DON BOSCO COLLEGE OF ENGINEERING

Fatorda, Goa - 403 602

DEPARTMENT OF CIVIL ENGINEERING

2023-2024

"EcoVille – 2k24"

.....way towards Sustainable Development

From the HOD's Desk:

It is a great pleasure to bring out the project idea book "EcoVille – 2k24" that we launched so enthusiastically in the year 2020 which projects the implementation of innovative ideas considering their impact on the environment.

Civil Engineering is one of the oldest engineering disciplines and aims at facilitating the life for the society and in general making the world a better and more civilized place to live. It is the most versatile and core branch of Engineering comprising of structural Analysis & Design, Geotechnical, Irrigation and water resources, Transportation, Construction and Environmental Engineering etc. In our department students are encouraged to participate and present their project work in National and International conferences. Students are also motivated to participate in project competitions organized at National level to enhance their presentation and communication skills along with technical knowledge. Our graduates are exceptionally well prepared for challenging careers, handling major projects and being on the fast track towards new heights in their careers.

Release of "EcoVille – 2k24", a project idea book of Civil Engineering department is an attempt to improve industry institute interaction.

Dr. Shwetha P.
Associate Professor and Head,
Dept. of Civil Engineering
Don Bosco College of Engineering, Fatorda-Goa

CONTENT

Domain of project : Recent Trend in Civil Engineering

EXPERIMENTAL INVESTIGATION OF REPLACEMENT OF RIVER SAND AND CRUSHED SAND BY SLAG SAND IN CONCRETE

Domain/Area of Interest: *Structural engineering*

Project Guide:

Dr. Neena S.P. Panandikar

Project Members:

Miss. Niella Maria Pereira

Mr. Johan Micheal Araujo

Mr. Chirag Rajendra Verenkar

Mr. Aleister Gomes

Brief Idea of project: *The global construction sector is increasingly adopting sustainable practices to reduce carbon footprints. The scarcity of natural sand is a significant issue, prompting a shift towards sustainable alternatives. This study aims to replace fine aggregates with steel slag sand, an industrial by-product from the steel manufacturing industry, to assess compressive strength for M30 grade concrete.*

Applications: *Steel slag, used as coarse and fine aggregates in concrete, has been found to enhance the properties of the concrete mix, according to research.*

Awards and Participation: ---

LANDSLIDE STABILITY ANALYSIS FOR SOME REGIONS IN GOA

Domain/Area of Interest: *Geotechnical Engineering*

Project Guides:
Dr. Shwetha Prasanna
Asst. Prof. Jonessa Ferrao

Project Members:
Miss. Sushmita Toraskar
Miss. Priyanka Goankar
Miss. Sailee Talwar

Brief Idea of Project: *This project focuses on landslide analysis for some regions in Goa i.e. Poira and Mapusa.*
Soil samples were collected from the landslide region to study and analyze slopes.
The different lab tests were performed on soils. Which include moisture content, compaction test, liquid limit, plastic limit, shrinkage limit, and Direct shear test. The results obtained were used in Geostudio software to analyze slope stability.
Factor of Safety of both the soils were determined. In one of the site, factor of safety was less. So in order to increase the factor of safety some adaptive measures are recommended i.e. benching and soil nailing. Apart from this other mitigations like slope flattening, vegetation and drainage can also be provided.

Application:

1. Slope stability analysis is implemented in numerous applications of civil engineering projects such as dams, embankment, excavated slopes and natural slopes.
2. Slope stability is used to increase the factor of safety of a slope to a level that is considered adequate.
3. Slope stability analysis accomplishes 4 key objectives it determines the long term serviceability of existing and excavated slopes, evaluate the effectiveness of proposed reinforcements, calculates shear strength and designs a successful slope.

