DON BOSCO COLLEGE OF ENGINEERING

Fatorda, Goa - 403 602

DEPARTMENT OF CIVIL ENGINEERING

2021-2022

"EcoVille – 2k22"

.....way towards Sustainable Development

From the HOD's Desk:

It is a great pleasure to bring out the project idea book "EcoVille – 2k22" 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 – 2k22", 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: 3R's in construction materials

EVALUATION OF LIME ACTIVATED GGBS BRICKS AND PLASTER

Domain/Area of Interest: construction

Project Members:

1.Edward Fernandes
2.Rajmohan Desai
3.Prahlesh Reddy
4.Parth Kushte
5.Jason Fernandes
6.Jurgen Gracious

Project Guides:

Oswyn Soares
Ashish Keni

Brief Idea of project: In today's world the main importance is given to green, renewable and sustainable development. Huge amount of GGBS is produced in steel plants obtained from blast furnaces, during the separation of iron from iron ore. The process involves cooling of the slag through high pressure water jets, which enables the formation of granular particles. The granulated slag is further processed by drying and then grinding it to a fine powder, which is called GGBS. It is a waste product which has a bad impact on environment and human health. According to EPD data, what sets GGBS apart from other building materials is that's its global warming potential is at 60.21kg CO_2 equivalent, which is among the lowest in the industry. Quarry dust is a by-product of the crushing process which is a concentrated material to use as aggregates for concreting purposes, especially as fine aggregates, the rock has been crushed into various sizes; during this process the dust generated is called quarry dust formed as a waste. The increasing population and urbanization increases the demand for buildings, transport facilities, etc. cement and aggregate are the fundamental needs of the construction industry. Conservation of the natural resources and protection of the environment today form a part of development. Cement and sand are the constituents

Applications: 1. Plastering 2. Bricks

Working Model:

Plaster

QUALITATIVE STRUCTURAL ASSESSMENT OF HERITAGE BUILDINGS

Domain/Area of Interest: Repair and Rehabilitation of structures

Project Members:

Miss. Berny Dias

Mr. Akash Kapolkar

Mr. Leon Lobo

Mr. Declan Luis

Mr. Lysander Fernandes

Project Guides:

Prof. Jeffery Valadares

Prof. Nadya Baracho

Brief Idea of project: The scope of our project is to assess and extensively study mainly the altered structural elements of the heritage structure so that we can provide data and information that can help in its maintenance and increase their lifespans so as to conserve the Cultural Heritage of the State of Goa.

Applications: The assessment of heritage structures and their preservation is of great significance due to its role in retaining our sense of historical, religious and cultural identity. Our study focuses on investigation, inspection and evaluation of heritage structures as well as interpretations from any existing document detailing about it, so as to derive a reliable description of its present condition. The information and data collected will be sourced from visual inspection, photo documentation, discussion through meetings with contractors and engineers appointed by the archaeological survey of India.

Awards and Participation: ---

Working Model: ***(If any)***

EVALUATION OF PERFORMANCE OF RCC STRUCTURE SUBJECTED TO STATIC AND DYNAMIC LOADS

Domain/Area of Interest: Parametric Study, ETABS

Project Members:

Mr. Manthan Manguesh Kaskar

Mr. Ashish Ratnadeep Humraskar

Mr. Pundalik Alias Saiel Pradeep Kanekar

Mr. Uttam Digambar Kalangutkar

Mr. Anirudha Umesh Parab

Project Guide:

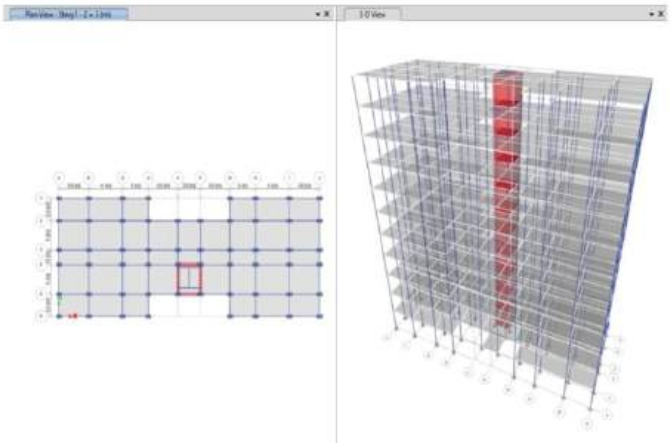
Prof. B.R. Anirudha

Brief Idea of project: The project consists of Evaluation of Performance of RCC Structure Subjected to Static and Dynamic Loads. The analysis is done by using ETABS software with Indian standards codal provisions for all the models. Parametric study is done on the structure by analysing a regular and an irregular building considering the following parameters such as Storey shear, Storey displacement, Storey drift, Storey acceleration. On comparing the data and graphs for various parameters that have been considered for this project, i.e. Storey shear, storey displacement, storey drift and storey accelerations, for both the Regular and Irregular structure, it is found that the Irregular structure is giving higher Critical values for all the parameters as compared to the Regular structure. From this we can conclude that Regular Structure behaves better under seismic forces and is more stable than an irregular structure.

