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iii) In the grade of M_{30} concrete future smart beam can only carries 360 kN with the deflection of 3.2mm.

iv) In the 20% of nitinol coating over reinforcement by electrolysis which in the yield strength of fe250, fe415, fe550 increased in to 430N/mm^2, 580 N/mm^2, 760 N/mm^2 respectively.

v) In the 50% of nitinol coating over reinforcement by electrolysis which in the yield strength of fe250, fe415, fe550 increased in to 610N/mm^2, 820 N/mm^2, 1200 N/mm^2 respectively.

vi) In the 70% of nitinol coating over reinforcement by electrolysis which in the yield strength of fe250, fe415, fe550 increased in to 820N/mm^2, 940 N/mm^2, 1910 N/mm^2 respectively.

REFERENCES

1. Giusepe Campione , Giovanni Minafo (2012), behavior of concrete deep beams with openings and low shear span-to depth ratio, engineering structures41(2012),pp 29-306.
2. Hawilwh (2007), RC beam with opening strengthened with CFRP composites. (2007), pp 2-8.
3. A.Ahmed (2012) 'Reinforced concrete beams state of the art review', Materials and design 40 (2012) pp . 90-102.
4. M. L. GAMBHIR. Concrete Technology,(2004), retrieved 2010-12-11
5. IS 10262-1982, recommended guidelines for concrete Mix design, bureau of Indian standards, New Delhi, India.
6. IS 383-1970: specification for coarse and fine aggregates from natural source for concrete, bureau of Indian Standards, New Delhi, India.
7. IS 516-1959: methods of tests for strength of concrete, bureau of Indian Standards, New delhi, india.
8. IS 456-2000 plain and reinforced concrete-code of practice, bureau of Indian Standards, New Delhi, India.

REMOVAL OF HEAVY METALS FROM TEXTILE EFFLUENT BY USING BLENDED NATURAL COAGULANTS- A REVIEW

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ABSTRACT

The present paper focus on the Textile industry is one of the most chemically intensive industries on the earth and the major polluter of potable water. It generates huge quantities of complex chemical substances as a part of unused materials including dyes in the form of wastewater during various stages of textile processing. The direct discharge of this wastewater into environment affects its ecological status by causing various undesirable changes. Heavy metals such as lead (Pb), chromium (Cr), cadmium (Cd) and copper (Cu) are widely used for production of colour pigments of textile dyes. Textile dyes pollutants are being released to the environment at various stages of operation therefore it is necessary that the pollutants are treated before discharge using zeolite with and without alum. This paper reviews the current methods that have been used to treat heavy metal wastewater and evaluates these techniques. Cicer arietinum, Moringa oleifera, and Cactus were found as 0.1, 0.3 and 0.2gm/500ml respectively. The optimum pH value with Cicer arietinum,Moringa oleifera, and Cactus was found to be 5.5, 4.5 and 5.5, respectively. In case of Cicer arietinum, Moringa oleifera, and Cactus maximum reduction in turbidity were found to be 81.20%, 82.02% and 78.54%,and maximum reduction in COD were found to be 90%, 83.33% and 75%, respectively. Very few researchers have been carried out the natural coagulants used in this study maximum turbidity reduction of 82.02% and COD reduction of 90% was found with Moringa oleifera and Cicer aretinum, M. oleifera reduced 98.6% turbidity of wastewater, 10.8 % of its conductivity, 11.7% of its BOD and removed its metal contents (Cd, Cr, Mn). When applied to ground water, M. oleifera removed the turbidity of ground water as much as 97.5%, while reduced the conductivity and BOD of ground water 53.4 % and 18%, respectively. In this study probes the performance of neem leaf biomass waste to sequester copper from aqueous solution. This review neem leaf serves as a potential alternative adsorbent to remove copper ions from copper containing solution. Based on the present review, the coagulation–flocculation process was spontaneous and endothermic with a positive change in entropy of the system. Total heavy metal removal of 100 % (Pb), 85.74 % (Zn), 84.16 % (Cd) and93.02 % (Cu) were achieved, under optimum conditions.

KEYWORDS: Textile effluent, Coagulation-Floculation, Heavy metals, Natural coagulants,Seed maaterials.

1. INTRODUCTION

Wastewater disposal is the major problem being faced by us. In developing countries, like India presently, only about 10% of the wastewater generated is treated; the rest is discharged as it is into our water bodies. The most commonly faced problem in disposal of wastewaters is their color and turbidity. Finely dispersed suspended and colloidal particles are responsible for the color and turbidity of the wastewaters. Color in water results from the presence of natural metallic ions, humus and peat materials, plankton, weeds and industrial wastes. Suspended and colloidal matter such as clay, silt, finely divided organic and inorganic matter, and plankton and other microscopic organisms are responsible for turbid waters. Liquid wastes from paper mills, leather industry effluent have 10 to 20% total solids with a Chemical Oxygen Demand (C.O.D.) content of 25000 to 75000 mg/l. Slaughter house effluent has total suspended solids in the range of 3000 to 4000 mg/l and a COD content of 6000 to 8000 mg/l. The effluent generated by anaerobic digestion of municipal market wastes has 2-3% solids. Wastewaters from textile, food, cosmetic, paper and leather industries contain dyes which being recalcitrant in nature are difficult to degrade. These dyes are highly colored compounds and leads to reduction of sunlight penetration in rivers, lakes or lagoons that in turn decrease photosynthetic activity and reduces the dissolved oxygen concentration. This brings about detrimental effect on the aquatic life. [21]

COMPARISON OF LAND USE/ LAND COVER CLASSIFICATION IN ERODE DISTRICT

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ABSTRACT

Land has been one of our most precious assets and its use has been multifaceted. It provides us with food and shelter, stores and filters water and proves to be a basis for urban and industrial development. Land cover is a natural one and land use is the change made by the human activity for his adaptability. Anthropogenic changes in land use / land cover are being increasingly recognized as critical factors influencing the global change. Land use / land cover change was mainly caused by human activities which has an impact on eco-environment and climate change. Aerial photography can detect change over relatively small areas at reasonable cost and satellite imagery has proven cost effective for large regions. Land use of the study area is mainly influenced by the available natural resources. The remote sensing image is used to delineate the different categories of land use /land cover pattern in a quick and inexpensive way. Land use in a particular place is identified based on the reflection of the rays. Each pixel value is assigned a class. The classification approach is based on the assumption that each of the class on the ground has a specific spectral response with each of the class varying in spectral patterns. So the present analysis is to compare resource assessment and monitoring of land/ use and land/cover area of Erode District.

INTRODUCTION

Land is a prime natural resource and the mapping of land use/land cover is essential for planning and development of land and water resources (Srivastava et al 2006). But anthropogenic and natural forces modify the landscape. So it is important to monitor and assess these alterations to avoid the misuse of land leading usable land into wastelands. Timely and accurate information on the existing land use/land cover pattern and its spatial distribution and changes is a prerequisite for planning, utilisation and formulation of policies and programmes for making any micro and macro-level developmental plan (Chaudhary et.al 2008, Ashwani Srivastava et.al 2006, Nagendra, Munroe and Southworth J. 2004, Ramachandra 2007). Remote sensing technology along with GIS is cost-effective and best utilised solutions for integration of various data sets for both macro and micro level analysis which helps in identifying the problem areas and suggest conservation measures. The mapping and monitoring of the land use/land cover requires a land use classification system. One of the most widely used classification scheme was developed by National Remote Sensing Agengy (NRSA 1995).

Study Area

Erode District (previously known as Periyar District) is a district in the Kongu Nadu region (western part) of the state of Tamil Nadu, India. It was the largest district by area in the state before the Formation of Tirupur District and the headquarters of the district is Erode. It is divided into two revenue divisions namely Erode and Gobichettipalayam and further subdivided into 9 taluks. Periyar district was a part of Coimbatore District before its division into two on September 17, 1979 and was renamed as Erode District in 1996. As of 2011, the district had a population of 2,251,744 with a sex-ratio of 993 females for every 1,000 males, much above the national average of 929.

RESULT AND DISCUSSION

Land use/land cover change detection mapping of the study area has been done by using software ERDAS Imagine 8.4 from Landsat TM and IRS LISS III data of 1992 and 2005 images and the details of satellite images are shown in Table 1. The classification system was based on the NRSA classification system using supervised classification.

Table 1 Detail of Satellite Images

S.No	Data type	Sensor	Scene	Path	Row	Date of acquisition	Resolution	Source of data
1	Digital data acquired by IRS ID	LISS III	1	100	65	13.02.05	23.5 x 23.5 m	NRSA, Hyderabad
			2	100	66	13.02.05		
			3	101	65	18.02.05		
			4	101	66	18.02.05		
2	Landsat TM	Grid N-44-10				11.3.1992	30m x 30m	www.land cover.org

DETERMINATION OF PHYSICO-CHEMICAL NATURE AND WATER QUALITY INDEX OF GROUNDWATER IN ERODE DISTRICT (PERUNDURAI)

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ABSTRACT
This paper presents the study on the physico-chemical parameters of Groundwater samples collected at nine stations at the radius of 10km as center as SIPCOT industries Perundurai in Erode district. The quality of Ground Water samples are compared to the water quality index for the drinking purpose. The water quality index is calculated by the help of parameter sample results like Turbidity, Electrical Conductivity, Total dissolved solids, Total Alkalinity, Sodium, Iron, Calcium, pH, Total Hardness, Magnesium, Manganese, Nitrate, Chloride, Fluoride, Sulphate, Ammonia, Phosphate through formulae. Finally, the comparison of quality of Groundwater on basis of Water quality index done on collected sample stations. The calculated water quality index results shows that 22.22% falls in the Excellent to Good water category. On the otherhand 44.44% falls in the poor to very poor water category indicating the water is not suitable for drinking and need further treatment.
KEYWORDS: *Ground water samples, Water Quality Index, Perundurai.*

INTRODUCTION

Water is important natural resource and is secondary requirement to sustain the life on the earth after the fresh air. Approximately 60-65 percent of human body is composed of water. Groundwater is used for domestic and industrial water supply and also for irrigation purposes in all over the world. In the last few decades, there has been a tremendous increase in the demand for fresh water due to rapid growth of population and industrialization. Human health is threatened by most of the agricultural development activities in excessive application of fertilizers and unsanitary conditions. According to WHO organization about 80% of all the diseases in human beings are passed by water. Once the Ground water contaminated, its quality cannot be restored by stopping the pollutant source.

The quality of water is generallydefined in terms of its physical, chemical and biological parameters and measured as Water Quality Index (WQI)to assess water portability. Water Quality Index is one of the most effective tool used to identify the standard of water based on several water quality parameters. WQI is defined as the rating reflecting the composite influence of different water quality parameters. In this index a mathematical equation used to transfer large number of water quality into a single number which is simple and easy to understandable for decision makers about quality and possible uses of any water quality. It serves the understanding of water quality for the possible uses by integrating complex data and generating a score that describes status of water quality.

The objective of present work is to discuss the suitability of groundwater for human consumption based on computed water quality index values.

STUDY AREA

In Tamilnadu, Erode is famous for its textile industries situated in the center part of Tamilnadu. Perundurai is a developing town because of the advent of SIPCOT which is fully supported by Tamilnadu government. The exact study area lies between 77°30' 55" E and 11° 15'22" N to between 77° 35'32"E and 11°11'41" N . It is situated on NH-47 between Salem and Coimbatore. It is 19km from Erode and 80km from Salem and Coimbatore. It is situated 25km towards West from District headquarters Erode, 410kms from state capital Chennai towards East. SIPCOT consist of 109 industries in which 71 are textile industries, 6 chemical industries and 32 other general type industries. A lot of textile industries were relocated from Tirupur to Perundurai. Most of the villages around SIPCOT depend on agricultural lands the sources of irrigation are streams, tanks and wells. Groundwater plays a major role for irrigation and domestic use. The key plan of study area is shown in Figure 1.

ASSESSMENT OF GROUND WATER QUALITY BY USING MULTIVARIATE STATISTICAL TECHNIQUES IN KARUR TALUK

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ABSTRACT

Ground water quality of the Karur Taluk was assessed to understand the contamination processes due to the presence of various contaminant sources and the suitability of ground water for drinking, agricultural, domestic and other purposes. Ground water samples were collected during 2017 at 12 different locations of Karur Taluk of Tamilnadu state of India. Their physico-chemical parameters like colour, odour, turbidity, TDS, EC, pH, TA, TH, Ca^{2+}, Mg^{2+}, Fe^{2+}, Na^{+}, K^{+}, Mn^{2+}, NH_3^{+}, NO_2^{+}, NO_3^{-}, Cl^{-}, F^{-}, SO_4^{2-}& PO_4^{2-} were assessed. The results were compared with the drinking water guidelines of Indian Standard (IS) and World Health Organization (WHO). The multivariate statistical studies of Descriptive analysis, Correlation co-efficient (r) analysis, Factor analysis and Cluster analysis were analyzed using SPSS (version 19.0) to determine the various types of pollution formation in the Karur Taluk

KEY WORDS: Ground water, physicochemical parameters, IS, WHO, Correlation co-efficient (r) analysis, Factor analysis, Cluster analysis and SPSS.

INTRODUCTION

Ground water is a part of precipitation that infiltrates through the soil to the water table. Ground water occurs as a part of the hydrological metamorphosis of permeable structured zones of the rocks, gravel and sand. Groundwater can be obtained from aquifers and hypopheric zones. Ground water is always moving by the force of gravity from recharge areas to discharge areas. In India, as groundwater is ultimate and key water resource, people use groundwater for drinking purpose. In addition to this, groundwater is also used in agricultural and industrial fields. If the groundwater used for drinking and other domestic activities is contaminated due to increase in population, industrialization and urbanization and it creates intimidation to the health of the people. To protect and manage quality and quantity of ground water is essential for the healthy development of any country.

Objectives of the study

- To assess the ground water quality by physico-chemical parameters analysis at various locations of Karur Taluk.
- To assess the ground water suitability for drinking purpose by comparing the physico-chemical parameters with the IS & WHO standards.
- To identify the types of pollution causes the ground water contamination by Multivariate Statistical Techniques.

STUDY AREA

The present study is related to the ground water quality of some places of the Karur Taluk which is situated in Karur district of Tamilnadu state of India. The district located very centrally along the Kaveri and Amaravathi rivers. Karur taluk having population of about 4, 44,721 as per the 2011 census. Karur taluk having the male population of 2, 21,107 and female population of 2,23,614. The density of population is about 9098 per sq. km for the area. Karur taluk have the sex ratio of 1011:1000. Karur taluk is located between 10°36' N and 11°58' N latitude and 76°49' E and 77°58' E longitude. It is positioned near to Central part of Tamilnadu. The average annual rainfall of Karur taluk region is 775 mm. The boundaries of the district are Namakkal in North and Tiruchirappalli in East, Erode & Tiruppur in West and Dindugal in the South direction. Karur taluk is characterized with a scantry rainfall and a dry climate with dry weather throughout except during the monsoon season. The Tamil Nadu Newsprint and Papers Limited (TNPL), Chettinad Cement Corporation Ltd., Textile Trade and Bus Body Building Industry are located at Karur Taluk. Map of Karur taluk as shown in *figure 1.*

MATERIALS COLLECTION

The current study was designed to investigate the conditions of ground water contamination in the study area. The hydro geochemistry study was undertaken by randomly collected 12 ground water samples from open wells covering entire Karur taluk during January 2017. Ground water samples from the

FEASIBILITY STUDY ON TREATMENT OF TANNERY EFFLUENT USING NATURAL COAGULANTS

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ABSTRACT
A preliminary investigation was carried out for the feasible use of Azadirachta Indica leafs and Cicer Aretinum seeds powder as a natural coagulant to the treatment of tannery effluent. In this paper, Azadirachta Indica leafs and Cicer Aretinum seeds powder of 1, 2, 3, 4mg/L and 8, 9, 10, 11mg/L respective dosage were used. Floc formation in coagulation process had been studied in the laboratory scale to determine the optimum dosage of natural coagulant. The above dosages were used in pre-treated tannery effluent with coagulants were considered to evaluate the percentage removal efficiency on the major pollutants of concern in in tannery effluent such as turbidity, TSS, TDS, COD and BOD. From the observed results, dosage of 3mg/L and 10mg/L of Azadirachta indica leafs and Cicer Aretinum seeds powder respectively gives better removal efficiencies with respect to turbidity, TSS, TDS, COD and BOD and appears to be suitable for tannery effluent treatment, when compared with other dosages. From the results of these two natural coagulants Azadirachta indica leafs powder will be effective.
KEYWORDS: *Azadirachta Indica (AI), Cicer Aretinum (CA), Coagulation,Tannery, Turbidity*

1. INTRODUCTION

Indian leather industry has established to a large range and is the second larger producer following to China. The industry is equipped mostly with a potential for employment generation, growth and exports, with the annual export touching 2 billion USD. Presently it is on an ever increasing phase with optimum utilization of available raw materials and returns from exports.