MANUFACTURE OF ECO BLOCK USING JUTE FIBRE AND CONSTRUCTION DEMOLITION WASTE

Domain/Area of Interest: *Construction*

Project Guide: *Asst. Prof. Swaroopa Sail*

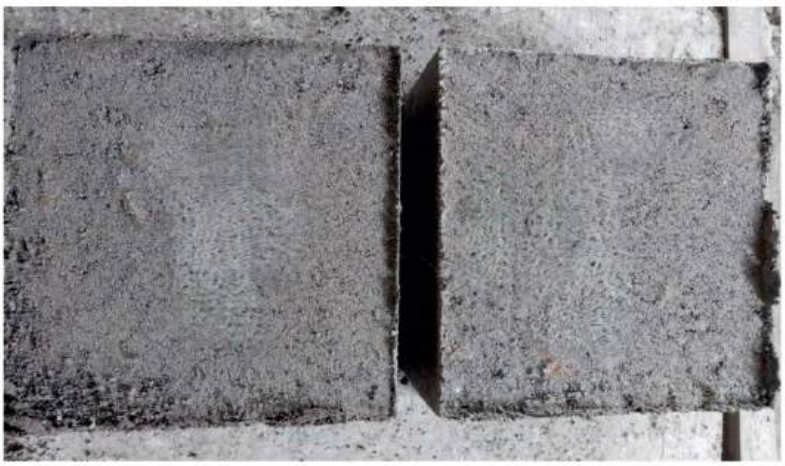
Project Members:

Mr. Alberto Blake Chris Lourenco
Mr. Rahul R. Betkekar
Mr. Devashish Khorjuvenkar
Mr. Musaddiq Aga
Mr. Akshay Naik
Miss. Yuwati S. Mavlankar

Brief Idea of project: *Nowadays, the issue of construction and demolition waste (C&D) is of great concern. During the demolition phase of construction projects, a significant amount of waste is produced. The approximate composition of C&D waste includes 40%-50% recycled coarse aggregates, 22%-25% fine aggregates, and 15%-20% plastics, ceramics, glass materials, and so on. By optimizing the utilization of demolition waste, specifically the coarse and fine recycled aggregates, we can effectively reduce the environmental impact and preserve natural resources. This study investigates the feasibility of C&D wastes (15cmX15cmX15cm concrete cubes, crushed) and waste jute fibers to produce eco blocks as a sustainable construction material. The need for this project arises from the urgent requirement to mitigate the global crisis caused by demolition of old structures ranging from residential to large man-made projects and the unsustainable nature of conventional construction materials. By repurposing C&D waste and waste jute fibers, this study aims to address environmental concerns and the increasing cost of construction materials*

***Applications*: Building walls and construction**

Working Model:



DEVELOPMENT OF REGRESSION FOR PPC WITH CRUSHED SAND USING ACCELERATED CURING METHOD

Domain/Area of Interest: *Structural Analysis / Concrete Technology*

Project Guide: *Asst. Prof. Shruti Jambhale*

Project Members:

Mr. Chandan Gawas
Mr. Roshan Ramesha
Miss. Ruhi Kamat
Mr. Trinay Naik
Mr. Vivek Chandichal

Brief Idea of project: *The study of "Development of Regression for PPC with Crushed Sand Using Accelerated Curing Method" by students from Don Bosco College of Engineering focuses on predicting the compressive strength of Portland Pozzolana Cement (PPC) concrete through the use of crushed sand and accelerated curing methods. The study aims to develop a regression model to predict and optimize concrete strength, thereby contributing to more efficient and eco-friendly construction practices. By analyzing the relationship between various factors such as curing time, cement content, and water-cement ratio, the research seeks to enhance the mechanical properties and durability of PPC concrete, ultimately offering a sustainable alternative to traditional materials and methods in civil engineering.*

Applications**:** *Environmental Sustainability, Cost Efficiency, Quality Control, Infrastructure Development, Research and Development*