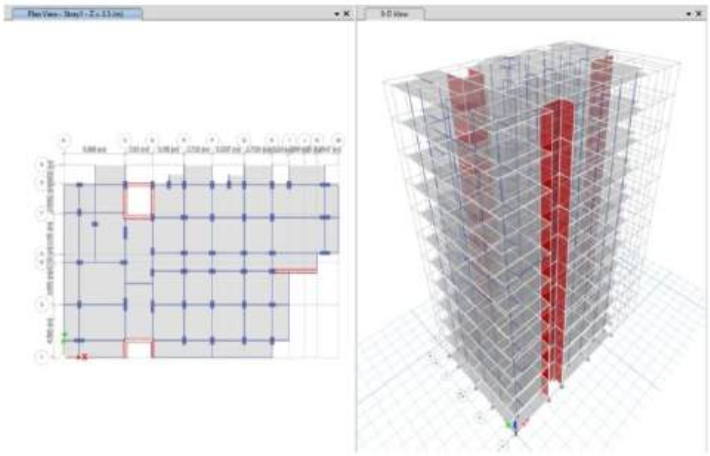
Applications:

1. Parametric comparison of the Regular and Irregular structures subjected to earthquakes.
2. Utilization of Shear wall to resist earthquakes in a structure

Working Model:



REGULAR STRUCTURE



IRREGULAR STRUCTURE

FLOOD ANALYSIS AND MAPPING FOR A REGION OF A RIVER

Domain/Area of Interest: **Flood Management**

Project Members:

Tanishq Kulkarni

Tarun Gupta

Imam Husen Desai

Nashville Dias

Amey Naik

Project Guide:

Dr. Shwetha Prasanna

Brief Idea of project: Flood has been considered as one of the most recurring and frequent disaster in the world. Due to recurrent prevalence, the economic loss and life damage caused by the flood has put more burdens on economy than any other natural disaster. Even a state like Goa suffers from flooding due to excessive rainfall and rise in river levels. Hence flood management and mitigation are very important to avoid heavy loss of human life and properties. Creating a flood model and predicting its behaviour is a helpful step in protecting nearby areas. An experimental model is created using HEC-RAS and other allied software, the output is represented with the help of map for better understanding.

Applications: Flood modelling forms a vital part of understanding **flood risk and hazards**. This means undertaking the evaluation and design of flood mitigation solutions that address both current and potential future flood risk conditions.

HEC-RAS (Hydrological Engineering Centre – River Analysis System) is a 1-dimensional and 2-dimensional hydraulic modelling program based on 4 types of analysis in rivers:

- **Steady flow models**
- **Unsteady flow models**
- **Sediment transport models**
- **Water quality analysis**

It allows simulating flow in natural riverbeds or artificial channels to determine the water level being its main goal develop flood studies and determine floodable areas.

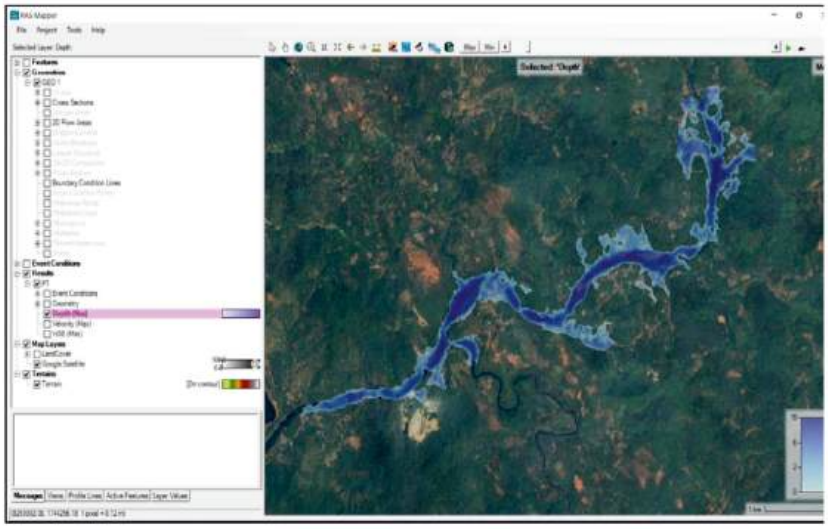
• This project gives an insight with regards to how to perform and use the HEC-RAS model for a beginner. As the accuracy of data increases, better models will be created and hence mapping out the flood affected areas.