Ever increasing industrialization and rapid urbanization have considerable increased the rate of water pollution. The dwindling supplies of natural resources of water have made thus a serious constraint for industrial growth and for reasonable standard urban living. Tanning industry is one of industries, which considered as highly polluting industry [1]. Tannery effluents contain lot of hazardous elements which can affect human immunity when it is directly discharged in water bodies [2]. Tannery generates effluent in the range of 30 – 35 L/kg skin or hide processed with variable pH and high concentration of suspended solids, BOD and COD [1].

In effluent treatment, coagulation has been practiced since earliest time and the main objective is to remove colloidal impurities hence also removing turbidity from water. Coagulant is a chemical used that is added to the water to withdraw the forces that stabilizes the colloidal particles and causing the particles to suspend in water. Once the coagulant is introduced into the water, the individual colloids must aggregate and grow bigger so that the impurities can be settled down at the bottom of the beaker and separate from the water suspension. Aluminium and iron coagulants are commonly used in most industries. However, when aluminium is used as a coagulant in waste water treatment, it can caused several bad effect on human health such as intestinal constipation, loss of memory, convulsions, abdominal colic's, loss of energy and learning difficulties [3].

In recent years there has been considerable interest in the development and usage of natural coagulants which can be produced or extracted from microorganisms, animal or plant tissues. The coagulants should be biodegradable and less voluminous sludge that amounts only 20 – 30% that of alum treated counterpart [4]. Therefore this study is carried out to analyze the effect of Azadirachta indica leafs and Cicer Aretinum seeds powder as a primary coagulant in clarifying tannery effluent in coagulation process at its optimum dosage. The optimum dosage and its removal efficiencies of Cicer Aretinum seeds powder on pH, turbidity, TSS, TDS, COD and BOD were determined.

2. MATERIAL AND METHODOLOGY

2.1 Collection and Preparation of AI and CA as Natural Coagulant

In this study Azadirachta indica leafs and Cicer Aretinum seeds powder were used as natural coagulant. AI was collected from road side of Tiruchengode city and CA was obtained from the local market of Tiruchengode city. Figure 1and 3 shows the pictorial view of Azadirachta indica leafs and Cicer Aretinum seeds respectively.

POTENTIALS OF NATURAL COAGULINTS IN THE TREATMENT OF TANNERY WASTE WATER-A REVIEW

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ABSTRACT

Tannery industry in India is one of highest pollutants producing industry, which is highly complex and is characterized by high BOD, COD, Suspended solids, settable solids, sulphides, chlorides and chromium. They use numerous amounts of chemicals for treatment of skin, which produces large quantities of effluents. This effluent contains solid waste, chromium and organic matters. Only about 60% of chromium salts reacts with hides and remaining chromium discharged along with solid and liquid wastes which is a potential environment problem. The wastewater has to treated before discharged into the nature. Even though the chemical wastewater treatment methods used to remove turbidity, color and oxygen demand reduction, this study focus on using naturally available coagulant to improve the quality of discharged tannery wastewater.

KEYWORDS: Tannery waste waters, Natural coagulants, FeCl, M.oleifera, C.arietinum, Opuntia FicusIndica, Calotropisprocera, Abelmoschusesculentus (okra**)**

INTRODUCTION

The large amount of water and chemical used in tannery industries for processing hides has caused a serious environment problem. These effluents are deteriorating the surface and underground water quality through seepage, due to chemical constituents of undesirable concentration and thus creating grave water pollution.

High concentrations of Heavy metals have strong toxic effects and are an environmental threat. Tannery wastewater with high concentration of dissolved solids, suspended solids; chloride, color, chromium etc. were being discharged every day in the receiving water bodies. The effluents of tannery industries are of inorganic, organic and toxic nature and require elaborate treatment before disposal.

Coagulation and flocculation processes are used for treatment of wastewater to remove color and turbidity. In general chemicals are used in these processes. Coagulants allows particles to stick together to create flocks by neutralizing the repulsive (negative) electrical charges. Flocculants helps the sticking of the coagulated flocks to form larger floccules enhance faster gravitational settlement. Various chemicals are used as coagulant and flocculation, such as FeCl3.6H2O (ferric chloride), FeSO4.7H2O (ferrous sulfate), Al2 (SO4)3.18H2O (alum) and CaCO3 (calcium carbonate).

The recent studies report various disadvantages to the use of inorganic coagulants aluminum and iron salts. Iron salts may produce brownish coloring of equipments and the aluminum salts may cause secondary contamination due to the sludge with high levels of aluminum contaminates treated water.

In this paper we study the performance of natural coagulants that can be used as an alternative for chemical coagulants for tannery wastewater.

TANNERY WASTEWATER

The tanning process aims to transform skins instable and imputrescible products namely leather. There are four major groups of sub-processes required to make finished leather: beam house operation, tan yard processes, re-tanning and finishing [1,2,3]. However for each end product, the tanning process is different and the kind and amount of waste produced may vary in a wide range [2, 4]. Traditionally most of tannery industries process all kind of leathers, thus starting from de-hairing to re-tanning processes. Acids, alkalis, chromium salts, tannins, solvents, sulfides, dyes, auxiliaries, and many others compounds which are used in the transformation of raw or semi-pickled skins into commercial goods, are not completely fixed by skins and remain in the effluent. For instance the present commercial chrome tanning method gives rise to only about 50–70% chromium uptake [5]. During re-tanning procedures, synthetic tannins (Syntan), oils and resins are added to form softer leather at varying doses [6]. One of the refractory groups of chemicals in tannery effluents derives mainly from tannins [7]. The oils

STRUCTURAL BEHAVIOUR OF ARTIFICIAL AGGREGATE IN CONCRETE WITH INTERIOR BEAM-COLUMN JOINTS

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ABSTRACT
Geo-polymer Concrete (GPC) is an innovative construction material which shall be produced by the chemical action of inorganic molecules. Fly ash is a product of coal obtained from the thermal power plant which is plenty available worldwide. Class F fly ash is rich in silica and alumina which reacts with alkaline solution. It is an excellent alternative construction material to the existing plain cement concrete. Geo-polymer concrete shall be produced without using any amount of ordinary Portlandcement. The geo-polymer concrete specimens with different composing molarities of sodium hydroxide with 8M, 12M and 16M were adopted. The compressive strength GPC increased 30% when compared to conventional concrete. The geo-polymer mixtures were cast to form a hard mass and its pulverized in to artificial aggregates.. These aggregates are used in interior beam-column joint for its structural behaviour in seismic performance and their properties are determined. Concrete grade of M30 and HYSD bars of grade Fe415 are to be used for conventional specimen. For GPC specimen concrete mix of M30 and HYSD bars of grade Fe415 are used. A beam column joint has been cast to a scale of 1/5th from the prototype and the model has been subjected to cyclic loading to find its behaviour during earthquake. The comparison of both RCC and GPC specimens for their adequate structural behaviour is determined by various parameters includes load deflection behaviour, Energy absorption capacity, Ductility, Stiffness and its crack pattern.
Keywords: Artificial Aggregate, , interior beam column joint, structural behaviour

1. INTRODUCTION

Beam column joints in a reinforced concrete moment resisting frame are crucial zones for transfer of loads effectively between the connecting elements (i.e. beams and columns) in the structure.Recent earthquakes worldwide have illustrated the vulnerability of existing reinforced concrete RC beam-column joints to seismic loading. Poorly detailed joints, especially exterior ones, have been identified as critical structural elements, which appear to fail prematurely, thus performing as ''weak links'' in RC frames. A typical failure mode in poorly designed joints lacking adequate transverse reinforcement! is concrete shear in the form of diagonal tension. Bond failure of rebar has been observed too, especially in interior joints where rebar's are not properly anchored with standard hooks. Strengthening of RC joints is a challenging task that poses major practical difficulties.

Portland cement concrete is one of the most widely used concrete materials. Ordinary Portland cement (OPC) is conventionally used as the primary binder to produce concrete. The climate changes due to global warming have become a major concern. The environmental issues associated with the production of OPC are well known. The amount of the carbon dioxide released during the manufacture of OPC due to the calcinations of limestone and combustion of fossil fuel is in the order of one ton for every ton of OPC produced. In addition, the extent of energy required to produce OPC is only next to steel and aluminium. On the other hand, the abundant availability of fly ash worldwide creates opportunity to utilize this by-product of burning coal, as a substitute for OPC to manufacture concrete. So, one of the ways to produce environmental friendly concrete is to reduce the use of OPC by using other forms of binders to make concrete. The geopolymer technology developed in the 1980's offers an attractive solution for this issue.

2. ARTIFICIAL AGGREGATE

Geopolymer aggregates are nothing but artificial aggregates made up of Fly ash using alkali activation process. Davidovits (1988, 1994) proposed that an alkaline liquid could be used to react with the silicon (Si) and the aluminium (Al) in a source material of geological origin or in by-product materials such as fly ash and rice husk ash to produce binders. The reaction takes place in this case is polymerization process and hence, he termed these binders as Geopolymers. Palomo et al., (1999) suggested that Pozzolana such as blast furnace slag might be activated using alkaline liquids to form a binder and hence totally replace the use of OPC in concrete. In this scheme, the main contents to be activated are silicon and calcium in the blast furnace slag. The main binder produced is a C-S-H gel, as the result of the hydration process.

In the present study, low-calcium (Class F) fly ash-based Geopolymer is used as the binder, instead of Portland or other hydraulic cement paste, to produce aggregate. The fly ash-based Geopolymer paste

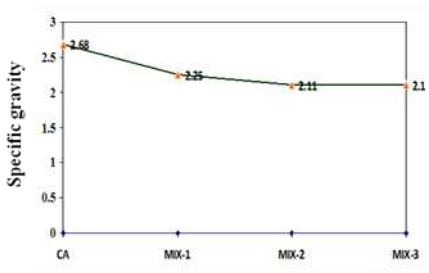

Fig 3.1 Specific Gravity variation

3.2 Water Absorption

The water absorption of 20 mm artificial aggregate and 20 mm conventional aggregate are approximately same. The water absorption variation of different mixes used in this project is shown in the Fig 3..2

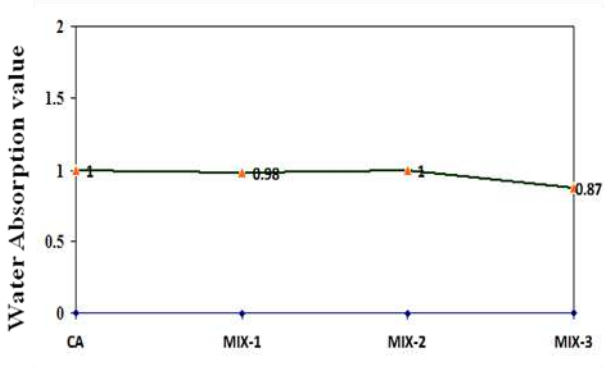

Fig 3.2 Water Absorption value variation

3.3 Impact Value

As per IS 383 – 1970, the aggregate impact value shall not exceed 45 percent by weight for aggregates used for concrete for non wearing surfaces and 30 percent by weight for concrete for wearing surfaces, such as runways, pavements and roads. Usually, for conventional 20 mm aggregate, impact value is 43.6% and artificial 20 mm aggregate impact value is 37.55%, 26.89% and 26.38% respectively. Even though these aggregates can be used for non wearing surfaces. The variations of impact value of different mixes used are as shown in the Fig 3.3.

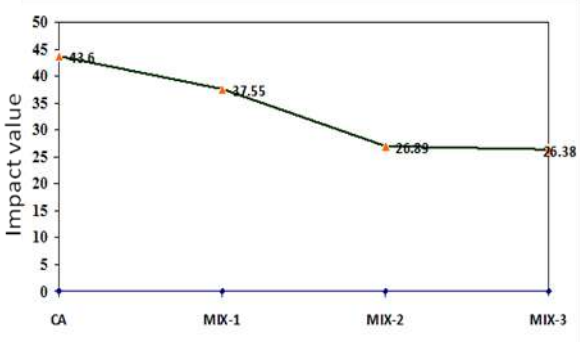

Fig 3.3 Chart Impact value variation

3.4 Crushing Value

As per IS 383 – 1970, the aggregate crushing value shall not exceed 45 percent by weight for aggregates used for concrete for non wearing surfaces and 30 percent by weight for concrete for wearing surfaces, such as runways, pavements and roads. Usually, for conventional 20 mm aggregate, crushing value is 5.78% and artificial 20 mm aggregate crushing value is 1%, 0.6% and 0.27%.though these aggregates can be used for non wearing surfaces. The variations of crushing value of different mixes used are as shown in the chart 3.4.

COMPARATIVE STUDY OF EICHHORNIA CRASSIPES AND ALGAE IN THE TREATMENT OF TANNERY WASTE WATER

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ABSTRACT
Tanning industry is one of the most important economic sectors in many countries especially in India. On the other hand, it generates more and more amount of waste water during the tanning process. Biological treatment (Phytoremediation) is more favorable and cheapest method compare to oxidation treatment, chemical treatment. The tannery waste water treatment is conducted by using aquatic plants of Eichhornia crassipes and Algae. Initially the pH, Turbidity, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD) of the raw water are found, after the biological treatment with aquatic plant of Eichhornia crassipes and Algae, finally the test results were compared to find which one is effective method to treat the tannery waste water.
KEY WORDS: *Tannery effluent, Eichhornia crassipes, Algae*

INTRODUCTION

Tannery industries are a very important one to export earnings. Tanning is the process of treating skins and hides of animals to produce leather [2]. In that industries deliver the huge quantities of untreated effluent during the process. The tannery industry waste water has more amount of chemicals and pollutants of chlorides, tannins, chromium, sulphate and sulphides, so that it was difficult to treat [3]. The chemical pollutions of waste water affect both human health and environment [2]. So the phytoremediation method is one of the best eco-friendly, cheapest and easiest method to treat the waste water [7].

Phytoremediation is the natural ability of certain plants to bio-accumulate, degrade, (or) render harmless contaminants in soils, water, (or) air, there are various types of phytoremediation exist, 1.Phytoextraction, 2.Phytodegradation, 3.Rhizofiltration, 4.Phytostabilization, 5.Phytovolatization. Eichhornia crassipes plant used treatment technique is called as Rhizofiltration, It is the process of removing pollutants and toxic heavy metals from the waste water by using roots of the plants, phytoremediation technology is easy way to remediate heavy metals contaminated environment [9]. which plants remove dangerous elements or components from soil or water, most usually heavy metals, metals that have a high density and may be toxic to relatively low contraction [6].

Many conventional processes were carried out to treat waste water from tannery industry such as biological process [1], oxidation process [5], and chemical process [10]. Biological treatment of waste water is more favorable and cost effective as compared to other physiochemical method. Various microorganisms are suitable to reducing the content of pollutants significantly [8].

MATERIALS AND METHODS

Collection of effluent sample

The effluent sample was collected from tannery industry, which is located at Erode, Tamilnadu-638005. The tannery effluent sample was collected after the primary treatment process. The collected effluent sample is dark color.

