VELAGAPUDI RAMAKRISHNA SIDDHARTHA SCHOOL OF ENGINEERING

SIDDHARTHA ACADEMY OF HIGHER EDUCATION

An Institution DEEMED TO BE UNIVERSITY

(Under Section 3 of UGC Act, 1956)

(Sponsored by Siddhartha Academy of General & Technical Education), Vijayawada, A.P.

DEPARTMENT OF CIVIL ENGINEERING

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About the University:

In 2024, VR Siddhartha Engineering College was declared as a deemed-to-be university under Section 3 of the UGC Act, 1956 by Ministry of Education, Government of India. With a legacy of educational excellence, the institution's UGC-granted autonomy, renewed through 2027-28, provides a strong foundation for its transformation. Guided by a detailed 15-year strategic vision and a 5-year rolling implementation plan, Siddhartha Academy of Higher Education focuses on key areas such as academics, faculty recruitment, student admissions, research, ICT infrastructure, and administration, with specific annual milestones and measurable outcomes.

SAGTE, as a responsive educational trust, aligns with the Government of India's target of achieving a 50% GER in higher education by 2035. Siddhartha Academy of Higher Education, Deemed-to-be University, offers diverse undergraduate and postgraduate programs through its specialized schools, including Velagapudi Ramakrishna Siddhartha School of Engineering (B.Tech., M.Tech.), School of Management (MBA), School of Law, School of Science (B.Sc., M.C.A.), and School of Arts & Commerce (B.Com.). Envisioned to support interdisciplinary and multidisciplinary education for students' holistic development, the university aligns with the aspirations and requirements of NEP 2020 to equip students with the skills and knowledge essential for future growth and societal contributions.

About the Department :

The Department of Civil engineering of Velagapudi Ramakrishna Siddhartha Engineering College was established in 1977 at the inception of the college. The under graduation program was started with an intake of 60 later increased to 120 in 2007 and further increased to 180 in 2011. The Department started offering Postgraduate courses Structural Engineering from 1999 and Geotechnical Engineering from 2016 with an annual intake of 18 each. At the postgraduate level, we offer M. Tech. degree in Structural Engineering. The number of sanctioned students for B. Tech., and M. Tech. SE. are 120, and 18, respectively, per year. Currently, the department has 16 Ph.D. scholars. The department has state of the art advanced laboratories to cater the needs of students, research and consultancy. The department has total faculty of over forty-five, with fifteen doctorates and seventeen more pursuing PhD. The department takes pride in its highly experienced faculty specialized in all major specializations of Civil Engineering.

Department Vision :

To impart teaching, research and develop consultancy that serves the society and to strive continuously for excellence in education.

Department Mission :

To provide quality education for successful career and higher studies in Civil Engineering that emphasizes academic and technical competence in profession and research, effective communication, team work and leadership to meet the challenges of the society.

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1. PAPER PUBLICATIONS OF THE FACULTY

How does mine tailings slurry solids concentration affect stability of dam embankment slope?

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In view of many past failures of tailings storage facilities, practising engineers have been analysing current design guidelines for different elements of these facilities, including for tailings dams. In this paper, an attempt is made to investigate how varying tailings slurry solids concentration (cs) affects the stability of tailings dam embankment slope. To achieve this, elaborate two-dimensional limit equilibrium and finite element simulations were conducted and a steady-state seepage analysis was performed so as to obtain accurate free surface water flux through the slope. Initially, numerical analyses were performed for the downstream embankment slope when no material is retained upstream. Subsequently, with all parameters kept constant, the same slope was then checked when water is retained upstream, and finally for varying slurry solids concentration. Special attention was paid to the boundary between sedimentation and consolidation, defined as the solids concentration limit beyond which effective stresses start to develop. From the stability analyses performed, it is found that the factor of safety of embankment slope varies nonlinearly with total unit weight of the slurry. For coal tailings slurry, factor of safety reduced from 1.24 when water is retained to 1.15 when tailings slurry with cw = 60% is retained, representing a drop by 7.3%.

