VELAGAPUDI RAMAKRISHNA
SIDDHARTHA ENGINEERING COLLEGE
(AUTONOMOUS)
(Sponsored by Siddhartha Academy of General & Technical Education)
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About the College:

Velagapudi Ramakrishna Siddhartha Engineering College was established in the year 1977, as the first self-financing Engineering College in the composite state of Andhra Pradesh. The college is in Autonomous Status from 2006 onwards granted by UGC, permanently affiliated to JNTUK and approved by AICTE. The institute is accredited by NAAC with A+ grade in 2021. All the UG programs are accredited by NBA under OBE Tier-I format and 5 PG in Engineering programs are also accredited once. The institute was ranked at 178 in NIRF-2021, 156 in NIRF-2020 and 171 in NIRF-2019 by MHRD and also stood at good rankings given in various surveys by national magazines. The institute was ranked in band A' (6-25 Rank) in 'ATAL Ranking of Institutions on Innovation Achievements (ARIA) in 2020 and was ranked ‘Excellent’ band by MHRD, GOI in 2021. The college received AICTE - CII Indpact award from MHRD for best I-I-I in civil engineering and was rated platinum for four consecutive years 2017-2020. The institute is recognized as' SIRO' by DSIR, MST, GOI. This is the only private college granted with "Margadarshan Scheme " project by AICTE in the state of AP. The institute wad rated PLATINUM by AICTE-CII survey for the last four years. The college has 20+ collaborative labs & COE's supported by Siemens, Dassault, IBM, DST, NI. Oracle, Apple, CISCO etc., The college is offering consultancy services in A.P. and earned more than Rs.12 crores during the last 5 years. The institute received R&D projects worth more than Rs.5.0 crores for the last 6 years funded by UGC, AICTE, DST, DRDO etc. The college has a worthy placement record, competent faculty with more than 135 PhDs. The strong presence of Alumni was felt across the Globe as Entrepreneurs, CEOs, Academic leaders etc. Six departments of the institute were recognized as Research centres by JNTUK, Kakinada. The institute has more than 60 MOUs with industry partners and more than 1000 publications by faculty for the last 3 years in National, International Journals and Conferences. Industry relevant curriculum is offered involving MOOCs Industry based courses, Internship Skill development, and Personality Development & Student practice courses. The college has NSS & NCC units in the campus recognized by State and Central Governments. There are quite a good number of visiting and adjunct faculties from foreign universities and industry. The

Laboratories in the Civil Engineering department are also accredited by NABL which is rare in academic institutions.

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 with an annual intake of 18. 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 Thirty-nine, with nineteen doctorates. 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

Solidification/stabilization of copper-contaminated soil using magnesia-activated blast furnace slag

Sandeep Reddy1 · Rama Vara Prasad Chavali

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The effluents discharging from various industrial and anthropogenic activities may contain traces of heavy metals. In most countries, these effluents are being disposed into landfills or on the open lands or into nearby water bodies without any prior treatment which may lead to the leaching of heavy metals into the subsurface and causing heavy metal contamination in soils endangering humans and neighbouring ecosystems. Solidifcation/stabilization (S/S) is one of the most efficient and widely adopted techniques to remediate heavy metal-contaminated soils by employing various cementitious materials. In light of this, a novel alkali-activated binder, comprising ground granulated blast furnace slag (GGBS) and magnesia, was developed to remediate copper-contaminated soils through the S/S technique. Copper-contaminated soils are synthesized in the laboratory with three diferent copper concentrations of 0.5, 1, and 2% representing naturally contaminated, industrially contaminated, and very highly contaminated soils, respectively. Variations of index properties, engineering properties, mineralogical and morphological characteristics of uncontaminated and copper-contaminated soils treated with magnesia-activated slag binder are studied. Unconfned compressive strength of uncontaminated soils increased proportionately as binder content increased from 3 to 15%, refecting the development of binding gels by hydration processes, which is further corroborated by XRD analyses. Based on the stress–strain characteristics of these combinations, an optimum binder content of 6% was chosen for treating copper-contaminated soils. In the solidifed/stabilized contaminated soil, the XRD analysis revealed the emergence of tenorite (copper oxide) which indicates the precipitation and reduced solubility of copper. Overall, magnesia-activated GGBS has shown great potential in the remediation of copper-contaminated soils.

Automatic Fire Detection, Indication and Controlling System for Commercial Building Using Programmable Logic Controller

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In urban architecture, the lives and belongings of people begin to cause enormous casualties. An automatic fire alarm system is used to detect the fire in the house. This paper explores the framework for automatic fire warning, composition, and functioning. The fire warning system is a mix of several systems that work together to identify and alert people when smoke is a fire utilizing visual and auditory devices. Smoke sensors or heat sensors may trigger the alarm used in the fire alarm system. Alarms may either be engine bells or sounders or horns mountable on a wall. In keeping and controlling secure conditions and situations of all kinds, the fire alarm system plays a major role. However, it is understood that many modern fire alarms and detection systems can be operated at high costs. The device is collected by the fire alert sensor for fire, failure, and other signals that are sent to the submachine, The re-transmission of such data will be sent to the fire alarm control and then the controller, sound, and light alarm monitor, alarm and other equipment will start. The main aim of this Fire Alarm Management System is to create a fire control and deletion system with cost reliability in building automation using PLC. The BASS fire alarm control system has three major systems: (1) fire warning, (2) alarm and control, and (3) the equipment to open the door and the lift to the ground for security purposes. The fire detector is the warning machine. This machine has elements, such as a flame sensor, a smoke detector, and a heat detector, including bimetallic strips. The key aim of the analysis was the assembly of a PLC-based fire alarm system with a programmable logic controller and its output in the field of smoke and heat detection and its effect on the automatic alarm and sprinkling (PLC). For control and extinguishing of fires, this device is the most powerful.

Efficacy of an organic–inorganic hybrid phosphorus compound in corrosion mitigation of reinforcement steel in concrete. I. Gravimetric and electrochemical analysis

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Bis(hexamethylene)triamine-pentakis(methylphosphonic acid) (BTPMP) was investigated for its inhibiting action on corrosion of Fe500D reinforcement steel. Results of gravimetric studies inferred that 10 mM of BTPMP is effective in corrosion control of the steel in saturated calcium hydroxide solution tainted by chloride ions. According to the electrochemical studies, the interface of the metal/solution exhibits higher charger transfer resistance and lower constant phase element values in the presence of BTPMP. The open circuit potential (OCP) measurements indicate that the presence of BTPMP shifts OCP values of steel in concrete in positive direction. The nature of the film is protective as observed from prolonged time taken for failure of BTPMP-protected rebar compared with unprotected rebar during accelerated corrosion tests. Furthermore, it is observed that the bond strength between concrete and steel is unaffected by the inhibitor film.