Analysis of physio chemical parameters

Samples were taken to analyze thepH, Turbidity, Total suspended solids (TSS), Total dissolved solids (TDS), COD and BOD was determined by using the following methods.

Analysis of pH

The pH meter is used to measure the pH value of the tannery waste water sample. The pH value of the tannery waste water was measured by using the pH meter. The difference in the pH of the waste water was measured.

Turbidity Analysis

Turbidity is an important indicator of the amount of suspended sediment in water, which have many negative effects on aquatic life. Test procedure is in accordance to IS: 3025 (Part 10)-Reaffirmed 2002.

Estimation of TDS:

Total Dissolved Solids (TDS) are the total amount of mobile charged ions, including minerals, salts or metals dissolved in a given volume of water, expressed in units of mg per unit volume of water (mg/L),

CRITICAL ANALYSIS OF CONSTRUCTION ERGONOMICS WITH BIORHYTHMIC CYCLE

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ABSTRACT
Construction industry is one of the most accident-prone industries among the production industries. Accidents prove to be costlier for both employee and employer. The objective is to give a basic introduction and clear definition of construction ergonomics. Based on the literatures, the most significant ergonomics risk factors were found out and those factors are awkward posture in handling job task, force, uncomfortable static position, contact stress of muscles, extreme temperature, repetition of specific movement and vibration. Some ergonomic injuries like Musculoskeletal disorder, Carpal tunnel syndrome,Tenosynovitis, Trigger finger,and Disc injuries arereally affecting the labour health during their work conditions. Thus, the intention of this paper is to discuss the way to mitigate the ergonomic risk factors in construction with biorhythmic cycle.
KEYWORDS*: construction ergonomics, risk control, biorhythm, awareness*

1. INTRODUCTION

The construction industry is the major economic activity around the world. The rapid growth of Construction industry has led to shortfall in terms of safety and health aspects of construction workers. All the types of construction work make up one industry. But each of them involves different exposure and thus differing risk potentials. Ergonomics is a significant factor in achieving and maintaining high levels of worker productivity and healthy.

Construction employee work in cleaning and preparing the sites, digging, operating power tool, loading and unloading of material, mixing and placing concrete and also work at different times, evening weekend or holidays, to finish his work. These factors lead him to ergonomic risk and serious injures such as strains, sprains and work related to musculoskeletal disorders. Ergonomics is one of the procedures that eliminate the hazards and risk in construction industry. Biorhythm is the one of the latest topics in the field of identifying minds ergonomics.

2. ERGONOMICS

Ergonomics is a derivative of the Greek words 'ergon' meaning to work and 'nomos' meaning study of. Ergonomics is therefore a study of human efficiency in their working environment.

2.1 Principles of Construction Ergonomics

- Prevent you from being injured
- Optimize your productivity
- Increase your comfort at workplace

2.2 Ergonomic Risk Factors

Ergonomic risk factors are not only affecting the people immediately but also, they take time to commence the affection on the person's health. The main ergonomic risk factors in construction industry are as follows

(1) Repetition
(2) Force
(3) Awkward posture
(4) Static posture
(5) Vibration
(6) Extreme Temperature

2.3 Ergonomic Disease in Construction

The most prevalent disease that normally occurs to the construction workers is Work Related Musculoskeletal Disorders are shown in figure 1.

Some of the Work Related MSD'S are,

1. Carpal tunnel syndrome
2. Tenosynovitis
3.Trigger finger
4. Disc injuries

HEAT CURED BOTTOM ASH - GGBS BASED SELF COMPACTING GEOPOLYMER CONCRETE

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ABSTRACT
This paper reports an attempt to study the performance of self-compacting geopolymer concrete (SC GPC) using bottom ash - GGBS blend under heat cured condition. The fresh properties were examined through slump flow, V-funnel, and L-box test methods. Strength properties such as compressive, splitting tensile and flexural strengths were determined after 24 hours steam curing. The results indicate that the bottom ash - GGBS blend SC GPC satisfied the workability requirements as per EFNARC standards. Also, bottom ash - GGBS blend SC GPC achieved remarkable strength enhancement at the early age.
KEYWORDS: *Geopolymer concrete, bottom ash, GGBS, alkaline liquids, curing, compressive strength*

1. INTRODUCTION
The global use of concrete is second only to water. As the demand for concrete as a construction material increases, so also the demand for Portland cement. The use of Portland cement in concrete addresses the global warming issue. Therefore, supplementary cementing materials like fly ash, GGBS, rice husk ash, silica fume are being used as a partial alternate to Portland cement Bennet Jose Mathew et al (2013). Further, continuous research is undertaken to reduce the environmental issues associated with Portland cement. As a result cement free binder is discovered by Prof Joseph Davidovits in 1978 Davidovits (2008). Cement free binder known as Geopolymer has been witnessed considerable application in concrete industries as an alternate binder to Portland cement due to high early strength, durability, eco friendly, economy and sustainable development as compared to Ordinary Portland Cement Ubolluk Rattanasak et al (2009) ; Venkob Rao and Revathi (2013), Chaicharn Chotetanorm et al (2013). On significant advancements of geopolymer concrete, the next step is the promotion of self compacting geopolymer concrete (SC GPC). Consequently, several studies were conducted on SC GPC.
Self compacting geopolymer is an innovative construction material in concrete technology, as the name implies it doesn't need any compaction efforts. Anuradha et al (2014) reported that concrete mixes containing higher concentration of NaOH were more cohesive and resulted in reduction of workability of SCGC. Ushaa et al (2015) investigated the effect of fly ash, silica fume, and ground granulated blast furnace slag as mineral admixtures on the fresh and hardened properties of self-compacting geopolymer concrete. It is observed that when mineral admixtures used in self-compacting geopolymer concrete, only 6% of super-plasticizer necessary to achieve a given fluidity. The optimum water/powder ratio was found as 0.33. The results indicated that 30% replacement of slag levels attained higher both strength properties. Kasireddy Mallikarjuna Reddy and Nagesh Kumar (2017) developed fly ash based self compacting geopolymer concrete with various percentages of GGBS. The authors noticed that increase in GGBS content reduced the workability characteristics. However, the addition of GGBS increased the strength properties. It was also observed that ambient cured specimens attained higher strength compared to oven cured specimens. Sashidhar et al (2016) examined the potential of SC GPC made with fly ash and GGBS. It was seen that GGBS contributes to attain early and rapid strength development at ambient room temperature curing. It was observed that SCGC mixes prepared with manufactured sand did not show any adverse effects. The authors reported that for the given coarse aggregate content of 30%, the paste content of 36.4% can be considered as adequate paste content to attain successful SCGC mixes.
The earlier works on SC GPC found that it was promoted by using fly ash, GGBS and silica fume and its combination Besides, the present study made an attempt to study the performance of self-compacting geopolymer concrete (SC GPC) using bottom ash and GGBS.

2. MATERIALS
Bottom Ash (BA)
Bottom ash is a part of non-combustible residue of combustion in a furnace or incinerator. Bottom ash used in the present study was obtained from Thermal power plant, Mettur. The specific gravity of bottom ash is 2.14 and the fineness is 346 m^2/kg. The properties are given in Table 2.1

EXPERIMENTAL STUDY ON SUGARCANE BAGASSE ASH AND GGBS BASED GEOPOLYMER MORTAR

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ABSTRACT
This paper discusses various combination of sugarcane bagasse ash and GGBS (Ground Granulated Blast Furnace Slag), as source material, to produce geopolymer mortar at room temperature or ambient curing. In geopolymer, sugarcane ash and GGBS act as binder and alkaline solution (NaOH and Na_2SiO_3) act as an activator. The mix was designed for NaOH molarity of 10M and 12M and alkaline ratio of sodium silicate to sodium hydroxide as 3 and 3.5. The compressive strength of the mixes was determined for their 7 days. The study revealed that blending of bagasse ash results in reduction of compressive strength. Further, the test results show that the compressive strength of the goepolymer mixes increases with the increase in the NaOH concentration.
***KEYWORDS**: Geopolymer, Sugarcane bagasse ash, GGBS, Sodium hydroxide, Sodium silicate, Molarity and Compressive strength.*

1. INTRODUCTION

It is widely known that production of cement contributes a large amount of CO_2. One possible alternative is the use of alkali – activated binder using industrial by products containing alumina silicate materials. Geopolymer concrete is an innovative and eco-friendly construction material. Geopolymer was the name given by Daidovits in the year 1978. In general, pozzalanas such as fly ash, GGBS rice husk ash, and metakaolin with combined aqueous solution of NaOH /KOH with sodium or potassium silicates was used to obtain geopolymer. The use of this concrete helps to reduce the stock of wastes and also reduces carbon emission by reducing Portland cement demand. The primary difference between concrete produced using Portland cement and geopolymer concrete is the binder (Llyod and B.V.Rangan, 2010; Khalid basher, 2014; Thakkar et al (2014); Sazmale.Arshad et al (2014); Dara and Bhogayata, (2015)
Sugarcane bagasse ash is available in abundance in India and faces disposal issues. These are the by products from sugarcane industry. A study by Bahurudeen et al (2014) explained that the sugarcane bagasse ash generated in India is abundant (more than 67000 tonnes/day). Ernesto Villar-Cocinaet al (2000) investigated sugar cane wastes as pozzolanic materials. A kinetic-diffusive model was proposed to determine the pozzolanic activity to find the optimum calcining temperature on the activation of wastes from sugar cane industries and their use as pozzolanic material. Guilherme Chagas Cordeiro (2002) made an attempt to use ultra-fine sugar cane bagasse ash as mineral admixture for concrete. Medjo Ekoet al (2002) made a study to develop a procedure for processing mixtures of soil, cement, and sugar cane bagasse. Further, Nuntachai Chusilp (2009) also conducted the study on development of bagasse ash as a pozzolanic material in concrete. Suvimol (2008) has conducted a study on effect of pozzolanic activity using bagasse ash and its application as a replacement for cement. Ramanagopal et al (2016) found that 30% bagasse ash blended with fly ash achieved structural grade compressive strength. The authors also suggested that 100% bagasse ash Geopolymer could be used a potential light weight material for partition walls with good thermal and sound insulation properties.
Amid, the present work aims to study the combination of combination of sugarcane bagasse ash and GGBS as a source material and its feasibility in geopolymer technology.

2. MATERIALS

Table 2.1 Chemical Properties of Sugarcane Ash

Parameter	Experimental Value
Silica (SiO_2)	73.15 %
Aluminum Oxide (Al_2O_3)	9.46%
Magnesium Oxide (MgO)	1.71 %
Iron Oxide (Fe_2O_3)	3.94 %
Calcium Oxide (CaO)	1.97 %
Sodium Oxide (Na_2O)	0.19 %
Potassium Oxide (K_2O)	3.24 %
Loss of Ignition (LOI)	0.73 %

EVALUATION OF FACTORS INFLUENCING QUALITY IN CONSTRUCTION PROJECTS

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ABSTRACT
Construction industry is one of the cannonading industries of today that has a great impact on the economy of any nation. Any piece of infrastructure or real estate erected around us is undertaken by segments under Construction Industry. Quality is considered as an important concern for project managers. Quality issues are a very disturbing event for a civil engineer. In this context, owners and engineers are alarmed by quality issues which have become more common than one can anticipate. This study mainly focuses on identifying and analysing the factors which influence quality in construction. The identified factors from the literature are time management, availability of resources, financial issues, labours, environmental conditions, materials and equipment used, lack of safety, co-ordination of participants, design, lack of communication, selection of contractor, inspection, codes and standards, execution and top management support. Based on the identified factors, a questionnaire survey was conducted to collect opinion from the construction experts. Then based on the questionnaire data, five factors which are most influencing were identified and they are labours, safety, co-ordination of participants, top management support and environmental conditions. This study also intended to provide every participant in construction industry necessary information needed to better manage the quality of a construction projects. Thus, certain points are suggested to improve and maintain quality.
KEYWORDS*: Quality, construction industry, questionnaire survey, factors.*

1. INTRODUCTION

The construction industry plays a socio-economic development in our nation (Tengan Callistus, 2014). The industry is a distinct sector of the economy which makes its direct contribution to economic growth like all the other sectors such as agriculture, manufacturing and services (Adenuga & Olumide Afolarin, 2013). It also provides basis upon which the other sectors can grow, by constructing the physical facilities required for the production and distribution of goods and services. The construction industry also has potential for generating activity and employment in other sectors of the economy such as manufacturing, transport, commerce and financial services owing to its interlink ages to other sectors (Arun Makulsawatudom and Margaret Emsley, 2003,. The performance of the construction industry can affect the economy of the nation. Failure of the construction industry leads to affect the reputation of the country (Priyanka, 2014).In this study, the factors affecting quality performance of construction projects were studied. It can be used to measure performance in construction projects. This will be a key component of any organization move towards achieving best practice in order to overcome the quality performance problem in the construction projects. Quality in construction is defined as 'meeting or exceeding the requirement of client/owners (Jha, 2006). In construction industry, quality is used in different every than the product industry. In the product industry, quality of some product is better than the other, but we cannot say that for one grade of concrete. Quality in construction is employed with conformity with which specifications are met. Designer specifies the grade of concrete to be used and contractor has to use the in gradients of concrete such that desired grade of concrete is obtained (Baiden and Tuuli, 2004).

The basic elements of quality in construction are characteristics, quality in design and its conformance. Quality characteristics: it is related to the parameters with respect to which quality- control process are judged. Quality characteristic includes strength, colours, texture, dimension, height, and etc. example in compressive strength of concrete, usability of concrete in slump, etc.

Quality of design: it refers to the quality with which the design is carried out. It primarily related to meeting the requirement of the standard, functionally efficient system and economical maintainable system.

Quality of conformance: it is referred to the degree to which the constructed facility conformed the design and specification. Quality of conformance is affected by field construction methodology and inspection (Davidkumar and Kathirvel (2015). The failure of process quality can start not only from the construction process but it involves in three important stages; design, construction and operation (David Arditi, 1998). In the modern construction market, quality is a major function in all stages of construction organization. This project helps the future projects to reduce the construction defect, minimizing rework and enhancing safety. The maintenance of quality management creates a high-performance team atmosphere and a culture of continuous improvement, making it possible to work toward a zero rework environment.

To improve their products quality

SOIL STABILIZATION BY MEANS OF DISCARDED MATERIALS

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ABSTRACT
Clay soil is considered to be problematic soil as it shows major volume changes due to change in its moisture content. This volume change cause wide spread damages to building and roads necessitating stabilization of such soil proceeding to the construction. The present paper investigates the effectiveness of different stabilizing agent viz.textile waste powder and fly ash with soil for improving its engineering properties. Soil samples were collected from district Erode, in state of Tamil Nadu, in order to look in to the relative effectiveness, and arrive at appropriate proportion of stabilizing. Combination of textile waste powder and fly ash are used to stabilize the soil. Quantity of stabilizing agent varied from 5 %, 10 %, 15 %, 20 % and 25 % of the soil weight and the performance is evaluated by observing variation in various engineering properties.
KEYWORDS: *Fly ash, Textile Waste, Atterberg limits, Unconfined Compressive Strength, California Bearing Ratio Test and soil stabilization.*

1. INTRODUCTION

In Civil Engineering Construction like Railway lines, Highway Network, Airport Runways, etc are required on Soil Embankment for construction. There are various processes like chemical, mechanical, biological or combined method in order to improve soil properties such as compressibility, strength, permeability and durability. Industrialization and urbanization is a major area of every country which is growing up in each year. Industrialization is one of the areas of each country in which numbers of industries are increasing year by year.

