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DEVELOPMENT OF GREEN BUILDING CONSTRUCTION SCHEMES TO REDUCE DEVELOPMENT FOOTPRINT IN BUILDING

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ABSTRACT
Green building is marked as economical, resource efficient and environmentally friendly compared to the conventional building. A green building depletes the natural resources to the minimum during its construction and operation. A construction activity generally confers to deterioration of the environment; this is due to the solid waste generated during construction. Production of carbon dioxide by occupants is also considered as a key factor. Due to this problem there is a considerable down terminal option of green building technology in construction industry. The main aim of this study is to set forth the factors influencing the adoption of green building. This study investigates the extent of adoption of green building concepts in commercial buildings and the key challenge sari sing from their adoption with the aim of determining appropriate strategies for implementing them. The study was conducted through survey method and used questionnaires, interviews, observations for data collection. In this paper a study is conducted which determines the concepts and strategies which can help to create awareness among people regarding the worth of green building and to promote green building practice for better environment.

INTRODUCTION
Green building practices are commonly defined by the areas of the environment they affect energy, water, site, air quality, and materials. Definitions of green building may range from a building that is "not as bad" as the average building in terms of its impact on the environment or one that is "notably better" than the average building, to one that may even represent a regenerative process where there is actually an improvement and restoration of the site and its surrounding environment. Also green building is defined as one whose construction and lifetime of operation assure the healthiest possible environment while representing the most efficient and least disruptive use of land, water, energy and resources.
The Environmental Protection Agency (EPA) defines green building as the practice of creating structures and using processes that environmentally responsible and resource efficient throughout a building's life-cycle from sitting to design, construction, operation, maintenance, renovation and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. It defines green building as the practice of increasing the efficiency with which buildings and their sites use energy, water, and materials, and reducing building impacts on human health and the environment, through better sitting, design, construction, operation, maintenance, and removal the complete building life cycle. The continued growth in population, industrial activity, resources use, and pollution could mean that standards of living would eventually decline. Climatic change and its attendant effects on the built environment is now widely accepted as being a reality today and have become a very serious problem facing humanity, some of the sea verse effects include: extreme weather conditions being experienced, increase in rainfall, flooding, building collapses, increased thermal discomfort in buildings, water shortages and draught, increase in cost of building construction and operation amongst others. Buildings are major consumers of natural resources and are therefore a natural focus when emphasizing the need to practice and make mandatory sustainable construction.

LITERATUREREVIEW
Syed khursheed Ahmad, et.al (2017) investigated the extent of adoption of green building concepts in commercial buildings and the key challenges arising from their adoption with the aim of determining appropriate strategies for implementing them. The study was conducted through a survey method and used questionnaires, interviews, observations for data collection. It also reviewed documented data from available records including journals and books. In this study, it is conducted to determine the main concepts involve in the construction of green buildings moreover the strategies are also discussed which can help to create awareness in between people regarding

EXPERIMENTAL INVESTIGATIONS OF MAKINGFLEXIBLEPAVEMENTOF LOCALLY AVAILABLE WASTE AS WELL AS NATURAL MATERIALS

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ABSTRACT

Every day, the discard waste plastics and many other mineral wastes like quartz powder, stone dust, marble waste etc., are dumped in the earth surface. It may cause environmental pollution. Now a days, many engineer and industries are investigating the possibilities of waste plastics and mineral waste inflexible pavement. An attempt has been made to use the plastic as aggregate coating in order to increase road performance and durability. Plastic wastes like low density polythene, polypropylene, polythene, Terephthalate are used. These waste plastics are cut into small pieces. Aggregate are heated to a certain temperature and the spread over the heated aggregate. Due to heating this plastic gets softened and forms a coating as layer over these aggregate. The result indicates that the 10%of plastic coated aggregate doesn't disqualify the material and no negative influence on the quality asphalt mixture. Even-though quartz stone powder used as filler material in asphalt mixture because they fill void sand enhances the cohesive property. Quartz is a mineral, which composed of sio $_2$ (silicon dioxide). It is the second most adopted mineral in earth continental crust. The durability of t he asphalt pavement is related to the appropriate proposing of mineral materials. Quartz mineral materials are used to enhance the asphalt mix quality. Bituminous mixtures are basically composed of aggregate of different sizes, fillers and bitumen. Fillers consist ofmineralgrainmostofwhich2.75mm sieve. Quartz powder may be of naturally available materials when derived from the crushing if quartz rocks. Discard waste plastics, quartz stone powder and a type of asphalt binder on the properties of asphalt mixture were investigated in this project. The result indicates positive influence on the quality of asphalt mixture. We used is carded waste plastic and quartz stone powder in more innovative and contributing in order to reduce negative impact of waste on environmental.

Keywords: *Waste Plastics, Bitumen, Aggregate, Quartz stone, plastic road*

INTRODUCTION

One of the most important infrastructures is Flexible Pavement. If there is any damage to this structure cause in convenience to the traffic, which ultimately affect future scenario of countries. Simultaneously, waste plastic disposal is extremely ever now a days. In order to improve the performance of the road surface. The plastic will be used for aggregate coating in order to increase road performance and durability. Due to the excessive usage of the plastic materials, the availability of waste plastic is enormous, as the plastic waste become part and parcel of daily life. Plastic wastes like Low Density Polyethylene, Polypropylene, polyethylene Terephthalate, Polystyrene are used. These waste plastics are shredded into small pieces. Dry process is followed here. Aggregates are heated to a certain temperature, and the shredded plastics are spread over these heated aggregate. These plastics get softened and form a coating slayer over these aggregates. Aggregates are coated with waste plastics up to 45% and tested. A property of aggregates gives good response to these coating. It shows better resistance to abrasion, Crushing, Impact, Water absorption test.

Bituminous mix is prepared and stirred well in order to get uniform mix, then quartz stone powder is weighted and added to the hot bitumen in different percentages. This quartz stone powder is used as a filler material. Until now, various fillers like cement, fly ash, egg shell powder, coconut shell powder, etc., are used. In the present study, an attempt has been made to use waste plastics as coat over aggregate and as quartz stone powder filler in bituminous mix. This mixture is laid on the road surface like a normal tar road.

One of the major concerns amongst these is safe and sound disposal of solid wastes. Bituminous mix is prepared with quartz stone powder waste upto 50% and plastic coated aggregates. Marshall Method is adopted for the mix design. India consumption of plastics grew every year and is set to be the world third largest consumer of plastic in this world.

Modified bitumen acts as multi grade due to their low susceptibility to daily and seasonal temperature variations.

STRENGTH STUDIES ON GEO-POLYMER CONCRETE BY USING FLY ASH AND QUARRY DUST

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ABSTRACT
The major problem the world is facing today is environmental pollution. In the construction industry mainly the production of Portland cement will cause the emission of pollutants results in environmental pollution. The alkaline liquids used in this study for the polymerization are the solutions of Sodium hydroxide (NaOH) and sodium silicate (Na_2Sio_3). Different molarities of sodium hydroxide solution i.e. 8M, 10M and 12M are taken to prepare different mixes. And the compressive strength is calculated for each of the mix. The cube specimens are taken of size 150mm x 150mm x 150mm.The Geo polymer concrete specimens are tested for their compressive strength at the age of 7days, mixes of varying sodium hydroxide molarities i.e.8M,10M and 12M are prepared and they are cured by direct sun-light and strengths are calculated for 7 days. The result shows that the strength of Geo polymer concrete is increasing with the increase of the molarity of sodium hydroxide.

KEYWORDS: compressive strength Geo-polymer concrete, physical properties, fly ash, quarry dust.

INTRODUCTION

For the construction of any structure, Concrete is the main material. Concrete usage around the world is second only to water. The main ingredient to produce concrete is Portland cement. On the other side global warming and environmental pollution are the biggest menace to the human race on this planet today. The production of cement means the production of pollution because of the emission of CO_2 during its production. There are two different sources of CO_2 emission during cement production. Combustion of fossil fuels to operate the rotary kiln is the largest source and other one is the chemical process of calcimine Lime stone into lime in the cement kiln also produces CO_2. In India about 2411.7 million of metric tons of CO_2 are emitted in the year of 2021. The cement industry contributes about 5% of total global carbon dioxide emissions. And also, the cement is manufactured by using the raw materials such as lime stone, clay and other minerals. Quarrying of these raw materials is also causes environmental degradation. To produce 1 ton of cement, about 1.7 tons of raw materials are required and the time taken to form the lime stone is much longer than the rate at which humans use it. But the demand of concrete is increasing day by day for its ease of preparing and fabricating in all sorts of convenient shapes. So to overcome this problem, the concrete to be used should be environmental friendly.

FLY ASH

Fly ash is manufactured by the burning of coal in an electrostatic precipitator, a by-product of industrial coal. The cementations properties of fly ash were discovered in late 19th century and it has been widely used in cement manufacture for over 100 years. In fly ash is supplied as a separate component for concrete and is added at the concrete at the mixer. It generally replaces between 20 and 80 per cent of the normal Portland cement.

QUARRY DUST

Now-a-days the natural river sand has become scarce and very costly. Hence we are forced to think of alternative materials. The Quarry dust may be used in the place of river sand fully. To overcome the stress and demand for river fine aggregate, researchers and practitioners in the construction industries have identified some alternative materials such as fly ash, slag, limestone powder and siliceous stone powder.

It is proposed to study the possibility of replacing sand with locally available crusher waste without sacrificing the strength and workability of concrete. Coarse aggregate of 20mm maximum size is used in Reinforced cement concrete work of all types of structures. This is obtained by crushing the stone boulders of size 100 to 150mm in the stone crushers.

AN ANALYSIS ON EMPLOYEE TURNOVER PROBLEM IN CONSTRUCTION INDUSTRY

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ABSTRACT
Employee turnover refers to the employees leaving an organization due to various reasons which can be voluntary or involuntary. The study focuses on voluntary turnover. Turnover intent acts as a precedent to turnover and hence the survey measures turnover intention as a precedent for turnover. The study has been conducted to understand the factors relevant to the career decisions of the professionals working in the industry and how well the factors are being fulfilled in the current scenario. The data was collected by a questionnaire survey to determine the relevant factors and their satisfaction levels. The importance of factors was assessed using Relative Importance index and correlation between importance. The factors and satisfaction were correlated to determine areas where improvement was needed to improve satisfaction and hence mitigate turnover intentions.