ROLE OF OLIVINE AGGREGATE IN LIME AND CEMENT MORTARS FOR THE SEQUESTRATION OF ATMOSPHERIC CO2

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Construction industry is majorly criticised due to a great liberation of carbon dioxide (CO2) into the atmosphere. Researchers have identified various techniques to capture the atmospheric CO2. Nevertheless, the recognised methods have both merits as well as demerits. Thus, scientific communities are working on simple and easily exhibited ways of capturing atmospheric CO2. One such technique is the conversion of gaseous CO2 into stable calcium/magnesium carbonates. The present study was con- ducted to identify the carbon-capturing efficiency of olivine aggregate in cement and lime mortars. Olivine aggregate has a ten- dency to change its mineral structure under alkaline environment and it is able to interact with atmospheric CO2 to form a stable carbonate. Analytical techniques (XRD, TGA) were conducted to elucidate the formation of hydrated phases formed in both lime and cement mortars. The study concluded that the addition of olivine sequestered atmospheric CO2 and converted it into magnesium carbonate. Out of the lime and cement mortar, lime mortar captured a greater amount of CO2 and produced stable compounds.

Sulfate Attack on cement based materials: An overview

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This paper overviews the present understanding of sulfate attack on concrete and or cementitious materials (CBM), with importance on the sources, behavior, and deterioration mechanism. This paper considers the physical and chemical perspective degradation of CBM. Thus attempts to provide general guidance to diagnose the sulfate attack and its progress in the attack and consequences. The main factors for sulfate attack like the presence of carbonates, sulfates, moisture, and low temperatures ($<15^0$C) are discussed. The sulfate attack depends on the surrounding environment, atmospheric conditions, processing conditions of the CBM, and proportions and quality of the mixed ingredients. In conclusion, to understand the deterioration process by sulfate attack, the surrounding environment/site conditions and material composition of the CBM are to be considered for enhancing the service life of concrete/cement-based structures.

Energy-based approach to study liquefaction triggering in homogeneous and stratified soils under consolidated undrained cyclic loading

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Pore water pressure development through seismic effect is one of the key reasons for liquefaction failures in the foundations, dams, bridges, slopes and other vulnerable geotechnical engineering structures. The energy dissipation theories have provided a remarkable understanding of the pore water pressure generation inside a soil skeleton. In the present study, a series of consolidated undrained cyclic triaxial tests have been performed to evaluate the normalized dissipated energy (Wn) required for triggering liquefaction in both homogeneous and stratified soil specimens (prepared using silt interlayer) to replicate the site conditions nearby marine or alluvial deposits. The generated hysteresis loops using cyclic loading facilitate the calculation of dissipated energy. Also, the test results indicated a significant variation in the dissipated energy of homogeneous specimens at different magnitudes of cyclic stress ratios (CSR) and relative densities (Dr). With an increase in the cyclic stress ratio from 0.14 to 0.20, the trend of dissipated energy was observed to be different when

relative density of sand varied from 30% to 65%. In the stratified specimens, thickness (t) and location of the silt layer (d) in the given soil specimen were the major influencing factors for estimating the liquefaction potential in loose conditions. Additionally, the highest value of Wn,max was obtained as 0.51 for the stratified specimen with topt = 28 mm at a cyclic stress ratio of 0.14. Based on the trendline variations, empirical models have been developed to estimate the normalized dissipated energy (Wn) for both homogeneous and stratified conditions. The developed models for homogeneous specimens are functions of CSR and Dr, whereas, in the case of stratified specimens, t, d and σd/ σ'c (σd = deviator stress, σ'c = effective confining stress) have been utilized to predict the Wn with an satisfactory R2 value above 0.90. From the analysis of liquefaction resistance curves, the energy-based approach used in this study has been observed to provide more realistic results than the pore pressure ratio and strain-based failure criteria.

Self-adaptive penalty approach as an alternative technique for lateral load analysis of framed type elevated water tank stagings

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Elevated water tanks are vulnerable to lateral loads since heavy mass is concentrated at the top of the slender supporting staging. For the prediction of lateral loads due to earthquakes fundamental time period of tank stagings is essential because it influences the value of the acceleration coefficient from the response spectrum graph. Time period in turn depends on the lateral stiffness of the framed type tank staging. Staging in elevated water tanks is more flexible to lateral loads up to top panel and behaves rigidly above it due to rigid connection of heavy mass which is placed over top of the staging with massive ring girder and monolithic connection of side wall and bottom slab. This rigid behavior will establish kinematic relations among the top nodal points of the staging with container when subjected to lateral loads. The rigid nature of the container and its lateral movement can be stared with the lateral movement of the centre of gravity of the container. Hence, in order to obtain optimum ideal behavior of the staging, centre of gravity of the container connected with top panel top nodal points of the staging with rigid links in the mathematical model. In the current study, Stiffness of the staging is being evaluated by kinematic relations between the centre of gravity point and the top nodal points of the staging using the penalty function approach. Appropriate penalty parameters are identified and have been applied to the elevated water tank staging with different configurations. This approach is much more precise, and it may be employed to design elevated water tank staging.

A Novel Wildfire Residue for Stabilization of Laterite Soil

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The annualized economic burden to United States in 2016 from wildfire is estimated to be between $71.1 billion and $347.8 billion. The cost of wildfire to Indian economy is at least USD148 million (₹1,100 Crores). One of the plants with high associated risk to wildfire is Calotropis Procera (CP). Thus, there is a great opportunity to explore materials which upkeep the good health of forest eco system, stabilize soil slopes in forest areas and serve as an alternative material for construction. Current research focuses towards application of various industrial wastes. There is a lot of scope for exploring the potential of re-using the residue collected from wildfires in the areas surrounding forest. There is an adequate scope to raise an alternative material to cement to reduce carbon emissions and achieve sustainability of resources used in the manufacture of cement. India has 10.6% of the hillslopes covered with laterite soils which are prone to frequent slope failures. In the present study, an innovative combination of materials “1) Ash of Calotropis Procera plant (Highly inflammable) – ACP (Derived from forest fires) and 2) Metakaolin – MET (An alternative cementitious material) were utilised to stabilize lateritic soil-LS. Proctor heavy compaction test was conducted to study the minimum water content required to achieve the highest value of unit weight of the resulting combinations. Various proportions of ACP used were “2%, 4%, 6%, 8% & 10%”. Various proportions of MET used were “0.2%, 0.4%, 0.6%, 0.8% & 1.0%”. Out of five combinations of Laterite soil(LS), Ash produced by burning Calotropis Procera (ACP), and Metakaolin (MET), the combination-3 i.e., LS+ 6% ACP + 0.6% MET gave rise to the highest value of unit weight in heavy compaction. The optimum moisture content achieved is 12% and the highest value of unit weight achieved is 20.8 kN/m3.