These industries manufacture many items and also produce thousands of tones waste material. Textile Industries is one of them which create waste material every year. Urbanization is the required for the growth of country resulting developing the lives of its country people. Civil construction is also a part of urbanization. Sometimes site engineers faces the problems in the field due to poor the strength of soil. Conventionally different materials like cement, lime and fiber etc are used to mix with soil for improving the strength of soil. These materials increase the cost of construction, results an uneconomical construction. In many industries waste materials are available which is not recycled yet for their utilizing purpose. Textile industries are one of them in which Textile Sludge is a waste material stored in the industry premise. When this waste material dried in presence of sun light creates dust which leads to the air pollution in nearby areas which also affects human health. Fly ash is a by-product of thermal power plants. Land area required for its disposition is a great problem in a densely populated country like India. Utilization of fly ash solves the problem of air and water pollution.

2. MATERIALS

2.1 Soil

Soil of kanthasamy palayam village of district Erode in Tamil Nadu is used for this study. Soil sample is identified as clay soil. The soil is tested for various engineering properties Liquid limit (L.L), Plastic limit (P.L), Plasticity Index (P.I).

2.2 Fly ash

Fly ash is a by-product of thermal power plants, land area required for its disposition is a great problem in a densely populated country like India. For this experiment fly ash is collected from thermal power plant in Mettur. Fly ash by itself has little cementations value but in presence of moisture it reacts chemically and forms cementations compounds and attributes to the improvements of strength and compressibility characteristics of soil. It has a long history of use as engineering materials and has been successfully employed in geotechnical applications.

2.3 Textile waste powder

For this experiment textile waste powder is collected from common effluent treatment plant at SIPCOT (States Industries Promotion Corporation of Tamil Nadu) in perundurai. The collected textile waste powder is sieved in 90 micron sieve. This powder cannot be disposed directly in water or land. If we use this textile waste powder as a stabilizing agent it will stabilize the soil and it also disposed safely. It is economical for stabilization of the soil.

EXPERIMENTAL INVESTIGATION ON CEMENTITIOUS COMPOSITES USING POLYVINYL ALCOHOL FIBER

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ABSTRACT
The pseudo strain-hardening behaviour of fiber reinforced engineered cementitious composites (ECC) is a desirable characteristic for it to act as a substitute for concrete to suppress brittle failure. The use of ECC in the industry is, however, limited by its high cost. To achieve higher cost/performance ratio, ECC can be strategically applied in parts of a structure that is under relatively high stress. In this paper, layered ECC-concrete beams subjected to flexural load are investigated from both theoretical and experimental aspects. The application of ECClayer on tensile side leads to increase in both the flexural strength and ductility, and the degree of improvement is found to increase with the ECC thickness. A semi-analytical approach for modelling the flexure behaviour of layered ECC-concrete beams is also developed. In the model, the stress–crack width relation of both concrete and ECC are employed as fundamental constitutive relationships. The model and experimental results are found to be in good agreement with one another. Simulation with the model shows that when the ECC thickness goes beyond a certain critical value, both the flexural strength and ductility (reflected by crack mouth opening and crack length at ultimate load) will significantly increase. The critical ECC thickness is hence an important design parameter, and it can be determined with the theoretical approach developed in the present work.

1. INTRODUCTION

Concrete is widely used in civil engineering construction. Though concrete is convenient and inexpensive to be made, its brittle behaviour upon tensile loading is one of its adverse properties that lead to the development of fiber reinforced cementitious composites. The brittle behaviour of concrete is due to the fast growing of a single crack that leads to the uncontrollable failure of the specimen. The ECC is similar and advanced method developed from fiber reinforced concrete.

2. ENGINEERED CEMENTITIOUS COMPOSITES

Engineered Cementitious Composites (ECC) is similar to fiber reinforced concrete (FRC). FRC contains water, cement, fine and coarse aggregate, fiber, and some common chemical additives. But only difference between FRC and ECC is, in ECC coarse aggregates are not used as they tend to adversely affect the unique ductile behavior of the composite. In ECC Coarse aggregate is replaced by fibers. A typical composition employs w/c ratio and sand/cement ratio of 0.5 or lower. Unlike some high performance FRC, ECC does not utilize large amounts of fiber. In general 2% or less by volume of discontinuous fiber is adequate, even though the composite is designed for structural applications.

Engineered Cementitious Composite (ECC), also called bendable concrete, is an easily molded mortar-based composite reinforced with specially selected short random fibers, usually polymer fibers.[1] Unlike regular concrete, ECC has a strain capacity in the range of 3–7%,[1] compared to 0.1 % for ordinary Portland cement (OPC). ECC therefore acts more like a ductile metal than a brittle glass (as does OPC), leading to a wide variety of applications.ECC looks similar to ordinary Portland cement-based concrete, except that it does not include coarse aggregate and can deform (or bend) under strainECC has been widely used in a variety of civil engineering applications; the properties of ECC (high damage tolerance, high energy absorption, and ability to deform under shear) give it superior properties in seismic resistance applications when compared to ordinary Portland cement.

Cementitious materials are characterized by low tensile strength, low strain capacity and low fracture toughness, they are brittle materials. Reinforcement in the form of continuous steel bars and stirrups is used to resist imposed tensile and shear stresses in reinforced concrete which renders it a usable structural material.

2.1 Effect of ECC compared with FRC

Fiber reinforced cementitious composites (FRC) can be classified into three groups. FRC employing low fiber volume fractions (<1 %) utilize the fibers for reducing shrinkage cracking. FRC with moderate fiber volume fractions (between 1% and2%) exhibit improved mechanical properties including modulus of rupture (MOR), fracture toughness, and impact resistance. The fibers in this class of FRC could be used as secondary reinforcement in structural members, such as in partial replacement of shear steel stirrups, or for crack width control in structures. In the last decade or so, a third class of FRCs, generally labeled as high performance FRC, or simply HPFRC, has been introduced. HPFRC exhibits apparent strain-

A CORRELATION AND REGRESSION ANALYSIS ON THE GROUND WATER OF PAPPIREDDYPATTY TALUK, DHARMAPURI DISTRICT

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ABSTRACT
Now a days, the groundwater potential and its quality level in major cities and urban centre's is getting deteriorated due to the population explosion, urbanisation, industrialisation and also the failure of monsoon and improper management of rain water. For that groundwater samples were collected from various locations in PappireddypattyTalukDharmapuri district, Tamilnadu. A correlation study has been carried out amongst all possible pairs of 13 physio chemical parameters to assess ground water quality. Correlation analysis is a useful statistical tool to determine the extend to which changes in the value of an attribute are associated with the changes in another attribute.
KEYWORDS-*Groundwater, Correlation and Regression analysis, Physio-Chemical Parameters*

1. INTRODUCTION

Groundwater is one of the most valuable resources, which supports human health, economic development and ecological diversity [1]. About 97.2% of water on earth is salty and only 2.8% is present as fresh water, from which about 20% constitutes about ground water [2]. In many parts of India especially in the arid and semiarid region, due to scarcity of surface water, dependence of groundwater resources has been increased tremendously in recent years. Now a days, the ground water potential and its quality level in major cities and urban centre's is getting deteriorated due to the population explosion, urbanization, industrialisation and also the failure of monsoon and improper management of rain water [3]. The major problem with the ground water is that once contaminated, it is difficult to restore its quality. Hence there is a need for and concern over the protection and management of groundwater quality.

2. STUDY AREA

Pappireddipattytaluk is located in Dharmapuri district of Tamilnadu, India. It lies between 11.9136◦ N latitude and 78.3657◦ E longitude. Its total area is about 3.5 sq.miles. Pappireddipatty village is 45 km distance from Dharmapuri District .The summer in these Pappireddipatty is unbearably hot with temperatures rising above 38◦ C mark. In the winter, the temperatures come down near 18◦ C. These major portion of the village is occupied by Fertile farms, Forests and ponds.

CONCURSUS OF POLYETHYLENE THEREPHATHALATE AND BITUMEN AS A BRICK

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ABSTRACT
*This experimental study investigates about the concursus of polyethylene therephthalate and bitumen as a brick. In the year 1807 Francis Bachman Hamilton described the laterite soil laterally it is named as brick. 15 % to 20 % of laterite soil is wasted while preparing a brick, in our preparation we are using the laterite soil that are considered as waste while preparing a bricks. Polyethylenetherephthalate is a #1 type of plastic which are mainly prepared from concursus of petroleum, hydrogen and carbon atoms. Polyethylene therephthalate takes over approximately 1000 years to decompose and its effects environments and all lives. To extirpate these effects #1 types of plastic which means polyethylene therephthalate are used in this processing. In this processing plastic are melted at the temperature of 135ºc, it exhaust fumes which contains toxics which affects environment but adding of plastic with bitumen in concursus it will reduce the*effects of fumes to great extends.
KEYWORDS : Polyethylenetherephthalate, Bitumen, Laterite soil

1. INTRODUCTION

Now-a-days recycling of waste material without affecting the environment is kind of the problems under major issues. Recycling of any types of plastics will becomes to plague the society near future. In preparation of an brick it will produce toxic fumes which are affects the environment. To overcome from this disadvantage we used the polyethylene therephthalate bricks which control pollution to certain extent. Normally bricks needs huge needs of water during the production process, but in Polyethylene therephthalatebricks, no water usage during the production process and it does not absorbs more than 0.7% of water because of absence of porous due to ductility and proper compaction. The usage of this bricks makes the buildings much stronger than the normal soil bricks. There are fourmajor form of plastics that can be used for many products by recycling with affecting environment are shown below.

- Lowest Density Polyethylene.
- Poly Propylene.
- Urea Formaldehyde.
- Polyester Resin (PR)

In our process we use the plastic named as polyethylene therephthalate #1 type with concursus of bitumen to reduce toxic fumes and reduce affects on environment. Bitumen are widely used for the construction of roads such as National Highway, Sate Highway etc. Normally the melting point of bitumen is 260°C. In our process bitumen plays a vital role for melting the plastic without affecting the environment because when plastics are melted with bitumen the fumes ejected are reduced. The plastic is 135°C which can be easily melted when mixed with melted bitumen at 260°C. Our process is both environmental and economic friendly even though the cost of bitumen is highest. The amount of bitumen used in our process amounts to 0% to 10 %by weight of soil which will reduce the cost of production and plastic at rate of 70% by the weight of soil is added constantly.

2.MATERIAL USED

2.1.1 Laterite soil

A good laterite soil is presented in the region of near Thanjavur. Laterite soil is mostly used in the process of production of bricks. This is ultimately used in the construction process. The soil which is used in this process of making PET (Polyethylene Therephthalate) brick which are retains from 2.36 mm sieve as a fine grain in size. The properties of laterite soil are listed below; Table1

Table 1Properties of Laterite Soil

Properties	Test value
Water content %	10.65
Liquid limit %	38.57
Plastic limit %	27.50

EFFECTIVE UTILIZATION OF DISCARD MATERIALS IN FLEXIBLE PAVEMENT

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ABSTRACT

The modification of bitumen using discard materials in road paving applications is gaining momentum day to day over the past few years. The need for the modification is raised due to the need in the improved performance of the flexible pavements. Developing countries like India whose transportation mainly depends upon the road, need a vast research in this field. Presently the commonly used modifier for the modification of bitumen is rubber and plastics. This not only allows us to collect modifier raw material at low cost, but also provides a solution towards ecological menace posed by increased use of discard wastes. The present paper is to study the modification of the bitumen using balloon rubber, fillers like textile sludge *waste and fly ash. Also plastic coated aggregates are used. Marshal method of bituminous mix design was carried out for various percentages of balloon rubber and fillers to determine the different mix design characteristics.*

Key words: *Bitumen, Balloon Rubber, Fillers- Textile sludgewaste and Fly ash, Plastic coated aggregate.*

INTRODUCTION

Over the years, road structures have deteriorated more rapidly due to increase in service traffic density, axle loading and low maintence services. To minimize the damage of pavement, the conventional bitumen needs to be improved with regards to performance deformation and fatigue cracking. Natural rubber modified is used for the prolongation of life of state roads. The need to adopt rubber for the use of construction of the roads is mainly that it reduces the cost of construction. A steady stream of huge volume of natural rubber is generated due to continual increase in the production of wastes generated by the population. The availability of the Natural Rubber (Latex) is enormous, as the rubber is a product obtained from Latex e.g., mattresses, balloons, gloves, swim caps has become part of daily life. If not recycled its present disposal is either by land filling or by incineration. Both the processes have certain impact on the environment.

Fillers modify the properties, accelerate the performance, and offer greater durability to composites, polymers, rubbers, adhesives and coatings.Fillers are used to reduce the cost of the materials, increase the stiffness and provide special features to material such as colour and fire proof. Typically fillers are fine powders having particle size less than 75μm. Fillers can be naturally occurring like calcium carbonate, manufactured or derived from industrial waste such as fly ash from thermal power plants and textile wastes from textile processing mills. Hence rubber and fillers are mixed with various proportions to increase the quality of road and whether it can be used for construction at low cost.

OBJECTIVE OF MODIFIED BITUMEN

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 materials as a pavement ingredients.
- To study the effect of balloon rubber and fillers mixed with bitumen.
-

LITERATURE REVIEW

Rokade S (2012) suggested that Use of Waste Plastic and Waste Rubber Tyres in Flexible Pavements. Plastics are user friendly but not eco-friendly as they are non-biodegradable. The better binding property of plastics in its molten state has helped in finding out a method of safe disposal of waste plastics, by using them in road laying. The rubber which is obtained from the waste tyres of Vehicles, in the construction of sourced from disposed waste plastic and crumb rubber. Two types of polyethylene were added to coat the aggregate: High Density Polyethylene (HDPE) and Low Density Polyethylene (LDPE). The crumb rubber was added to 60/70 grade bitumen in varying percentage of 8%, 10%, and 12%. The

EVALUATION ON STRUCTURAL BEHAVIOUR OF HYBRID FIBER REINFORCED CONCRETE USING BASALT AND POLYESTER FIBER

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ABSTRACT

The conventional concrete is enhanced by the addition of Fibre in the composites. The brittleness in concrete is reduced and the adequate ductility of concrete is ensured by the addition of fibres in concrete. For brittle materials, Such as cement, concrete, fly ash, etc., increasing their ductility and toughness has been a major motivation for many research works in recent years. The fibres used are Basalt and Polyester Fibres in various volume combinations. The main reason for adding fibre to concrete its matrix is to find its compressive strength, flexural strength and split tensile strength. It should be used for to improve the post-cracking response of the concrete and also to improve its energy absorption capacity and apparent ductility and to provide crack resistance and crack control. The hybrid fibres of various combinations 0%, 0.25%, 0.50%, 0.75% and 1.0% are decided to use in concrete mix. The workability of hybrid fibre reinforced concrete mix will be increased by addition of super plasticizer. In this chapter that the addition of short basalt fibres can significantly improve the ductility of the concrete composites.

1. INTRODUCTION

Concrete as the most commonly used construction material is developing towards high performance, i.e., high strength; high toughness, high durability and good workability shrinkage and permeability resistance of concrete are two important properties relating to durability. An important measure of improving concrete impermiability is to improve the capability of resisting shrinkage and cracking. Concrete can be modified to perform in a more ductility form by the addition of randomly distributed discrete fibres in the concrete matrix.

Experimental Setup

In this stage collection of materials required for the mix design are obtained by sieve analysis and specific gravity. Sieve analysis is carried out from various fine aggregate (FA) and coarse aggregate (CA) samples and the samples which suits the requirement is selected. Specific gravity tests are carried out for fine and coarse aggregate. The various materials use wastest as per Indian specification.

Hybrid Fiber Reinforced Concrete (HFRC)

The concrete in which more than one fibre types are used as secondary reinforcement is called hybrid fibre reinforced concrete. Extensive research work on FRC has established that addition of various types of fibres such as metallic and non-metallicfibres like steel, glass, synthetic and carbon in plain concrete improves strength, toughness, ductility, post-cracking resistance, etc., The crimped end steel fibres and Polyester fibres can effectively be used for making high strength FRC after exploring their suitability. In this investigation, therefore, an attempt has been made to study the feasibility of using two kinds of fibbers for making FRC. Cementitious materials are generally quite brittle with relatively low strength and strain capacity under tension, for low reinforcement levels, the partial of even complete replacement of this conventional reinforcement by fibres is an advantageous alternative. For special applications, highly ductile fibre reinforced cementitious materials like ultra-high performance concrete or engineered cementitious used.