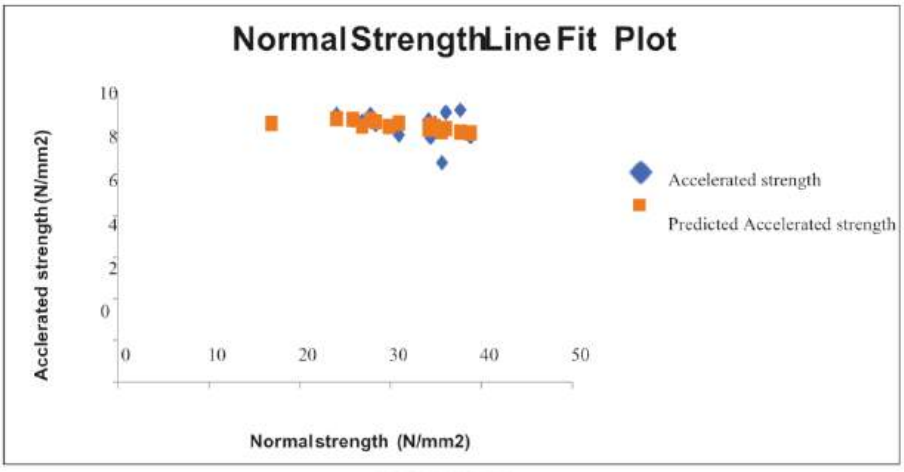
Working Model: *1) Regression curve is developed for concrete manufactured with PPC and manufactured sand (crushed gravel)*

2) The regression equation is $R_{28}=11.82+0.04R_a$

With additive constant = 11.82

And multiplying constant = 0.04

3) As multiplying constant is very small it can be neglected. Hence the final equation will be $R_{28}=11.82+R_a$



REGRESSION CURVE

DECENTRALIZED WASTEWATER TREATMENT SYSTEM

Domain/Area of Interest: *Environmental Engineering*

Project Guide*: Asst Prof. Prachi Dessai*

Project Members:
Mr. Sahil Patil
Mr. Rigved Pednekar
Mr. Kartik Shinde
Miss. Upeksha Baadkar
Miss. Sumidha Sawant

Brief Idea of project: *This study explores the potential of native Goan plants in a pilot-scale wetland for domestic sewage treatment. The investigation assessed the impact of various plants on wastewater parameter removal efficiencies. The wetland operated with a 24-hour hydraulic retention time in a vertical flow configuration. The Canna lily consistently exhibited superior removal efficiency among the plants tested across most parameters. Additionally, comparative studies were conducted between a sequential batch reactor at a sewage treatment plant and the experimental constructed wetland to evaluate performance differences*

Applications: *Grey water, wastewater treatment, stormwater management, pollution control, groundwater recharge.*

Awards and Participation: *Received third place for video making project competition.*

Working Model:

EXPERIMENTAL INVESTIGATION OF SELF CURING CONCRETE BY PARTIAL REPLACEMENT OF CEMENT WITH GGBS AND FLY ASH

Domain/Area of Interest: *Concrete Technology*

Project Guide: *Asst. Prof. Kaushik Pai Fondekar*

Project Members:

Miss. Ayanaa Inamdar

Miss. Grishmaa S. Bandodkar

Miss. Valanka G. Rodrigues

Mr. Saif Khanapurkar

Mr. Vishal Sutar

Brief Idea of project: *Self-curing concrete utilizes Polyethylene glycol-400 (PEG-400) to maintain internal moisture, reducing the need for external water curing typically required in conventional concrete during the critical first 28 days. PEG-400 acts as a moisture-retaining agent, preventing early drying and minimizing shrinkage, which can lead to cracks and reduced durability. By ensuring continuous hydration of cement particles, PEG-400 enhances compressive strength and overall performance of the concrete structure. This project compares conventional concrete with self-curing concrete in terms of strength and performance. It evaluates the compressive strength of self-curing concrete by partially replacing cement with fly ash and GGBS (Ground Granulated Blast Furnace Slag) separately. Additionally, the project examines the compressive strength of a ternary mix, which includes both fly ash and GGBS in conjunction with cement replacements, under self-curing conditions. The aim is to identify optimal mixtures that enhance concrete strength and durability while reducing reliance on external curing methods.*

Applications**:** *Self-curing concrete is beneficial for high-rise buildings, infrastructure projects like highways and bridges, remote construction sites, precast concrete products, and repair projects. It ensures proper curing in inaccessible areas, reduces costs and time, and improves durability by minimizing cracks*

and shrinkage. Its versatility supports both small repairs and large-scale construction, making it a valuable advancement in the building sector.

