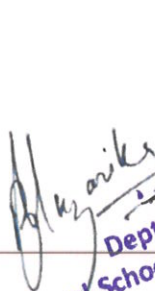
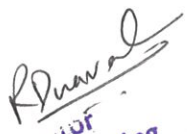
Report submitted by:

Mayuri Nath

Roll No.: 214021021

Place: Guwahati

Date: 19/06/23



Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University
Guwahati

Mr. Bhabatosh Hazarika

Assistant Professor

Department of Civil Engineering

The Assam Royal Global University

Guwahati, Assam 7954001

CERTIFICATE FROM THE DEPARTMENT

This is to certify that the thesis entitled "Flood Hazard Mapping Using Remote Sensing and GIS Techniques at Majuli River Island: A case study of Assam, India" has been carried out under my supervision and submitted for the award of the degree of "Master of Technology (Civil Engineering)" of Royal Global University.

I hope this thesis will help in her future practice field.

Report submitted by:

Mayuri Nath

Roll No.: 214021021

Place: Guwahati

Date: 19/06/23


Dr. ARONAB SARMA

Professor and Head

Department of Civil Engineering

The Assam Royal Global University

Guwahati, Assam 781035

ABSTRACT

Majuli is a river island in the Brahmaputra River, Assam which is the first island to be made a district in India. Flood is the most devastating and frequent disaster in North-East India, resulting in loss of human life and damage of properties. The physical and socio-economic condition of the inhabitant of the river island is affected by such an event. Flood disasters have become a menace affecting the socio-economic, environmental, health and safety of the people. The current study introduces the methodology of flood hazard zonation using various tools and techniques. Monitoring and mapping out flood prone areas, assessing the extent of coverage is thus not in existence and this has been a problem for the government and the entire emergency agencies. However, this literature uses remote sensing and GIS as an emerging tool to detect the entire flood hazard/prone areas to address and improve the efficiency of flood monitoring, and mapping. A SRTM Remote Sensing Data acquired through the SRTM website for making a flood hazard map with the help of GIS analysis tools and the acquired DEM which shows the topography and elevation of the state. This study provides an easy, simple and short technique for producing flood hazard zonation from various satellite data by using Geographic Information System (GIS) tools.

R. Duval
HoD/Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University
Guwahati

A DISSERTATION
On
**ANALYSIS OF RAINFALL PATTERN AND TRENDS DUE TO
CLIMATE CHANGE OF TRIPURA**

Submitted in partial fulfilment of requirements for the award of

Masters of Technology (M. Tech)

In

Water Resources Development and Management



ROYAL GLOBAL UNIVERSITY
- GUWAHATI -

Submitted by:

KHASRANG JAMATIA

M. Tech, 2nd year

Registration Number: 1211319

Roll Number: 214021017

Royal School of Engineering and

Technology Department of Civil

Engineering

(Session 2022-2023)

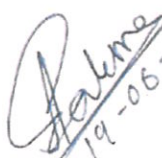
R. D. D. D.
HOD, Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University
Guwahati



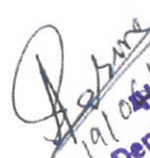
CERTIFICATE

Certified that this dissertation titled “**Analysis of Rainfall Pattern and Trends due to Climate Change of Tripura**” undertaken by KHASRANG JAMATIA (214021017) of 2nd year (M.Tech) in Water Resources Development & Management of ROYAL SCHOOL OF ENGINEERING AND TECHNOLOGY, is a bonafide work carried out by her during the academic year 2022-23. This report is evaluated by Dr. Arnab Sarma, Head of Civil Engineering Department, Royal Global University, Ghy-35. The matter embodied has not been submitted to any other University or Institution for the award of any Degree.

This is also certified that the thesis represents the independent work of the candidate.


19-06-2023

Dr. Arnab Sarma
Project Supervisor
Professor, Dept. of Civil Engineering


19/06/2023
HOD/Coordinator
Dept. of Civil Engineering
Royal School of Engineering & Technology
Royal Global University

Dr. Arnab Sarma
HOD, Dept. of Civil Engineering
Royal Global University, Ghy 35

ABSTRACT

Rainfall is an important parameter to study global warming and climate change. Tripura receive rainfall from southwest monsoon. Tripura is an agricultural state its economy mainly depends on agriculture, so the change in rainfall trends will directly affect the economics of the state. Some of the important aspect of studying rainfall are in flood risk assessment, climate change assessment, water resource management, agriculture, food security, infrastructure planning and design. In this study the analysis of rainfall is done by bar graph, line chart, Mann-Kendal and Sen slope estimator. Months with highest rainfall are June and July, and lowest rainfall on January and December. According to the analysis we see decreasing trends in rainfall for the past 30 years.


HoD/Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University

A DISSERTATION

On

Rain water harvesting in Cherrapunjee, Meghalaya

Submitted in partial fulfilment of requirements for the award of

**Masters of Technology (M.Tech.) Water Resource
Development and Management**



ROYAL GLOBAL UNIVERSITY
GUWAHATI

Submitted by:

Chare Jaksrame A Sangma

M.Tech. (WRDM)

Registration Number: 1211317

Roll Number: 214021015

(Session 2021-2023)

UNDER THE SUPERVISION OF

Mr. Chandra Upadhyaya

Department of Civil Engineering

The Assam Royal Global University

Guwahati-35 Assam

R. D. D. D.
HOD/Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University



ROYAL GLOBAL UNIVERSITY
GUWAHATI

CERTIFICATE

This is to certify that the dissertation titled “**Rainwater Harvesting in Cherrapunjee**” undertaken by Chare Jaksrame A Sangma (214021015) of 2nd year (M.Tech.) in Water Resource Development & Management of ROYAL SCHOOL OF ENGINEERING AND TECHNOLOGY, is a bonafide work carried out by her during the academic year 2022-2023. This report is evaluated by Chandra Upadhyaya. The matter embodied has not been submitted to any other University or Institution for the award of any Degree.

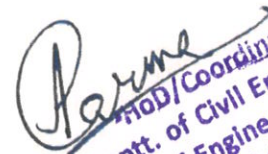
This is to certify that the above statement made by the candidate is correct and to the best of our knowledge.

Chandra Upadhyaya
15/06/2023

Mr. Chandra Upadhyaya

Project Supervisor

Professor, Dept. Of Civil Engineering


HOD/Coordinator
Dept. of Civil Engineering
Royal School of Engineering & Technology
Assam Royal Global University
Guwahati

Dr. Arnab Sarma

HOD, Dept. of Civil Engineering

Royal Global University, Ghy 35

ABSTRACT

Water is considered as an important free source that is available in the nature in limited quantity. Meghalaya being the state that receives the highest rainfall during the monsoon period, the state faces acute water shortage during the lean season due to lack of water storage systems. Considering the limitations of surface and ground water in the state, the most reliable source of water for daily uses can be succeeded by Rainwater Harvesting. Rain water harvesting has a documented history that stretches back to ninth or tenth century Asia. In many rural areas of the developing world, it continuous to be an important source of domestic water. The immense possibilities of water harvesting however remain largely unexplored in the state.

Cherrapunjee, which receives around 11,000-millimeter rainfall every year, has been facing severe water shortage during post monsoon and winter season for many years. During the winter season, especially during the months of December and January, the amount of rainfall in Cherrapunjee drops drastically, which, in, turn precipitates a water crisis in the area. This highlights the need to implement measures to ensure that the rain falling over a region is tapped as fully as possible through rain water harvesting techniques.

R. D. D. D.
HOD/Coordinator
Deptt. of Civil Engineering
Royal School of Engineering & Technology
The Assam Royal Global University