GIT | GHARDA INSTITUTE OF TECHNOLOGY

GHARDA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

TECHNICAL MAGAZINE

(Students Project Abstracts)

Academic Year: 2022-23

Faculty Editor: Prof.V.R.Kasar

Student Editors: *Yash S.Bhatkar, Asmita D.Pendhari*

Department of Civil Engineering
Gharda Institute of Technology
A/P Lavel, Tal. Khed, Dist. Ratnagiri

Message from Principal:

Dear Alumni,

I am happy to share with you this Technical Magazine, we

Conducted for the overall grooming of the students for the betterment of the society. I congratulate the pass out batch of the academic year 2022-23 and wish them great success in future. We are rigorously working on the development of infrastructure, facilities and the most important, teaching and learning processes. One of the significant facilities we have started is the college transport system. We are also extending our industry interaction through various MOUs and collaborations. We invite you also for such interaction and collaborations, particularly the entrepreneurs with their unique ideas. At the end note, I wish a bright future for all alumni of GIT.

Dr. S. K. Patil

Message from Head of Department:

It gives me immense pleasure to bring this Magazine to alumni for the academic year 2022-23. The purpose of this newsletter is to bring updates about the department for the year. Our institute will be facing NAAC accreditation for the second cycle. We also have strengthened our physical infrastructure, more online connectivity (due to Covid pandemic) and social outreach activity. I hope all of you are doing well and must be busy with your activities. I would like to request you for your participation during the NAAC visit. This will be a small gathering for you as well. The date and timing for the visit will be informed to you through whatsapp group. Once again, I wish all of you great success in future and a very happy new year ahead.

Thanks….

Dr. A. D. Bhosale

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Title: Utilization and comparison of paper waste in combination with fly ash, sand and cement to develop eco-friendly and lightweight bricks

Guide: Prof. V. S. Jadhav.
Students: Mr. Yash Santosh Bhatkar, Mr. Dharmaraj Raju Bhoi, Mr. Akhilesh Antosh Kalekar, Mr. Shubham Rajkumar Kamat

Abstracts:
In the field of mining, Pharma industry, mineral processing flow of granular material through hopper is crucial. In industries lots of problems happening related to the flow of granular material through hopper like rat-holing, arching, bridging, erratic flow, segregation etc. Granular material liberally exiting hoppers under gravity is one of the oldest and most studied problems in granular flow. Particulate matter is made up of distinct solids or particles that move like liquids. . Material flow through the hopper is a matter of basic industrial unit operation and granular flow, the material flows under gravity and exits the storage bin through the bottom outlet of the bin. Such funnels are very useful in the food, biopharmaceutical, and agricultural industries. It is crucial to comprehend and model such granular fluxes in terms of the variables that have an impact on them, including grain size, solid percentage, wall roughness, particle particle interactions, and others.

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Keywords: Granular material, Hopper, Rat-holing, Arching, Bridging, Erratic flow

Title: Partial replacement of coarse aggregate with Demolition waste in concrete

Guide: Prof. V.S. Jadhav
Students: Pratiksha Vikas Jadhav, Tejas Rajendra Gurav, Akash Rajendra Jadhav, Pooja Vikas Jadhav

Abstracts:
Increasing population and rapid urbanization contribute to demolition waste generation. Every year approximately 150 million tonnes of construction and demolition waste is generated. Disposal of that amount becomes a tedious process. The alternative is to reuse this demolition waste in construction. This study reviews the standard of demolition waste as a replacement for coarse aggregate in concrete. The scope of this study includes the study of the characteristics of demolition waste, a comparison of the compressive strength of demolition waste to normal concrete, and an estimation of the cost of demolition waste concrete and normal concrete for compound walls. The method of study includes a consistency test on cement, impact test on aggregate. All tests have been carried out using standard procedures, and results have been recorded in tabular format. It was concluded from the results that the strength of the Lateritic aggregate concrete blocks is less than the normal concrete blocks. But the cost of Lateritic aggregate concrete blocks is less than that of normal concrete blocks.
Keywords: demolition waste, coarse aggregate, Lateritic aggregate