2. MATRERIALS AND MIX PROPORTION

Marerials

Raw materials required for the concreting operations of present work are cement, fine aggregate and coarse aggregate.

Cement

Cement is used as binding material in the concrete where the strength and durability significant important. The ordinary Portland cement of 53 Grades conforming to IS 12269-1987 is used to manufacture the concrete. Also some tests were content such as consistency test, setting time test and Specific Gravity test.

PERFORMANCE EVALUATION OF LIGHT WEIGHT CONCRETE USING E-PLASTIC WASTE

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ABSTRACT

Lightweight concrete can be defined as a type of concrete which includes an expanding agent in that it increases the volume of the mixture while giving additional qualities such as nailbility and lessened the dead weight. Lightweight concrete maintains its large voids and not forming laitance layers or cement films when placed on the wall. This research was based on the performance of Light weight cellular concrete, made by incorporating air voids into the cement slurry. It is homogeneous when compared to normal concrete, as it does not contain coarse aggregate. The properties of aerated concrete depend on its microstructure (void-paste system) and composition, which are influenced by the types of binder used, methods of pore-formation and curing. Although it was initially known as a good insulation material, there has been renewed interest in its structural characteristics in view of its lighter weight, savings in material and potential for large scale utilization of fly ash, bagasse ash and e-plastic waste. In this study, replacement of E-Plastic waste in 0%, 5%, 10%, 15%, 20%, 25% in sand proportion of light weight concrete. From the optimum percentage of compressive strength of light weight concrete, performance studies are carried out. Hence the reduction of hazardous material is towards the landfill and decomposing in earth. Thus developing the new mode of sustainable material is in construction. The performance of aerated lightweight concrete such as compressive strength tests, water absorption and density and supplementary tests and comparisons made with other types of lightweight concrete were carried out.

KEY WORDS: *light weight concrete, E-Plastic waste,forming agent*

*1.I*NTRODUCTION

Light Weight Concrete (LWC), in which air-voids areentrapped in the mortar matrix by means of a suitable aerating agent. Air bubbles are created to reduce the density of the concrete and to provide good thermal insulation. However, aerated concrete exhibits low compressive strength and high rate of water absorption. It provides considerable savings in material due to the porous structure. According to Chinese national standard, LWC is the only one type of wall materials owning the ability to meet 50% of the building energy saving request without adding other thermal insulation materials. It is widely used in construction mainly due to its improved insulation properties. Because of its high porosity, LWC is characterized by low weight and strength and high brittleness. Structural elements made of LWC are not common. A structural element should withstand different loadings and perform properly. To achieve that it should be properly reinforced, and be characterized by satisfactory ductility, shear resistance, etc..LWC is commonly used in masonry, mainly as in fill walls. Masonry blocks made of LWC may provide the required thermal insulation, and their limited strength and ductility may be acceptable. The aim of this work is to analyze LWC with bagasse ash and glass power as partial replacement of sand and to test the physical and mechanical properties of the aerated concrete. Though largely new to the India, LWC is not a new building material. Developed in Sweden in the 1920s in response to increasing demands on timber supplies, LWC is a lightweight manufactured building stone. Comprised of all natural raw materials, LWC is used in a wide range of commercial, industrial, and residential applications and has been in use in Europe for over 70 years, the Middle East for the past 40 years, and South America and Australia for approximately 20 years. According to one manufacturer, LWC now Accounts for over 40% of all construction in the United Kingdom and more than 60% of construction in Germany.The current processes for the manufacture ofLWC arebased on a number of patents that have been granted since the early 1900's. The earliest U.S. patent for the use of powdered aluminum and calcium hydroxide as gas forming agents in a cementations mixture was granted in 1914. In 1929, U.S. patents were granted to the use of hydrogen peroxide and sodium or calcium hypochlorite as gas forming agents.The first patent for the manufacture of LWC was granted in 1923 to a Swedish architect, Johann Erickson. His patents included the use of aluminum powder in moist cured and autoclaved concretes.Factory production of LWC began in Sweden in 1924 and expanded to other parts of Western Europe soon after. Over the years, as the merits of the product wererealized by others, themanufacturers began providing licensing technology and know- how to other countries.In addition several other manufacturers were among the pioneers in the international use of Light Weight Concrete. H + H began production in Denmark in1937 and presently have 6 plants in Denmark and have a subsidiary in

IDENTIFICATION OF GROUNDWATER QUALITY ANALYSIS FOR CONSTRUCTION PURPOSES

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ABSTRACT:
Since last decade, the value per barrel of portable ground water has outpaced the value of a barrel of oil in many areas of the world. Due to the industrial revolution and population increases the quality of water is deteriorated. Hence it is necessary to identify the quality of water before consumption. So the present study was to investigate the ground water quality for construction purpose in a part of Erode district, Tamil Nadu. Fifteen groundwater samples was collected to classify the physicochemical characteristics like pH, chlorides, sulphates, suspended solids, inorganic matters, organic matters, limits of acidity, limits of alkalinity and the results were compared with IS456 guidelines. All the parameters values are within the permissible limits hence suitable for the construction purposes.
Key words: Groundwater, physico chemical characteristics, parameters, permissible limits.

I.Introduction:

India has been the second largest populated country in the world and also the foreign policies of the government have made many multinational companies to invest in industrial sectors in India which have increased the number of industries. Ground water is a vital resource. Overall development in various fields such as industrial, agriculture, construction, urbanization has led to an increase in demand for water particularly in India.

Depletion of water level in aquifers and decline in design yield of wells due to excessive pumping in the absence of adequate knowledge on groundwater availability are becoming a major concern across the India. All the above factors have increased the demand for water in India which would be crucial problem in the near future. This has lead to the over exploitation of groundwater in many parts of our country. Hence there is a need for proper planning, development and management of water [4].

In these case, the quality of ground water is of great importance in determining the suitability of ground water for a certain use such as public water supply, irrigation, industrial application, constructional use etc.[6].There is to estimate the ground water quality index several parameters have to be analyzed and proper weightage must be assigned for each one[12]. So this study is focusing to identify the quality of water for construction purpose in Erode District.

II.Study area :

Erode district predominantly agrarian in nature is emerging gradually but steadily as industrially promising district. The district lies between the latitudes $10^{O}36'$ N and $11^{O}58'$ N and longitudes $76^{O}49'$ E and $77^{O}58'$ E and 171.91m above mean sea level. It has an area of 8162 km^2 accounting for 6.3% of the total area of the state. The town is situated on the bank of river Cauvery. Due to urbanization industrialization and increase in population the environment in erode district is getting day by day.

FIG 1 : Sampling location

III.Sampling:

Fifteen water samples were collected from bore wells at various location in the study area during January 2017. Samples were collected in polyethylene bottles. Then the ground water samples was analyzed to determine various parameters. The analysis of water was done by using procedures of "standard method".

STUDIES ON STRENGTH CHARACTERISTICS ON UTILIZATION OF WASTE CERAMIC TILE AS COARSE AGGREGATE IN CONCRETE

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ABSTRACT

*Depletion of natural resources is a common phenomenon in developing countries like India due to rapid urbanization and Industrialization involving construction of Infrastructure and other amenities. In view of this, people have started searching for suitable other viable alternative materials for concrete so that the existing natural resources could be preserved to the possible extent, for the future generation. This paper is to study the strength characteristics of waste crushed tiles replaced with coarse aggregate in the concrete. Ceramic waste concrete (CWC) will be made with these tiles at 0%, 10%, 20%, and 30% replacement of coarse aggregate in OPC and PPC mix. M30 grade concrete will be adopted; a constant water cement ratio of 0.45 will be maintained for all the concrete mixes. The characteristics properties of concrete such as workability for fresh concrete, also Compressive Strength, Split Tensile Strength and Flexural strength for hardened concrete will be found out in this study at 7 and 28 days for each percentage of replacement The optimum percentage of coarse aggregate that can be replaceable by crushed tiles is 30% of attained strength***.***

KEYWORDS: Waste ceramic tile, Aggregate, Concrete, Compressive strength, Flexural strength, Ceramic waste concrete.

I.INTRODUCTION

Aggregate and Cement, which are the most important constituents used in concrete production, are the essential materials needed for the construction industry. This certainly led to a continuous and increasing demand of natural materials used for their production. Consequently, huge money is being spent for their disposal reasons as well as environmental pollution occurs. It is well known that addition of these wastes in concrete as a supplement generally reduces the construction cost and more or less maintains the properties of concrete.

Studies have investigated that he use of ceramic wastage in concrete as a partial replacement of cement or natural aggregates (fine/coarse). Khaloo (1995), observed that the concrete made with 100% crushed tile as the coarse aggregate had a lower density and higher compressive (+2%), tensile (+70%) and flexural (+29%) strengths. Lopez et al.(2007) concluded that this substitution process would increase slightly the compressive strength. Besides, Torgall and Jalali (2010) also concluded that using ceramic wastage as sand and coarse aggregate can slightly enhance compressive strength and also durability of concrete. Medina et al.(2012) also deal with the substation of ceramic as a coarse aggregate and finally reported a positive effect for the process. Tavakoli D. et al.(2013) estimated that the optimal case of using tile wastage as sand are amounts of 25 %to 50 %.Senthamarai(2005) concluded that ceramic tile waste can be effectively used as aggregates in concrete making, based on the strength of ceramic waste aggregate. The crushing value, impact value, abrasion values for ceramic scrap were 27, 21 and 28% correspondingly besides, the best case of their use as coarse aggregate are as amounts of 10% to 30%.MdDaniyal and Shakeel Ahmad(2015) studied that after 30% replacement of coarse aggregate with ceramic tile aggregate increases the compressive strength at OPC and PPC concrete when compared to reference concrete and in our study we have concluded that 30% replacement only gives maximum compressive strength and flexural strength when compared with reference concrete. The split tensile strength is maximum at 20% and 30% replacement in OPC concrete and in PPC mix the maximum split tensile strength is achieved at 30% of replacement of coarse aggregate.

II. MATERIALS AND METHODS

In this experimental study, first the grinded waste ceramic tile and then its grading were done in a way that the tile grading curve of the natural aggregates used in control concrete was completely in compatible with the ceramic tile aggregates as per IS 383-1970. After that, a range of experiments were done on natural aggregates and ceramic tile aggregates as per IS 2386 (Part I-VIII) -1960. Having been ready, in the first stage of the study, the ceramic tiles with per cents of 0, 10, 20 and 30% were substituted for natural coarse aggregates with w/c ratio of 0.45. After that, a comparison was made between the slump, unit weight and compressive strength, of new concrete and the reference samples. After that optimum per cent of ceramic tile aggregate and w/c ratio were determined.

STABILIZATION OF SOIL USING COCONUT FIBRE ASH AND LIME

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ABSTRACT:
Soil stabilization has become a major issue in construction engineering and the researches regarding the effectiveness of using natural wastes are rapidly increasing. The use of natural fibres to reinforce *soil is an old and ancient idea. Consequently, randomly distributed fibre reinforced soils have recently attracted increasing attention in geotechnical engineering. The main aim of this paper, therefore, is to review the, benefits, properties and applications of coir fibre in soil reinforcement through reference to published scientific data.*
Keywords: *California Bearing Ratio (CBR), Unconfined Compressive Strength (UCS), Optimum Moisture Content (OMC), Maximum Dry Density (MDD), Fly Ash (FA), Safe Bearing Capacity (SBC), Coconut fibre(coir).*

INTRODUCTION:

Keeping in mind the large geographical area of India (3,287,240 sq. km) and population of India (125 million approximate) the vast network of structures and roads are required. (Singh and Mittal, 2014) The land available for construction is very less because of increasing urbanization and modernizations. Everywhere land is being utilized for various structures from an ordinary house to sky scrapers, from bridges to airports and from village road to highways or expressway. Soil being the cheapest and readily available construction material, has been popular with the civil Engineers, even though it being poor properties. Owing to this, construction of structures these days is being carried on land having weak or soft soil. Now, stability of any structure depends on the properties of soil. Using land having soft soil for construction leads to various ground improvement techniques such as soil stabilization and soil reinforcement. Most of the soil available are such that they have good compressive strength adequate shear strength but weak in tension/ poor tensile strength. To overcome the same, many researchers have concentrated their studies on the development of new such materials, through the elaboration of composites. (Chapale and Dhatrak, 2013)

The foundation of a building or road is an essential part for effective transmission of load to the subsoil present beneath it. The quality of soil has large impact on type of structure and its design. The expansive soils are examples of weak soils, which encountered in foundation engineering for bridges, highways, buildings, embankments etc. Expansive soil undergoes volume changes when they come in contact with water. They show alternate swelling and shrinkage properties. It expands during rainy season and shrinks during summer season. Expansive soil covers nearly 20% of the land mass in Indian. These soils possess weak properties due to presence of clay minerals known as “Montmorillonite”. Typical behavior of soil results into failure of structure in form of settlements cracks etc. Therefore it is important to remove the existing weal soil and replaced it with a non-expansive soil or improves the properties of weak soil by stabilization. (Kharade et. al, 2014) Expansive soils exhibit generally undesirable engineering properties. They tend to have low shear strengths and to lose shear strength further upon wetting or other physical disturbances. They can be plastic and compressible. Cohesive soils can creep over time under constant load, especially when the shear stress is approaching its shear strength, making them prone to sliding. They develop large lateral pressures. They tend to have low resilient modulus values. (Brooks, 2009).

For all the above reasons, expansive soils are generally poor materials for construction. So to improve the soil properties stabilization or reinforcement of soil is done. Soil reinforcement is defined as a technique to improve the engineering characteristics of soil. In this way, using natural fibers to reinforce soil is an old and ancient idea. Consequently, randomly distributed fiber reinforced soils have recently attracted increasing attention in geotechnical engineering. (Hejazi et al, 2012).For sustainable development use of locally available materials, waste material should be encouraged in order to save the natural resources for future generation. Natural fibres can be easily obtained in many tropical regions and available throughout the world. There are many types of natural waste material found in India like coir, bagasse, rice husk, sisal, jute, oil palm etc. Being good reinforcement materials there is a need to concentrate on improving properties of soils using cost-effective practices. (Barazesh, 2012)

2.LITERATURE REVIEW :

The outer covering of fibrous material of a matured coconut, termed coconut husk, is the reject of coconut fruit. The fibers are normally 50–350 mm long and consist mainly of lignin, tannin, cellulose, pectin and other water soluble substances.(Hejazi,et. al,2012)

WORKABILITY CHARACTERISTICS OF BOTTOM ASH – GGBS BLEND SELF COMPACTING GEOPOLYMER CONCRETE

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ABSTRACT

Self-compacting concrete (SCC) represents one of the most outstanding advances in concrete technology. Self-compacting concrete is a flowing concrete mixture that is able to consolidate under its own weight. The highly fluid nature of SCC makes its suitable for placing in difficult situation and in sections with congested reinforcement. In this paper experimental studies are carried out to understand the fresh properties of Self Compacting Concrete (SSC) in which cement is replaced by Ground Granulated Blast Furnace Slag (GGBS) and Bottom Ash (BA) (i.e. Geo polymer concrete) in various proportions. A Preliminary effort on alkali-activated bottom ash, blast furnace slag based geo polymer (BA-GGBS-GP) mortar with river sand was carried out to identify the suitable mix for concrete. The proportions of GGBS: BA in which cement replaced is 100:0, 75:25, 50:50, 25:75 and 0:100.The alkaline liquid used in geopolymerisation was the combination of sodium hydroxide (NaOH) and sodium silicate (Na_2SiO_3) was 2.The Molarity of NAOH was considered as 8M. From the test result it was observed that compressive strength was achieved at early ages under steam curing 60◦C for 24 hours was selected.Super plasticizer GLENIUM B233 is used to maintain workability with constant Water-Binder ratio.

Keywords: — Bottom Ash, GGBS, GLENIUM B233, SCC,Workability.