• HEC RAS can also be used for Water quality, Sedimentation flow model

• The model can also be used as reference by any NGO, or stakeholders to see and check if the land is under any risk.

Awards and Participation: Presented papers in the International conference

Software Model:



COMPARITIVE STUDY OF SUITABLE WATERPROOFING SYSTEM FOR THE STATE OF GOA

Domain/Area of Interest:

Project Members

SIMRON CHERYL FERNANDES
JATIN NAIK
ATMESH PEDNEKAR
AVISHA SATARKAR
VINIT TALAVNEKAR

Project Guide:

SHRUTI JAMBHALE

Brief Idea of project: The suitable waterproofing system for the state of Goa is studied in this project. We studied the different types of waterproofing methods for RCC structure like traditional and modern methods along with their application process. We also studied the waterproofing methods for mud structures and also wooden structures along with their application process. The suitable type of waterproofing materials also studied in this project. We also studied the particular waterproofing methods and the causes of dampness in different region of the building. Based on the issue related to dampness and water leakage in the different regions of the building or construction structure suitable waterproofing materials and their application system will be suggested.

***Applications*: Basement waterproofing**:

For the waterproofing of raft slabs mainly HDPE (High Density Poly Ethylene Membrane) or Kotastone are used.

- HDPE Membrane is used because it is cheap and easy to apply.
- Kota stone is used if it is available in nearby area to the site and if skilled labours areavailable.

For the retaining walls SBS membrane (Styrene- Butadiene- styrene membrane) are used.

Toilets:

Cementitious based product are used.

Terrace Roofs:

APP membrane (Atactic Polypropylene membrane), cementitious based product and liquidmembrane are used.

- APP membrane is used when there are skilled labours available.
- Cementitious based products and liquid membrane is used because it is easy to apply anddoes not require skilled labour.

Water tanks and swimming pools:

Cementitious based product are used.

Working Model:

SLOPE STABILITY ANALYSIS USING GEO5

Domain/Area of Interest: Geotechnical Engineering

Project Members:

Mansa N. Zambaulikar
Dhanashri Sawant
Srivarad Manerkar
Aniket Hadfadkar
Abhishek Kharbe

Project Guides:

Asst Prof. Starina Dias
Asst Prof. Swaroopa sail

Brief Idea of project: This project is about studying the stability of slopes that is located at Guardian Angel Educational Institute, Curchorem. The Analyses is done using Geo5 software based on varying the various factors like different parameters that could possibly affect the stability of slope such as slope inclination, soil type and water content. We have also suggested providing suitable remedial measures like retaining wall, anchors and soil nails in order to stabilize the Slope.

Applications: Slope Stability Analysis is performed to assess the safe design of a human-made or natural slopes (e.g. embankments, road cuts, open-pit mining, excavations, landfills etc.) and the equilibrium conditions. Slope stability is the resistance of inclined surface to failure by sliding or collapsing. The main objectives of slope stability analysis are finding endangered areas, investigation of potential failure mechanisms, determination of the slope sensitivity to different triggering mechanisms, designing of optimal slopes with regard to safety, reliability and economics, and designing possible remedial measures.

ANALYSIS OF RAFT FOUNDATION ON NATURAL SOIL AND STABILIZED SOIL.

Domain/Area of Interest: **GEOTECHNICAL ENGINEERING**

Project Members:

Nikhil Chinchawad

Mr. Hrithik Desai

Mr. Sourav Fadte

Mr. Parag Khadji

Mr. Ratik Sawant

Project Guides:

Prof. Jeffrey Valadares

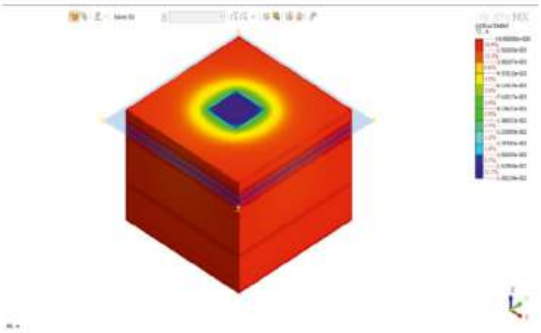
Prof. Nadya Baracho

Brief Idea of project: By doing the calculations of raft foundation on the soil profile it was found that the major settlement was in the first layer of the soil. The settlement subsequently decreased in the further layers with least settlement in the fourth layer. With increase in the dimensions of the raft, the settlement was found to be less. Settlement was less in the stabilized soil conditions as seen from the calculations performed. But in some cases increasing the dimensions of the raft may not be convenient as there may be site or budget constraint. An economical approach would be to use a combination of soil stabilization and appropriate change in dimensions. Further study can be done on ground improvement techniques for improvement in properties of the soil for the same raft parameter.