Experimental Investigations on Concrete with replacement of cement by reactive magnesium oxide and fly ash

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The durability performance of sustainable concrete that included reactive magnesium oxide (MgO) and fly ash (FA) was assessed in this study. Due to the sustainability advantages and decreased shrinkage, the partial substitution of cement with these two materials is an intriguing alternative for the building industry. The percentages of FA incorporation by partial cement replacement were 0%, 15%, and 30%. MgO was added to

concrete at different rates: 0%, 5%, 10%, and 20%. There were two different kinds of MgO utilised, one from Spain and the other from Australia. A comparison of these two materials' individual incorporations was made, and subsequently a comparison of their simultaneous usage was made. In all tests (water absorption through capillarity and immersion, carbonation depth, and resistance to chloride penetration), performance reductions ranging from 3% to 95% were found. Due to the gradual hydration of these two alternative materials, the performance gap between them and the reference concrete tends to narrow with time. It was discovered that the adverse effects did not overlap in the majority of the experiments. In other words, the performance losses brought on by the simultaneous integration of MgO and FA were less than the total of the losses brought on by each component's incorporation separately.

Evaluation of Shear Properties of Ultra High Strength Concrete

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In recent years, there has been a sharp increase in the use of ultra-high performance concrete (UHPC) as a substitute for conventional/normal concrete (NC). Its shear behaviour, which is crucial for creating design parameters for structural applications, is, however, little understood. 38 beam specimens, of which half were manufactured of UHPC and the other half of NC, were subjected to a thorough parametric analysis. Two different types of UHPC mixes, a proprietary and a generic mix, were employed to guarantee the applicability of the findings. While 20 of the beams were constructed and tested in Miami, Florida, the other 18 were created and tested in Tabriz, Iran. The shear span-to-depth ratio (0.8, 1.2, and 2.8), reinforcement ratio (2.2% to 7.8%), and reinforcement anchorage were test parameters. The types of concrete used were UHPC and NC. The cross sections of each specimen varied while having the same length. According to test results, UHPC specimens have substantially greater ductility and shear strength than NC beams. For shorter shear spans and larger reinforcement ratios, both normalised shear and shear strength increased. While improving the ductility of NC beams, the anchoring had little effect on UHPC beams. The necessity for a more precise evaluation of the shear strength of UHPC was confirmed by the relatively conservative results of theoretical shear strengths calculated using RILEM equations for UHPC beams.

Experimental Investigations on Hybrid Glass Fiber Reinforced Slag Fly Ash Blended Geopolymer Concrete

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In this study, the effects of various combinations and volume fractions of hybrid glass fibres (GF) addition on the characteristics of geopolymer concrete made with slag-fly ash blended are assessed. Two separate GF kinds (A and B) with lengths of 24 and 43 mm each were taken into consideration. GF were either fully or partially integrated. With an A:B ratio of 3:1, 1:1, or 1:3, and a constant volume percentage of 1%, three different hybrid GF combinations were employed. A GF hybrid combination with a 1:1 A:B ratio was used with three volume fractions (0.5, 1.0, and 1.5%). Workability, 1- and 7-day compressive strength, and 7-day splitting tensile strength were used to describe the performance. The outcomes of the experimental tests demonstrated that the addition of GF had a negative impact on the workability of geopolymer concrete. However, hybrid GF blends performed better than their equivalents generated from a single kind of GF. In addition, compared to the plain control mix, the inclusion of hybrid GF combinations boosted the compressive and splitting tensile strengths by up to 26 and 59%, respectively. The strengths improved as the hybrid GF volume fractions were raised by up to 1%. More long GF was added to the hybrid GF combination, resulting in the mix having a 1:3 A:B ratio, and exceptional strengths were seen. The results show that employing hybrid GF, the workability of slag-fly ash blended geopolymer concrete can be maintained while the hardened characteristics can be improved.

Mechanical Properties of High Strength Self Compacting Concrete Based on Rheological Mix Proportioning

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The main problem is to raise the standard of construction, rethinking concrete's expanding potential as a construction material. The scarcity of river sand as a fine aggregate ingredient is currently a widespread issue for many concrete plants. As a result, quarried stones that were accessible locally were used as fine aggregate. Crushed Rock Particles, also known as crushed sand, performs better in terms of fresh characteristics since there are more fines present in CRF than in river sand. The current study additionally examines the relationship between plastic viscosity and the fresh and hardened SCC properties. As a partial substitute for Ordinary Portland Cement, Fly Ash and Ground Granulated Blast Slag blends are used to generate binary and ternary. The experimental tests satisfactorily validate the suggested blend design. The results shown that SCC mixture with ternary blend, binary blend with GGBS, fly ash, and blend with pure OPC are suitable for creating fresh characteristics. Additionally, it was found that a cohesive and workable mix was produced when 100 % CRF was used in place of sand.

Production of Bio Briquettes from Gloriosa Superba Wastes-Turmeric Leaves (GSW-TL) with Cassava Starch Binder for Environment Sustainability

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Biomass briquettes were developed as an alternative to fossil fuels using Gloriosa Superba wastes-Turmeric leaves (GSWTL) with cassava starch binder to ensure energy security and address environmental issues. GSW-TL was mixed in various ratios ranging from 0 to 100% (w/w) with a 10% increment. As a binder, 10% (w/w) cassava starch was used. For the production of the briquettes, a compressed hydraulic system with a 90 s dwell period and a 200 kN compaction pressure was employed. The produced biomass briquettes were measured for their diameter, height, mass, volume, density, density ratio, relaxed density, relaxation ratio, texture, colour, and shattered index. Using EDAX/SEM, the presence of macro elements, micro elements, and the morphology of the produced biomass briquettes were investigated. The mass loss, heating values, exothermic peak, and endothermic peak of biomass briquettes were determined using thermal analysis (TGA/DSC). The development of biomass briquettes was found to have higher compression strength and calorifc value than

other biomass briquette samples reported in the literature (Comparison analysis). The current study validated the feasibility of producing biomass briquettes from GSW-TL with cassava starch as a binder.

2. CONFERENCES ATTENDED BY FACULTY

Case study: Ground Improvement technique with Geosynthetics as reinforcement on soft ground for building in coastal Andhra Pradesh

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Andhra Pradesh is a well-known coastal state in India, Some of the regions, the ground is soft clay in nature shows the soil has low bearing capacity and high compressibility characteristics, so ground improvement techniques may be a viable solution for the construction of any structure. Geosynthetics are the most often utilized reinforcing material in design of foundation in such soils. The significant design parameters are Modulus of subgrade reaction (K), California bearing ratio (CBR) and Modulus of elasticity (E). In Machilipatnam area, the soil is weak and having high compressibility characteristics. Hence ground improvement technique by using Geosynthetics (geotextile as separator, geogrid as reinforcement, GSB as a filling material) is adopted for two major project buildings. Field tests such as Modulus of subgrade reaction test, Plate load test were conducted over the improved ground to ascertain the quality of improvement. Furthermore, a correlation between K and CBR, E and CBR is established. The corresponding California bearing ratio values are correlated using IRC58-1988. A comparison was made over the untreated ground using correlation of E and CBR from others to know the behaviour of unreinforced and reinforced soils.