I. INTRODUCTION

Self-consolidating concrete is a highly flowable type of concrete that spreads into the form without the need of mechanical vibration. Self-compacting concrete is a non-segregating concrete that is placed by means of its own weight. The importance of self-compacting concrete is that maintains all concrete's durability and characteristics, meeting expected performance requirements. In order to flow, fill through the dense reinforcement the SCC must pose certain properties like passing ability, filling ability, Resistance to Segregation. Self-compacting concrete produces resistance to segregation by using mineral fillers or fines, and using special admixtures. Self-consolidating concrete is required to flow and fill special forms under its own weight, it shall be flowable enough to pass through highly reinforced areas, and must be able to avoid aggregate segregationConcrete is the most commonly used construction material in society, which is conventionally produced by using the ordinary Portland Cement (OPC). However, the production of OPC has resulted in the environmental problems over the production of CO_2 with approximately 1 ton of CO_2 produced per 1 ton OPC. The current concrete construction practice can be considered unsustainable as it consumes enormous quantities of natural resources such as stone, sand, water, and 2-½ billion tons of OPC per year.This has led to the adoption of industrial waste materials, such as fly ash and ground granulated blast furnace slag (GGBS), as replacement materials for OPC due to their ability to enhance the physical, chemical and mechanical properties of cements and concretes.Attempts had been done in this studies using Flyash, rice husk, Metakaolin. In this paper attempts have been taken with Bottom ash and Ground Granulated Blast Furnace Slag (GGBS) as a main composition in the self-compacting geopolymer concrete.The main objective of the study is to develop the bottom ash based self-compacting geo polymer concrete and replace bottom ash in various percentage of GGBS which achieve both workability and mechanical properties. Finally studying the effect of curing on the properties of SCGPC.

C.Sashidhar et al,(2015) studied on the effect of manufactured sand in self compactinggeopolymer concrete, where the material used are flyash and GGBS at 50:50 proportion and 100% replacement of river sand by manufactured sand. The molarity was varied from 8M to 12M. the compressive strength were measured on 7,28,56 and 90 under ambient room temperature. Up to 6% of SP dosage and 12M of NaOH concentration could give satisfactorily result in compressive strength and workability. The 7 days strength was found to be 70% of its 28 day strength by addition of slag.

Saifuddin.K.P(**2014)** conducted an experimental work on effect of super plasticizers with use of fly ash, and GGBS in geopolymer concrete. The superplasticizer is used with variation of polycarboxylic based, Sulfonatednaphthalene based and lignine based Superplasticizer. Up to 6% of SP dosage and 12M of NaOH concentration could give satisfactorily result in compressive strength and workability. The 7 days strength was found to be 70% of its 28 day strength by addition of slag.

Sara Almeida Santos et al (2017), conducted a study on self-compacting recycled aggregates. The recycled aggregates were made from demolition waste. Sodium hydroxide and sodium silicates were used as alkaline activators.It is generally found that, even though there is a loss of performance in the fresh state, the SCC with RA show a satisfactory behaviour with no segregation or exudation.

THE STUDY OF PHYSICO-CHEMICAL PARAMETERS OF GROUNDWATER IN PALLIPALAYAM BLOCK (NAMAKKAL)

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ABSTRACT

Groundwater is an invaluable commodity available in very limited quantity to man and other living beings. But the quality of groundwater gets affected due to introduction of pollutants into it, causing physical, chemical and biological changes. The present study deals with the study of groundwater quality by examining various physico-chemical characteristics. The bore well samples are collected at different areas in Pallipalayam. The physico-chemical parameters like Turbidity, Electrical conductivity, TDS, PH, Total Alkalinity, Total Hardness, Calcium, Magnesium, Sodium, Iron, Manganese, Ammonia, Nitrate, Chloride, Fluoride, Sulphate, Phosphate of the collected sample were analysed. The experimental values of these parameters were compared with Indian standard values and pre monsoon & post monsoon comparison were made and the quality of groundwater were identified to check whether it is used for drinking purpose.

KEYWORDS: Groundwater, Physico-chemical Parameter, Water Quality

INTRODUCTION

Water is the most precious resource required for the existence of living being. It is a chemical compound and it may either occur in liquid or solid or gaseous form. All these three forms are extremely useful to man in providing him the luxuries and comforts in addition to the basic necessities. Water is the renewable natural resource by the annual replenishment of meteoric precipitation. As it is the medium for most of the chemical, biochemical reaction, it happens to the elixir of life.

The human activities such as rapid urbanization, ever increasing population and deforestation have interrupted the natural hydrological cycle. This ecological imbalance results in non-uniform distribution of rainfall. The present world as to meet both the challenge of increase water demand and the depleting water resource. The contamination of water resource is also increasing in the course of development and modernization. Hence, a threat to the quantity and quality of this valuable resource is emerging at an alarming rate.

Out of total resources of water on earth only 0.00192% is available for human purpose. According to a survey under taken by CPCB identified many places in different states of India has grave for water pollution. The primary cause being Industrial effluent like lead, zinc, calcium etc., are present in water. According to WHO about 80% of the disease in human beings is caused by water. Once the water is contaminated, its quality cannot be restored. The objective of the present work is to confer the suitability of water for drinking purpose by comparing with Indian Standards,to compare the pre monsoon and post monsoon analysis and also to work out the water quality index values for the selected area.

STUDY AREA

Pallipalaiyam is one of the municipal town is located in north eastern part of the Namakkal district in Tamilnadu, lying between 11˚0'10" and 11˚0'20" northern latitudes and between 77˚0'30" and 77˚0'40" eastern longitudes. The area comes under the sub-tropical type of climate with average rainfall approximately 764 mm. The temperature varies form 28˚C to 45˚C. The rainy season occur between July and October following winter season between November and May. The predominant soil type is red loam and black soil. Red loam was found in all the villages with more concentration in Pallipalayam town. The predominant rock type is several crystalline bands.

STABILIZATION OF BLACK COTTON SOIL USING BIO-ENZYMES

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ABSTRACT

Bio-enzymes are fermented vegetable extracts which improves the engineering qualities of soil, provides high soil compaction densities. It also increases the stability. Bio-enzymes are natural, non-toxic and non-corrosive liquid. The reaction between the clay particles and ions are catalysed by the bio-enzymes. The absorbed double layer thickness is reduced by the bio-enzymes. While chemicals are added to soil it is difficult to mix. But bio-enzymes can be easily mixed with soil and compacted. A study is carried out to check the improvements in the properties of black cotton soil with bio-enzymes in varying dosages as 1ml/kg, 2ml/kg, 3ml/kg, 4ml/kg, 5ml/kg. In this study soil properties at normal conditions are tested and soil properties after stabilization with varying dosages were evaluated. The test such as CBR and UCC are carried out. The result indicates that the bio-enzymes increase strength to a greater extent, thus bearing capacity increases in stabilized soil.

Keywords: *Bio-enzyme, black cotton soil, CBR, UCC.*

1. INTRODUCTION

Every structure is ultimately built on the soil, its consideration plays a key role in the design of every structure that is built on it. Roads, buildings, towers, bridge and many other structures are dependent on soil and without these in this age of developing technology it would be unimaginable. Checking the stability of soil becomes a necessity in order to build reliable structures and therefore, it is important to study the response of soil in different condition. By consolidating under load and changing volumetrically along with seasonal moisture variation, these problems are manifested through swelling, shrinkage and unequal settlement. The need for the good highways with well geometric design, condition and maintenance in increased due to increase in population. In India many area contains silt and clay soils in constructing areas which has to be stabilized while constructing. Thus the soil stabilizing techniques has been adopted at construction site. Soil may be improved by chemicals and various materials. Recent studies have been emerged to use Bio-Enzymes as a new material for stabilization. Bio-Enzymes are nontoxic organic liquid concentrated substances. These are used to improve the stability of soil of soil sub base of pavement structures. Bio-enzymes are convenient to use and dramatically improves road quality. The soil is stabilized using techniques to improve the strength, stiffness, workability, constructability, it also reduce the plasticity index.

1.1 Soil

Soil is a broad term used in engineering applications which includes all deposits of loose material on the earth's crust that are created by weathering and erosion of underlying rocks. Although weathering occurs on a geologic scale, the process is continuous and keeps the soil in constant transition. The physical, chemical, and biological processes that form soils vary widely with time, location and environmental conditions and result in a wide range of soil properties. Physical weathering occurs due to temperature changes, erosion, alternate freezing and thawing and due to plant and animal activities causing disintegration of underlying rock strata whereas chemical weathering decomposes rock minerals by oxidation, reduction, hydrolysis, chelation, and carbonation.

1.2 Bio-Enzymes

Bio-enzymes are fermented vegetable extracts which are natural, non-toxic and non-corrosive liquid. It increases the strength, stability, constructability of the soil which is used for construction.

2. MECHANISM OF SOIL STABILIZATION BY BIO-ENZYME:

The water mixed with the clay soil forms positively charged ions around the soil and it helps the water particles remain attached to the soil particles. The plasticity nature of the soil is provided by the absorbed water or double layer. The size of the double layer may increase but decreases when it dries. Thus the thickness of double layer has to be decreased to improve the soil properties. The enzymes play a important role in improving the soil properties without forming the any of the end product.

AN EXPERIMENTAL INVESTIGATION ON REUSE OF GRANITE WASTES AS PARTIAL REPLACEMENT OF COARSE AGGREGATE

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ABSTRACT

This study is an attempt to investigate the suitability of granite waste as a partial replacement of coarse aggregates in concrete making. Here, the properties of granite chips are studied and compared with the conventionally used aggregate material. Since granite is a lighter material compared to aggregates, its use in concrete will reduce the self-weight on members, dead load on columns and eventually the foundation system. Concrete cubes, cylinders and beams of standard dimensions of M35 grade are cast using Portland pozzolana cement and a total of 110 specimens were cast. From fully conventional concrete to concrete with coarse aggregate replaced with granite chips up to 50% were adopted. Compressive strength, split tensile strength and flexural strength tests were conducted on all the test specimens at 7-days and 28-days' time periods. Based on the tests conducted on various proportions with granite chips as coarse aggregate is compared with the conventional concrete. It is concluded that concrete with 40% replacement of granite chips possesses great strength and since granite chips, considered here are recycled materials, this usage is not only beneficial stability-wise, but also cost-wise.

1. INTRODUCTION

Concrete is a man-made construction material that is widely used. It is obtained by mixing cement, water and aggregates (and sometimes admixture) in required proportions. Aggregates provide higher volume, stability and better durability than cement paste in concrete and provide around 75 per cent of the body of concrete1. The aggregates are obtained from natural sources. But in regions where natural rock deposits are scarce, burnt-clay bricks are used as an alternative source of coarse aggregate. Since granite is a lighter material compared to aggregates, its use in concrete will lead to reduced self-weight on members and hence reduced dead load on columns and eventually, the foundation system2. Concrete that has a mixture of coarse aggregate and granite chips in certain proportion will have more strength than the sum which has coarse aggregate completely replaced with granite chips. Hence, this study on the replacement of coarse aggregate by granite chips in concrete, will be carried out through studying the properties of the mixed aggregate concrete mix. Often additives like pozzolana and superplasticizers are included into the mixture to improve the physical properties of wet mix or the finished material.

2.MATERIALS USED

2.1 Cement:

Cement is the main binder that coats the aggregate developing a good bonding between them in the concrete where the strength and durability resignificant important. The Portland pozzolana cement of 33 grades Ultratech brand is used to manufacture the concrete. Portland Pozzolana Cement containing the pozzolanic materials like fly ash, blast furnace slag and silica fume can also be used. However, use of pozzolanic materials will affect setting time, strength, porosity and permeability of the resulting concrete. Also some tests were conducted such as consistency test, setting time test, specific gravity test.

2.2 Aggregate:

The size of aggregates used is 20mm and the grain size of sand is used. The aggregate tests are performed and results are as follows.

1. Fine aggregate:

It consists of small angular or grounded grains of silica (SiO2) and is formed by decomposition of sand stone under the effect weathering agencies. The size which is less than 4.75mm is called as fine aggregate. River sand is used as fine aggregate conforming to the requirements of IS 383. Before using that, it can be properly cleaned by sieving and washing to eliminate the impurities.

2. Coarse aggregate:

Coarse aggregate may be in the form of irregular broken stones or naturally occurring rounded gravel. Materials which are large to be retained on 4.75mm sieve size called as coarse aggregate. It acts as a main filler, and forms the main bulk of concrete. Of which the materials adhere in the form of film. Aggregates balance the shrinkage and volume changes of concrete conforming to IS: 383 are used.

3. Granite waste:

STRENGTH CHARACTERISTICS OF THERMALLY TREATED BENTONITE MORTAR AND CONCRETEWITH REPLACEMENT OF CEMENT

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ABSTRACT

Today's environmental problem the manufacturingcompany pollutes the atmosphere with carbon dioxide. The cement industry also uses a lot of natural resources such as limestone, Clay, Coal and other substance. This has led to the concept of using mineral admixtures in concrete. Nowadays there are many mineral admixtures are available such as fly ash, rice husk, GGBS etc. Thermally treated Bentonite is considered in this paper to mix with cement (PPC). The Study and the replacement of cement by bentonite to find out the strength parameter of concrete specimen. The ratio of replacement of cement is varied with an increment of 4% up to 20%.It is found from the compressive strength test in PPC it is up to 16% is optimum. The test results are elaborately discussed in this paper.

1. INTRODUCTION

The construction industry has taken considerable strides forward over the last two or three decades with regard to trials in the use of one or another cementitious materials generally identified as pozzolans, for the compounding of various cement based products. Among these coal fly-ash, blast furnace slag, rice hull ash, silica fume, or metakaolin are the most common ones. Bentonite clay is clay this is mined from the earth and it's formed after volcanic ash has weathered and aged in the presence of water. Clay is a fine-grained natural rock or soil materials that combines one or more clay minerals with traces of metal oxides and organic matter. Clay is plastic due to their water content and become hard, brittle and non-plastic upon drying or firing. geologic clay deposits are mostly composed of phyllosilicate minerals containing various amount of water trapped in the minerals structures.[10].S.Targan had result showed that setting time of cements was generally accelerated when bentonite replaced a part of the cement. Bentonite is a form of metakaolin clay (i.e. clay that has gone through heat process to be in its powder form) that consists of a primary mineral called montmorillonite which gives it its properties. Metakaolin clay seems to have the greatest overall potential as alternative pozzolanic material for concrete due to its availability in large quanta and the relatively cheap price. [4].The effect of metakaolin clay replacement of cement on the durability of concrete to sulfate attack has also been investigated. The study showed that metakaoline replacement of cement increased the sulfate resistance of the concrete. The sulfate resistance of metakaoline concrete increased with increasing the metakaolin replacement level. The sulfate resistance of metakaolin concrete at w/c ratio of 0.5 is more than, at w/c ratio of 0.6.[5] Al-Akhras, have investigated the effect of metakaolin (MK) replacement of cement on the durability of concrete to sulfate attack and also studied the experimental parameters were, water to binder ratio (0.5 and 0.6).[8] M.Aravindharaj investigated the work strength and durability of concrete is addressed . High range water reducing admixtures [HRWRA] are used. The durability was measured in term of resistance offered to the penetration of sulphate ions into concrete. Ultrasonic pulse velocity testing was done for this purpose and quality of concrete will be checked.

2. SELECTION OF MATERIALS

2.1. Bentonite Clay

Bentonite is an absorbent Aluminum Phyllosilicate, essentially impure clay consisting mostly of montmorillonite. There are different types of bentonite, each named after the respective dominant element, such as potassium (K), sodium (Na), calcium (Ca), and aluminum (Al). Experts debate a number of nomenclatorial problems with the classification of bentonite clays.