GENERAL
The construction sector is responsible for building houses, apartments, factories, offices and schools. It is also responsible for the construction of roads, bridges, ports, railroads, sewers, tunnels etc. In addition, the construction industry maintains, repairs and makes improvements on all those structures. The industry's significance lies not only in the fact that it provides buildings and infrastructure on which virtually every other sector depends, but also in the fact that it is such a sizeable sector in its own right. In India, the construction industry is the second largest industry next to agriculture. The Indian construction industry accounts for nearly sixty-five per cent of the total investments in infrastructure. Investment in construction accounts for nearly eleven per cent of India's GDP (Gross Domestic Product). India's infrastructure and transport sector contributes about 5% of its GDP

The Indian economy has witnessed considerable progress in the past few decades. Most of the infrastructure development sectors moved forward, but not to the required extent of increasing growth rate up to the tune of 8 to 10 per cent. The Union Government has underlined the requirements of the construction industry. After recording a spectacular growth of over 12%, more than the country's GDP in the past half-decade, the Indian construction sector all of a sudden lost stream in last fiscal largely due to global financial turmoil.

IMPORTANCE OF EMPLOYEE TURNOVER
The execution of a construction project involves a combination of clients, designers, constructors and suppliers. Such multi-disciplinary characteristics pose challenges to the management who secure appropriate engineers / managers for projects at different levels. Even after the careful recruitment of field engineers, it becomes very difficult to retain them for various reasons. The training and education of these construction managers and project management strategies have traditionally focused on the issues of structuring and planning of the operations, with relatively little attention being paid to the retention of employees. Since project success is always measured in monetary terms, people related issues are given a second priority to the core procurement challenges of meeting time, cost, quality targets, and to achieve better productivity. But shortage of trained personnel has hit the Indian construction industry hard, leading to high turnover rates.

OBJECTIVE OF THE STUDY
- Determine the satisfactory level of employees towards their job and working conditions.
- Finding the factors which make employees dissatisfy about company policies and norms.
- To know the employee turnover rate and growth of the company.
- To know the reasons of increasing of employee turnover rate.
- To find alternative ways to reduce employee turnover rate in construction industry.

SCOPE OF THE STUDY
- This study will help to growth both of the employees and construction industry.
- This study can help the management to find the weaker parts of the employee

EXPERIMENTAL INVESTIGATION ON PLASTIC SAND AGGREGATE AS A PARTIAL REPLACEMENT FOR COARSE AGGREGATE IN CONCRETE

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ABSTRACT
The attempt is made on using plastic-sand aggregate as a partial replacement for coarse aggregate in concrete. In this project work, conventional aggregate is replaced by 5, 10 & 15 percentage of plastic-sand aggregate in M20 grade of concrete. The compressive strength and split tensile strength of concrete mix at 7th, 14th and 28th day of curing period is determined along with the workability property of fresh concrete and results are analyzed and compared with the conventional mix.

INTRODUCTION
Concrete is a composite material composed of coarse aggregate bonded together with fluid cement and harden over time. Most concrete used are lime-based concrete such as Portland cement concrete are concrete made with other hydraulic cements. Perhaps the earliest known occurrence of cement was twelve million years ago. A deposit of cement was formed after an occurrence of the oil shale located adjacent to bed of lime stone burned due to natural causes. These ancient deposits were investigated in 1960s and 1970s. concrete like material were used since 6500 BC by the Nabataea traders or Bedouins who occupied and controlled a series oasis and developed a small empire in the regions of southern Syria and northern Jordan a discovered the advantages of hydraulic lime, with some self-cementing properties by 700BC. They build kilns to supply mortar for the construction of rubble wall houses, concrete floors, and underground waterproof cisterns. In this project the waste plastic bags are recycle and it's taken as partial replacing material for coarse aggregate for construction practices. The waste plastic product is named as PLASTIC SAND AGGREGATE (PSA) which is having similar characteristic like coarse aggregate. For those properties of plastic sand aggregate, it May be partially replaced in concrete fine coarse aggregate. The study leads about strength and behaviour of partially replaced plastic sand aggregate in concrete.

CEMENT, FINE AGGREGATE AND COARSE AGGREGATE
Cement used in construction are usually in organic of a lime based and can be characterized as being either hydraulic or non-hydraulic depending upon the ability of the cement to set in the presence of water. Cement is composed of lime 60-67%, calcium oxide and silica, and alumina 12-15%, iron oxide 0.5-6% gypsum. The constituent slowly hydrates and crystallize the interlocking of the crystals gives cement its strength. Maintaining high moisture content is cement during increases both the speed of curing and its final strength. IS specifications classify the fine aggregate into four types according to its grading as fine aggregate of grading Zone-1 to grading Zone-4. The four grading zones becomes progressively finer from grading Zone-1 to grading zone-4. 90% to 100% of the fine aggregate passes 4.75mm IS sieve and 0 to 15% passes 150 micron IS sieve depending upon its grading zone.

- Natural sand - aggregate formed by natural process
- Crushed stone sand - aggregate formed by crushing stone
- Crushed gravel sand - aggregate formed by crushing gravel

If the aggregate retained in 4.75mm then it is termed as coarse aggregate as per our Indian standards. Coarse aggregate occupies 35 to 70% of total volume of the concrete. Usually, an aggregate with specific gravity more than 2.45-2.55 and absorption less than 2% (except for light weight aggregate) can be regarded as being of good quality. Aggregates should be clean, hard and strong. The aggregate is usually washed to remove any dust, silt, clay, organic matter, or other impurities that would interfere with the bonding reaction with cement paste. Coarse aggregates are mainly classified as Natural aggregate and Coarse aggregate.

AN ANALYTICAL STUDY OF THE KEY BARRIERS IN CONSTRUCTION PROJECT COORDINATION

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ABSTRACT
The complexity of the nature of construction makes it one of the most adverse businesses that has ever existed. Construction projects have often suffered from high fragmentation, large waste, poor productivity, cost and time overruns, and conflicts and disputes for a long time. Thus, many new and innovative management systems in construction are introduced such as partnering, joint venture, alliances, supply chain management, enterprise resource planning, just in time and total quality management to meet these challenges. However, these construction management systems are nothing without coordination, a vital management principle and activity, which provides best cooperation among team members. Although coordination plays crucial functions throughout the building process especially during the design and construction stages, some failures in construction projects adopting coordination principles are still observed. Hence, a study is carried out to investigate the key barriers of coordination in construction project. Through the literature review, five groups of key barriers including the nature of construction, traditional contract agreement, construction participants, characteristics of organization and the management approach are grouped. A detailed study is carried out by collecting data and analyzing them. Suggestions are given to better implementation of the management principles.

KEY WORDS: High fragmentation, coordination, innovative management, supply chain management, enterprise resource planning.

INTRODUCTION
The construction industry generally represents a considerable percentage of profit in our country, but the productivity of this industry is lower than most other industries. Construction industry covers a wide range of projects and every construction project is unique in nature as it involves myriads of interrelated activities, tasks and work packages (Chris, 2009). With these complexities, construction is observed as the most adverse business among many industries. Therefore, construction projects have commonly suffered from high fragmentation, large waste, poor productivity, cost and time overruns as well as enduring conflicts and disputes.
Coordination is an important function in the building process. Nevertheless, many authors of textbooks on construction project management have not discussed this vital topic. A question emerged is: "What are the key barriers in employing coordination in construction?". Therefore, a study related to key barriers of coordination in construction must be carried out so that the real phenomenon of reluctant to change related to coordination in construction project can be deeply assessed and developed.
In construction industry, the central problem of coordination arose from the fact that the basic relationship between the parties of a construction project has the character of interdependency. There is a lack of match between the technical interdependence of the work and the organizational independence of those who control the work. The construction industry has been struggling to reconcile this technical interdependence and organizational independence. Coordination is one of the most sensitive functions of management. We can distinguish three main functions: Design, Construction and Coordination.
These discussions describe the main concern and principle of coordination that focus on organization, interdependency linking, relationships, information exchange and common goals among team members in various industries. Several questions emerge in line with this intention. What is the coordination context solely adopted in the construction industry? How does the characteristic of construction respond to coordination approach? In comprehensively identifying these answers, coordination in construction industry must be closely examined, and thus will be discussed in the next section.

STUDY ON LEAN PRACTICES IMPLEMENTATION ISSUES IN INDIAN CONSTRUCTION INDUSTRY

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ABSTRACT

Lean is a philosophical way of working, which emphasizes the removal of wastage within the process. Lean process emphasizes on getting the right things done in the right place at the right time in the right quantity. The objective is to achieve perfect sustainable work flow, while minimizing waste and maximizing the value of the final output. In 1980s' the Toyota Production System (TPS), has introduced the lean manufacturing concept and hence are considered to be the key originators of this philosophy. Over the years the concept of lean has made its way into many sectors and construction industry is one of them. For the successful implementation of the very same, the joint combination of technical and human elements i.e, socio technological design is essential. Lean culture can be influenced by a wide variety of contributing factors, which include, the professional and educational background of the people, the geographic location of operations, the longevity and experience of people working together and the practices adopted by the leaders within the organization towards the employees. Lean transformation of an organization includes instigating a sense of lean culture among the people of the organization. This transformation is intended to advocate a positive change in the organization. Our study focuses on identifying the factors that affect the adaption of lean culture by the employees. It also helps in understanding better about the barriers in the successful implementation lean principles. This paper also indicates that the existing organizational culture can be improved by identifying and focusing on those aspects that prove to be a hindrance in implementing lean principles. Some of the basic assumptions on which, the lean tools work are people will change when there is a need to change. It has been observed that more than 50% of change efforts fail to meet expectations, the studies reveal that the tools don't cause failures and similarly willingness to change, also does not cause failures, however a small combination of these two lead to failure. The crux of the current research focuses on understanding the aspects that prove to be barriers in lean practicing construction companies.