Title: Construction of Ferro cement Dome shaped slab for existing fibrocement water tank

Guide: Prof.G.D.Parulekar
Students: Mr. Mohammed Tashif Abdul Majeed Panjri, Mr. Suraka Sadiq Mukadam, Mr. Namir Ramzan Zambharkar, Mrs. Gauri Satish Kabbur

Abstracts:
Ferrocement is composite of chicken mesh and mortar (cement, sand and water). Ferrocement technology is fact is an older and simpler version of RCC; essentially the materials are principally same in both the types with cement matrix taking care of compressive forces and steel taking tensile load. Ferrocement is type of thin wall reinforced concrete commonly constructed of hydraulic cement mortar reinforced with closely spaced layers of continuous and relatively small size wire mesh which may be made of metallic or other suitable materials. Since ferrocement possess certain unique properties, such as high tensile strength to weight ratio, superior cracking behavior, light weight, mold ability to any shape. The project attempts to review of literature on ferrocement and brings out the salient features of construction, material properties and special techniques of applying mortar on the reinforcing mesh for the construction of ferrocement dome shaped slab for existing ferrocement water tank. The study concludes that ferrocement will certainly be one of the best alternatives for RCC in future and can be adopted for construction of economical water storage tank.
Key words- Ferrocement technology, Reinforcing mesh, mortar

Title: Utilization of crumb rubber for water proofing

Guide: Prof. G.D Parulekar
Students: Ms. Gamare Priyanka Madhukar, Ms. Gole Darshana Dashrath, Mr. Khamkar Vishal Vijay, Mr. Pawar Sahil Bharat

Abstracts:
This paper shows the experimental study on the consumption of refuse Tyre crumb rubber in mortar in replacement of fine aggregate in different percentages. It focuses on determining the engineering properties of the rubber water proofing. Decomposition of waste Tyre rubber can take longer year, and every year the variety of discarded Tyre is rapidly growing. We describe that the use trying out of recycle rubber Tyre crumb as chance production cloth with waterproofing capacity that would function as an excessive chance to the present waterproofing products. This accumulate waste material may be utilized in Civil Engineering construction production. The check approaches on these studies made use of tests like water absorption, compression strength making use of exceptional sieves sizes of rubber crumb, cost compression etc. The end result of check for waterproofing capacity of rubber concrete aggregate the use of the those check approaches had been in compression with a number of the waterproofing product to be had with inside the market. for the assessment reason 5 baskets (samples) are casted as compatible with exceptional ratio 1:4 with rubber crumb was taken on different proportion of 20% , 7.5% , 10% , 12.5 % and 15% . The 5 baskets (Samples) had been organized examined end result had been were discussed.

Keywords: Tyre crumb rubber**,** waterproofing, concrete aggregate

Title: Study & Design of Flexible Pavement using Steel Slag

Guide: Prof. V.D. Kamble
Students: Mr. Apange Pranit P.,Mr. Bate Hujaifa S.,Mr. Mate Hrushik D.
Mr. Potbhare Kshitij M.

Abstracts:
This paper represents the use of steel slag in the bituminous mixtures. Steel Slag is the byproduct of various steel industries. The steel slag is chosen on the basis of its engineering properties and its utilization for road construction in different ways. In this study, steel slag was used, as a replacement for natural aggregates in various percentage in the bituminous mixture. The Marshall Stability Test was taken on the different grade specimens which having 0%, 25%, 50%, 75% and also 100% replacement of natural aggregates with Steel Slag. The 3 specimens where prepared of each percentile to get accurate reading and minimizing the errors. Then the results of each percentage specimens were compared with each other to see whether the steel slag fulfilled the characteristic of natural aggregate in the mixture and at what percent it shows the best result. At last, the test provided the satisfactory results.

Keywords: Steel Slag, Bituminous Mixture, Aggregates, Stability, Utilization

Title: Laboratory study on the effect of Plastic Waste Additives on Shear Strength of Soil

Guide: Prof. V. D. Kamble.
Students: Mr. Onkar Shashikant Bandbe, Mr. Shubham Prakash Bhalekar, Mr. Prajwal Santosh Darde, Mr. Pratik Sanjay Devare.