Comparative study of Conventional and other Filter Medium

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In this new era of urbanisation and industrialisation involving new constructions and other conveniences resulting in depletion of huge natural resources. In order to resolve this recurring issue, people have begun their research to find some vital alternative materials to save these natural resources from depletion. A natural resource such as river sand is used extensively in the filtration process of water treatment, which is essential for living. Hence there will be an urgent need to improve the performance of such treatment plants by carrying out appropriate modifications and improvements using other materials such as M- sand, glass etc. Utilization of M-sand not only eco-friendly but also resolves the issues related to, shortage of convention material. In this

paper, an attempt was made in regards to M-Sand and Crushed glass, which includes the study of their medium characteristics. In addition to them, Turbidity, Flow rate, Hardness, Sieve tests were conducted and their results are compared with conventional river sand medium.

The Role of Granite Waste Powder on Mechanical and Durability performance of GGBS and Metakaoline based concrete

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Industrial wastes such as granite waste powder (GWP), GGBS, and Metakaoline (MK) are widely available in numerous Indian states. Due to their pozzolanic abilities, GGBS and Metakaoline were used as a partial alternative to cement in the manufacture of concrete, with constant levels of 40% GGBS and 10% Metakaoline. In addition, to minimize the use of natural resources, granite waste was used as a fine aggregate substitute in various percentages (0, 10%, 20%, 30%, and 40%) on a weight basis, and a PC-300 Maximo-Plats super plasticizer with a dose of 0.3 percent was used to retain the essential workability. For this project, M45 grade concrete with a w/c ratio of 0.36 was used to assess the mechanical properties of blended concrete at the ages of 7 and 28 days. At 28 days of age, durability studies such as water absorption and RCPT tests were conducted. According to the experimental data, the optimum compressive strength of blended concrete was found to be at a 20% replacement of GWP.

A Review on the Utilisation of Silica Fume and Metakaolin as Novel Grout Materials

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One of the approaches for solving challenges related to foundations, open cut excavations, landslides, rock slopes, fractured rocks and tunnelling is enhancement of soil via grouting. Two main components of soil enhancement are reduced permeability and increase in strength. To overcome reduced

strength and permeability in soils and rock fissures, it has always depended on cement and lime treatment. To replace cement and lime, chemical and ultra-fine cementitious grouts are often employed to break through highly fissured rocks or fine sands. This document gives a censorious evaluation of chosen studies that used unconventional cementitious groutsin order to assist practicing engineers and promote best practice. In sand and cohesive soils, sodium silicate, colloidal silica, metakaolin,silica fume, flyash,resins, polymers, and microfine substitutes were evaluated as grouting material. The intent of the article is to procure effective data for consultants and contractors who will be building injection works that use non-cementitious fluids in the future.

Greener and sustainable self-compaction concrete: A review on performance at elevated temperatures

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Self-compacting concrete (SCC), highly flow-able engineer-friendly concrete that have moderate viscosity, low yield stress, good segregation resistance, and high deformability. SCC is a composition of high amounts of cement, mineral admixtures, fine aggregate, water, superplasticizer, and coarse aggregate. Mineral admixtures obtained from agricultural and industrial by-products and or waste materials are primarily used as filler materials and or pozzolanic materials for increasing the slurry or cementitious paste in SCC. Many high-rise concrete structures or plain concrete structures and or reinforced concrete structures are nowadays constructed by using SCC. Hence, considering its fresh and hardened properties, materials used, and importance in the construction industry, understanding the behaviour of SCC after exposure to elevated or high temperatures is of utmost importance and gaining attention. In SCC, explosive spalling was mainly caused by the stress developed, water to binder ratio and cement binder ratio. Higher amounts of powder content in SCC reduced the porosity and made SCC more vulnerable and susceptible to spalling. The strain values of SCC are enhanced by the increase in temperature. Higher reduction in strength values are observed with nondestructive testing than destructive tests. The scanning electron microscope of SCC revealed that the stiffness ratio between aggregates and cement matrix reduced with elevated temperature, which results in reducing the interaction transition zone. Finally, from the literature review, it may be concluded that the degradation mechanism of SCC when subjected to elevated temperatures is similar to the conventional concrete.

Ultrahigh Performance of Concrete using Manufactured Sand

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The resistance and durability of concrete structures can be improved by using ultra-high performance concrete (UHPC). A crucial component of energy conservation and concrete cost reduction is the use of locally available materials. In this study, the effects of a common type of locally accessible manufactured sand (MS) on the characteristics of UHPC were investigated from both a physical and chemical standpoint. The main objective of the current study is to use locally available materials to create a UHPC with a compressive strength of 100MPa. The impact of fine materials, binder type and content, mixer type, steel fibres, and curing regimes on the concrete's compressive strength was examined in this study. The use of high strength concrete has various benefits, including a reduction in the size of beams and columns and an increase in the height of buildings with multiple stories. In recent years, high strength concrete has seen increased use in civil engineering. By minimising non-homogeneity, porosity, and micro-cracks in the concrete and its zone of transition, high strength is made achievable. Super plasticizers and additional cementing substances such granulated blast furnace slag, silica fume, and natural pozzolana can be used to achieve it. Concrete with a high modulus of elasticity is strong. On cement, fine aggregate, and coarse aggregate, preliminary studies have been conducted. In the current study, 920KK is employed as a chemical admixture and silica fume is used as a mineral admixture. For M100 concrete, the w/c ratio is taken to be 0.25. The mix proportion for M100 grade concrete can be calculated by following the design process suggested by the ACI Method as 1:0.454:1.527.

A study on Real time strength assessment of concrete by maturity method

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The Nurse-Saul technique is employed to ascertain a member's strength. Because the concrete members' strength is being estimated in real-time concrete members. Using the Nurse-Saul maturity method, the member is precisely strengthened at a specific temperature, and after achieving its initial strength, the formwork is removed. The benefits of using the maturity process are covered, along with alternative methods for calibrating

indicator of maturity. the capability of a structure, which can be determined in a number of destructive (or) non-destructive ways, is a crucial component for a suitable operational condition in terms of conditional assessment. The maturity approach is one such nondestructive technique that delivers excellent outcomes. Usually, after a mixture has fully cured, test cylinders are cast to measure its strength. The results are then analyzed in a lab (3, 7, 28 days). This technique takes more time to ascertain the strength of a certain mixture. Using the maturity approach, we calculated the member's temperature and used that information to resolve the problem. Because this maturity process has already been employed by other researchers for standard concrete mix designs, this work will concentrate on unusual concretes. Due to the rarity of experiments on unique concrete, this process was tested using concrete blocks. As a result, this maturity approach is is a method for evaluating the strength of any concrete elements by measuring the temperature of the structure.