Experimental and analytical investigation of a model towards predicting the compressive stress–strain behaviour of Graded Glass Fiber Reinforced Concrete (GGFRC) using fibre reinforcing index

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The stress–strain behavior of graded glass fiber reinforced concrete (GGFRC) is a crucial factor in its performance and appropriateness for diverse applications. In the present study, experimental and analytical methods were used to develop a model for the stress–strain behavior of GGFRC under uniaxial loading. The experimental program is designed to investigate the impact of mono glass fibers (3, 6, 12, and 20 mm) with varying volume fractions (0.1%–0.5%) and graded glass fibers (combinations of 3 + 6 + 12 + 20 mm) on the behavior of concrete of M50 grade. By grading glass fiber lengths in the concrete, GGFRC's pre-peak strength and post-peak deformation have increased, allowing the composite to control the various scales of cracking. A uniaxial compressive stress–strain model has been developed utilizing the fiber reinforcing index to predict the stress–strain curves of GGFRC in compression. The fiber reinforcing index, which is a measure of the quantity of fiber reinforcement in the material, is used as a variable in the current model to observe how it impacts the material's behavior. This would help evaluate the material's behavior under uniaxial compressive loading conditions and then use that data to develop a mathematical model that can predict the material's response under other conditions. Finally, it can be concluded that there is a significant correlation between the experimental results and the proposed analytical model.

Comparison of environmental impacts of traditional geofoam and modifed geofoam made with silicon-rich agro-waste ash and recycled EPS composites

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Sustainable futures can be achieved by limiting non-renewable resource consumption and minimizing waste and associated emissions. Sustainable modifed geofoam (MGF) blocks made of sustainable materials contribute to sustainability goals from environmental, societal, and economic perspectives. This study aims to develop MGF blocks prepared by blending cement and rice husk ash (RHA) as a binding material, water, and recycled expanded polystyrene beads. RHA is a silicon-rich agrowaste ash that is used to partially replace up to 30% of cement. MGF blocks were prepared by mixing beads at percentages of 0.50, 0.75, 1.00, 1.25, and 1.5% by the dry weight of the binding material at different water/binding material ratios. The MGF blocks

were cured for 7 days, 28 days, and 56 days. This study compares the environmental impacts, energy consumption, and cost analysis of the production of traditional geofoam (TGF) and MGF blocks. MGF can reduce environmental impacts by about 80–95% compared to TGF. The MGF was found to be an eco-friendly, energy-efficient, and cost-effective material.

Assessing the synergistic effects of GGBS and glass fibre on expansive soil behaviour using response surface methodology

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Numerous techniques are available to improve soils characterized by inadequate shear strength, bearing capacity, and other swelling parameters, which can jeopardize the stability of several infrastructure projects. This study explores the potential of sustainable utilization of ground granulated blast furnace slag (GGBS) and glass fibres (GF) with varying quantities and aspect ratios. A unique approach was formulated to optimize additive dosages, incorporating a central composite design within the framework of Response Surface Methodology. This methodology was validated through both experimental outcomes and analysis of variance (ANOVA). Subsequently, the stiffness behaviour of the soil was assessed by conducting a cyclic triaxial test to determine the resilient modulus of both untreated and stabilized soil. The formulated methodology employs input parameters ranging from 0 to 30% for GGBS, 0–2% for GF, and 300 to 750 for GF aspect ratio, while the output response is characterized by unconfined compressive strength (UCS). Though the soil exhibited an increase in strength with GGBS, it also revealed an increased brittleness, which was proportional to the amount of GGBS added. The inclusion of GF was intended to counteract the brittleness resulting from the incorporation of GGBS into the soil, and the improved stress-strain response was evident in experimental outcomes of soil treated with both GGBS and GF. The formulated approach revealed the optimal values to be 24% GGBS and 0.78% GF, along with an aspect ratio of 512. The utilization of the optimal GGBS and GF-treated soil resulted in a significant 72% enhancement in unconfined compressive strength while indicating an approximately threefold increase in resilient modulus compared to the natural soil.