Abstracts:

The quality and life of any auxiliary material relies upon its establishment. Consequently soil is the basic component deciding achievement of any development building project. As the plenitude of soil stores in nature exists in incredibly unpredictable way in this manner a boundless assortment of blend affecting quality alongside different characteristics .Therefore understanding the designing properties of soil is significant for quality and economy. Soil adjustment is the way toward expanding steadiness of soil alongside expanded quality for constructional purposes. Soil is the essential development material as it underpins the foundation of any structure and it is subgrade of asphalts. Once in a while the dirt present at proposed development area may have poor bearing limit and higher compressibility or now and then unreasonable growing if there should arise an occurrence of sweeping soil like dark cotton soil. From the above results we have conclude that, the addition of plastic strips with varying percentage in soil increases un-soaked CBR of soil as compared to untreated soil The test result shows that maximum value of CBR is obtained for an optimum plastic content of 2% and 4%. The CBR of soil decreases with partial replacement of soil with plastic strips with 6% and 8%. For best results use 4% of plastic content and plastic strip size of 5mm by 7.5mm, with lateritic soil.
Keywords: soil, plastic strips, CBR, lateritic soil.

Title: Ground improvement using bottom ash for WBM road

Guide: Prof. S.S. Patil
Students: Mr. Abhishek Pravin Malgaonkar, Mr. Shrinath Krishna Mene
Mr. Unmesh Rajendra Mhalim, Miss. Shraddha Sharad Mohite

Abstracts:

Bottom ash produced from coal-fired power plants has been utilized in engineering Applications for the purpose of recycling and solving disposal issue of bottom ash. This study reviews various applications of bottom ash in engineering fields. The engineering properties exhibited by bottom ash in terms of free draining, granular, lightweight and interlocking nano structures allow them to be used for different functions. The bottom ash used is not limited to its raw state, but can be mixed and modified for advanced applications without neglecting the impacts on the environmental. The presence of metals in bottom ash are well known and being discussed whether they are harmful to the environment. Many countries have their own threshold limit of maximum contaminants, hence TCLP result will determine the hazardous status of bottom ash. This review helps in promoting the solution and potential usage of bottom ash, since coal is one of the utilization of coal bottom ash in civil engineering is one of the most promising options to reduce, or possibly eliminate, the environmental and social problems related to the disposal of bottom ash. This study reviews the traditional and state-of-the-art utilization technologies of bottom ash in the field of civil engineering. It covers the production and characteristics of bottom ash, case studies of its conventional applications as a simple replacement of natural resources and advanced applications for special purposes, and environmental considerations for both raw bottom ash and its applications. This review is intended to stimulate and promote the effective recycling of coal bottom ash in the civil engineering field.
Keywords: Bottom ash, coal-fired, nano structures, TCLP

Title: Modification of stepped spillway in hydraulic investigation

Guide: Dr. Amardeep D Bhosle
Students: Mr. Gijjewar Mahesh Ramesh,Mr. Alim Mushtaq Humdulay Mr. Parkar Hasan Abdul Rauf,Mr. Pulekar Pratik Vijay

Abstracts:

The terminal structure of a spillway plays a major role in dissipating specific energy of excess flood to safeguard the river channel and downstream structure. The ogee profile spillway is hydraulically efficient, structurally stable and more adequate to dispose excess flood effectively on downstream end of river channel. This spillway will be helpful to control the erosion, scouring and pondage if suitable energy dissipater provided at terminal structure.
Due to high discharge of excess flood there are chances of causing erosion on Spillway bed, which is a major problem to affect the spillway capacity. Excess air entrainment causes positive pressure on spillway bed and helpful to achieve maximum energy dissipation by replacing ogee profile by steps. But there are chances of erosion on the nosing of steps which ultimately leads to the failure of structure so to reduce the erosion on nosing and maintain the minimum energy dissipation the sharp edges are converted into curves at specified radius.
Even to maintain the maximum head so that hydroelectric power can also be generated. Therefore, after testing we can conclude that this device is best suitable for energy dissipating device to overcome the spillway problems by enhancing minimum energy dissipation or not.