KEY WORDS: Lean Principles, Implementation of Lean Techniques, Construction Industry, Factors influencing Lean.

INTRODUCTION

Toyota way principle which is an equivalent term for lean thinking has gained popularity and has become recognized as strategic means that can substantially contribute to improving quality, productivity and other performance indicators. Attempts have been made to seek their implementation both inside and outside of manufacturing. The success in implementing lean practices can be attributed to various factors, including a shift in thinking, organizational behavior and the culture that focuses equally on waste elimination and development of human resource. The methodology of lean principle focuses on designing production systems, which ensures reduction in wastage of materials, time and effort resulting in highest possible value. The principal purpose of minimization of non-value adding activities can be achieved when the principles as well as practices of lean philosophy are not only the process oriented and people oriented. Similarly, the concept of value creation should also be process and people oriented.

A lean organization understands customer value and focuses its key processes to continuously increase the value of the output. The ultimate goal is to provide perfect value to the customer through a perfect value creation process that has zero waste. To accomplish this, lean thinking changes the focus of management from optimizing separate technologies, assets, and vertical departments to optimizing the flow of products and services through entire value streams that flow horizontally across technologies, assets, and departments to customers. Eliminating waste along entire value streams, instead of, at isolated points, create processes that need less human effort, less space, less capital, and less time to make products and services at far less costs and with much fewer defects, compared with traditional business systems. Companies are able to respond

ANALYTICAL STUDY ON SEISMIC RESPONSE OF RC AND STEEL STRUCTURES WITH LEAD RUBBER BEARING IN DAMPERS USING ETABS

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ABSTRACT
This study compares the effectiveness of lead rubber bearings in dampers in reducing the seismic response of both reinforced concrete (RC) and steel structures. The main objective is to compare the behaviour of structures with LRB and fixed base buildings using ETABS. The dynamic response of the structures was analysed using non-linear analysis based on the ground motions of the El-Centro earthquake. The seismic reaction parameters for the structures were determined, including storey displacements and storey drifts. The buildings were analysed using time history analysis, and the results were taken in the form of storey displacements and storey drifts values ranging from 35 to 65% for unmanaged structures. It is also understood that the optimum positioning of the dampers is greatly influenced by the aspect ratio of the building.

KEYWORDS—Base Isolators, Lead Rubber Bearing, Fixed Base, Time History Analysis, Storey Drifts, Storey Displacements

INTRODUCTION

One of the natural events that most building engineers must deal with is earthquakes. Structures must be designed to withstand seismic forces. Seismic protection for tall and heavy structures has been a focus of research for many years. Buildings have a limited intrinsic dampening capability, rendering them vulnerable to earthquake forces in general. Dynamic forces created by fault movement within the earth's crust cause earthquakes. When faults move, they release energy in the form of seismic waves. When seismic waves reach the structure's foundation, the structure begins to shift. Reactions are the horizontal and vertical vibrations in buildings caused by these intricate movements. Displacements, velocities, and accelerations are examples of these responses.

Excessive vibration may occur when structures are strengthened to withstand earthquake forces. Extreme vibrations may result in the loss of the building's functional requirements, as well as human life. As a result, energy dissipation-based devices minimise vibrations more effectively. The dampening devices will function similarly to automotive shock absorbers. As a result, the building's lifespan will be extended, and vibration frequency will be reduced.

The structure is isolated from the foundation and shock is absorbed using the base isolation method. The base isolator absorbs more energy when seismic energy approaches a structure, forcing the structure to vibrate slowly.

OBJECTIVES OF THE STUDY

The study considers three types of frames with lateral resistant systems for a G+10 storey reinforced concrete building developed in line with IS 1893:2002 regulations. One has a fixed base, while the other has an isolated base, and the third is a braced frame. Maximum reactions under each column are determined by examining the fixed base buildings. Lead Rubber Bearings (LRBs) are developed manually to isolate the superstructure from the substructure for these maximum values. X bracings are given around the peripheral walls for braced systems. El-Centro earthquake ground motion records are used to conduct Response Spectrum Analysis, Push Over Analysis, and Time History Analysis (THA).

- To get a better understanding of earthquake-resistant structures by modelling and analysing structures against seismic loads with the ETABS software and interpreting the findings.
- Conducting numerous trials to determine the best location for energy dissipation dampers in structures in order to minimise storey displacements and inter-storey drifts.
- To learn more about the behaviour of Lead Rubber Bearing (LRB) dampers and to compare them to other types of dampers.

LITERATURE REVIEW

Saiful Islam, et al. (2011) explored the analytical nonlinear seismic response of a ten-story building

SUSTAINABLE GEOPOLYMER CONCRETE USING GROUND GRANULATED BLAST FURNACESLAG AND RICE HUSK ASH: STRENGTH PROPERTIES

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ABSTRACT

Sustainable development is mandatory to protect our environment. In agriculture and other industries waste materials are released which are organic and inorganic materials and can be an alternate material for OPC.RHA, as a pozzolanic material containing 85-90 percent silicon dioxide, has the potential to be used as a source material in geopolymer concrete (SiO_2). GGBS is a slag material that can also be used as an alternative to OPC. This study looked at the effect of replacing rice husk ash (RHA) with ground granulated blast furnace slag (GGBS) on the performance of geopolymer mortars, as well as the effect of adding RHA as a partial replacement for GGBS on compressive strength. The liquid/binder, Na_2SiO_3/ NaOH, and NaoH molarity were kept constant and cured at room temperature. RHA was replaced with GGBS in the following percentages: 0%, 20%, 40%, 60%, 80%, and 100%. Compressive strength tests were performed on the specimen after 3, 7, and 28 days. The compressive strength of 60.9 MPa was achieved by combining 80% GGBS and 20% RHA. This result suggests that it can be widely accepted for the majority of construction works, ultimately broadening the scope of RHA for a greener binder synthesis via geopolymerization.

1. INTRODUCTION

Concrete is the most world widely used in construction material. The increase in demand of concrete has developed more new methods and materials. Nowadays many researchers have been carried out to reduce theCO_2 emissions [1]. One of the way of reducing CO_2 is using rice husk ash which is an agricultural residue accounts for 4.65 – 5.58 million tons (15-18% of rice husk). The produced partially burnt husk from the milling plants when used as a fuel contributes to pollution and efforts are being made to overcome this environmental issue by utilizing this material as a supplementary cementing material. [2].

On the other hand, GGBS is produced from steel industries. It is highly cementitious and high in calcium silicate hydrates (CSH) which is a strength enhancing compound which improves the strength, durability and appearance of the concrete. Its manufacturing requires less energy and produces less CO_2 emissions compared to Portland Cement production. When added to concrete, it acts as a stabilising agent and improves the quality of concrete. [3].

Geopolymer materials represent an innovative technology that is generating considerable interest in the construction industry, particularly in light of the ongoing emphasis on sustainability. The geopolymer paste binds the loose coarse aggregates, fine aggregates and other unreacted materials together to form the geopolymer concrete. [4].

The manufacture of geopolymer concrete is carried out using the usual concrete technology methods. As in the Portland cement concrete, the aggregates occupy the largest volume, that is, approximately 75 to 80% by mass, in geopolymer concrete. The silicon and the aluminum are activated by a combination of sodium hydroxide and sodium silicate solutions to form the geopolymer paste that binds the aggregates and other unreacted materials. [5]

Further, the optimum use of RHA to produce sustainable concrete is vital in the development of geopolymer concrete. The use of large amount of RHA with relatively larger RHA solid particles and low specific gravity of RHA produce weaker and less ductile geopolymeric mortar [6]. Hence, mortar with a large amount of RHA cannot be compacted properly and the strength of the mortar reduces. The compressive strength of mix is reduced for using RHA at 70% because more unreacted RHA may be present in the end products [6].

Moreover, the density of the geopolymer binder is reduced when the organization of Si and Al is disturbed because of the higher concentration of soluble Si [7] and as a consequence compressive strength of geopolymer binder is also reduced. About 60% of the chemical composition of GGBS consists of CaO and Al_2O_3 and these oxides play a significant role in the geopolymerization process during the formation of the tetrahedral aluminium with an associated alkali cation to maintain electro-neutrality [8]. Ca^{2}+ is capable of acting as a charge balancing cation within the geopolymeric binding structure, and the studies [9,10] have shown that calcium has a positive effect on the comprehensive strength of geopolymeric binders.

EXPERIMENTAL STUDY ON PARTIAL REPLACEMENT OF FINE AGGREGATE BY SPENT COFFEE GROUNDS IN CONCRETE

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ABSTRACT
To meet the global demands and to reduce the natural resources usage in the concrete production several researches are undergoing all over the world. Despite many advancements and technologies developed regarding eco-friendly and reusable waste materials, still many new material and already used waste materials are tested and found out. Modification of concrete properties by the addition of appropriate materials is a popular field of concrete research. In this study we are focusing on the use of selected solid waste of food industry (spent coffee grounds) as a partial replacement for fine aggregate in the production of concrete. In this research study, concretes were made with spent coffee grounds (SCG) as substitution for raw fine aggregate. Fine aggregate was replaced by these wastes in different proportions (0%, 5%, 10%, 15%, & 20%) by weight of fine aggregate. The aim of this study is to investigate the compressive strength, split tensile strength and Material properties of concrete with spent coffee dried powder as a partial replacement for fine aggregate. The experimental results indicate that, the concrete mixed with spent coffee dried powder have lesser strength than conventional concrete, while in the case of concrete mixed with the scale of 10%, it attains the maximum strength equal to conventional concrete and after it gradually loses strength.