Advancing GIS map maintenance: change detection and update using ResU-Net: a case study on Chandigarh and Hyderabad cities, India

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India’s metropolitan cities have been growing rapidly for many years. To keep geographical information accurate and current, it is essential to update GIS maps. Traditionally, experts have analysed new data sources and made necessary adjustments to the maps manually. Such manual monitoring is a laborious test both economically and in terms of workforce. Geographical data are transformed into digital maps by GIS

mapping, making it simple to spot patterns, trends and linkages. Extraction of humanmade objects, such as roads, water bodies and buildings, from remotely sensed imageries holds significance in various urban applications, including urban land-use and land-cover assessment, geographical database updates and change detection. Cartosat-3 data can provide detailed information about buildings and their changes over time. Additionally, GIS maps are manually updated by rasterizing vector data. The suggested system consists of ResNet and U-Net architecture as its core. The bi-temporal images are initially coregistered to completely align 2020 and 2022 satellite images with respect to the coordinates. Buildings are then segmented using U-Net with ResNet as the backbone, and the resultant segments are converted from raster to vector format. The suggested model has been tested and trained using the Chandigarh dataset, which resulted in an accuracy of 95%.

Analysing the influence of ground granulated blast furnace slag and steel fbre on RC beams flexural behaviour

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This study examines the effect of Ground Granulated Blast Furnace Slag (GGBS) and steel fibres on the flexural behaviour of RC beams under monotonic loading. Various percentages of GGBS were used to substitute cement, namely 0%, 20%, 40%, 60%, and 80% and fbers were added to the concrete mix as 0%, 0.5%, 1%, and 1.5% of the volume of concrete. The load–defection behaviour of GGBS incorporated RC beams with fibres was compared with the control RC beam. Beams were tested under load control for 28 days and 180 days. The ultimate load of the GGBS-incorporated RC beam up to 40% cement replacement was found to higher than that of the control beam. The strength of concrete is reduced by 28% and 19% when cement was partially replaced by 80% of GGBS at 28 and 180 days, respectively, compared to control concrete without fbres. Further, the analytical load–defection response of GGBS-incorporated RC beams was determined by using several codes of practice, namely, ACI 318-11(2011), CSA A23.3-04 (2004), EC-04 (2004), and IS 456 (2000). The Codal provisions were primarily based on the effective moment of inertia, Young's modulus, and modulus of rupture, stiffness, and cracking. Average load–defection plots obtained from experiments were compared with the computed load–defection of analytical studies. It was found that the analytically predicted load– defection behaviour is comparable with the corresponding average experimental load–defection response. Moment curvature relations were also developed for RC beams.

Using Geospatial Techniques, Morphometric Investigation of The Nirguna (Bhikund) River Watershed In The Districts of Akola And Washim, Maharashtra, India

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The Nirguna (Bhikund) river watershed has been the subject of the current research, which was conducted by utilising the DEM, or Shuttle Radar Topographic Mission. The findings of the morphometric study show that the catchment of the Nirguna (Bhikund) river watershed, which covers an area of 726 sq. km, may be characterised as being of 6th order. The study areas upper and lower portions having dendritic drainage pattern show a lack of structural control and uniformity in texture. The elongated structure of the study area depicted by the values of various ratios like form factor and circulatory ratio. According to the mean bifurcation ratio, geological characteristics have less of an impact on drainage patterns than structural disturbances have on the watershed. A significant gradient may be seen in the longitudinal profile at the beginning, but when the river has eroded its base level, the gradient progressively flattens out. A significant portion of the research area is covered in impermeable rocks, which is the reason for the high runoff, according to the data for the amount of infiltrations, frequency of streams, intensity of drainage, and texture of drainage. Therefore, understanding the effect of catchment characteristics on runoff concerning water harvesting would be helpful.

Evaluation of Customers Purchase Decision Impact on Branded over unbranded Apparel Analysis

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Clothing Shoppers across Indian metros and networks and urban territories are continuously demonstrating their inclination towards western put on, thusly boosting the can foresee checked clothes, making it the quickest making instructions across numerous garb walls. In fact, even inside the Traditional put on partition women, western wear is getting the balance. This paper deals with the consumer's tendency for checked

clothing and its well-known network is to recognize the consumer renovation levels closer to the stamped dress. The main network is to find the reasons in the back of the emblem care and emblem upkeep on diverse manufacturers and how clients get pulled in to clothing manufacturers and what number of customers is making an intermittent buy in this brand and no longer shifting to other logo purchases. The evaluation is directed to know Retention, Perception, and Awareness of the consumer of attire with a model size of a hundred and ten and offers with all age bundles and Occupation of clients in the market. The rule objective of this evaluation is to recognize the consumer's lifestyle, Income degree, Perception, direct about the clothing brands. The critical difficulty perceived is best, Price, Designs, crisp introductions, Advertisements. It moreover makes a specialty of acknowledgment, Awareness, Brand Retention of the Customers in Retail shops and Branded Show rooms at Hyderabad, Vijayawada, and Guntur.

