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(Students Project Abstracts)

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Title of the Mini Project: Performance analysis of Intersection by using SIDRA Software

Guide Name: Prof. V. D. Kamble

Name of Students: Sami Surve, Pawar Harsh, Pandit Durva, Jadhav Manasi

Abstract:

This study presents a performance analysis of an intersection using the SIDRA software, a powerful tool for simulating and modeling the performance of road networks and intersections. The objective is to evaluate various performance indicators such as delay, level of service (LOS), queue length, and vehicle throughput under different traffic conditions. The analysis focuses on optimizing intersection design and signal timings to enhance traffic flow and minimize congestion. SIDRA, being a widely used software for traffic analysis, offers detailed insights into the operational efficiency of intersections by considering factors such as traffic volume, signal cycle length, and turning movement distributions. Results from this study show how adjusting signal timings and intersection geometry can lead to improvements in the overall performance and capacity of the intersection. This research provides valuable data for urban planners and traffic engineers seeking to improve traffic management and reduce delays at critical intersections, contributing to better transportation infrastructure planning.

Keywords: SIDRA software, Intersection, Queue length, Signal timings, Traffic flow

Title of the Mini Project: Waterproof concrete additives and their effects on Concrete Properties

Guide Name: Prof. G. D. Parulekar

Name of Students: Jadhav Sakshi, Kurulkar Granthesh, Jadhav Sakshi, Jadhav Manasi

Abstract:

This study investigates the effects of waterproof concrete additives on the properties of concrete, focusing on their ability to enhance durability and resistance to water penetration. Waterproof additives, such as crystalline admixtures, hydrophobic compounds, and other chemical agents, are increasingly used in construction to improve the performance of concrete in environments exposed to moisture, water pressure, and aggressive conditions. The research examines how these additives influence key concrete properties, including compressive strength, workability, water permeability, and long-term durability. Experimental tests are conducted to compare the performance of concrete with and without these additives under various conditions. The results show that waterproof additives significantly improve the concrete's resistance to water infiltration, while also maintaining or enhancing its mechanical properties. Additionally, the study highlights the potential for using these additives to prolong the lifespan of concrete structures, particularly in applications such as underground constructions, water tanks, and marine environments. This research provides valuable insights into the practical application of waterproof additives, contributing to the development of more durable and sustainable concrete materials.

Keywords: Waterproof concrete additives, Durability, Water permeability, Workability, Crystalline admixtures.

Title of the Mini Project: Development of sediment sampler of river basin studies

Guide Name: Prof. V. R. Kasar

Name of Students: Khopadkar Yash, Jadhav Prathamesh, Kamblekar Amar, Sawant Rajaratna

Abstract:

This study focuses on the development of an innovative sediment sampler designed for river basin studies, aimed at accurately capturing and analyzing sediment transport and deposition in river systems. The sediment sampler is engineered to address the specific challenges of monitoring sediment dynamics in varying flow conditions, sediment types, and riverbed characteristics. The research investigates the design, calibration, and field testing of the sampler, ensuring its effectiveness in collecting representative sediment samples from different depths and flow velocities. Key design features include adjustable mechanisms to handle varying sediment sizes, an efficient collection system to prevent sample contamination, and ease of deployment in diverse river environments. The developed sampler is evaluated for its ability to provide reliable data on sediment load, particle size distribution, and sediment transport rates. Results from field trials demonstrate the sampler's capability to enhance the accuracy and efficiency of sediment monitoring, offering valuable insights for river basin management, erosion control, and water quality studies. This tool contributes to improving the understanding of sedimentation processes and assists in making informed decisions for environmental protection and sustainable river management.

Keywords: Sediment sampler, River basin studies, Sediment transport, Sediment Deposition, River systems

Title of the Mini Project: Slope stability methods for landslides prevention

Guide Name: Dr. Y. R. Kulkarni

Name of Students: Mihir Oak, Ammar Chaugale, Salunkhe Siddhesh, Rathod Kiran

Abstract:

Slope stability is a critical concern in preventing landslides, which pose significant risks to both human life and infrastructure. Various methods have been developed to assess and mitigate slope instability, with the aim of preventing landslides and minimizing their impact. These methods encompass both traditional and modern techniques, ranging from empirical analyses and geotechnical investigations to more advanced numerical modeling and monitoring systems. Key strategies include slope reinforcement through vegetation, soil stabilization, the use of retaining structures, and the application of drainage systems to control water flow. Additionally, advanced technologies such as remote sensing, geophysical surveys, and real-time monitoring systems offer valuable insights into slope conditions and provide early warning mechanisms. The integration of these methods, along with ongoing research into the underlying causes of slope failures, plays a crucial role in designing effective landslide prevention strategies. This paper reviews the various slope stability methods and highlights the most effective approaches for preventing landslides, focusing on the balance between engineering solutions and natural processes.