KEYWORDS- Fine Aggregates, spent coffee grounds, Compressive Strength, Split Tensile Strength

INTRODUCTION
Concrete is the most widely used material on earth after water. Many aspects of our daily life depend directly or indirectly on concrete. Concrete is prepared by mixing various constituents like cement, aggregates, water, etc. which are economically available. Concrete is unique among major construction materials because it is designed specifically for Civil Engineering projects. Concrete is the composite material composed of granular materials like coarse aggregate combined and bound with cement or binder which fills the space between the particle sand glues them together with water. Concrete plays a critical role in the design and construction of the nation's infrastructure. Almost three quarters of the volume of concrete is composed of aggregates. Concrete contributes about 8% of all Carbon-di-oxide emission around the world which in turn leads to global warming. To meet the global demand of concrete in the future, it becoming a more challenging task to find suitable alternatives to natural aggregates for preparing concrete.

MATERIAL AND METHODS
Spent coffee grounds (SCG) is the waste product obtained brewing of coffee. They are solid wastes which has liquid content, so it has to be dried in sunlight for usage.

Spent coffee grounds
In this concrete, spent coffee grounds are obtained from local coffee shops at tiruchengode and their physical properties are given below in table 1.

Table. 1 Physical property of spent coffee grounds

Properties	Value
Finesses modulus	2.9
Specific gravity	1.5

AN EXPERIMENTAL STUDY ON PAPERCRETE BRICKS MANUFACTURED USING PAPER PULP LIME CEMENT AND FLY ASH

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ABSTRACT
Papercrete brick is one of the most innovative, eco-friendly brick. It is the major concern building material used for constructional purpose. Our project aimed to utilize the waste paper and fly ash to use as a construction material constitutes a step towards sustainable development. This could help eradicate a few of the environmental hazards caused by the construction industry. The brick mix proportion was done for OPC of 53 grade. In these bricks comprises of various materials such as paper, fly ash, sand, water, lime and cement respectively were different proportions in the six variable ratios of cement: sand: waste paper used were 1:2:1.25, 1:2.5:1.5, 1:3:1.75, 1.5:2:1.25, 1.5:2.5:1.5, 1.5:3:1.75. Partial replacement of cement by using Fly ash as 20% and lime as 10%. To compare the compressive strength, water absorption, soundness, Efflorescence, Colour, Hardness, Shape and size, weight test of Papercrete brick with conventional clay brick. The dimension size of brick is Width as 4 inch, Depth as 3 inch and length as 9 inch. six trial mix ratios as used for 18 bricks were investigated. Each trial mixes have 3 bricks produced. The bricks produced using each of the Papercrete mix ratios were cured at the age of 7, 14 and 28 days. Class C fly ash is used as Papercrete bricks. The specific gravity of fly ash is 2.62. To determine the material properties and its testing of all materials. The main objective of this project is build a rigid, cost effective and economical structure of the building. To compare the Quality standards of Papercrete bricks with clay bricks.

KEYWORDS: Papercrete bricks, Compressive strength, Eco-friendly, Innovative, Cost effective, Economic

INTRODUCTION

A brick is building material used to make walls, pavements in masonry construction. The environment impact of paper is significant, which has led to changes in industry. The production and use of paper has a number of adverse effects on the environment which are known as paper pollution. Papercrete is an innovative composite material developed to build an environmental friendly house made up of waste papers, cement, Fly-ash, Lime, River sand and water. The specimen of dimension 190mmx90mmx90mm were subjected to 7 days and 28 days air curing and sun drying before tests were performed on them. It has been reported to be a cheap alternatively building construction material, to have a good absorption and thermal insulation, to be a light weight and fire resistant material. The paper used in making are those that need to be recycled. Papercrete was first patented in 1928 by Eric Patterson and Mike McCain, who 'invented' it independently as 'padobe' and 'fibrous cement' respectively. Papercrete is an emerging new concept however it has limited scope. Papercrete has three derivatives, namely fibrous concrete, padobe and fidobe.

OBJECTIVES

- To analyse and improvise the material properties and Good characteristics of normal papercrete brick by using paper pulp, fly ash, sand and lime for its physical properties. To compare the Quality standards of papercrete bricks and conventional bricks.
- To determine the material testing of normal papercrete bricks for cement, lime and fly ash test includes Fineness, setting time, consistency, soundness test and fine aggregate test includes fineness modulus, sieve analysis, surface moisture content, silt content test were conducted.
- The main objective of this project is to build a rigid, cost effective and economical structure of the building. Price effective, Environmental friendly, Less weight, Ignitable, Less water absorption and Simply obtainable.

EXPERIMENTAL INVESTIGATION ON RECRON FIBER INFUSED SELF CURING CONCRETE

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ABSTRACT
In this work, the properties of self-curing concrete were studied with recron fibers. To study the properties of concrete, three different Concrete Grades M_{20}, M_{25} and M_{30} were taken. For each Grade of concrete, four different types of specimens were cast. The first one is normal concrete with water curing, and the second one is concrete with self-curing compound, and the third one is recron fiber concrete with water curing and the fourth one is recron fiber concrete with self-curing compound. Specimens were tested at the age of 7th day and 28th days curing. The experimental results, conclude that the strength of self-curing concrete is reduced by 10% compared with the water curing concrete and the strength of Recron Fiber concrete is increased by 25% compared with the normal concrete.

INTRODUCTION
Self-Curing is otherwise called as Internal Curing. Internal Curing refers to the process by which the hydration of cement occurs. Internal water that is not the part of the water. Curing concrete means creating conditions such that water is not lost from the surface. Internal curing is allowing for curing from the inside to outside. Internal Curing is often also referred as self-curing.

Application of Recron Fiber
RCC and PCC like lintel, beam, column, flooring and wall plastering. Foundation, tanks, manhole cover and tiles. Plastering. Roads and Pavement. Hollow Blocks and Precast Slabs. Wherever cement is used, the Recron can be used to improve the quality of construction.

Advantages of Recron Fiber
It results savings of expansive mortar, cement and sand. Time taken for plastering is reduced. Work will complete faster. Reduce cracks during plastic and hardening stage. Reduce water seepage. It protects steel in concrete from corroding. It protects walls from damping.

Chemical to Achieve Self-Curing
The water-soluble chemical added during the mixing can reduce water evaporation from and within the set concrete, making it 'self-curing. The chemical should have abilities to reduce evaporation from solution and to improve water retention in ordinary Portland cement.

Autogenously Shrinkage
It is as a volume change in concrete occurring without moisture transfer from the environment into concrete. It is due to the internal chemical and structural reactions of the concrete.

Improvements to Concrete due to Internal Curing
Reduces autogenously cracking, largely eliminates autogenously shrinkage, reduces permeability, Protects reinforcing steel.

Mix Design Report

Cement	: OPC – 53 S Grade for use in concrete.
Coarse aggregate	: Conforming to IS 383 – 1970
Max size of coarse aggregate	: 20 mm
Shape and Texture	: Angular rough grained
Fine aggregate	: Conforming to IS 383 -1970
Shape and Texture	: Clean and dirty
Water	: Conforming to IS 456 CI 4.3
Concrete Mix design	: As per IS Specifications T- 391985 (Third Revision)

EXPERIMENTAL INVESTIGATION FOR URBAN ROADS DIESEL DRIVEN VEHICLES AIR POLLUTION MODELING

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ABSTRACT
The air pollution problem has received more attention during the last decades whereby there has been a significant increase in public awareness of the potential danger caused by chemical pollutants and their effects on both human beings and the environment. The higher level of air pollutants in various urban centers of India mainly contributed from vehicular sources is a cause of real concern. Rapidly increasing vehicular population and urbanization has further aggravated the air pollution problem in these cities. Indian cities are among the most polluted cities in the world. The main source of air pollution in Indian metropolitan cities is petrol and diesel driven vehicles. They particularly emit CO, CO2, HC, NOX and SOX. In this study, five gas analyzer will be used to find out the emission rates diesel vehicles under static and dynamic conditions. The factors to be considered under static conditions are the age of the vehicles and the load carried by them. The factors to be considered under dynamic conditions are the type of pavements, age of the vehicles and the load carried by them and roughness of the roads. Comparison of roads with different roughness values for finding the emission levels. From the emission rates, emission loads will be found out. Ambient air quality in the atmosphere is also to be measured. Vehicular Air Pollution Modeling will also be done.

INTRODUCTION
Pollution in air is generated by the developments, which typically occurs as the country gradually shifts towards industrialization, due to city growth, increasing traffic, rapid economic development, and higher levels of energy consumption. Indian cities are among the most polluted cities in the world. The main source of air pollution in Indian metropolitan cities is petrol and diesel driven vehicles. These vehicles are consuming huge amounts of petrol and diesel for which the country has to pay nearly in foreign exchange. Vehicular emissions contain sulphur dioxide (SO2), Nitrogen Oxides (NOx), Carbon Monoxide (CO), particulate matter (PM) and other products of combustion. The growing vehicular population has resulted in increased air pollution, which in turn has affected the people's health, which lives along the transportation corridors. It is not that much easy to find out the vehicle emission loads with the associated factors such as the age of the vehicle, type of fuel and the type of roads. Vehicle emission models are necessary for quantifying the impact of traffic flows on air quality. Models are nothing but, they are the representation of the real world system. By creating these models, it is able to predict the amount of air pollution in a particular area and hence we are able to give necessary suggestions, so that the vehicle emissions are within the emission standards.

NEED FOR THE STUDY
Transport related air pollution in developing countries is largely an urban phenomenon confined mainly to very large cities with a high proportion of trips by buses, automobiles, motorcycles and three wheeled vehicles. Increase in vehicular population, has resulted in decrease in quality of air and the environment. This stresses the need, to study about the traffic that pollutes the atmosphere by releasing the harmful gases. A number of models have been created by the foreign countries, but this is not suitable for the Indian cities. This may be due to heterogeneity of vehicles, multiplicity of modes and the difference in geometrics of road. Therefore, the need arises to develop a model that best suits our Indian condition.

OBJECTIVE OF THE STUDY
- To study the emission of diesel driven vehicles under static and dynamic conditions for the same vehicle.
- To find out the influence of vehicular emissions on ambient air quality in the selected test stretch.
- To develop a mathematical model considering age of vehicle, speed and road roughness.
- To suggest transport solutions that is environmentally sustainable.