2.1.1. Sodium bentonite

Sodium bentonite expands when wet, absorbing as much as several times its dry mass in water. Bentonite of its excellence colloidal properties, it is often used in drilling mud for oil and gas well and for geotechnical and environmental investigation. The property of swelling also makes sodium bentonite useful as a sealant, especially for the sealing of subsurface disposal systems for spent nuclear fuel and for quarantining metal pollutants of groundwater. Similar uses include making slurry walls, waterproofing of below grade walls and forming other impermeable barriers. Before its using we are going to treated at 200^0C.After that cement is going to replace by sodium bentonite clay with (4%, 8%, 12%, 16%,and 20%), then foe each sample mix proportion cubes are casted and undergone certain tests to investigate the strength of the mortar cube with respect to replacement

AN EXPERIMENTAL INVESTIGATION OF ENGINEERED CEMENTITIOUS COMPOSITES USING STEE FIBRES

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ABSTRACT

Engineered Cementitious Composites (ECC) is a type of high performance cementitious composites which it has good ductility and durability properties. This paper focuses on the experimental investigation on the mechanical characteristics of ECC using Steel fibers. The addition of Steel Fibers is varied from 0 % to 2% in the interval of 0.2% to the cement matrix. The mortar specimen was casted to evaluate the compressive, split tensile and flexural strength of ECC. All the specimens were tested at the age of 7 and 28 days. By evaluating the experimental test results, it was observed that the ECC has better performance characteristics compared to control specimen and 1.2% addition of Steel Fibers in ECC shows noticeable strength development compared to all other mixes.

1. INTRODUCTION

Engineered Cementitious Composite is an easily molded mortar-based composite reinforced with specially selected short random fibers, usually steel fibers. Engineered Cementitious Composites (ECC) is similar to Fiber Reinforced Concrete. Only difference is, in ECC coarse aggregates are not used, as they tend to adversely affect the unique ductile behavior of the composite (1). In ECC Coarse, aggregate is replaced by fibers. Unlike some high performance FRC, ECC does not utilize large amounts of fiber (2). In general, 2% or less by volume of discontinuous fiber is adequate, even though the composite is designed for structural applications (2). The most significant characteristics of ECC is its tensile strain-hardening behaviour with strain capacity in the range of 3 to 7 % with a fiber content which is typically less than 2 % by volume [13]. This means that ECC will bend just like a piece of metal under the same stress, which will cause conventional concrete to crack and fail. The advantageous attributes of flexible processing in the fresh state and ultra high composite ductility in the hardened state make ECC as an attractive material for a broad range of applications. However, the adaptation and commercial development of ECC technologies must be justified with advantages in cost-benefit ratio [14]. Even though the initial material cost of ECC would be higher than conventional concrete, the long-term benefits are sufficient to potentially drive this technology further into its commercialization stage [14]. ECC has been widely used in a variety of civil engineering applications; the properties of ECC (high damage tolerance, high-energy absorption, and ability to deform under shear) give it superior properties in seismic resistance applications (1).

1.1 Steel Fiber

Steel fibers are high-performance reinforcement fibers for concrete and mortar. Steel fibers are well suited for a wide variety of applications because of their superior crack-fighting properties, high modulus of elasticity, excellent tensile and molecular bond strength, fatigue and abrasion. Steel fibers are unique in their ability to create a molecular bond with mortar and concrete that is 300% greater than other fibers.

THE RETROFITTING AND STRENGTHENING OF RC BEAM WITH EPOXY BONDED FIBER REINFORCED COMPOSITE MATERIALS

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ABSTRACT

Fibre reinforced polymer (FRP), as externally bonded reinforcement, is a very beneficial technique to repair and strengthen reinforced concrete (RC) members. This technique is used in a number of applications to increase the shear capacity of structural beams. The size of the beam is 1.4m length, 0.170m breadth, 0.250m depth. This feature is achieved by applying e.g. basalt fibre reinforced polymer (BFRP) that is glued to the RC concrete member with an adhesive. The most common adhesive used for strengthening is epoxy. There are some limitations with the use of epoxy adhesives, including poor fire resistance. Therefore, other adhesive was used to strengthen concrete beams in flexure Cement-based bonding material would be beneficial to produce strengthening system that is fire resistant, also it significantly lower the cost of retrofitting on existing structures. An experimental investigation was conducted on shear behaviour of RC beams that are strengthened using BFRP external reinforcement with epoxy resin as bonding agent. This experimental test program is set up to test the shear capacity of beam specimens The experimental investigation was conducted in two phases and consisted of 5 full-scale ordinary RC concrete beams, 3 of them were used as retrofitting and the remaining 2 were strengthening with BFRP sheets. The

Super plasticizer (SP) to reduce the water content and to achieve the workability. Three different mixtures were used, including super plasticizer(SP), synthetic micro fibres and Epoxy resin.

INTRODUCTION

Concrete as the most commonly used construction material is developing towards high performance, i.e, high strength, high toughness; high durability and good workability shrinkage and permeability resistance of concrete are two important properties relating to durability Concrete can be modified to perform in a more ductility form by the addition of randomly distributed discrete fibres in the concrete matrix.

MATRERIALS AND MIX PROPORTION

MARERIALS:

Raw materials required for the concreting operations of present work are cement, fine aggregate and coarse aggregate.

CEMENT:

Cement is used as binding material in the concrete where the strength and durability resignificant important. The ordinary portandland cement of 53 Grades conforming to IS 12269-1987 is used to manufacture the concrete. Also some tests were content such as consistency test, setting time test and Specific Gravity test

Table1 Physical Properties of Cement

S.No	Properties	Relevant IS Code	Observed Value
1.	Standard Consistency Test	IS 4031 (Part IV) : 1988	31%
2.	Fineness Test	IS 4031 (Part III) : 1988	2%
3.	Specific Gravity	IS 4031 (Part II) : 1988	2.92
4.	Initial setting time	IS 4031 (PArt V) : 1988	45 min
5.	Final setting time	IS 4031 (Part III) : 1988	390 min
6.	Compressive strength	IS : 650-1991	54.08 N/mm^2

DURABILITY STUDY ON CONCRETE WITH EGG SHELL POWDER

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ABSTRACT
During the manufacturing of cement carbon- di- oxide is released and it causes environmental pollution and global warming. To reduce the impact of carbon - di - oxide in environment, waste by products are used as admixture in this study, so that environmental pollution and natural resources consumption is reduced. Eggshell is generally thrown away as a waste. It can used as a partially replacement of cement. It contains calcium carbonate. Its usage increases the strength. 20% of raw eggshell powder is mixed with the 80% of cement, and 30% of incineration eggshell powder is mixed with the 70% of cement. For both the ratios mould is prepared and specimen is tested. Various durability tests such as RCPT, salt resistance test, sulphate resistance test, abrasion test, acid resistance test, water absorption test.
Keywords: Concrete, Eggshell, industrial waste.

INTRODUCTION

Development of nation not only depends upon the technology but also depends upon the infrastructure. Without concrete infrastructure is not possible. Thus concrete is indispensible material in every construction. The major element of concrete is cement. Since cement price is volatile and demand is so high, an alternate material can be used for replacement of cement.Since several replacement experiments were done for coarse and fine aggregate. Hence we go for replacement for cement. The alternate material in our project used was powdered eggshell. Our project describes then effect of replacement of eggshell powder for cement in 20% of ESP and 30% of IESP. The results outcome was found to be successful.

LITERATURE REVIEW

Dhanalakshmi M, DR Sowmiya N (2015) studied the minerals present in the eggshell. The carbon dioxide produced by cement industries causes environmental pollution and global warming. Among these and eggshell are known as good prospects in the usage of sand. Increase in workability was found with addition of fly ash to optimum ESP concrete. Increase in density was observed to addition of fly ash to optimum egg shell concrete. Compressive strength of egg shell concrete was lower than control concrete mix. The combination of ESP+FA showed the reduction in compressive strength compared control concrete and egg shell powder concrete.

D. Gowsikaetal (2014) carried out the experimental investigation of eggshell powder as partial replacement with cement in concrete. In this paper the chemical composition of eggshell powder and compressive strength of cement mortar of mix 1:3 in which cement is decreased the drying shrinkage and creep of the recycled aggregate concrete. The results showed also that one of the practical ways to utilize a high percentage of recycled aggregate in structural concrete is by incorporating 25 -35% of fly ash as some of the drawbacks induced by the recycled aggregates in concrete could be minimized.

N**. Tangboriboon et al (2012)** carried out the preparation and properties of calcium oxide from eggshells via calcinations. In this paper raw duck eggshells were calcined at temperature between 300-900ºc for 1,3 and 5h. Both the raw and calcined duck eggshells were characterized by FTIR, STA, XRF, a practical size analyzer and an impedance analyzer the proper calcinations conditions are 900ºc and 1h, yielding calcium oxide is 53,53 as measured by STA(TG-DTA,DTG).the samples of raw duck egg shell and duck egg shell calcined at 900ºc for 1 hour were ground in to powder and compressed in to sample mould prior to test in.

MATERIALS

Egg shell powder:

Eggshell consist of several mutually growing layers of $CaCO_3$, the innermost layer-maxillary 3-layer grows on the outermost egg membrane and creates the base on which palisade layer constitutes the thickest part of eggshell. The top layer is a vertical layer carbonate (lime) and protein. The quantity of the lime in eggshell wastes to be almost the same as ground chalk or limestone tone for tone. In many other countries, it is the accepted practise for eggshell to be dried and use as a source of calcium in animal feeds. The quality of lime influence din eggshell waste is influenced greatly by the extent of exposure to sunlight, raw water and harsh weather conditions. It is the fine grained powder with suitable proportion which is sieved to the required size before use with concrete/mortar.

STUDY OF CONCRETE USING EGG SHELL POWDER AND FLY ASH AS ADMIXTURES

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ABSTRACT

Through out the world, concrete is being widely used for the construction of most of the buildings, bridges etc. Hence, it has been properly labeled as the backbone to the infrastructure development of a nation. To meet out this rapid infrastructure development a huge quantity of concrete is required. Unfortunately, India a is not self sufficient in the production of cement ,the main ingredient of concrete and the demand for exceed the supply and makes the construction activities very costlier. Hence currently the entire construction industry is in search of a suitable and effective the waste product that would considerably minimize the use of ultimately reduces the construction cost. Few of such products have already been indentified like Rice Husk, flyash, Silica Fumes, Egg shell etc. Among these and egg shells are known to have good prospects in minimizing the usage of sand. So, in our concept of the project is replacing the fine aggregate by egg shell, and also reduce the weight of the concrete with achieve the required strength of concrete.

Keywords: Concrete, Egg shell powder, Fly ash, strength characteristics.

1. INTRODUCTION

Cement is the major ingredient in the production of concrete. Its utilization can be reduced by using waste by products as admixtures. In our daily life egg shells are agricultural thrown away products produced from chick hatcheries, bakeries, fast foods, among others which pollute the surroundings and as a result comprising ecological issues/contamination which would need appropriate treatment. Our project describes then effect of replacement of eggshell powder for cement in 20% of ESP and 30% of IESP. Besides this study also explores the possibility of replacing part of fine aggregate with fly ash as a means of incorporating significant amounts of fly ash. This experimental study aims to investigate the suitability of fly ash and egg shell powder as partial replacement for fine aggregate at an appropriate proportion.

2. MATERIALS

2.1Egg Shell

Eggshell is generally thrown away as a waste. The egg shell also creates some allergies when kept for a longer time in garbage. Disposal is a problem. It creates undesirable smell which can cause irritation.

The main ingredient in eggshells is calcium carbonate (the same brittle white stuff that chalk, limestone, cave stalactites, sea shells, coral, and pearls are made of). The shell itself is about 95% CaCO3 (which is also the main ingredient in sea shells).

The remaining 5% includes Magnesium, Aluminum, Phosphorous, Sodium, Potassium, Zinc, Iron, Copper, Ironic acid and Silica acid. Eggshell has a cellulosic structure and contains amino acids; thus, it is expected to be a good bio-sorbent and it was reported that large amounts of eggshells are produced in some countries, as waste products and disposed in landfills annually.

Table no-1: Chemical composition of Raw and Incinerated Egg Shell powder

S. No	Chemical composition	ESP	IESP
1	Cao	50.7%	51%
2	Sio_2	0.09%	0.05%
3	Al_2o_3	0.03%	0.02%

HIGH CALCIUM FLY ASH - METAKAOLIN BLEND GEOPOLYMER MORATR

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ABSTRACT
The present study described a study on high calcium fly ash - metakaolin blend geopolymer mortar. High calcium fly ash was partially replaced by metakaolin blend by 0%, 25%, 50%, 75% and 100%.The alkaline liquids used for the polymerization was sodium hydroxide (NaOH)and sodium silicate (Na_2SiO_3). Ambient curing was given to the high calcium fly ash geopolymer mortar specimens. Based on many trials on compressive strength of high calcium fly ash geopolymer mortar at 3, 7, 28 days, the optimum mix combination was chosen. Test results depict that high calcium fly ash geopolymer mortar attained higher compressive strength at 75% replacement of metakaolin.

KEYWORDS: *Geopolymer, High Calcium fly ash, Metakaolin, Alkaline Liquid, Strength Properties*

1. INTRODUCTION
Manufacturing of Portland cement is an energy intensive process and releases a large amount of green house gas to the atmosphere. Recently, another form of cementations' materials using silicon and aluminum activated in a high alkali solution was developed This material is usually based on fly ash as a source material and is termed geopolymer or alkali-activated fly ash cement . Geopolymers was first developed by Davidovits, consist of SiO_4 and AlO_4 tetrahedral networks [1-3]. The prepared mixture can be subjected to curing at room temperature or at a given temperature. Alumina silicate reactive materials dissolve in strong alkaline solutions and free SiO_4 and AlO_4 tetrahedral structure forms. However, the reaction of the fly ash in the production of geopolymers is low at ambient temperatures [4]. It is also well known that geopolymers possess excellent mechanical properties [5]. Class C fly ash had higher compressive strength than that with Class F fly ash. The mixture of fly ash with 10 molarity (M) of NaOH is suitable for the geopolymer synthesis [6-8]. The strength of the fly ash-based geopolymer increased after exposure to elevated temperatures (800°C). However, the strength of the corresponding metakaolin-based geopolymer decreased after similar exposure. geopolymer suffers strength loss after sulphate attack exposure but gains strength with increasing replacement level of fly ash by metakaolin from 5% to 20% and obvious increasing in compressive strength could be observed when the replacement percentage exceeds 15% [9]. The annual output of lignite fly ash from Neyveli Lignite Corporation station 28.5 million tons per annum at Neyveli and one open cast lignite mine of capacity 2.1 million tonnes per annum. This fly ash contains a high percentage of calcium and is being used quite extensively for construction in Tamilnadu. The knowledge of the use of high calcium lignite fly ash in producing geopolymer would be beneficial to the understanding and to the future applications of this material. Therefore, this study focuses on use of high calcium fly ash and metakaolin in geopolymer binder.

2. EXPERIMENTAL DETAILS
2.1 Materials
Class C fly ash used in this work was collected from Neyveli Lignite Corporation in Cuddalore district of Tamilnadu. Metakaolin was collected from Jeetmull jaichandlall Pvt Ltd. The chemical composition of high calcium fly ash, metakaolin is shown in Table 1. Other materials like alkaline solution, and fine aggregate were used in making of geopolymer concrete. The physical properties of fine and coarse aggregate are shown in Table 2. Alkaline solution comprises of sodium hydroxide and sodium silicates were used.