Application: 1) Used to find economical design of raft.

2)Used to find the settlement of soil.

Working Model:



Result of analysis

PERFORMANCE ANALYSIS OF FIBER REINFORCED CONCRETEBY PARTIAL REPLACEMENT OF COARSE AGGREGATE WITH WASTE CERAMIC TILES

Domain/Area of Interest: Performance analysis of fiber reinforced concrete by partial replacement of coarse aggregate with waste ceramic tiles.

Project Members:

Ms.Samrudhi Mandurkar

Mr.Shashank Naik

Mr.Anant Naik

Mr.Sarvesh Parwar

Mr.Viraj Shirodkar

Mr. Shubham Madkaikar

Project Guides:

Prof.Kaushik Pai Fondekar

Dr. Shwetha Prassana

Brief Idea of project: A large quantity of ceramic materials changes into wastage during processing, transporting and fixing due to its brittle nature. Therefore, using these wastes in concrete production could be an effective measure in maintaining the environment and improving the properties of concrete. The increasing demand of construction material and degradation of environment, there is need to explore alternative construction material from industrial as well as household waste and recyclable materials. In this project control concrete is cast for M25 grade and the partial replacement of waste ceramic tiles 0f 10%, 20%, 30% by weight of coarse aggregate. Glass fiber-reinforced concrete consists of high-strength glass fiber embedded in a cementitious matrix. The inclusion of fiber reinforcement in concrete, mortar and cement paste can enhance many of the engineering properties of the basic materials, such as fracture toughness, flexural strength. An experimental investigation of compressive strength will be undertaken by partial replacement of coarse aggregate by waste ceramic tiles and glass fiber.

Applications: Fiber reinforced concrete is a composite material which consists of fibrous material which increases its structural integrity. Fibers are used in concrete to control cracking due to plastic shrinkage and to drying shrinkage. They reduce the permeability of concrete and hence reduce the bleeding of water. Fiber reinforced concrete is useful where high tensile strength and reduced cracking is desirable. It improves the impact strength of concrete, limits the crack growth and leads to greater strain capacity of the composite material. Adding fibers to the concrete will increase resistance to plastic

Working Model:

EXPERIMENTAL INVESTIGATION ON USAGE OF WASTE MATERIAL IN CONCRETE

Domain/Area of Interest: **CONCRETE TECHNOLOGY**

Project Members:

Mr. Brayden Alvares

Mr. Anshul Bhaje

Mr. Ranganath Chari

Mr. Dhiresh Gaonkar

Mr. Omkar Kanekar

Mr. Shubham Pagi

Project Guides:

Mr. B.R. Anirudha

Ms.Akshata Kudchadkar

Brief Idea of project: The suitability of Rice husk ash as a filler material in concrete production will be studied in this project. Rice husk is an agricultural waste obtained from rice. We have experimentally determined partial replacement of cement by rice husk ash as filler material at 0%, 5% 10%, 15% by weight respectively. Effect on compressive strength and workability was studied.

Application:

- Rice husk ash provides good compressive strength to concrete at optimum percentage.
- It is a by-product; hence,it helps in cutting down the environmental pollution.

Working Model:

UTILIZATION OF CERAMIC WASTE IN CONCRETE

Domain/Area of Interest: **Sustainable and Economical Building Material.**

Project Members:

Anvit A Kelekar
Sagar S lawande
Kaushik S Fal Dessai
Ravindra M Gurav
Sapnesh B Jangli

Project Guide:

Prof. Satyesh A Kakodkar

Brief Idea of project: The objective of our project is to produce environmentally friendly and cost-effective concrete. Our project focuses onutilizing the Ceramic Waste Powder as partial replacement of cement in concrete. The effect of the CWP in concrete is analyzed by various tests and the compressive strength is analyzed by M30 grade of concrete in 5 trials with various percentage of CWP to find the optimum content. Compressive strength of M30 grade concrete increases when cement is replaced by ceramic powder up to 25% of the weight of the cement and further replacement decreases its compressive strength. Hence CWP can be used toimprove the compressive strength of concrete.

Applications: To manufacture Pavers, concrete blocks.