EXPERIMENTAL INVESTIGATION UNDER FLEXURAL LOADING ON BEHAVIOUR OF FERROCEMENT CHANNELS

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ABSTRACT
This paper presents a study of the flexural behaviour of ferrocement channels under two point loading. The effect of parameters like different depths as per aspect ratio of two point loading, thickness of the ferrocement layer (I, II and III layers) and the connection between the ferrocement channel and the reinforced concrete on the ultimate flexural load, first crack load, crack width and spacing, and the load deflection relationship were to be examined analytical as well as an experimental model. Ferrocement channels were casted using self compacting mortar (SCM) with Conplast 430 and SIKAMANT FF(T) as super plasticizers. The optimum dosage of super plasticizers was arrived using Marsh cone test. The properties of SCM like fresh behaviour of mortar using flow table test, the hardened behaviour of mortar using compressive strength at 7, 14, 28 days at normal curing condition and water absorption test were studied. The results showed that the SCM with SIKAMANT FF (T) is of high strength, low water absorption and exhibiting early age strength comparable to that of with Conplast 430 and can be designed in order to cast thin ferrocement channels.
KEYWORDS: Ferrocement channels, Flexural loading, SCM.

INTRODUCTION
The application of ferrocement, with a rapid progress of innovative construction technique is increasingly becoming more common for use in various structural engineering applications. This has led to a large scale research on this material and the presence of a considerable volume of technical information regarding design, construction, maintenance and rehabilitation techniques using ferrocement. In reinforced concrete structures a much higher probability is often acceptable for serviceability limit mainly because of economy; crack width for different exposure conditions is therefore the established criteria followed by almost every code of practice. Keeping in view the much improved cracking behavior of ferrocement, it would be quite appropriate to define a general lower limit based on crack free Surface. This would simplify the code procedures without resulting in high demands. It should also be noted that ferrocement being relatively more ductile than reinforced concrete, would need more flexural rigidity to function properly. As channel shaped cross sections have the most practical range of utility this research therefore, reports an experimental study on channel shaped ferrocement specimens under flexural loading and a simple computational model to predict the first cracking strength, flexural of ferrocement channels based on the classical beam theory. The distribution of flexural stresses is based on homogenous beam concept.

MATERIALS USED
For the purpose of experimentation, Ordinary Portland Cement of 53 grade conforming to Indian Standard Specifications was used along with locally available river sand as fine aggregate. Potable water was used for mixing. The Super plasticizers, Conplast SP430 (Sulphonated Napthalene Polymers) and SIKAMANT FF (T) (Modified Melamine Formaldehyde Condensate) are compared and the best in terms of compressive strength and workability is used for the Self compacting mortar.

CASTING AND TESTING OF SPECIMENS
Basic Properties
Determination of basic properties of constituent materials namely cement, sand, coarse aggregates, steel bars and weld mesh as per relevant Indian standard specifications. The optimum dosage of super plasticizers to be added in the weight of cement is found by Marsh cone test. The optimum dosages for two plasticizers are given in Table 1.

STUDY OF GEOPOLYMER CONCRETE USING GROUND GRANULATED BLAST FURNACE SLAG AND FLY ASH

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ABSTRACT
Power stations using hard coal or brown coal as fuels are important energy sources world-wide. But only about 20% of the fly ashes produced as by-products in the combustion process are reused. In order to reduce the negative environmental impact of the production of ordinary Portland cement, the possibility to reuse this in organic waste as alkaline activated building materials (geopolymers) is of increasing importance. The projected use of such material is mortar for the building industry in general. In order to reach this goal more knowledge about the characteristics of the fly ashes, mix design and resulting properties is needed. In this study one hard coal and four brown coal fly ashes are characterized by various methods like chemical analysis and laser granulo me try. Geopolymer mortars and concretes are produced by mixing fly ash, aggregates, sodium silicate, sodium hydroxide and deionizer water. The variables used were the amount of activators (sodium hydroxide and sodium silicate), and cured at ambient temperature. The influences of these variables on strength were studied. In this work, GGBS & fly ash replacing cement and m sand were used to find different strength

KEYWORDS: GGBS, Fly ash, Geopolymer, Mix design

INTRODUCTION
Hard or brown coal as fuel for power stations plays an important role world-wide. As a result, high quantities of fly-ashes are obtained nowadays. For example, in Czech Republic more than 10 million tons of fly-ash is obtained per year. Most of the fly-ash is considered as waste and put out in landfills. Currently, only about 20% of these ashes are reused. One possibility is the reuse as geopolymers. Geopolymers are an in organic aluminum-silicate composite synthesized from materials as fly ash or slag that are rich in silicon and aluminum. The potential use of the alkali-activated geopolymers includes concrete for the construction industry, in particular concrete with high resistance to heat and acids and repair mortars. On the other hand, production of ordinary Portland cement needs large energy resources and is responsible for a considerable C02 output into the atmosphere. The global cement indust1y contributes around 1.3 billion tons of the greenhouse effect gases emissions annually; that is about 7% of the total world made green house gases mission to the earth's atmosphere. The increased use of alkaline activated geopolymers as concrete and mortar represents a possibility to decrease C02 emission in the production of building materials.

EXPERIMENTAL PROGRAM
Geopolymer concrete were prepared by using fly ash (FA), Ground granulated Blast Furnace Slag (GGBS) and alkaline solution. Crushed granite with nominal grain size of 20 mm and well-graded river sand of maximum size 4.75 mm were used as coarse and fine aggregates, respectively.

MATERIALS USED
Ground granulated blast furnace slag (GGBS)
Ground-granulated blast-furnace slag (GGBS or GGBFS) is obtained by quenching molten iron slag (a by-product of iron and steel-making) from a blast furnace in water or steam, to produce a glassy, granular product that is then dried and ground into a fine powder at 1500 C. Molten iron and molten slag are obtained after heating the mix. The low-density molten slag comes up on the surface and easily separated from rest of the mass. Afterwards it is cooled down by the action of water. The water pressure during the cooling process breaks down this lag in to a size less than five millimeters. Blast furnace slag powder is then obtained by grinding the dried slag mass.

Fly Ash
Fly ash is the alumino-silicate source material used for the synthesis of geopolymer binder. Fly ash obtained from the silos of Mettur thermal power station, was used for the experimental work. The Fly ash was of low calcium Fly ash which confirms to class F of ASTM standards. The percentage of fly

EXPERIMENTAL STUDY ON METAKAOLIN AND RICE-HUSK ASH BASED ON GEOPOLYMER CONCRETE

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ABSTRACT
Cement concrete is the most extensively used construction material. Because of the high usage of cement in the society, Metakaolin is used as a replacement of Cement in major places. This study presents the effect of incorporating metakaolin (MK) on the mechanical and durability properties of high strength concrete. The mix design was carried out using the Absolute Volume method. The metakaolin was used to replace cement at 2.5%, 5%, 7.5% and 10% at various water levels. The control mix was designed to establish a comparative basis between the mixture blended with Mk and ordinary cement concrete. MK can be used in traditional paste, mortars and concrete to improve their properties. The 20% of cement-substituted MK in the experiment showed the lowest water absorption percentage compared to other mixes designs. In addition, MK can be used as a source of cementing materials without Portland cement (PC) named as geopolymer.

Keywords: Metakaolin, Rice husk ash, Blended concrete, High performance concrete.

INTRODUCTION
Concrete is one of most extensively used construction materials in the world. But the emissions of greenhouse gases due to structural concrete materials production, especially cement, have become primary global concern. The utilization of by-products, such as MK and RHA, as a partial replacement for cement and had a beneficial performance by demonstrating economic, environmental, and technical advantages because it provides a new use for waste materials, produces cheaper mortar and concrete materials for low-cost construction, and reduces carbon emissions. Experimental Study on Metakaolin and Rice-husk ash Based Geopolymer Concrete. MK is categorised as being a highly reactive pozzolan that displays favourable concrete performance when utilised in combination with rice-husk ash. It includes the utilization of supplementary cementing materials such as fly ash, silica fume, granulated blast furnace slag, rice-husk ash and metakaolin, and finding alternative binders to Portland cement.

EXPERIMENTAL PROGRAM:
The cement used in all mixture was normal OPC (53 grade) conforming to IS: 12269. Good quality aggregates have been procured for this investigation. Crushed granite with nominal grain size of 20 mm and well-graded river sand of maximum size 4.75 mm were used as coarse and fine aggregates, respectively. RHA with a specific surface area of 9768 cm^2/g, 9768 cm^2/g.

MATERIALS & METHODS

MATERIALS
Metakaolin (MK, kaolin)
Metakaolin is obtained from the calcination of kaolinitic clay at temperatures ranging from 600 - 850^{O}C, exceeding this temperature leads to the metakaolin becoming non-reactive and inert. It is usually a white powder that consists of particles with a diameter of approximately 2 μm, which in finer than Portland cement. MK is usually used to replace cement in concrete at a ratio of 5–15%. Metakaolin is classified as an alumina silicate material that contains varying amounts of alumina and silica. MK is a product or by-product manufactured from China clay (kaolin) on heating it at a higher temperature, a very effective pozzolanic material used in concrete. In the 1960s, metakaolin was successfully incorporated into the concrete used in the construction of several large constructions. Metakaolin is used as a replacement to OPC for improving various properties of cement concrete. The fine and irregular particle shape ofMK often mean that MK generally requires more solution for wetting and reaction to take place appropriately.

STRENGTH AND DURABILITY OF E-PLASTIC WASTE CONCRETE INCORPORATING QUARRY DUST

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ABSTRACT
Disposal of waste products creates major environmental threat owing to its hazardous content and rapidly growing volume. Recycling is one of the options for the diversion of waste. In this investigation part of the study, the usage of quarry dust and E-Plastic waste in concrete was considered as the eco-friendly disposal. It also satisfies the overall demand over construction materials. The emphasis of the present study is to determine the strength and durability of E- plastic waste concrete incorporating quarry dust. The material properties are determined and respective mix proportions have been calculated for various replacement ratios such as 0%, 5%, 10%, 15%, 20% and 25% of both quarry dust and E-plastic waste concurrently. The strength tests for replaced concrete have been carried out and compared with conventional concrete. The durability studies are made for replaced concrete to know it performance over various acid attack, sulphate attack, marine condition, Impact, absorption and supportively.