Awards and Participation: *2nd place - Project Competition organized by Civil Engineering Dept., DBCE*

NON-DESTRUCTIVE TESTING OF DISTRESSED BUILDING

Domain/Area of Interest: *Structural Engineering*

Project Guide: *Asst. Prof. Nadya Baracho*

Project Members:

Mr. Prinston Fernandes
Mr. Kunal Kundaikar
Mr. Shriraj Amonkar
Mr. Sohan Ambe
Mr. Yask Naik

Brief Idea of project: *Non-destructive testing (NDT) methods are essential for evaluating the condition of distressed concrete structures without causing damage. These techniques allow for the assessment of concrete strength, homogeneity, and the presence of defects such as cracks, voids, and reinforcement corrosion. Some common NDT methods used for assessing distressed structures*

Applications**:** *Non-Destructive is used to assess the condition of building without damaging the structure. Visual inspection is done to identify defects like cracks, corrosion of reinforcement, spalling of concrete, delamination of concrete and peeling of paint and plaster.*

DESIGN OF A FLOOD CONTROL SYSYTEM

Domain/Area of Interest: *Hydraulics*

Project Guide: *Dr. Shwetha Prasanna*

Project Members:

Miss. Amanda Jill Luis
Mr. Leonardo Caetano Francisco Vaz
Mr. Raylan Anthony Palmeira
Miss. Siddhi Rajiv Parvatkar
Mr. Wallance Xavier Fernandes
Miss. Anushka Manoj Naik

Brief Idea of project: *Panaji, a coastal city facing increasing vulnerability to flooding due to projected sea level rise, rapid urbanisation, and rapidly increasing tourism, confronts imminent challenges exacerbated by climate change. As a designated smart city by the Government of India, addressing these issues necessitates a proactive and dynamic approach. This study focuses on Patto, a pivotal area in Panaji, to conduct a comprehensive assessment of flood-prone zones, analyse the underlying technical causes of drainage congestion within the existing infrastructure, and quantify the extent of flooding. By identifying these critical areas, the study aims to propose effective strategies to mitigate waterlogging and - strengthen the area's drainage system.*

Applications: *Drainage maps that have been revised as part of the study can be used by relevant departments to carry out necessary works. The drains in Patto, Panaji can be reengineered using the proposed design to mitigate waterlogging.*

Awards and Participation: *1st place at Project Competition held by the Department of Civil Engineering, Don Bosco College of Engineering.*

MANUFACTURING OF CONSTRUCTION PRODUCTS USING BOILER BOTTOM ASH

Domain/Area of Interest: *Geotechnical/Concrete Technology*

Project Guides: *Asst. Prof. Satyesh Kakodkar*
Asst. Prof. B. R. Anirudha

Project Members:

Miss. Simran Mogale
Mr. Samarth Marathe
Mr. Omkar Lotlikar
Mr. Soubhagya Tiwari
Miss. Kritha Rajan

Brief Idea of project: *Manufacturing of construction products using boiler ash. To assess and test the physical and chemical properties of boiler ash. To Assess the compatibility of boiler ash with other raw materials like cement, GGBS etc. Manufacturing of construction products like bricks, pavers & concrete etc. Assessment of cost of manufacturing. The complete study on the possibility of utilizing biomass briquette ash (BBA) in the fabrication of construction products like as bricks and panels indicates tremendous potential for generating eco-friendly and resource-efficient building materials.*

Applications: *we found out that BBA which was the waste products and was used in fields which caused Hazardous effect on environment was utilized in manufacturing of construction products like Bricks , panels etc which helped in limiting use of natural resources material like clay bricks.*

UTILIZATION OF FLY ASH AND ALCCOFINE IN MANUFACTURE OF ECO-BLOCK

Domain/Area of Interest: *Geotechnical Engineering and Construction*

Project Guide: *Asst. Prof. Swaroopa Sail*

Project Members:

Mr. Krishnarao Desai
Mr. Vishvesh Korgaonkar
Mr. Ravi Masurkar
Mr. Aniket Shetye
Mr. Kartik Patil
Mr. Anant Talkar

Brief Idea of project: *Our study aims at development of ECO BLOCK and its utilization in construction Industry. Fly ash is a byproduct of burning pulverized coal in power plants, Quarry dust is a byproduct of quarrying activities, Alccofine is a new generation micro-fine material of particle size much finer than cement and has special attributes to enhance the performance of concrete. Blocks were cast with proportions of fly ash and alccofine as 45% and 5%, and the other with fly ash and alccofine as 50% and 5% respectively. The resulting blocks underwent extensive testing to assess durability, water absorption properties as well as compressive tests.*