Keywords: - Ogee spillway, terminal structure, roller bucket, steps and energy dissipation.

Title: Seismic analysis of structure (Civil department) using sloped bottom tuned liquid damper

Guide: Dr. Amardeep D Bhosle
Students: Mr. Baing Tanmay Prakash,Mr. Bhabal Kunal Santosh,Mr. More Vighnesh Vikas,Mr. Yelonde Prasad Babaram

Abstracts:
Tuned Liquid Dampers is a structural vibration control device against environmental hazards such as earthquake. The TLD damper is an effective vibration control device with high volumetric efficiency, consistent behavior over a wide range of excitation levels and a definite, quantifiable damping mechanism. Tuned Liquid dampers are generally rectangular and are installed at the roof level. Tuned Liquid Damper is a passive damper which is essentially a tank partially filled with liquid, designed to suppress undesirable structural vibration through
the liquid sloshing in the rigid tank. The vibration energy is dissipated by means of friction in the boundary layers of the fluid, contamination of the free surface (adding floating objects), sloshing and wave breaking, thus increasing the damping of a structure. A structure with TLD attached to it and subjected to base motions is formulated. Only translation motion of the TLD has been included in the formulation. In subsequent chapters, the TLD-structure system is analyzed for harmonic base motion using a computer program developed with the formulation.
the design parameters which control the performance of TLD namely depth ratio, mass ratio and tuning ratio have been presented. Need for improvement over flat bottom TLD and TLD design steps are suggested. Structural properties and TLD parameters mass ratio and depth ratio are investigated. A mass ratio is analyzing for damping ratio to investigate effectiveness of flat bottom tuned liquid damper. From the study optimum depth ratio was found out. For different structures Percentage reductions in peak structural acceleration for structures with TLD for different mass ratio are found out. Also effect of mass ratio, depth ratio and damping ratio was studied.
Keywords - TLD -Tuned Liquid Damper, sloshing, damping ratio, depth ratio, mass ratio, Seismic Control.

Title: Estimation of Rainfall Errosivity Factor Using GIS in Konkan Region River Basin

Guide: Prof. V.R. Kasar
Students: Ms. Ketaki Vilas Gurav, Ms. Naina Vivekanand Naik, Ms. Asmita Dilip Pendhari, Ms. Rachana Dashrath Uttekar

Abstracts:
Rainfall erosivity is a measure of the erosive force of rainfall which represents the potential of rain to cause soil erosion. A large proportion of the total eroded soil in India is due to erosion by water, and rainfall erosivity is one of the major components. Remote Sensing (RS) and Geographic Information System (GIS) techniques have become important tools as they evaluate erosion at larger scales due to the required amount of data and wider area coverage. The rainfall erosivity factor (R) values for the study area were calculated using equation. We have selected Vashishti River as ourstudy area to find rainfall erosivity. The R factor, which is one of the important elements of RUSLE equation with long years average precipitation data was determined using Wischmeier and Smith (1978) equation. The (R) factor is mainly depended on precipitation data. The 16 years (2006-2021) rainfall data is derived from the four stations situated in Ratnagiri district. i.e. Chiplun, Khed, Guhagar and Dapoli. GIS techniques were used to model rainfall runoff erosivity (R) factor for Vashishti river basin. Rainfall erosivity map was generated. Results revealed that the average R-Factor value ranged between 18648.99 to 44920.47 MJ.mm/ha/hr/y in Chiplun; 15891.24 to 64017.17 MJ.mm/ha/hr/y in Dapoli; 15081.84 to 45952 MJ.mm/ha/hr/y in Khed and 7607.97 to 41884.86 MJ.mm/ha/hr/y in Guhagar. The highest rainfall erosivity value experienced in Dapoli and lowest in Guhagar.