Awards and Participation: *Project Funded by: Goa State Innovation Council, Govt. of Goa*

Working Model:

EVALUATION OF LIME ACTIVATED FLYASH BRICKS AND PLASTER

Domain/Area of Interest: **construction**

Project Members:

Prathamesh Borkar
Larison Gama
Sanket Gaonkar
Sahiraj Naik
Jez Vaz
Dhruv Gaonkar

Project Guide:

Oswyn Soares

Brief Idea of project: lime activated flyash bricks where sand is replacedwith stone dust and flyash is used as main dry ingredient.

Applications: 1. plastering 2.bricks

Awards and Participation: ---

Working Model: ***(If any)***

CASTED BRICK

DESIGN OF PILE USING MIDAS GTS NX SOFTWARE

Domain/Area Of Interest :- Geo technical Engineering

Project Members:

Vardhan Natekar
Udhav Lotlikar
Eliza Miranda
Rushika Khajnekar
Snevisha Rodrigues

Project Guide:

Asst. Prof. Nadya Baracho
Asst. Prof. Jeffrey Valadares

Brief Idea of Project

This project is aimed to model various soil profiles with different pile diameter, structural loads and change in pile length on MIDAS GTS NX software. The entire project has been developed keeping in view of the modelling of soil profiles.it analyses the effects of ground improved for the soil parameters and to understand the relationship between pile diameter, pile length and load carrying capacity. Real 3D geometry modelling, powerful mesh generator, fast analysis solver and outstanding post processing can be done on MIDAS GTS NX software.

The project has been planned to design pile foundation on MIDAS GTS NX software. The load carrying capacity of piles with different pile diameter, length and various soil profiles we calculated manually.

A graph of pile diameter v/s load carrying capacity is plotted to show how the soil will react under the load acting on it.

Application

Design of Pile on Software

EXPERIMENTAL STUDY ON WASTE RUBBER CHIPS AND BRICK POWDER AS A SOIL STABILIZER

Domain/Area of Interest: **Soil Stabilization using waste Materials**

Project Members:

Rohit Ravi
Hrishabh Bhat
RamnathNayak
PradhumPhadte
Paritosh Sawant

Project Guides:

ASSOCIATE PROF. SHWETHA PRASANNA
ASST. PROF. KAUSHIK FONDEKAR

Brief Idea of project:

To study effect of waste rubber chips and brick powder as a soil stabilizer.

Different tests will be conducted by using 30% of brick powder as a soil stabilizer

Different tests will be conducted by using 10% rubber chips as a soil stabilizer.

Applications:

Brick powder performs significantly better overall than rubber chips, therefore it can be utilized as a better stabilizer for soil used as a subgrade for roads and railways. The usage of both materials combined is preferable for creating an affordable slope for embankments.

SPATIAL ANALYSIS OF GEOTECHNICAL PROPERTIES USING GIS

Domain/Area of Interest: **Geotechnical properties of soil**

Project Members:

Mr. Smaran N.S Kanekar
Mr. Sufiyan Shaikh
Mr. Nikhil Pereira
Mr. Nester A. Fernandes
Mr. Vibhav K. Prabhu Dessai

Project Guides:

Asst. Prof Swaroopa Sai

Asst. Prof Akshata Kudchadker

Brief Idea of project:

- To analyse geotechnical properties of soil on a specific study area.
- To collect multiple soil samples at a depth of 1.5 meter from the ground level in an around salcete area.
- To integrate this geotechnical data into maps using Geographical Information System (GIS)
- To use this maps and other data found, as a preliminary study of soil for any constructional activities.

Applications:

- The data that is integrated in GIS in form of maps can be used for designing different footings.
- Based on the results, types of soil can be determined.
- It can be used for designing retaining walls.

CONSTRUCTION OF PLASTIC BITUMINOUS ROAD

Domain/Area of Interest: **Transportation Engineering, Waste Management.**

Project Members:

Gaurav Shetgaonkar
Akash Naik
Abhishek Kothambikar
Adit Velip
Vivek Naik
Divya Naik

Project Guide:

Prof. Satyesh A. Kakodkar

Brief Idea of project: The Plastic disposal is an immense problem in our country and world. However, the one element that is particularly useful for everyone's daily needs is plastic. A like, regarding how plastic is applied to the motion of items, their protection from water, their covering, their storage, their use as an insulator, and other uses. Studies show that waste plastics have a great deal of potential for use in bituminous construction because their modest additions—5–10% by weight of bitumen—help to significantly increase the Marshall stability, strength, fatigue life, and other desirable properties of bituminous mix, leading to improved durability and pavement performance. Using discarded plastic in road building contributes to the creation of greener highways.

***Applications*:**

Working Model: ***(If any)***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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.