Evaluating the effect of steel fibers on the mechanical performance of high-volume fly ash concrete

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The construction sector contributes significantly to environmental degradation by completely depleting energy resources. Cement industry emissions are the most significant contributors to climate change along with global warming. To address this issue, researchers are investigating different materials with cementing properties thereby replacing the cement in concrete either partially or completely. Various materials such as different types of ashes and slags have been effectively utilized as cement substitutes thereby making the concrete sustainable. Partial substitution of cement with fly ash has a positive impact on the overall performance of concrete but the incorporation of fly ash at a higher volume into the concrete reduces its characteristics. The objective of this work was to improve the overall performance of High-Volume Fly-Ash concrete by incorporating steel fibers with varying volume fractions. From this study, it can be inferred that reinforcing with steel fibers up to 1.2% fiber volume has compensated for the negative effect of HVFA by improving the overall properties.

A study on the Water Proofing Behaviour of Fly Ash, M-sand and Dust based concrete with varying percentages of different Crystalline Admixtures

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For many years, concrete has been the most commonly used building material. When we focus on sustainable materials,long-term serviceability becomes an issue. There are methods for lowering risks and increasing service life. Crystalline admixtures, also known as permeability-dropping, are marketable products used in little concentrations in cement incorporated materials to enhance concrete durability and promote autogenous crack healing. This paper presents various investigations into the mechanical and long-term durability characteristics of concrete made with Fly ash, M-sand, Dust. In this study, fly ash is used as a 30% substitute for cement, M-sand and Dust is used as a 100% substitute for river sand and two types of crystalline admixtures with different proportions of 0%, 0.5%, 1.0%, and 1.5% were added to the mix. Cubes and Cylinders were casted by mixing M-Crete and Master Pel 760 crystalline admixtures for two grades, M25 & M35 and left for curing period of 28 days. Test methods include compressive strength, split-tensile strength, RCPT, % of water absorption and % of Voids. The test results showed that both crystalline admixtures with Fly ash at 0.5% produced better results and significant rise in compressive strength and tensile strength. Similarly, a decrease in percentages of RCPT, water absorption, voids was observed in both M25 and M35 grades. Finally, Master Pel 760 has shown better performance than M-Crete crystalline admixture. So, the above two crystalline admixtures have the potential to increase the durability and decrease the permeability of concrete.

Flexural Performance of Sustainable Fly Ash Based Concrete Beams

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The demand for concrete is high due to its solid strength and flexibility. To produce more concrete requirement of cement is very large. The production of concrete releases CO_2 into the atmosphere. This can lead to global warming. By including other substances that have a cementations tendency, cement consumption can be decreased. To lower the cement consumption in concrete, a variety of pozzolanic ingredients are being used. It is being investigated whether fly ash can replace cement. Flexural tests were performed on reinforced concrete beams with fly ash contents ranging from 0% to 60% and binder contents of 400 and 450 kg/m3 with

a water binder ratio of 0.4. The beam size is 100X200mm with a length of 1.2 m. It was observed that all the beams failed under compression in both mixes. In both, the mixer's depth of crack is reduced when compared with the fly ash incorporated beams with nofly ash concrete beams. The quick spread of the fracture is slowed down by the addition of fly ash to concrete. The filler effect, which aids in pore refinement and prevents the creation of cracks as well as the enlargement of propagated cracks, is initiated in the concrete as the fly ash content rises. According to the experimental findings, the load capacity of RC beams containing 30% fly ash is the greatest of all the beams. The outcomes for exhibit the same behaviour. Compression resistance. Finally, it was shown that, versus ordinary concrete RC beams, the inclusion of fly ash boosted the beam's capacity to carry loads by up to 40% fly ash replacement. Whenever the fly ash content is increased by up to 40% replacement, the RC beam's final deflection increases.

Mechanical And Durability Behaviour Of GGBS, M-sand Based Concrete With Varying Percentages Of Two Crystalline Admixtures – An Experimental Study

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This paper presents various investigations into the mechanical and long-term longevity parameters of concrete made with ground granulated blast slag (GGBS). In this experimental study, GGBS is used as a 30% substitute for cement, and two types of crystalline admixtures (CA's) with different proportions of 0%, 0.5%, 0.75%, and 1% were added to the mix. Cubes and Cylinders were casted by mixing Mcrete and Master Pel 760 crystalline admixtures for two grades, M25 & M35 and left for curing period of 28 days. Test methods includecompressive strength, split tensile strength, Rapid Chloride Permeability test (RCPT), Sorptivity, Percentage of water absorption, Percentage of Voids and carbonation. The test results showed that both CA's with GGBS at 0.75% produced better results and also significantly increased compressive strength by 12.08% for M25 grade and 16.04% for M35 grade, and tensile strength by 19% for M25 grade and 30.59% for M35 grade. Similarly, a decrease in percentages of 14.7 & 16.9 in RCPT, 8.52 & 11.19 in water absorption, and 11.34 & 10.01 in voids was observed in both M25 and M35 grades. Finally, Master Pel 760 has shown better performance than Mcrete Crystalline admixture. So, the above two CA's has the potential to increase the durability and decrease the permeability of concrete buildings, particularly those exposed to corrosive conditions.

Study On Behaviour Of Aluminium Metal Matrix Composite Reinforced With Silicon Carbide And Titanium Diboride.

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Advanced designed materials like metal matrix composites (MMC) consists of at least two constituent parts, a matrix and reinforcement of different materials such as metals, fibers, glass, organic compounds, or ceramics. An MMC can exhibit various enhanced properties like lightweight, high-specific strength and better ductility when compared with a single material. They have an advantage of the increasing mechanical and physical characteristics of the composite by varying the reinforcement percentages by volume fractions or orientation of fibers or laminates. The most popular materials such as aluminum, titanium, magnesium, and silicon carbide are possible reinforcement materials with aluminum as matrix. This work is mainly focused on study on behaviour of Aluminum Metal Matrix Composite, reinforced with Silicon Carbide and Titanium diboride for various kinds of loads and optimization for tensile strength and ductility. In this work two composite models of size 60µm * 60µm * 60µm with a reinforcement volume proportion of 20% of SiC and TiB2 were compared with the use of FEM tool (ABAQUS CAE). The tool is basically used for assigning different material properties such as young's modulus, Poisson's ratio, yield stress & different loads and to extract the results in the form of various stresses and strains on the modeled aluminum metal matrix composite (AMMC). The test results showed that the AMMC with SiC as reinforcement has better young's modulus and tensile strength than AMMC with TiB2.