Keywords: Rainfall erosivity, Remote Sensing (RS), GIS, RUSLE, Vashishti River

Title: Case Study of Land Use Land Cover, Slope Length and Steepness Factor of Konkan River Basin by Using QGIS software

Guide: Prof.V.R.Kasar

Students: Mr. Lankesh Ashok Chougule, Mr. Ajay Vijay Kale, Mr. Rahul Jagdish Kuwar, Mr. Siddesh Sambhaji More

Abstracts:

This case study examines the Land Use/Land Cover (LULC) and the Slope Length and Steepness Factor (LS Factor) of the Konkan River Basin using QGIS software. The study aims to assess the spatial distribution and variability of land use types and their influence on the basin's hydrological characteristics, with a particular focus on erosion susceptibility and water runoff. LULC classification was carried out using satellite imagery, while the LS Factor, a critical component for soil erosion modeling, was derived through a Digital Elevation Model (DEM) within QGIS. The integration of these datasets enabled the identification of areas prone to erosion, waterlogging, and other land degradation processes. The results highlight the relationship between steepness, slope length, and land cover types in determining the region's vulnerability to environmental changes. This study demonstrates the utility of QGIS as an effective tool for spatial analysis, providing valuable insights for sustainable land management and watershed planning in the Konkan River Basin.

Title: Morphometry Analysis of Vashisthi River Using GIS Software

Guide: Dr. Y.R.Kulkarni

Students: Mr. Abhyankar Karan Pramod, Mr. Jadhav Suyash Anant , Mr. Krishna Safal Valsan, Mr. Pednekar Aditya Pramod

Abstracts:
The morphometric analysis of the Vashisthi River basin was conducted using Geographic Information System (GIS) software to evaluate the physical characteristics of its drainage system. Various morphometric parameters such as stream order, stream frequency, drainage density, watershed length, shape factor, elongation ratio, compaction coefficient, infiltration number, fitness ratio, and mean bifurcation ratio were assessed. The study revealed that the stream order in the Vashisthi River basin ranges from 1 to 7, indicating a complex drainage network. The stream frequency varies between 0.11 to 16.24 streams per square kilometer, while the drainage density is recorded at 6.14 km/sq.km. The total watershed length of the river is 111.07 km. additionally, the shape factor of the watershed is found to be 5.58, suggesting a moderately elongated shape, while the elongation ratio is 0.48, indicating a more elongated basin. The compaction coefficient is calculated as 1.88, and the infiltration number stands at 50.23, reflecting the groundwater infiltration potential. The fitness ratio is 0.36, and the mean bifurcation ratio is 2.51, showing the hierarchical nature of the river system. These findings provide valuable insights into the hydrological and geomorphological characteristics of the Vashisthi River, which can aid in watershed management and planning.

Keywords: morphometric analysis, Vashisthi River, stream frequency, compaction coefficient, watershed management

Title: Improving properties of bricks by using fiber glass

Guide: Dr.Y.R.Kulkarni .
Students: Mr .Jadhav Saurabh Santosh,Ms. Khedekar Sanjita Ashok,Mr. Sange Asad Ahmed , Mr. Barkatali Mubeen Wasta.

Abstracts:
The construction industry is one of the world's most rapidly growing sectors. Concrete is a widely applied construction material in the construction industry and is critical to its success. Concrete is flow able while wet, but once set, it is tough and long-lasting. Concrete will be the most frequently used building material globally due to its diverse and favorable features. On the other hand, concrete has several undesirable features such as brittleness, poor fracture resistance, low impact resistance, and high weight. Therefore, there is a demand to enhance the concrete assets. To improve the tensile strength of concrete, glass fibers can be added to the Concrete mixture. When glass fibers are added into the Concrete mixture, there is a marginal improvement in the compressive strength of the concrete at 28 days. Experimental results have shown that the addition of a Percentage of glass fibers leads to an increase in the compressive strength, flexural Strength, of concrete. The best results at 0.3% of Glass fiber, the compressive strength of concrete is increased by 28% as Compared to conventional concrete.