Morphometric analysis of Bembla sub-basin in Maharashtra using Remote Sensing and GIS based techniques

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The present study aims to demonstrate the use of remote sensing and GIS based tools and techniques in analysing and maintaining water resources. Morphometric analysis involves evaluation of the linear and spatial aspects like drainage area and relief of a basin to better understand the properties and geomorphological controls of the basin. The Bembla river is a VIIth order stream and a tributary of Wardha River.The Bembla sub-basin covers an area of 3040 km2. Morphometry of the Bemblasub-basin indicates that the drainage basin is slightly elongated. The Bemblasub-basin is of low relief and has a coarse drainage. The basin overlies relatively impermeable stratum with low peak floods and high storage capacity. The study was undertaken using a SRTM data coupled with ArcGIS tools to process the data which enables the calculation of terrain parameters like slope, relief, ruggedness and establishes their relationship withthe drainage network.

2. CONFERENCES ATTENDED BY FACULTY

Factors Affecting Improvements in Labour Productivity in Building Construction Projects—India

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The construction industry's productivity is mostly determined by three factors: labour factors, management methods, and external challenges. Over the years, various aspects affecting labour productivity in building sector have been identified. It is critical to understand the degree of productivity in order to design innovative methods to improve construction productivity. The objective of this paper is to find the improvement measures in labour productivity. This paper presents a combination of a literature review and a data analysis of questionnaire survey on the aspects of labour productivity. The identified productivity factors have been divided into five groups, i.e., communication, labour management, management factor, supervision and leadership, and use of construction methods. During the data collection, a total of 86 responses has been collected from various contractors, project managers, consultants, and site engineers working in the building construction sector. The analysis of the study provides a better understanding of productivity concerns in India and directs their efforts to enhance productivity for construction professionals.

Assessment of the Relationship between Undrained Shear Strength and Geotechnical Parameters for Sensitive Clays of Eastern Canada

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Eastern Canadian clays are characterized by high sensitivity and compressibility and warrant the need for an appropriate estimation of the undrained shear strength for a safe geotechnical design. A multivariate geotechnical database consisting of natural water content, Atterberg limits, undrained shear strength, effective vertical stress, pre consolidation pressure, and over consolidation ratio from 49 sites in Eastern Canada is compiled from literature for this purpose. The primary objective of this study is to analyse the dependence of undrained shear strength on the aforementioned parameters and propose a correlation that satisfies practical conditions through regression analysis. Bias and uncertainties of existing empirical correlations are assessed. A comparative study is also made with sensitive clays of Norway and Sweden. The results show the poor

correlation of Eastern Canadian clays with index parameters and their strong dependence on the stress history of the soil.

Stainless Steel-Reinforced Concrete (SSRC): A Review

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Reinforced steel corrosion in concrete and masonry buildings is so common that it has earned the moniker "Concrete Cancer" to describe the phenomenon. Corrosion causes many cracks and concrete spalling, eventually bringing down the lifetime of the building. RC buildings are more expensive to repair and maintain, and the resulting vibrations can be harmful to the sustainability of the remaining structure. Taking measures to reduce corrosion, such as raising the cover or applying anti-corrosion coatings, will result in larger section sizes, higher construction costs, and weakened bonds. Stainless steel is used as reinforcement because it is more corrosion-resistant, has a longer lifespan, and requires less maintenance. In comparison to regular steel, it has improved ductility and strain-hardening capabilities. While the cost of this stainless steel may be higher than that of mild steel at the outset, it will require far less upkeep over time. Compared to conventional RC buildings, the lifespan of those made with stainless steel reinforcement is doubled. More study is being devoted to this stainless steel-reinforced concrete because of the current emphasis on "Sustainable infrastructure." This paper provides a concise overview of the material and structural features of SSRC, an in-depth examination of the already available data, and a discussion of where further study is needed.