Probability based Assessment of Soil Liquefaction Potential in Vijayawada Region (CRDA)

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Risks of liquefaction are commonly related to saturated cohesionless soils that have low plasticity and density. As liquefaction causes severe destruction to structures and risk of losing lifeline it is important to study the liquefaction potential for CRDA region because for the development of AP capital heavy structures are being constructed and a population increase is being expected in this region. In the current investigation, soil resistance to liquefaction was analyzed in each bore log in consideration of significant soil characteristics such as grain size, fines content, unit weight, saturation percentage, SPT Nvalue, and soil origin. The safety factor

for liquefaction is evaluated using data from several bore holes that were collected and used for this purpose. The approach recommended by Seed and Idriss was utilized to assess the safety factor for liquefaction. The obtained results from the semi-empirical calculations are further compared to the results obtained from Software for more reliability.

Analysis of Liquefaction Potential of Soils in Guntur Region (CRDA)

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In earthquake-prone areas that are susceptible, liquefaction is a severe natural hazard. Due to a rise in pore water pressure, soil liquefaction happens Due to the reduction in strength and stiffness of saturated and cohesion-less soil. By being rapidly loaded or shaken during an earthquake, soil can occasionally lose part of its strength. Liquefaction results in soil failures, which severely harm buildings supported on such grounds and incur large economic losses. Regarding the protection of both life and property, study of liquefaction potential is crucial. The aim of the study is to assess the liquefaction potential in the Guntur region. Understanding the liquefaction mechanism is necessary for a methodical approach to the improvement of capacities to evaluate the liquefaction potentiality of soil deposits & earth structures. So, utilizing the information from the (SPT), liquefaction analysis is done utilizing the strategy of the simplified approach described by Seed and Idriss. It is possible to determine a number of parameters, including reduction factor, cyclic stress ratio (CSR), cyclic resistance ratio (CRR), and liquefaction potential index. More detailed studies can be done by using software to acquire more accuracy.

Stabilization of black cotton soil with waste plastic and admixtures

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Black cotton soil is inorganic clay formed mainly in regions with poor drainage conditions. However, it is considered a problematic soil in the field of geotechnical engineering because it has high swelling and shrinking nature depending upon the weather conditions. So, one of the most common methods to improve the characteristics of the soil is the stabilizing procedure, which lessens soil settlement and can increase shear strength. The addition of lime is a common technique. It has been shown that adding lime to soil enhances its technical qualities. In the current study, an effort has been made to stabilize the soil by using PET (Polyethylene Terephthalate), Bagasse ash, and Rice husk ash in the percentages of 2 to 8 is used because it has a tendency

to enhance the black cotton soil's current qualities and also utilization of polymeric materials improves the eco-system and decrease the environmental pollution. As It is increasing day by day leading to various environmental concerns.

A review of fresh and hardened properties of concrete reinforced with waste materials

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The worlds demand on aggregates in construction is rapidly increasing from last few years, reason is mainly due to drastic economic growth of the Nations like Brazil, China, and India. Basically, this growth inspires the construction development and destruction activities. This study expresses the state of art of review on research of the industrial wastes which are polluting the environment. During the process of manufacture of several proportions and grades of concrete, nonconventional materials such as foundry sand from metal forging industry and tile dust produced by the tile industries were used to replace fine aggregate partial replacement of 10% - 50%, by weight of fine aggregate. It is found that compressive strength and flexural strength were increased up to 20% replacement of used foundry sand and 10% replacement of tiles dust with natural sand. Since the thickness of pavement slab is reduced, the cost of pavement construction is reduced almost 15% and 22% respectively for both type of alternative concrete mixes. Reuse of waste materials as a partial replacement of fine aggregate in concrete helps to achieve eco-friendly and sustainable development. Quarry dust is a flowable material used for ecofriendly waste for where the grade of conventional concrete is prepared. The mix of nano silica and GGBS with concrete (50 % GGBS, 46% OPC, and 4 % Nano Silica). The effects of reactive silicate and process variables like sodium content and molarity on the alkaline activation of various Nano clays and GGBS are investigated. Considering all the properties and materials partial substitution of 40% copper slag with fine aggregate is nearly equal to the strength of the conventional concrete. Among all other findings foundry sand and quarry dust of 20% and 10% proportions are used as a substitutional material in concrete got achieved adaptable strengths. In porous dam structures bentonite with high water cement ratio with aggregates produces flexible material used as a permeable layer.

Investigation of Mechanical Properties of M-sand concrete with Polypropylene and Steel fiber

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This study looks into the impact of the adding of polypropylene(pp) and Hooked-end steel (HES) fibre on the mechanical characteristics of M-sand concrete (MSC). HES fibres with a 30-mm length were used at 1% to the weight of the cement for every mix and Polypropylene(pp) fibers with length 12-mm were used at the content of 0.25%, 0.50%, and 0.75% and 1%. All the mixes were produced with the mixing of HES and pp fibers. All the mixes with fiber-reinforced concretes (FRC) contained 60% M-sand as fine aggregate (FA) replacement. For increment of workability, the super plasticizer is also added. The compressive strength, splitting tensile strength, flexural strength of the concrete mixes was examined for M30 Concrete. Results of this work indicated that the adding of the M-sand improves compression characteristics of plain concrete mix. The outcomes also show that the mechanical characteristics of MSC were amplified by the addition of steel (HES) and polypropylene (pp) fibers at each weight fraction taken into account in this investigation. Additionally, it was found that adding 1% steel fiber considerably increased the concrete's split tensile test values and also flexural test values. The blend with the highest performance out of all the varied steel and polypropylene(pp) fibre combinations tested had 1% HES and 0.5% pp fiber. Finally, the findings demonstrated that adding fibres to concrete led to reduction in compressive strength and increase in the value of split tensile strength and also flexural strength.

An Experimental Investigation on Self Compacting Concrete By Partial Replacement of Cement Using GGBS For Sustainable Construction

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The topic of substitution of cement for sustainable construction is defined a throw utilization of commercial by - products to mitigate depletion of intrinsic deposits, energy, as well as environmental contamination. A massive group of crushed grind kiln ash, which will be presently produced like a derivative of pig iron production, will have a significant influence on the environment and humanity. This research aims at the viability of employing GGBS as a substitute for cement in the production based on self-compacting concrete. GGBS can also be exploit as filler substance in self-compacting concrete to aid minimizes void content. In this journal, mortar has been supplanted with GGBS in the proportions of 0%, 25%, and 50% by mass of cement for the M-55 mix. The water/cement ratio (w/c) was found by progressive trial mixes, and selfcompacting concrete mixtures were created. The optimum mix is achieved with 25% of GGBS replacing cement after curing for 7, 14, and 28 days. As a result, employing GGBS in concrete decreases cement consumption costs and allows for the creation of long-lasting, environmentally beneficial structures.