Keywords: Slope stability, landslide prevention, geotechnical investigations, soil stabilization, slope reinforcement

Title of the Mini Project: Stability Analysis of retaining wall (Case Study)

Guide Name: Prof. N. H. Koppa

Name of Students: Divekar Prajakta, Khair Prashant, Mistry Prateek, Rasal Pranjan

Abstract:

Retaining walls are essential structures used to prevent soil movement and protect slopes from instability, particularly in areas where steep terrains are common. The stability of retaining walls is critical in ensuring the safety and longevity of infrastructure and preventing landslides or soil erosion. This case study examines the stability analysis of a retaining wall constructed for a road project on a steep hillside. The analysis includes evaluating various factors such as the wall's material properties, the slope's geometry, groundwater conditions, and loading from external forces, including traffic loads and seismic forces. Different methods of stability analysis, including limit equilibrium analysis, finite element modeling, and soil-structure interaction analysis, are employed to assess the wall's performance under various conditions. The case study further explores the potential failure modes of the retaining wall, including sliding, overturning, and bearing capacity failure. Recommendations for improving the stability of the wall, such as proper drainage systems, the use of geogrids, and soil nailing, are provided. This case study highlights the importance of comprehensive stability analysis in the design and maintenance of retaining walls, emphasizing both conventional and advanced engineering techniques.

Keywords: Retaining wall, stability analysis, limit equilibrium, finite element modeling, Soil-structure interaction.

Title of the Mini Project: Process and Design of Commercial Buildings

Guide Name: Prof. S. S. Patil

Name of Students: Shinde Siddhesh, Wadkar Akshit, Pujari Khemaraj

Abstract:

The process and design of commercial buildings involves a multifaceted approach that integrates architectural, structural, mechanical, electrical, and environmental considerations. This process begins with understanding the client's requirements, followed by site analysis, conceptual design, and detailed engineering planning. Key stages include the development of floor plans, building orientation, and space optimization to meet functional needs while ensuring compliance with building codes and safety standards. Structural design plays a critical role in ensuring the stability and durability of the building, with materials such as concrete, steel, and wood being selected based on load-bearing requirements and environmental factors. Additionally, mechanical and electrical systems, including HVAC, plumbing, and lighting, must be efficiently incorporated to provide comfort and sustainability. The integration of sustainable design practices, such as energy-efficient technologies, renewable energy systems, and green building certifications, is becoming increasingly important. The final stages of the process involve construction management, cost estimation, and project execution, ensuring that the building is completed on time and within budget. This paper outlines the comprehensive approach to the process and design of commercial buildings, focusing on both technical and aesthetic aspects.

Keywords: Commercial buildings, Building design, Architectural design, Structural Engineering, Mechanical systems.

Title of the Mini Project: Shear wall design of building by using ETAB software

Guide Name: Prof. V. M. Mali

Name of Students: Sutar Pranav, Mane Niket, Shinde Sushant, Mahadik Yash

Abstract:

E-TABS (Extended Three-Dimensional Analysis of Building Systems) is a powerful software tool widely used in the design and analysis of buildings. It integrates advanced analysis capabilities with an intuitive user interface, making it an essential tool for engineers in both the structural design and analysis of commercial and residential buildings. This project focuses on the use of ETABS for the design and analysis of a multi-story building, aiming to understand the structural behavior under different load conditions, including dead loads, live loads, wind loads, and seismic forces. The project involves modeling the building structure in ETABS, assigning material properties, and defining boundary conditions. The results from the analysis, such as the displacement, stress distribution, and member forces, are evaluated to ensure compliance with relevant building codes and safety standards. Additionally, the project explores the application of ETABS in optimizing the design by analyzing different structural configurations, such as the choice of columns, beams, and floor systems. The integration of ETABS with other tools, like AutoCAD for drafting and BIM (Building Information Modeling) for project coordination, is also discussed. This project demonstrates the efficiency of ETABS in providing accurate and detailed analysis, which ultimately aids in the decision-making process for structural engineers.

Keywords: E-TABS, Structural analysis, Building design, Multi-story building, Load analysis.

Title of the Mini Project: Sewage water treatment plant

Guide Name: Dr. S. K. Patil

Name of Students: Gangavne Nishant, More Shreeraj, Shinde Prathamesh

Abstract:

A sewage water treatment plant (STP) is an essential facility designed to treat wastewater generated from residential, commercial, and industrial activities before it is safely released back into the environment or reused. The process involves multiple stages aimed at removing contaminants, reducing pollutants, and ensuring that the treated water meets regulatory standards for discharge or reuse. The typical sewage treatment process includes primary treatment, which removes large solids and debris; secondary treatment, which focuses on breaking down organic matter using biological processes; and tertiary treatment, which further purifies the water through filtration, chemical treatment, or disinfection. In some cases, advanced treatment technologies like membrane filtration and reverse osmosis are applied for high-quality water recovery. Sewage treatment plants also play a critical role in controlling the spread of waterborne diseases, improving public health, and protecting aquatic ecosystems from contamination. This paper discusses the design, operation, and maintenance of sewage treatment plants, highlighting various treatment methods, emerging technologies, and the challenges faced in maintaining these systems. The importance of energy efficiency, resource recovery, and the integration of green technologies in modern STPs is also examined.

Keywords: Sewage water treatment, wastewater treatment, primary treatment, secondary treatment.