Keywrds: fiber glass, Concrete, Glass fiber, strength of concrete, conventional concrete

Title: Comparison between Geosynthetic Clay Liner and Bentonite clay for Water Retention in Laterite soil

Guide: Prof. N.H.KOPPA
Students: Mr. Prathamesh P. Rathod, Mr. Swaraj Dinesh Shirke, Miss. Arpita Ashok Gavanang, Mr. Nikhil Subhash Nalawade

Abstracts:
In Konkan region, the high annual rainfall is around 3500 – 5000 mm, but still most of the part of region faces scarcity of water during non-monsoon seasons as maximum part of Konkan belt have present of laterite soil. In this red coloured soil, due to the porosity and high sand content resulting high rate of percolation and infiltration of water. In-other hands we are using Bentonite clay and Geosynthetic clay linear to prevent the infiltration of water in soil. After absorbing water, the sodium Bentonite dry particles have a lamellar and compact structure, and the number and size of the pores gradually decrease to spread the water evenly. In current trends, bentonite clay and Geosynthetic Clay Liners (GCLs) are widely used in different kinds of anti-seepage projects. Hence in our research we are utilizing Bentonite clay as an admixture in Lateritic soil and application of Geosynthetic Clay Linear for the prevention of seepage loss. After Completion of experimental work around 30% to 40% of water retention is achieved.
Keywords: Geosynthetic Clay Linear, Bentonite Clay, Laterite Soil, Water Retention Capacity.

Title: Improvement of Geotechnical Properties of Lateritic Soil by Using Fly Ash Aggregates

Guide: Prof.N.H.Koppa
Students: Shubham Mahendra Ambre, Kaushal Rajendra Jadyal, Sankalp Raju Kamble ,Sahil Dattaram Rasal

Abstracts:
The study investigates the improvement of geotechnical properties of lateritic soil by using fly ash aggregates as a stabilizing agent. Fly ash, a by-product of thermal power plants, was added to the lateritic soil in varying percentages (5%, 10%, 15%, and 20%) to assess its impact on the soil's shear strength and ultimate bearing capacity. The study primarily focused on the evaluation of the Soil Bearing Capacity (SBC) as a key indicator of soil improvement. Laboratory tests were conducted to determine the optimum water content and shear stress of the soil with different fly ash aggregate replacements. Results show that the addition of fly ash aggregates up to 10% significantly increases the SBC of the lateritic soil when compared to untreated soil, indicating an improvement in the soil's geotechnical properties. However, beyond a 10% replacement (at 15% and 20%), a decrease in SBC was observed. This reduction in SBC can be attributed to the weakening of the binding properties of the soil under optimum water content, which leads to a decrease in shear strength and follows a negative stress path. The findings suggest that the optimal percentage of fly ash aggregate for improving the geotechnical properties of lateritic soil is 10%.
Keywords: lateritic soil, fly ash, soil improvement, SBC

Title: Analysis and design of G+6 building by using different soil condition

Guide: Prof. V.M. Mali
Students: Pranay Sunil Kumbhar, Manish Chandrakant Repal, Sairaj Prashant Sawant,Anagha Dilip Jadhav

Abstracts:

This study presents the analysis and design of a G+6 building under varying soil conditions, with a focus on optimizing foundation design for both safety and economy. Different soil types, including red soil, were considered for foundation design to evaluate their impact on structural stability and cost-effectiveness. The study involves a comprehensive comparison of different foundation types, including footing foundations and pile foundations, based on the geotechnical properties of the soil. Results indicate that while footing foundations are more economical for typical construction, pile foundations offer a more reliable solution for buildings in red soil due to its lower bearing capacity. However, the use of pile foundations, though more cost-effective in the long term, may require skilled labor and advanced techniques, making them less favored in conventional construction. In contrast, box/raft footings, although less economical, are often preferred in conventional practice due to the relative ease of execution. The conclusion of the study emphasizes the need for careful consideration of both economic factors and safety requirements when selecting the appropriate foundation type for G+6 buildings, particularly in areas with less stable soil conditions like red soil.

Keywords: design, varying soil conditions, skilled labor, red soil, economic factors