Stiffness Method for Analysis of Foundations using Subgrade Modulus

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Analysis of foundations primarily requires the input from soil in two forms such as safe bearing capacity (SBC) and modulus of subgrade reaction of soil. When SBC is considered for analysis, the foundation is treated as rigid and when modulus of subgrade reaction is considered then the foundation is treated as flexible. It is usual that foundations for small structures are analyzed using SBC of soil but for large structures where economy plays an important role, the foundations can be analyzed with subgrade modulus reaction. When the column loads are high in soils with poor bearing capacity, raft foundations are preferred. In case of insufficient bearing area sometimes rafts are supported by piles. Sometimes, due to the poor bearing capacity of soil the foundations are difficult to analyze when raft foundations are supported by piles. In this paper an attempt is made to analyze the raft foundations resting on piles with the concept of subgrade modulus. Finite element is preferred for analysis of raft foundations with subgrade modulus. In the present work it is proposed to analyze the foundations using subgrade modulus theory with the help of stiffness method and will be compared with the finite element (FEM) software.

Study on Performance of RHS And Tapered Sections For A Multi-Bay Industrial Building

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The purpose of this research is to compare and contrast the utilization of Rectangular hollow section and Tapered section for a multiple-bay industrial construction. The many comparison fields primarily demonstrate cost absorption, time consumption, structural weight, and economy of both portions. The shear force and bending moment are computed in this analysis. In Visakhapatnam, a model with a height of 8 meters, a roof angle of 5.71 degrees, and bay spacing of 7.4 meters was chosen, and a comparison was made between a Rectangular hollow section and a Tapered section with the same size of building. Finally, the results reveal that tapered sections are more cost effective than the RHS. The structural weight of the RHS and tapered sections without crane is less than the RHS and taper section with crane.

Post Peak Energy Adsorption Enhancement of Glass Fiber Reinforced Concrete with Effect of Graded Fibers

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Potential use of short and long fibers blends in a concrete may enhance the properties at micro and macro scale of composite. The idea of combining the short length and long length fibers with different volume proportions to form Graded Fibers. It would aid in the prevention of micro and macro cracks, enhancing concrete's pre- and post-peak performance. The effect of adding Graded Glass Fibers with varying fibre lengths and volume fractions to Glass Fiber Reinforced Concrete is investigated in this work. The tests were carried out using M40 concrete with a 0.20 percent fibre volume. It contains Single length Glass fiber in Mono Fiber form (150 µm, 6 mm length and 20 mm length fiber), short length Glass fiber in Graded form (150 µm Micro length Glass fiber + 6 mm SLGF) and LLGF in Graded form (150 µm Micro length Glass fiber + 6 mm SLGF + 20 mm LLGF). This study found that Graded GFRC had a greater post-peak energy absorption capacity than Mono Glass Fiber Reinforced Concrete.

Removal of Fluoride Concentration In Water Using Natural Adsorbents

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The Regions of Nandigama and Kanchikacherla areas of Krishna District in Andhra Pradesh depend on ground water for drinking purpose. The Ground Water found to contain fluoride content in excess of drinking water standards set by World Health Organisation. Fluoride is harmful toxin which is rated slightly above Lead and if present in excess affects the digestive system, leads to Oster fluorosis, dental fluorosis to name a few. Various methods are available to remove excess fluorides for instance Nalgonda Technique, reverse osmosis ion-exchange, electrolytic defluorination, Donnan dialysis, contact precipitation and adsorption. Fluoride ahead of required amounts (0.6 to 1.5 mg/l) in drinking water is a main problem in large part of the world. Hence, understanding of its removal, using best modus operandi with optimum efficiency is considered necessary. Taking the intensity of the problem into consideration, this paper aims to provide a easy to use approach for removal of fluoride with low cost adsorbents from water. The aim of the project is to use adsorbents (Tamarind seeds, Drumstick seeds, Neem leaves, Rice husk, Peel Powders of Orange and Pineapple) to remove excess fluoride. Defluoridation depends upon several factors such as dosage, time of contact and PH Value. Effect of these parameters are studied and noted. From experimental results it was observed that the adsorbents can be used effectively to remove excess fluoride.

Evaluation of Seismic Vulnerability and Retrofitting of Existing Steel Buildings

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The current research focuses on seismic retrofitting of existing gravity-designed steel structures that are seismically weak. The research is based on three steel buildings that exist in India. To examine the capability of structures under seismic stresses, all structures are subjected to Non-linear Static Pushover and Dynamic Time History Analysis using SAP 2000. In the pushover study, the plastic hinges are allocated as per FEMA 356 criteria. For dynamic analysis, Elcentro Ground Motion is employed. The Pushover and Time History Analysis are compared to see how accurately the Pushover analysis forecasts the structure's dynamic reaction. The examination revealed that all the structures had been damaged, with the production of hinges exceeding the level of collapse prevention. In addition, all the structures' inter-storey drifts exceeded the IS1893 drift limit. Thus, each structure is converted using the most appropriate retrofitting procedures. The retrofitted buildings are also subjected to non-linear static pushover and dynamic time history analyses, and the results are compared to the un-retrofitted structures to determine the structure's resilience to seismic stresses.

Study On Existing Reinforced Concrete Buildings Seismic Vulnerability After Retrofitting

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The present study focusses on retrofitting of the seismically deficient gravity designed existing RC buildings. Four RC buildings which is existing in India were taken for this analysis. All the structures are subjected to Non-linear Static Pushover(PO) and Dynamic Time History(TH) Analysis using SAP 2000 to check the capacity of structures under seismic loads. The plastic hinges are assigned as per the guidelines of FEMA 356 in Pushover analysis. Elcentro Ground motion is used for dynamic analysis. The comparison is made between Pushover and Time History Analysis to check how closely the Pushover analysis estimates the dynamic response of the structure. The analysis showed damages in all the buildings with formation of hinges above Collapse Prevention (CP) level. Also, the interstorey drifts of all the buildings exceeded the drift limit as per IS1893. Hence, each building is retrofitted with different suiTABLE retrofitting techniques. Further, the retrofitted buildings are subjected to the Non-linear Static Pushover and Dynamic Time History Analysis and compared with the unretrofitted buildings to check the resilience of the structure under seismic loads.