INTRODUCTION
Research concerning the use of by-products to augment the properties of concrete has been going on for many years. In the recent decades, the efforts have been made to use industry by-products and waste from various sources in concrete for the replacement of cement, fine and course aggregate. The use these materials in concrete come from the environmental constraints in the safe disposal of these products.

WASTE SOURCE
Concrete is the most widely used man-made construction material in the world. Seeking aggregates for concrete and to dispose of the waste from various commodities is the present concern. Today sustainability has got top priority in construction industry. This gives birth to the alternative for core materials by various wastes. Waste comes in many different forms such as shown in Table 1. These waste substances are in the long run hazardous in nature as they are ignitable, corrosive, reactive, toxic, explosive, poisonous or infectious. Hence, they pose substantial or potential threat to public health and the environment. Non recycling Waste materials are posing serious pollution problems to the human and the environment. So, new effective waste management options need to be considered.

QUARRY DUST
Numerous waste materials are generated from manufacturing processes, service industries and municipal solid wastes. The increasing awareness about the environment has tremendously contributed to the concerns related with disposal of the generated wastes. Solid waste management is one of the major environmental concerns in the world. The quarry dust can be used to replace the natural sand in concrete. Currently countries have taken a major initiative on developing the infrastructures which leads to the environmentally friendly substitutes for concrete materials. The quarry dust is the by-product which is formed in the processing of the granite stones which broken downs into the coarse aggregates of different sizes. Quarry dust has been proposed as an alternative to river sand that gives additional benefit to concrete. Quarry dust is known to increase the strength of concrete over concrete made with equal quantities of river sand, but it causes a reduction in the workability of concrete.

E-WASTE
Electronic waste describes discarded electrical or electronic devices. Electronic waste or e-waste is one of the rapidly growing problems of the world. Informal processing of electronic waste in developing countries may cause serious health and pollution problems. E- waste is a term used to cover almost all types of electrical and electronic equipment (EEE) that has or could enter the waste stream. Although e-waste is a general term, it can be considered to cover TVs, computers, mobile phones, white goods (e.g. fridges, washing machines, dryers etc.), home entertainment and stereo systems, toys, toasters,

EXPERIMENTAL STUDY ON GEOPOLYMER CONCRETE WITH DIFFERENT TYPES OF CURING

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ABSTRACT

The use of Portland cement in concrete construction is under critical review due to high amount of carbon dioxide gas released to the atmosphere during the production of cement. In recent years, attempts to increase the utilization of fly ash to partially replace the use of Portland cement in concrete are gathering momentum. Most of this by-product material is currently dumped in landfills, creating a threat to the environment. Geopolymer concrete is a 'new' material that does not need the presence of Portland cement as a binder. This thesis reports the details of development of the process of making fly ash-based geopolymer concrete. Due to the lack of knowledge and fly ash in the based geopolymer concrete in the published literature, this study adopted a rigorous trial and error process to develop the technology of making, and to identify the salient parameters affecting the properties of fresh and hardened concrete. As far as possible, the technology that is currently in use to manufacture and testing of ordinary Portland cement concrete were us prepared. Geopolymer concrete specimens were produced by activating fly ash and microwave incinerated rice husk ash with 8 molar solutions of sodium hydroxide solution and sodium silicate

INTRODUCTION

The development of science and technology is a continuing process for improvement of infrastructure all over the world. Every day new innovations in the construction industries are being created safely, economically and environmental sustainability. Besides water Concrete is the most utilized substance around the world. Ordinary Portland cement is customarily utilized as the main binder to manufacture Concrete. The difficulties related with the production of are properly noted. Production of geopolymer concrete does not require the use any but, the binder is produced by the reaction of an alumina silicate material with strong alkaline liquids. Collectively, geopolymer cement gel binds the aggregates and unreacted material to yield the mix and cured at the same conditions double the compressive strength results. However, for method of curing have significant impact on the micro-structural and strength development. Class F fly ash geopolymer mixture hardens gently at surrounding temperature and reveals small strength gain at initial ages in contrast to oven cured specimens. Therefore, the geopolymerisation process is normally dependent on mode of curing. geopolymerisation is faster, but the oven curing can only be achieved in precast concrete structures. These attributes limit the broader utilization of fly ash based geopolymer to only precast concrete and believe to be a hurdle for on-site concrete applications. The present paper reviews the method of curing of geopolymer concrete.

LITERATURE REVIEW

Steam Curing

There is a limited experimental work on steam curing of geopolymer concrete and among the few research studies, the work of Yewale et al. (2016) was one of the most important papers. They have found that strength of geopolymer concrete improves at higher temperature and the optimum strength was found to be 80°C temperature for steam curing, while for water curing, the strength obtained after 28 days was less than the characteristic strength due to the low development of strength at lower temperature. Moreover, Pangdaeng et al. (2014) have reported that addition of OPC in high calcium fly ash enhances the attributes of geopolymer concrete cure in steam and thus facilitated the hydration process due to the presence of OPC in the binder and thereby yields improvement in compressive strength. Similar work of Yunsheng et al. (2007) revealed that condition of curing have significance influence on the strength of slag based geopolymer concrete. Slag based geopolymer exhibited lower strength at ambient temperature compared to the steam cured specimens. During the first 2 hours of steam curing at 80°C, 9.4 MPa of compressive strength was achieved which is 19.14% higher than 3-days ambient curing. As the curing time was extended to 4 and 8 hours the strengths improved by 46.03% and 53.16% respectively. They also, obtained the maximum compressive and flexural

AN EXPEIMENTAL STUDY OF CONCRETE BY PARTIAL REPLACEMENT OF ALCCOFINE AND RICE HUSK ASH

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ABSTRACT
In this paper the mechanical properties of Alccofine and rice ask ash has been studied. Alccofine 1203 is a specially processed product based on high glass content with high reactivity obtained through the process of controlled granulation. Concrete attains high strength at a very early age, due to the presence of alccofine material. The mechanical properties studied here are compressive strength on concrete cubes at 7 & 28 days of curing and split tensile on cylinders at 7 & 28 days of water curing. It is observed from the result that the Alccofine material increases the strength to a large extent at 15% replacement level of cement. Keywords: Alccofine, Rice husk ash, Compressive strength, Split tensile strength.

INTRODUCTION
The construction industry relies heavily on conventional materials such as cement, sand and granite for production of concrete. Concrete is the basic civil engineering composite. The quality of concrete is determined by the quality of paste/mix. It is the worlds most consumed man-made material. Its great versatility and relative economy in filling wide range of needs has made it a competitive building material. The demand for concrete for today's infrastructural development is rising day-by -day. In light of this, the non-availability of natural resources to future generation has also been realized. Concrete production is not only a valuable source of societal development but also a significant source of employment. Following a natural growth in population, the amount and type of waste materials have increased accordingly creating thus environmental problems. Historically agricultural and industrial wastes have created waste management and pollution problems. Different alternative waste materials and industrial by-products such as fly ash, bottom ash, recycled aggregates, crumb rubber, saw dust, brick bats etc. were replaced with natural aggregates. Although these materials are traditionally considered as primitive and therefore inferior to more highly processes in terms of safety, durability, performance, occupant's health and comfort with respect to environmental issue, consumption of environmental products and energy within the construction industry has created a significant demand for raw materials and for production thereby contributing to the many environmental problems associated with diverse ecosystem. Concrete is typically the most massive individual material element in the built environment. If the embodied energy of concrete can be reduced without decreasing performance or increasing cost, significant environmental and economic benefits may be realized. Concrete is primarily comprised of Portland cement, aggregate, and water. Approximately 6 to 7% of the worldwide CO2 emissions. This paper focuses cement with rise husk ash and ALCCOFINE 1203. This replacement increases the strength, durability, resistance to chemical attack of concrete.

What is Alccofine?
Alccofine-1203 (AF) is a product of Abuja Cement Ltd, an extra high-purity, high-grade, highlyAlccofine-1203 is an additive to concrete and mortars. The density ranges from600 -700 kg /m 3. The Alcofine-1203 metal blend can be used to increase strength and economic design. Alccofine 1203 is a revolutionary new material, used as a substitute to Micro Silica / Silica Fumes. Alccofine-1203 provides innovative solutions to improve the performance of Concrete many folds without increasing the cost. Alccofine 1203 is a specially processed product based on slag of high glass content with high reactivity obtained through the process of controlled granulation. Owing to its unique chemistry and ultra-fine particle size, Alccofine 1203 provides reduced water demand for a given workability as per requirement of concrete performance. Alccofine 1203 and Alccofine 1101 are two types of Alccofine with low calcium silicate and high calcium silicate respectively. Alccofine 1203 is slag based supplementary cementitious material having ultra-fineness with optimized particle size distribution. The workability of the mix retention is improved due to Alccofine 1203 and increased the flow ability of the mix.