Site selection for solid waste management in Krishna district, Andhra Pradesh using GIS

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Solid waste management involves collecting and processing garbage. It also recycles products. Solid waste management helps determine the best ways to use industrialised garbage. Industrialization produces chemicals and other waste products that harm human health. Solid waste management reduces this impact. Waste management has several ways. This study examined Krishna district in Andhra Pradesh. This study collects soil and geological data. This study shows how GIS may be utilised for waste management planning. The result shows the solid waste management area. So, garbage management should be simplified.

Performance Assessment of Recycled Aggregate Concrete Blended with Supplementary Cementitious Materials and Steel Fibers: An Approach Towards Developing Green and Sustainable Concrete

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Though the term "sustainability" was heard frequently, few people understand its significance, which is to ensure human safety on the planet. Sustainability has many short- and long-term benefits and ignoring it will result in depletion of natural resources in the long run. In this context utilisation of by-products as well as waste materials into the concrete and thereby decreasing carbon dioxide emissions and virgin aggregate extraction will be a sustainable way of developing a green concrete. In this manuscript, an attempt has been made to develop green and sustainable concrete by including Recycled aggregate (RA), Fly Ash (FA) & Sugar Cane Bagasse Ash (SCBA) as supplementary cementitious materials (SCMs). Also, an attempt is made to access the effect of steel fibers (SF) on the concrete thus made. The variables of the study include RA content (0, 100%), FA content (0 to 40%) and SCBA content (0 to 15%) and SF dosage (0, 1%). The properties examined in the study include compressive strength, split tensile strength, flexural strength, water absorption (WA), and acid attack. The results of the experimental programme show that the use of SCMs and SF can significantly improve the mechanical strength and durability of Recycled Aggregate Concrete (RAC). The use of SCMs improved the durability of the mix by densification of the matrix whereas incorporating steel fibers improved the tensile characteristics of the mix significantly, which means that use of RA in conjunction with SCMs and SF improves the overall performance of the concrete and might be a green and sustainable alternative to plain concrete.

Time Period Determination for Shaft-Type Elevated Water Tank

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An elevated water tank is constructed to store water at a certain height in order to pressurize the water distribution system. Elevated water tanks are often built with framed or shaft-type staging. When the staging height exceeds 15 m, shaft-type stagings are often used due to the fact that they may be constructed with slip form shuttering. In either case, lateral load analysis dominates the evaluation of seismic vulnerability. According to researchers, the elevated tanks supporting system (staging) is an especially vital structural aspect of the tanks. This paper deals with the stiffness of shaft-type elevated tank stagings. This study focus on the stiffness determination from analytical formula to software model implementation. In this work, a shaft-type

raised water tank staging with varied time periods was taken to examine the difference in tank staging stiffness. It is observed that the conventional method which assumes staging stiffness calculation is very inaccurate.

The Influence of the Non-dimensional Slenderness Ratio on the Flexural Strength of Beams

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This paper mainly deals with the effect of the non-dimensional slenderness ratio (λlt) on a member's ability to flexural behavior, which was studied numerically using a wide range of built-up I-sections. Axial, bending, shear, and torsional stresses are frequently present during a complicated loading condition that is applied to thin-walled frame parts with extremely narrow open cross-sections and poor torsional stiffness. As a result, they frequently experience instability even before reaching their production capacity. One of the most common types of lateral torsional buckling (LTB) is a prevalent instability phenomenon related to thin-walled constructions. The results are drawn to the conclusion that the design methodology was decided Instead of section classification, the non-dimensional slenderness ratio (λlt) determines the type of failure. The design procedure for the flexural design strength of the member, when the $\lambda lt \leq 0.4$ the yield stress governs the flexural design strength, it denotes that the component can form plastic hinges and has the necessary rotational strength for the structure to fail due to the development of plastic mechanism. When the $\lambda lt > 0.4$ then the flexural torsional buckling strength governs the design bending strength, which means the member can't develop plastic hinges and the member failed before the process of the plastic mechanism's creation. As a part of the research, we are focusing on how the non-dimensional slenderness ratio affects the flexural capacity of a member. It was observed that even though the section was under the plastic section and compact section, the member failed before reaching its yield stress.

ssStudy on Properties of Alkali-Activated Concrete by Replacement of Fine Aggregate with Quartz Sand

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Concrete is an extensively used material in the construction of structures. Ordinary Portland cement which is used in concrete emits lots of carbon dioxide. Production process of OPC alone contributes to 3% of world pollution. To drop the usage of cement and also for the use of by-products from various industries alkali-

activated concrete (AAC) is used by replacing the cement with industrial by-products and using alkali activators, i.e., NaOH, Na2SiO3. The present study focuses on the mechanical and thermal properties of the alkali-activated concrete (AAC) with GGBS and fly ash as binders with NaOH and Na2SiO3 as activators and replacing fine aggregate with quartz sand.