A Review on Delamination and Wear Characteristics of Metal Matrix Composites

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Matrix composites (MMC) are advanced engineered materials capable of displaying lightweight, high-specific strength and higher ductility that possess excellent physical and mechanical properties. In these, the most commonly used materials like Aluminium, titanium, magnesium and silicon carbide. (AMMC) are potential materials in which aluminium serves as matrix. Because of its qualities such as strong strength, density, thermal conductivity and withstand wear, AMMC is in high demand. Because of inter-laminar stresses in combination with typically low thickness, strength, axial loading and natural frequencies, delaminating occurs and also there are other effects that cause wear. To reduce the delimitation and wear characteristics, different materials with selective properties are used as reinforcement to avoid the failure of the composite laminated structure. So, several techniques are used to access the severity of delimitation and wear characteristics. The purpose of this study is to present and review various characterizations of delimitation and wear from various works on metal matrix composites

Prediction of Concrete Compressive Strength by Machine Learning Technique Using Multivariable Regression Analysis

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The purpose of this study is to forecast the compressive strength of machine-mixed concrete. We are all aware that an experimentation study was conducted to analyze compressive strength using a Uni-axial Compressive Testing Machine. However, in this case, we studied and predicted utilizing Artificial Intelligence (AI). Nowadays, technology is advancing at a rapid pace in every organization, as we used to forecast the compressive strength of concrete grades using numerical modelling executed in a machine learning software. The compressive strength of concrete is primarily determined by the amounts of coarse aggregate, sand, cement, and admixtures in the mix. In this case study, the replacement of binding material is proportioned for the aim of renewable and sustainable without any trials or attempts, the compressive strength of concrete this can save time, manpower, and money. The findings can be discussed in further depth.

Investigation on Performance of GGBS Concrete by Incorporating Steel Fibers

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The consumption of cement and its manufacturing has expanded considerably as a result of increased infrastructure activity. Ground Granulated Blast Furnace Slag is the material used in this study and it ispartially replacethe percentages of cement at0, 20, 40, 60, and 80. In the view of this ordinary concrete of the ratio of 0.5is water to binder ratio, 350 kg/m3 cement was used. The Strength characteristics were assessed for various ages, and an increase of up to 40% replacement was recorded. However, beyond 40 percent noted that there was a reduction in strength. Concrete performance has been improved as the GGBS replacement rate increased. In the concrete mix Steel fibers are addedpercentages of 0.5, 1.0, and 1.5. The mechanical properties of fiber-reinforced mixes were measured after 28, 90, and 180 days. The steel fibers have been improvedbending, tensile strength of concrete, with respect to VF.A Rapid Chloride ion Penetration test used to assess chloride ingression inGGBS-based concrete at 28th and 180th days. The increase in the durability as the amount of GGBS in the concrete increased

Experimental Study on Physio – Mechanical Characteristics of Self-curing Rapid Hardened Concrete

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The traditional methods of curing need a huge quantity of water. Water shortages and high-rise construction make this more difficult to do. To maximize concrete's strength and durability, curing is a critical factor to consider. The concrete elements de-shuttering will be done on completion of its curing time to initiate its strength which normally take max of 14 - 21 days until the element attains the strength of twice the stress it observes at the time of removal of formwork. The time delays to attain the strength of the desired grade of concrete and its curing time to allow the hydration process has been addressed. Hence the idea is to cut short the setting time process and curing time process by use of admixtures and limiting the desired strength within the short period of 7 days and by avoiding the direct curing and allowing the concrete for its self-curing for it entire period of attaining its ultimate strength. The project is analyzed by taking basic concrete grade of M20, And M20 grade of concrete is verified with two different admixtures of Auramix-200 and Auracast 404 for its early strength with a percentage Ratios of 0.38 to 1.0% and evaluate the optimum dosage and suitable admixtures out of two selected. Trail mixes has been worked out for attaining early strength in short period of 1,3 and 7 days and after that the blending of the self-curing chemical is added and work out for the different combination to obtained for the optimum dosage of the combination for early strength attainment and self-

curing chemical to avoid traditional curing. The combination of early strength admixture Auracast 404 -0.4% and self-curing chemical Glycol- 4000 with 0.65% dosage has achieved to provide best results. With the optimum combination the results of M20 grade of concrete without curing has been achieved in 7days output.

Study on Performance of Concrete by Replacing Cement with Seashell Ash Powder and Fine Aggregates with Brick Powder

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This research analyses the strength and permanence attributes of M20 and M25 grade concrete by partially replacing cement with sea shell ash powder (Bivalve cockle shells) at levels of 5%, 6%, 7%, 8%, 9%, and 10%, respectively.In addition, around 20% of the fine particles are substituted with brick powder.Sea shells are part of the marine trash that accumulates on riverbanks and seashores every day.Seashells are high in calcium, which has cement-like binding qualities.As a result, this research is being carried out to determine the ideal percentage of sea shell ash powder and brick powder in concrete.The workability of concrete was shown to deteriorate as the percentage of sea shell ash powder was increased in this investigation.When seashell ash powder is replaced at 7% and brick powder is substituted at about 20%, the compressive strength of concrete is increased to the maximum. At the same percentages, the tensile and flexural strengths are at their maximum. Acid attack tests reveal that traditional concrete is durable, while the RCPT test shows that chloride ion penetrability is minimal.

Enhancing The California Bearing Ratio(CBR) Of Expansive Soil Using Shredded Waste Plastic

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Expansive soils are a problem that has been documented all throughout the world. They absorb water and swell duringthe monsoon, but they diminish throughout the summer due to evaporation. Lightly laden civil engineering structures such asresidential buildings, pavements, and canal linings are badly damaged as a result of this alternative swelling and shrinkage. Thisstudy looked into the use of expanding soil that has been stabilized using shredded waste plastic (PET). The issuewith expansive soil is that it expands when moisture is introduced and contracts when it dries. The project used discarded shredded plastic to mobilize the swelling and shrinkage traits of the soil, i.e., manipulate the OMC & MDD of the soil (PET). These characteristics can

be mobilized by using them. Through the mobilization of these characteristics, we can enhance the CBR values of the subgrade soil. The most CBR value is acquired via including 2% shredded waste plastic (PET), and the CBR values are mentioned similarly below.

Experimental Study of Expansive Soil Stabilized with Rice Husk Ash and Quarry Dust for Subgrade Application

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Expansive soil is brittle and unstable, making it unsuitable for any sort of construction. The subgrade is a layer beneath the sub base course of a flexible pavement. Improving the subgrade's engineering qualities is critical for making it stable. To improve the strength of subgrade soil, stabilisation of using Rice Husk ash (5%, 7%, 10%) and Quarry Dust (10%, 20%, 30%) is employed in this study. Identification of optimum dose of stabilizer is the prime objective of the study and analyzes the performance of admixtures. Various geotechnical tests like Sieve analysis, Atterberg limits, Proctor test for OMC, MDD and CBR tests are performed and evaluated the properties of natural soil and treated soil. The results indicate a greater increment in strength aspect in terms of CBR with Quarry dust where as results are not upto requirement for design of pavement when using rice husk ash as stabilizer. The pavement design as per IRC:37 -2018 of for traffic range carrying 5 to 50msa is done and results reveal using quarry dust the thickness of pavement is reduced considerably which decreases cost of construction.

3. Patents granted

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