What is RHA?
Rice husk may be smoldered into fiery remains that satisfies the physical qualities and compound piece of mineral admixtures. Pozzolanic action of rice husk cinder (RHA) depends on upon (i) silica

EXPERIMENTAL STUDY ON PARTIAL REPLACEMENT OF COARSE AGGREGATE BY COCONUT SHELL IN CONCRETE

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ABSTRACT
A large amount of waste coconut shell is generated in India from temples and industries of coconut product and its disposal need to be addressed. Researchers have proposed to utilize it as ingredient of concrete. This experimental investigation was aimed to quantify the effects of replacing partially the conventional coarse aggregate by coconut shell to produce concrete. The research work was divided into two parts. The density, slump and compressive strength of concrete are tested. There placement of coarse aggregate by coconut shell by 0%, 10%, 20%, 30%,40%. First part was aimed to observe the effect of such replacement on compressive strength and density of concrete. In the second part, the aim was to find out the additional quantity of cement required to compensate for reduction in strength of concrete resulted due to this replacement. It was found that with increasing proportion of coconut shells, there is decrement in compressive strength.
KEYWORDS: Coconut shell, light weight aggregate, Compressive strength, slump and density

INTRODUCTION
Infrastructure development across the world created demands for construction material. Concrete is the premier civil engineering materials used in the structure. Concrete manufacturing involves consumption of ingredients like cement, aggregates, water and admixtures. Among all the ingredients, aggregates form the major parts. Production is expected to increase to more than billions tons per year by the year. Use of natural aggregates in such a rate leads to a question about the preservation of natural aggregate sources. Using alternative materials in place of natural aggregates in concrete production makes concrete as sustainable and environmentally friendly construction material. The chemical composition of coconut shell is similar to wood and it contains Lightweight aggregate concrete can be used produced using a variety of lightweight aggregate. Light weight aggregate can be originated from natural materials like pumice, the thermal treatment of natural raw materials like clay slate or shale. The other byproduct may include fly ash. The required properties will have bearing on the best type of lightweight aggregate used. The benefits of using lightweight aggregate concrete include reduction in dead load, improved thermal properties, improved fire resistance and reduction in form work.

Application of coconut shell as coarse aggregate
Coconut is grown in more than 86 countries. India occupies the premier position in the world with an annual production of 13 billion nuts. The coconut industry in India accounts for about one sixth of the world's total coconut oil output and is set to grow fur- there with the global increase in demand. shows the world's top five countries by coconut production. However, it is also the contributor to the nation's pollution problem as a solid waste in the form of waste coconut shells. In view of huge demand, naturally available conventional aggregates are depleting fast and becoming scarce. Waste coconut shell may also be considered as one of the replacement alternative. Properties of coconut shell which may make it suitable coarse aggregate for concrete are (i) its high strength and modulus properties; (ii) its high lignin content that makes the composites more weather resistant; (iii) its low cellulose content due to which it absorbs less moisture as compared to other agricultural waste;(iv) its shells are non-biodegradable; (v) they can be used readily in concrete which may fulfilled most all the qualities of the original form of concrete; (vi) sugar in the coconut shell is not in a free sugar form, and therefore does not affect the setting and strength of concrete; (vii) its surface texture is fairly smooth on concave and rough on convex faces. Kulkarnietal in their experimental study observed that there is no need to treat the coconut shell before use as an aggregate except for water absorption.
They found that there was adequate bonding between the coconut shell aggregate concrete and the steel bars. Gainer on used coconut shells and fiber as substitute for aggregates in developing concrete hollow block. The study was carried out for various percentage of coconut shell content as partial replacement of conventional aggregate. They observed that replacement of appropriate coconut shell content produces workable concrete with satisfactory strength.

EXPERIMENTAL INVESTIGATIONS OF MAKINGFLEXIBLEPAVEMENTBYMEANS OFDISCARDEDPLASTICAS WELL AS MINERAL FILLERS

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ABSTRACT

Every day, the discard waste plastics and types of mineral filler like cement, quartz powder, stone dust, marble waste etc., are dumped in the earth surface. It may cause environmental pollution. Nowadays, many engineers and industrial list are investigating the possibilities of waste plastics and mineral waste in flexible pavement. An attempt has been made to use the plastic as aggregate coating in order to increase road performance and durability. Plastic wastes like low density polythene, polypropylene, polythene, Terephthalate are used. These waste plastics are cut into small pieces. Aggregate are heated to a certain temperature and the spread over the heated aggregate. Due to heating this plastic gets softened and forms a coating as layer over these aggregate. The result indicates that the 10% of plastic coated aggregate doesn't disqualify the material and no negative influence on the quality asphalt mixture. The durability of the asphalt pavement is related to the appropriate proposing of mineral materials.

Keywords: *Waste Plastics, Bitumen, Aggregate, cement, plastic road*

INTRODUCTION

One of the most important infrastructures is Flexible Pavement. If there is any damage to this structure cause inconvenience to the traffic, which ultimately affect future scenario of countries. Simultaneously, waste plastic disposal is extremely severe nowadays. In order to, improve the performance of road surface. The plastic will be used for aggregate coating in order to increase road performance and durability. Due to the excessive usage of the plastic materials, the availability of waste plastic is enormous, as the plastic waste become part and parcel of daily life. Plastic wastes like Low Density Polyethylene, Polypropylene, polyethylene Terephthalate, Polystyrene are used. These waste plastics are shredded into small pieces. Dry process is followed here. Aggregates are heated to a certain temperature, and the shredded plastics are spread over these heated aggregate. This plastic gets softened and forms a coating as a layer over these aggregates. Aggregates are coated with waste plastics up to 40% and tested. A property of aggregates gives good response to these coating. It shows better resistance to abrasion, Crushing, Impact, Water absorption test. Bituminous mix is prepared and stirred well in order to get uniform mix, then cement is weighted and added to the hot bitumen in different percentages. This cement is used as a filler material. Until now, various fillers like cement, fly ash, eggshell powder, coconut shell powder, etc., are used. In the present study, an attempt has been made to use waste plastics as coat over aggregate and Cement filler in bituminous mix. This mixture is laid on the road surface like a normal tar road. One of the major concerns amongst these is safe and sound disposal of solid wastes. Bituminous mix is prepared with cement up to 50% and plastic coated aggregates. Marshall Method is adopted for the mix design. India consumption of plastics grew every year and is set to be the world third largest consumer of plastic in this world.

Modified bitumen acts as multi grade due to their low susceptibility to daily and seasonal temperature variations.

- Higher resistance to deformation at elevated pavement temperature and resistance to brittle cracking at low pavement temperature.
- Better adhesion between aggregate and binder, higher fatigue life of mixes under heavy axle loads and better resistance to ageing.
- Overall improved road performance in extreme climatic conditions and heavy traffic conditions.

Objective of Present Study

- To utilize the discard plastics materials as a pavement ingredient.
- To study the properties of cement and used as a fillers mixed in bituminous mix

ASSESSMENT OF WATER POLLUTION LEVEL AROUND THE INDUSTRIAL AREA (3 DISTRICTS)

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ABSTRACT
As the world became more industrial and smaller due to communication and trade, accidental and purposive hazardous dumping has contributed to the problem. All water pollutions dangerous to the health of living organisms. The primary sources of potable water by population all over the world. This paper examines the different cause of river for its quality and population. In the study area 12 samples were collected from the around three districts. Several physical and chemical parameters where tested in the collected sample PH, turbidity, chloride, iron, sulphate, hardness, temperature, total dissolved solids, color and appearance, odor, calcium and magnesium, sodium, potassium, nitrate, fluoride, phosphate.
Keywords: Water, physical and chemical parameters.

INTRODUCTION

Water is one of the vital for human beings. Water is used to domestic and irrigation purposes in every part of the world. Now a day's water is not available in pure state. It contains several impurities like chemicals. Suspended solids and other impurities. Out of total resources of water on earth only 0.001929% is available for human purpose. The primary cause being Industrial effluent like lead, zinc, calcium etc., are present in water. The objective of the present work is to confer the suitability of water for domestic and irrigation purpose and also work out the water quality Index values for the selected area.

MATERIALS

Surface water sample are collected in 2-liter polythene bottles and sewage water sample are collected in another 2-liter polythene bottle from the different location. Before collecting the sample bottles where thoroughly cleaned. Those samples were tested within 24 hours after collection.

Water

Water sample are collected from the different station in around the different region. From each station both sewage water and surface water sample are collected. For those collected twelve samples various test are conducted physical and chemical characteristics.

Colour and odour

Colour in water is primarily a concern of water quality of aesthetic reason. Coloured water gives the appearance of being unfit to drink.

Turbidity

Turbidity in surface water is determined through Nephelometric method. The measurement of turbidity is a key test for water quality. In surface water it is more inorganic caused by natural geological factor. IS limit of Turbidity ranges from 1 to 5 mg/l as per IS.

Total Dissolved Solids (TDS)

Total Dissolved solids are measure of organic and inorganic substances which are suspended condition in a liquid. TDS of 500 mg/l or lesser is desirable for drinking water. IS limit of Total Dissolved solids ranges from 1 to 500 mg/l. Total dissolved solids is determined by Gravimetric. The total dissolved solids in all the study area varies from 232 to 637Mg/l

Electrical conductivity

It can be defined as the ability of a solution to conduct electric current and measured in micro. The Electrical conductivity is determined by conduct meter. Most of the salts in water are present in their ionic forms and capable of current and conductivity is good indicator to assess ground water quality. IS limit of Electrical conductivity from 0 to 1500 mg/l.

p^H

The p^H is a numerical scale which express the degree of acidity or alkalinity of solution and represented by the equation $p^H = -log^H+$.

EXPERIMENTAL STUDY ON PARTIAL REPLACEMENT OF FINE AGGREGATE BY STEEL SLAG IN CONCRETE

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Abstract
Modification of concrete properties by the addition of appropriate materials is a popular field of concrete research. In this study we are focusing on the use of selected waste of steel industry (steel slag) as a partial replacement for fine aggregate in the production of concrete. In this research study, concretes were made with steel slag as substitution for raw fine aggregate. Fine aggregate was replaced by these wastes in different proportions (10%,20%,30%,40%, & 50%,) by weight of fine aggregate. The aim of this study is to investigate the compressive strength, split tensile strength, flexural strength and material properties of concrete with steel slag as a partial replacement for fine aggregate. The experimental results indicates that, the concrete mixed with steel slag have better strength than conventional concrete, while in the case of concrete mixed with the scale of 30%, it attains the maximum strength.
Keyword- *Fine Aggregates, Steel Slag, Compressive Strength, Split Tensile Strength, flexural strength*

Introduction
Concrete is the most widely used material on earth after water. Many aspects of our daily life depend directly or indirectly on concrete. Concrete is prepared by mixing various constituents like cement, aggregates, water, etc which are economically available. Concrete is unique among major construction materials because it is designed specifically for civil engineering projects. Concrete is the composite material composed of granular materials like coarse aggregate embedded in the matrix and bound together with cement or binder which fills the space between the particles and glues them together. Concrete plays a critical role in the design and construction of the nation's infrastructure. Almost three quarters of the volume of concrete is composed of aggregates. To meet the global demand of concrete in the future, it is becoming a more challenging task to find suitable alternatives to natural aggregates for preparing concrete.