Effect of Bio-cementation Process on Lightweight Bio-inspired Concrete

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Nowadays, the bio-cementation process is widely used in the field of civil engineering. It is acknowledged as a green choice to use bio-cementation as a bonding agent in building materials. Calcium carbonate for use in construction is produced by the bio-cementation process using microorganisms. The bio-cementation technique creates a binding in building materials based on a process called microbial-induced $CaCO_3$ precipitation (MICCP). MICCP is catalysed through cementation and hydrolysis of NH_2COOH (urea). By using urease enzyme, ureolytic bacteria produce precipitated $CaCO_3$. Calcium ions and carbon dioxide from urea combine to generate calcium carbonate. Bio-cementation process will also help to enhance the compressive strength by reducing water permeability. Bio-cementation is proved to be an eco-friendly technology in the various fields of engineering. An attempt was made to use the coconut shells (CS) as coarse aggregate (CA) in concrete. The effect of bio-cementation process on bio-inspired lightweight concrete was observed. The considerable increment in the mechanical properties was found when compared to normal concrete.

Experimental Study on the Substitution of Natural Sand with M-Sand and Incorporation of Steel Fibers in Concrete

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In recent years, gigantic structures like multi-story buildings, dams, bridges, and nuclear plants are constructed with high-strength concrete. However, concrete is brittle and has a lower tensile strength. When exposed to high temperatures, concrete loses some of its mechanical properties. Fibers were added to the concrete to lessen brittleness and enhance these mechanical properties at high temperatures. Natural sand is scarce and has negative environmental effects when it is taken out of riverbeds and other sources. To address these issues, researchers have looked into alternatives like manufactured sand (M-sand). To ensure long-lasting and sustainable constructions, improving the mechanical qualities of concrete has also been a priority. In this

study, the performance of concrete was examined after addition of steel fibers and MS and are added in place of natural sand. In this work M75 grade concrete was used. Various amounts of M-sand (0, 25, 50, and 75%) was used in place of natural sand. From this study concluded that M-sand is particularly cost-effective when utilized to achieve increased strength and replacing 50% of M-sand results in greater strength. The tensile strength of concrete is also increased by the insertion of steel fibers.

An Experimental Study on Vibration Induced by Dynamic Pile Load in an Adjacent Building

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Vibrations from different sources can propagate through the soil mass and excite the supported structures. Prolonged exposure to these vibrations might cause adverse effects on both the building and its occupants. These vibrations should be quantified and checked for the permissible limits, as recommended by the relevant standards. The vibrations induced in a building due to dynamic load tests on pile groups conducted in the vicinity were measured and reported in this article. Acceleration and velocity time histories were measured at the source of vibration and different floors of the nearby building. The vibration parameters, in terms of peak ground acceleration (PGA), peak ground velocity (PGV), pseudo-spectral acceleration (PSA), and predominant frequencies (*f*), were obtained from the recorded responses and compared with the maximum permissible limit recommended in the relevant standards and codes of practice. The results show that the predominant frequencies obtained from acceleration and velocity time histories were well within the permissible limits. However, a considerable amplification in the vertical component (Z) vibration was observed when compared to the lateral components (X and Y).

A Review on Impact Assessment of 3D Printing Technology in the Field of Modern

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Rapid urbanization necessitates the discovery of viable alternatives to conventional building practices. Traditional construction methods can no longer keep up with the growing demand for new structures and infrastructure. The development of environmentally friendly and cost-effective alternatives to conventional building practices has become an important objective. New technology and materials enable us to construct buildings that are more durable, less expensive, and more productive. In addition, by employing multiple strategies, we can create a built environment that is more adaptable to our changing needs. In recent years, the use of 3D printing technology in contemporary building construction has increased in popularity. The time and money required to construct a structure can be cut in half due to the advent of 3D printing technology, which

enables the rapid production of intricate structures and components. It is also used to create one-of-a-kind designs that would be impossible with more conventional construction methods. In this review, we are discussed about how 3D printing is currently being utilized in the construction industry, as well as its potential to save money and increase productivity, as well as its futuristic significance in the construction industry.