Tests were conducted to assess the durability of the building blocks through examinations of their resistance to weathering and degradation over time. Compressive load testing was employed to measure the blocks' capacity to withstand crushing forces. The compressive strength values obtained were 6.52N/mm² and water absorption 5.09%

Applications: *We can use this blocks for Partition walls.*

STUDY AND DESIGN OF RETENTION ELEMENT FOR DEEP BASEMENT AND EXCAVATION

Domain/Area of Interest: *Soil Retention For Deep Excavation Projects*

***Project Guide*:** *Asst .Prof. Jeffery Valaders*

Project Members:

Mr. Hussain Pinjar

Mr. Shahbaz Mulki

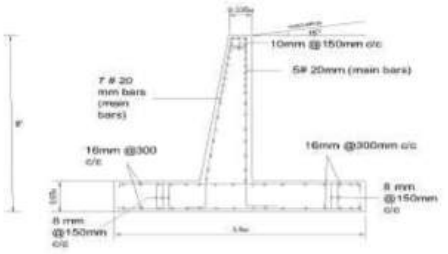
Mr. Pranav Naik

Mr. Jeremaih Cunha

Brief Idea of project: *The project focuses on studying and designing soil retaining elements for deep excavation projects.it involves studying the soil strata, its composites , soil properties and according to its suitability adapting the suitable soil retaining element. For dep excavation projects soli retaining elements are crucial to ensure stability and prevent collapses. Design is based on factors like soil type, excavation depth, and nearby elements*

Applications: *Underground Basement for depth 6,8,10 m , soil retaining during const without disturbing the nearby structure*

Working Model: *This project aims to enhance safe excavation upto 8 m to construct basement at miramar Panjim Goa. According to Soil analysis report and design criterior retaining wall upto 6m is suitable.*



Deep Excavation above 10 m touch piles are suitable while provide laterial support against earth pressure.

ROAD INFRASTRUCTURE SAFETY AND DEVELOPMENT

Domain/Area of Interest: *Road Safety Engineering/ Arlim To Davorlium Circle*

Project Guides:
Asst. Prof. Starina Dias
Asst. Prof. Genevieve Fernandes

Project Members:
Mr. Zubair Ahmad Sofi
Mr. Sahil Desai

Brief Idea of project: *The project focuses on enhancing the safety and efficiency of road networks through effective management practices. It involves the assessment and improvement of road design, maintenance, and traffic management strategies. Key objectives include reducing accidents, optimizing traffic flow, and ensuring the sustainability of road infrastructure. The project may incorporate modern technologies like smart sensors, data analytics, and automated systems to monitor road conditions and manage traffic in real-time. It also emphasizes the importance of regular maintenance and the adoption of best practices in road construction and design to enhance safety and longevity.*

Applications: *Traffic monitoring system, Smart traffic light, Accident analysis and prevention, Public information platforms*

Working Model: *1] This project aims to enhance road infrastructure safety and management by integrating advanced technologies, sustainable practices, and efficient traffic management strategies. The primary objectives are to reduce accidents, improve traffic flow, and ensure the long-term sustainability of road infrastructure.*

2] Predictive Maintenance:

Data Analytics: Use machine learning algorithms to predict road wear and tear.

Regular Inspections: Conduct periodic inspections to complement predictive models

Department of Civil Engineering
Don Bosco College of Engineering, Fatorda, Goa

Vision

To be the Center of Excellence in Civil Engineering Education and Consultancy by providing holistic, innovative and research centric environment and keeping pace with rapidly changing technologies.

Mission

- To impart quality education in civil engineering, through effectiveness and innovation in teaching and learning.
- To promote positive interactions among faculty and students and foster networking with alumni, industry and other stakeholders.
- To train young minds in soft skills, intellectual and ethical strengths, conducive to globally competitive environment.
- To motivate students for research and entrepreneurship in relevant sectors of society with focus on excellence and creativity.
- To undertake sponsored research and provide consultancy services in all the areas of civil engineering beneficial to the community.