Experimental Detail
Material
Cement
Ordinary Portland cement of 53grade is used. It is tested as per Indian standard specification (IS 4031 - 1996). Various properties are given in the Table1. Fineness of cement is determined by means of dry sieving. These test results shows that the property of cement, satisfies the requirements.

Table 1 Properties of Cement

Properties	Values
Fineness	5%
Consistency	29%
Initial setting time	45 min
Specific gravity	3.15

Aggregates
Steel slag, a by-product obtained from the steel manufacturing plant, is crushed into pieces and used as a fine and coarse aggregate along with conventional fine and coarse aggregate. River sand is used as a conventional fine aggregate and crushed granite as conventional coarse aggregate. Various properties of all the aggregates along with the standards, from Indian codal provisions (IS 383 – 1970) are given in table 2 and 3. The properties of natural fine aggregate and SS are as per the requirements. The crushing and the Attrition values of the steel slag coarse aggregate (SSCA) are higher than that of the standard values. This has to be taken care when

EXPERIMENTAL STUDY ON GEOPOLYMER CONCRETE USING HEAVY WEIGHT AGGREGATE

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ABSTRACT

Geo polymers has gained increasing attentions in recent decades because of its potential for CO2 emission reductions. The second most consumed product in the world is cement. It contributes nearly 7% of the global carbon dioxide emission. Geo polymer concrete has become eco-friendlier concrete alternative to Ordinary Portland Cement. Heavyweight self-compacting concrete (HWSC) and Heavyweight geo polymer concrete (HWGC) are new types of concrete that integrate the advantages of Heavyweight concrete (HWC) and geo polymer concrete (GC), respectively. The replacement of natural coarse aggregates with magnetite aggregates control GC at volume ratio of 25%,50%, 75% and 100% was considered in this study to obtain heavyweight concrete classifications.

INTRODUCTION

Concrete is the most widely used construction material in the world and Ordinary Portland Cement (OPC) is the major ingredient used in concrete. The development of science and technology is a continuing process for improvement of infrastructure all over the world. The production of cement releases large amount of carbon dioxide (CO_2) to the atmosphere that significantly contributes to greenhouse gas emissions. On daily basis we can see new innovations in the construction industries, which are economically and environmentally sustainable. Besides water concrete is the most utilized substance around the world. Ordinary Portland cement is main binder to manufacture Concrete alumina silicate. Heavyweight aggregates as it can be seen from the name is an aggregate that possess relatively high density and it is fundamental in a situation that high density concrete is necessary.

Generally, aggregates with specific gravity of 2400 kg/m^3 and higher are considered to be heavyweight. The density achieved will depend on the type of aggregate used. Typically using barites, the density will be in the region of 3,500kg/m^3, which is 45% greater than that of normal concrete, while with magnetite the density will be 3,900kg/m^3, or 60% greater than normal concrete. Very heavy concretes can be achieved with iron or lead shot as aggregate, 5,900kg/m^3 and 8,900kg/m^3 respectively. Cement contents and water/cement ratios are similar to those for normal concretes, but the aggregate/cement ratios will be significantly higher, because of the higher density of the aggregates. Heavyweight concrete can be batched, transported and placed using conventional equipment, though there are obviously certain aspects, such as the amount that can be carried by a ready-mixed truck or handled in a skip that will be limited by the density. Because of the higher density, formwork pressures will be increased. The rate of wear of mixers and pumps will also be increased. Compaction will require more energy than normal concrete and poker vibrators will have to be inserted at closer centres. There may be a greater tendency for the mix to bleed.

MATERIAL AND METHODS

In this chapter the materials which are used to make Geopolymer and their physical and chemical properties where explained. The materials used for making fly ash-based Geopolymer brick specimens are low calcium fly ash as the source material fine aggregates, alkaline such as sodium hydroxide solution, sodium silicate solution were as binders and water as workability measure.

Fly Ash

Flyashusedasthepartialreplacementofcementinthisstudywasselectedduetoitsabilityto promote flow-ability and increases in compressive strength due to their spherical glassy shapeparticles.Flyashconformstorequirementsofandpropertiesofflyashcanbefoundin Table1.

EXPERIMENTAL STUDY ON ADMINISTER OF FUTILE MATERIALS BY MEANS OF GREEN CONCRETE

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ABSTRACT
Green concrete has nothing to do with color. It is a concept of thinking environment into concrete considering every aspect from raw materials manufacture over mixture design to structural design, construction, and service life Conventional concrete is responsible for amount of carbon-dioxide emission to some Extent. So to reduce the emission, various types of concrete are developed using waste products from industries and agricultural use like blast furnace slag, silica fume, fly ash which requires low Amount of energy and also cause least harm to the environment. Green concrete is a new technology developed now days to reduce the effect on environment by production of cement. Cement contains high amount of carbon-dioxide which harms the environment drastically, so by replacing the cement by various materials which causes harm to the environment we not only reduce the problem of disposal of these materials but also we reduce the emission of carbon-dioxide from cement and as a result of which we reduces the negative effect on environment.

INTRODUCTION
Around the world; Clay tiles (Roofing Material), Paver blocks is one of the most common masonry units used as building material. A massive amount of natural resources are utilized either in their production plant or as the materials itself. ϒ Extraction and production of these virgin materials is an unsustainable practice. Wastage of materials, environmental deterioration, depletion of resources, and the spike in material cost led researchers to search for alternative materials that can be used in the making of Clay tiles and Paints. ϒ In India, textile industries are one of the prime and eldest sectors. An Enormous quantity of water is been used by textile industries for its various operations and processes, which generates hazardous waste. ϒ High amount of sludge is produced while treating textile effluent. Every day about 70 to 80 million tonnes of textile sludge is generated as a by-product of 240 dyeing industries. As such, the sludge treatment is considered in many countries a very substantial and dangerous problem due to its high operational cost and rigid environmental regulation as it may cause danger for the humankind Due to the strict environmental laws and the flagrant environmental side effects which caused due to the traditional sludge disposal ways many countries urgently tried to find new ways to get rid from the large quantities of wastewater sludge without harm the humankind or harm the environment, one of these new methods is using the sludge in the construction materials

2. MATERIAL AND METHODS

2.1 Sludge
The sludge was brought from EL-HAWAMDIA WWTPs (including industrial wastewater). These plants chosen due to better management and operation system. Sludge samples were obtained from drying beds site, which exposed to the sun for the long period in the drying beds, as varying in moisture depending on weather, temperature and sludge depth are given below in table 1.

Table. 1 Physical property of waste water sludge powder

Properties	Value
Finesses modulus	2.0
Specific gravity	1.75

EXPERIMENTAL STUDY ON PARTIAL REPLACEMENT OF COARSE AGGREGATE BY E-WASTE IN CONCRETE

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ABSTRACT

Electronic waste, popularly known as E-waste, is a growing concern that is causing major environmental issues for both humans and plants, which is becoming difficult problem to dispose of. For the purpose of resolving the disposal of huge amounts of E-waste, the most realistic application is the reuse of E-waste in the concrete industry. Modification of concrete properties by the addition of appropriate materials is a popular field of concrete research. In this study we are focusing on the use of selected Electronic Waste as a partial replacement for Coarse aggregate in the production of concrete. The work was conducted on M20 grade mix. The percentage of Coarse aggregate replaced by E-waste is in the range of 0%, 5%, 10%, 15%, and 20%. The aim of this study is to investigate the compressive strength and Material properties of concrete with Electronic Waste as a partial replacement for Coarse aggregate. The addition of E-waste shows increase in compressive strength upto 15% replacement and after it gradually loses its strength.

KEYWORDS-- E-waste, Compressive strength

INTRODUCTION

Concrete is one of the most commonly used building materials. Concrete is a composite material made from several readily available constituents (fine aggregate, coarse aggregate, cement and water, etc.). Concrete is unique among major construction material because it is designed specifically for civil engineering projects. One of the new waste materials used in the concrete industry is E-Waste. The increasing market penetration in developing countries and high obsolescence rate of electronic goods make Electronic waste (E-waste) one of the fastest growing waste streams. E-waste is valuable source for secondary raw material but harmful if
treated and discarded improperly as it contains many toxic components such as lead, cadmium, mercury, etc… The quantity of E-waste generated in developed countries equals 1% of total solid waste on an average and is expected to grow to 2% by 2010. Modification of concrete properties by the addition of appropriate materials is a popular field of concrete research. In this study we are focusing on the use of selected Electronic Waste as a partial replacement for Coarse aggregate in the production of concrete. The work was conducted on M20 grade mix. The percentage of Coarse aggregate replaced by E-waste in the range of 0%, 5%, 10%, 15%, and 20%. The aim of this study is to investigate the compressive strength and Material properties of concrete with Electronic Waste as a partial replacement for Coarse aggregate.

MATERIAL AND METHODS

Material

The mostly commonly available Ordinary Portland Cement of 53 grades was selected for the investigation. The cement used was dry, powdery and free from lumps. All possible contact with moisture was avoided while storing cement. Concrete mixes were prepared using locally available river sand. Ordinary crushed stone with size 20mm was used as coarse aggregate in concrete mixes. They generally possess all the essential qualities of a good building stone showing very high crushing strength, low absorption value and least porosity. In general, water fit for drinking is suitable for mixing concrete. Impurities in the water may affect concrete setting time, strength, shrinkage or promote corrosion of reinforcement. Hence locally available purified drinking water was used for the work. E-waste was collected locally from a PCB (Printed Circuit Board) cutting unit in the form of long chips. Copper strips present at the bottom of PCB were removed manually and broken in to half inch length pieces. Specific gravity, water absorption and impact value were tested for E-waste and results are given in Table 1.