3. Patents granted

क्रम सं/SL No :044189969

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADEMARKS
GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

पेटेंट कार्यालय,भारत सरकार | **The Patent Office, Government Of India**

पेटेंट प्रमाण पत्र | Patent Certificate

(पेटेंट नियमावली का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	543381
आवेदन सं. / Application No.	:	202141025922
फाइल करने की तारीख / Date of Filing	:	10/06/2021
पेटेंटी / Patentee	:	1.Dr.V.V.N.Prabhakara Rao 2.Dr. Anuja U. Charpe

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *REINFORCEMENT OF MARINE SANDY SOIL USING TREATED GIANT REED FIBER AND PROCESS THEREOF* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख जून 2021 के दसवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *REINFORCEMENT OF MARINE SANDY SOIL USING TREATED GIANT REED FIBER AND PROCESS THEREOF* as disclosed in the above mentioned application for the term of 20 years from the 10th day of June 2021 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 27/06/2024
Date of Grant :

पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, जून 2023 के दसवें दिन को और उसके पश्चात प्रत्येक वर्ष मे उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 10th day of June 2023 and on the same day in every year thereafter.

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

ORIGINAL
क्रम सं/ Serial No. : 158778

पेटेंट कार्यालय, भारत सरकार — The Patent Office, Government Of India

डिजाइन के पंजीकरण का प्रमाण पत्र | Certificate of Registration of Design

डिजाइन सं. / Design No.	:	390349-001
तारीख / Date	:	14/07/2023
पारस्परिकता तारीख / Reciprocity Date*	:	
देश / Country	:	

प्रमाणित किया जाता है कि संलग्न प्रति में वर्णित डिजाइन जो *AI & IOT BASED PEDESTRAIN TRAFFIC DISPLAY* से संबंधित है, का पंजीकरण, श्रेणी 10-06 में 1.Dr. Siva Rama Krishna Uppuluri 2. Dr. Sri Ram Raviteja Prathipati 3.Dr. Yeswanth Paluri 4.Dr. Turumella Vijaya Gowri 5.Dr. Samanasa Krishna Rao 6.Chiranjeevi Tadi के नाम में उपर्युक्त संख्या और तारीख में कर लिया गया है।

Certified that the design of which a copy is annexed hereto has been registered as of the number and date given above in class 10-06 in respect of the application of such design to *AI & IOT BASED PEDESTRAIN TRAFFIC DISPLAY* in the name of 1.Dr. Siva Rama Krishna Uppuluri 2. Dr. Sri Ram Raviteja Prathipati 3.Dr. Yeswanth Paluri 4.Dr. Turumella Vijaya Gowri 5.Dr. Samanasa Krishna Rao 6.Chiranjeevi Tadi.

डिजाइन अधिनियम, 2000 तथा डिजाइन नियम, 2001 के अध्यधीन प्रावधानों के अनुसरण में।
In pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

जारी करने की तिथि :
Date of Issue : 29/02/2024

उन्नत की पंडित

महानियंत्रक पेटेंट, डिजाइन और व्यापार चिह्न
Controller General of Patents, Designs and Trade Marks

*पारस्परिकता तारीख (यदि कोई हो) जिसकी अनुमति दी गई है तथा देश का नाम। डिजाइन का स्वत्वाधिकार पंजीकरण की तारीख से दस वर्षों के लिए होगा जिसका विस्तार, अधिनियम एवं नियम के निबंधनों के अधीन, पाँच वर्षों की अतिरिक्त अवधि के लिए किया जा सकेगा। इस प्रमाण पत्र का उपयोग विधिक कार्यवाहियों अथवा विदेश में पंजीकरण प्राप्त करने के लिए नहीं हो सकता है।

The reciprocity date (if any) which has been allowed and the name of the country. Copyright in the design will subsist for ten years from the date of Registration, and may under the terms of the Act and Rules, be extended for a further period of five years. This Certificate is not for use in legal proceedings or for obtaining registration abroad.