Table 1. *Chemical Composition of High Calcium Fly Ash*

Chemical composition	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	LOI
Fly Ash	63.11%	19.58%	5.03%	0.24%	17.13%	0.29%	0.84%	1.55 %
Metakaolin	52.22%	40.35%	2.13%	0.79%	0.21%	0.59%	0.61%	2.08%

STEAM CURED CLASS C FLYASH WITH METAKAOLIN BLEND GEOPOLYMER MORTAR

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ABSTRACT
In the present study, experimental study was made on steam cured class C fly ash with metakaolin blend geopolymer mortar. Steam curi8ng was attempted to accelerate the geopolymeric reactions. Five combinations of high calcium fly ash and metakaolin was used. The compressive strength of high calcium fly ash and metakaolin geopolymer mortar was determined at 3, 7, 28 days. The test results depicts that strength property of High Calcium Fly Ash Geopolymer mortar was marginally higher under steam curing with 75% replacement of metakaolin.
KEYWORDS: *Geopolymer, High Calcium fly ash, Metakaolin, Strength Properties*

INTRODUCTION

Geopolymers was first developed by Davidovits, which is nothing but the alumino silicate binder. This binder requires source materials and alkaline activators. The source material should be rich in silica and alumina. This silicon and aluminum is activated in a high alkali solution to get the geopolymer binder. Alumina silicate reactive materials dissolve in strong alkaline solutions and free SiO_4 and AlO_4 tetrahedral structure forms. However, the reaction of the fly ash in the production of geopolymers is low at ambient temperatures. It is also well known that geopolymers possess excellent mechanical properties[(1-3)].
The chief source of source material is Class F fly ash. However, use of Class C fly ash finds its limited contribution in geopolymer. Therefore, the present study aims to promote Class C fly ash with metakaolin as source material. The annual output of lignite fly ash from Neyveli Lignite Corporation station is 28.5 million tons per annum at Neyveli and one open cast lignite mine of capacity 2.1 million tonnes per annum. This fly ash contains a high percentage of calcium and is being used quite extensively for construction in Tamilnadu. The knowledge of the use of high calcium lignite fly ash in producing geopolymer would be beneficial to the understanding and to the future applications of this material [(4-6)]. Therefore, this study focuses on the use of a geopolymer binder for making high calcium concrete which comprises lignite fly ash, sodium silicate and sodium hydroxide solution, and coarse aggregate with partial replacement of metakaolin blend..

2. EXPERIMENTAL DETAILS

Materials

Class C fly ash used in this work was collected from Neyveli Lignite Corporation in Cuddalore district of Tamilnadu. Metakaolin was collected from jeetmull jaichandlall Pvt Ltd. The chemical composition of high calcium fly ash and metakaolin is shown in Table 2.2.1. Other materials like sodium based alkaline solution, and fine aggregate were used in making of geopolymer mortar. The physical properties of fine aggregate are shown in Table 2.2.

Table 2.1. Chemical Composition of High Calcium Fly Ash and Metakaolin *:*

Chemical composition	SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	MnO	TiO2	LOI
FlyAsh	63.11%	19.58%	5.03%	0.24%	17.13%	0.29%	0.84%	-	-	1.55 %
Metakaolin	52.22%	40.35%	2.13%	0.79%	0.21%	0.59%	0.61%	-	1.0%	1.8%

Table 2.2. Physical Properties of fine aggregate

Description	Fine aggregate
Specific gravity	2.55
Bulk density	1791.1kg/m^3
Fineness modules	2.6

EXPERIMENTAL STUDY ON THE PARTIAL REPLACEMENT OF SAND BY ORGANIC COMPOST

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ABSTRACT

Concrete is a major building material which is used in construction throughout the world. The consumption of concrete is increasing very year. This results in excessive extraction of natural aggregates. The use of these materials is being constrained by urbanization, zoning regulations, increased cost and environmental concern. Thus, it is becoming inevitable to use alternative materials for aggregates in concrete. In our project we partially replace the sand by the organic compost. We had replaced the sand in the ratio of 10%, 20%, 30%. The compressive strength of the concrete in obtained with the replaced material. The environmental problems may also be reduced by using this material. For the replacement of fine aggregate by organic composite, It produce lower strength as compared to the conventional concrete because lack of bonding nature of the organic compost. Even though in this project when comparing among the various proportion in the replacement we get the conclusion that 10 % of sand by organic composit give less difference when compared with conventional concrete, so we can use this type of Organic composite concrete in Less Importance Structures like tile, Filling Brick, Temporary Shelters etc.,

Keywords: Organic compost, Sand replacement.

INTRODUCTION

The consumption of natural resources can be reduced by using the organic compost as partial replacement of fine aggregate. In present situation there will be lot of municipal solid waste generated in Coimbatore city. The article describes the feasibility of using organic compost as partial replacing with the fine aggregate in concrete. In our country there is a lot of municipal solid waste producing cities are available. From the above sources there will be more organic wastes are formed. The properties of organic wastes are investigated. The control measurement of cement concrete is investigated by using calculated mix design. The properties of cement such as specific gravity, fineness, consistency test; initial and final setting times are investigated. The properties of sand such as specific gravity, fineness modulus of fine aggregate and sieve analysis are investigated. The slump test and compaction factor test on fresh concrete, compressive strength, tensile strength on harden concrete are investigated 7, 14 and 28 days. Organic composts are the waste product of the so it make the concrete as very economical. They play the major role and gives high volume in concrete, so the partial replacements of fine aggregate are very effective and economical project.

COLLECTION OF MATERIALS

2.1 Fine Aggregate:

A concrete with better quality can be made with sand consisting of rounded grains rather than angular grains. River or pit sand must be used and not sea sand as it contains salt other impurities In this project ,River sand is used as fine aggregate. By conducting sieve analysis, and compared with grading table from IS 383- 1970, Table3.2, it was found that the sand used belongs to Zone –II.

2.2 Cement

Cement is a binding material in concrete, which binds the other material to form a compact mass. Generally OPC is used for all Engineering Construction works. OPC is available in three grades of 33,43, 53 .In the project, Ramco-53 grade cement is used for the experimental study.

2.3 *Coarse Aggregate*

Aggregate must be clean and free from impurities. The coarse aggregate used in this project is of the size 20mm.

2.4 Organic Compost

The organic compost which are collected from the municipal solid waste yard are investigated.

CONSENSUS BETWEEN THE WORKPLACE ATTITUDES OF BABYBOOMERS AND MILLENIAL

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ABSTRACT
Much has been written stereotyping both the millennial and baby-boomer generations, but the real insight lies in how they work together in the right environment. Boomers take skills, knowledge and wisdom they have gained from decades of work and put them to use on projects they find meaningful. On the other hand, millennial are known as tech-savvy, idealistic and hard for older generations to work with.This project is about matching of two generations to bring out a structure a Boomer-Millennial dream teamto become an unsuspecting source of power for a project or business unit.
KEYWORDS: *Millennial, Baby boomers, Generation surpass, Workplace attitudes, Decade gaps*

1. INTRODUCTION

There are vast, and conflicting, amounts of literature and empirical studies discussing the existence of generational differences as it pertains to the workplace. The majority of research concludes Millennial differ from both their generational cohort predecessors, and can be characterized by a preference for a flat corporate culture, an emphasis on work-life balance and social consciousness. Also, on the other hand, Baby Boomers have always had an outsized presence compared with other generations.
In the 2010 the "Journal of Business and Psychology", contributors Myers and Sadaghiani find Millennials "expect close relationships and frequent feedback from supervisors" to be a main point of differentiation
Hershatter and Epstein also stress a growing importance on work-life balance. Studies show nearly one-third of professional's top priority is to "balance personal and professional life". The Brain Drain Study shows nearly 9 out of 10 Millennial place an importance on work-life balance, with additional surveys demonstrating the generation to favor familial over corporate values. Studies also show a preference for work-life balance, which contrast to the Baby Boomers' work-centric attitude.

2. MILLENNIAL AND BABYBOOMERS

The term Millennial generally refers to the generation of people born between the early 1980s and the early 2000s. Perhaps the most commonly used birth range for this group is 1982-2000. The Millennial Generation is also known as Generation Y, because it comes after Generation X — those people between the early 1960s and the 1980s.
Baby boomers are the demographic group born during the post–World War II baby boom, approximately between the years 1946 and 1964. ... The term "baby boomer" is also used in a cultural context, so it is difficult to achieve broad consensus of a precise date definition.

3. ATTITUDE ANALYSIS

The project includes insights from professionals across generations and industries about the strengths and weaknesses of workers from different generations, based on the perceptions of their peers. The participants from the study were both managers and non-managers. The attitudes that are mainly focused on this project are as follows.

- Survey on Communication skills
- Survey on Documentation skills
- Survey on Technical Skills
- Survey on Work- Life Balance

4. COMMON CHARACTERISTICS OF BABY BOOMERS

4.1 Work-Centric:

Baby Boomers are extremely hardworking and motivated by position, perks, and prestige. Baby Boomers relish long work weeks and define themselves by their professional accomplishments. Since they sacrificed a great deal to get where they are in their career, this workaholic generation believes that Generation X and Generation Y should pay their dues and conform to a culture of overwork. Baby Boomers may criticize younger generations for a lack of work ethic and commitment to the workplace.

4.2 Independent:

EQUIPMENT MAINTENANCE AND, MANAGEMENT IN CONSTRUCTION PROJECTS

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ABSTRACT

The contractor's equipment policy and equipment management system have a great impact on the profitability of a firm, especially for contractors with large investment in equipment .The cost of equipment in civil engineering construction projects can range from 25-40% of the total project cost .Proper planning, selection, procurement, installation, operation &maintenance of construction equipment play an important role in production in construction projects. However, research papers published in relation to construction equipment ,are highly diversified and there is a lack of systematic analysis and classification .This paper describes about how the productivity and cost of equipment can be controlled ,and which factors affecting them.

Keywords: construction equipment, productivity, maintenance and repairs, cost control.

1.INTRODUCTION

Equipment maintenance and management is an important task for timely completion of a project and increase in productivity .Due to improper management of equipments sometimes defects will occur or it may lead to accidents also. The following requirements for investigating accidents are highlighted:

The health and safety standards;
The design of machines, equipment and products;
The company's management system;
Technological developments;
Working conditions;
The reliability of systems.

2. LITERATURE REVIEW

A.V. Kizim describes that a comprehensive approach to ensuring equipment maintenance and repair organization (MRO) efficiency in solving tasks with supporting tools and a systematic approach in "Establishing the maintenance and repair body of knowledge". The work describes brief results obtained during the maintenance and repair program informational and methodological support organization. They form a maintenance and repair body of knowledge which can be used for MRO organization along with MRO automation and support.N. Kumar Kittusamy tells about one page checklist for evaluating cab design of construction equipment. The cab design evaluation checklist was developed, pilot tested and used to measure several characteristics of cab design. The checklist is a general assessment tool. It provides a static, instantaneous snapshot of characteristics during a specific time. Nevertheless, this and other checklists provide the critical point of departure in initiating the ergonomic analysis.

Hamid Aadal explains "Impact of plants and equipment management in construction industry of Iran. In this the effect of spare parts availability to decrease downtime ,the effect of employing expert mechanics to increase the repair quality ,impact of gasoline and petrol availability to decrease wasting time, impact of periodic control and serviceability of plants and equipment to increase productivity, impact of training persons who are involved plants and equipment to increase productivity .It goes without saying that extracted factors have significant role in the construction projects and different contractors should consider them in their projects.

Marcus Bengtsson and Martin Kurdve presents life cycle cost or total cost of ownership analysis has been performed on machining equipment in a Swedish company. Life cycle cost models used in case studies are compared to an empirical model, used at the company. The life cycle cost aspect of the equipment give guidelines to consider operation, maintenance, tools, energy, and fluid cost in addition to acquisition cost, when designing /specifying the equipment. It gives implications on equipment design to be easy to maintain, easy to clean and easy to operate, stochastic parameters may require additional cost risk analysis or simulation in "Machining equipment lie cycle costing model with dynamic maintenance cost".

Mali Pitam,A., M. R. Apte says about traffic flow of construction equipment in the journal "Effect of construction equipment on production in building construction project". A large construction project requires large quantities of construction equipment. This volume of equipment results in a traffic jam within a construction site, thereby reducing overall efficiency of construction operations. It is necessary to evaluate whether a project can be completed in a given time even if additional construction equipment is brought to the site. It is essential for a construction industry to improve the production rate of equipment. In order to improve this overall equipment effectiveness was improved with low machine breakdown, less

DURABILITY STUDIES ON PERVIOUS CONCRETE WITH DIFFERENT BINDERS

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ABSTRACT
This paper presents a study on durability properties on pervious concrete made with Portland Pozzolana Cement (PPC) and Fly ash-Lime and Gypsum (FaL-G) binder with different coarse aggregate sizes for sustainable pavement construction. The size of coarse aggregate (CA) ranging from 6.3 mm to 12.5 mm was used in this study. Aggregate to binder ratio and water to binder ratio was considered as 3.3 and 0.35. Durability properties such as oil resistance, mud water resistance, water absorption test, flexural strength test, abrasion resistance test have been carried out for PPC and FaL-G Binder pervious concrete. The durability results are compared with pervious concrete made out of PPC binder. The results indicated that PPC binder pervious concrete shows better durability resistance when compared to FaL-G binder pervious concrete. However FaL-G binder pervious concrete results satisfy the requirements with adequate properties.
Keywords: *Pervious concrete, PPC, Fly ash, Lime, Gypsum, coarse aggregate, water absorption, abrasion resistance*

1. INTRODUCTION

Pervious concrete is a highly gap graded concrete made using coarse aggregates with little to no fine aggregates, with continuous voids which are purposefully in corporate in to concrete so as to achieve its special characteristic features . It is also called as porous concrete, permeable concrete, no-fines concrete and enhanced porosity concrete. It behaves as a storm water infiltration basin and allows the storm water to enter in to the soil over a large area, thus helps in recharging of precious groundwater. It is conventionally used in parking lots, light traffic pavement, pedestrian walkway, swimming pool decks etc. The quantity of water, cement and coarse aggregate are selected carefully to create an interconnected network of pores in the material. The pores in the previous concrete are created by the reduction or elimination of fine aggregate from the concrete mix. Typically, void content ranges from 15% and 25% with percolation rate around 0.34 cm/s. Adequate amount of paste is required to coat and bind the aggregate particles together [1]. Permeability is one of the important factors in pervious concrete and is significantly related to void content of aggregate mixture. Generally, as the void content increases, the strength decreases and permeability increases [2]. PPC binder pervious concrete made with smaller size aggregate possesses higher compressive strength and flexural strength than other size aggregates and it was noticed that there was a gradual increase in permeability values w1ith increase in aggregate size [3]. Sometimes various additives and admixtures and a variety of binders are used to improve the properties of pervious concrete. Pervious concrete properties are greatly influenced by aggregate size, admixtures and binder materials [4].Various researchers are undergoing research with conventional materials using OPC, fly ash as binder in pervious concrete. Strength and durability characteristics were reported by several researchers including field study [5-14].

Further, the rapid increase in the capacity of thermal power generation in India has resulted in the production of a huge quantity of fly ash, which is approximately 180 million tons per year. The prevailing disposal methods are not free from environmental pollution and ecological imbalance. Large stretches of scarce land, which can be used for shelter, agriculture or some other productive purposes, are being wasted for disposal of fly ash. Similarly phosphogypsum is an important by-product of phosphoric acid fertilizer industry. It consists of CaSO4.2H2O. Approximately 5 million tons of phosphogypsum is produced each year in India and causes serious storage and environmental problems. Fly ash, lime and gypsum (Fal-G) materials are mostly available in all regions. The use of FaL-G binder in pervious concrete involves a lesser amount of green house gas and more environmental friendly binding material compared to cement. However, FaL-G binder is successfully used especially in the low strength products such as bricks and hollow blocks [15]. Compressive strength and split tensile strength of control mix made with OPC binder and FaL-G mix increased with decrease in porosity and increased with density of aggregates and it was found that FaL-G binder pervious concrete has better resistance against salt, sulphate and acid environment [16]. Moreover, the earlier work on FaL-G binder on pervious concrete was reported. Besides, the present study also aims to carry out the durability properties of pervious concrete made with various binders using different aggregate sizes.

EFFECTS OF INCORPORATING INDUSTRIAL WASTE BY-PRODUCTS ON DURABILITY PROPERTIES OF IMPROVISED CONCRETE MATRIX

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ABSTRACT
This paper presents the results of an experimental investigation which was carried out on the steel slag concrete to evaluate durability properties of concrete mixtures. The fine aggregate was replaced with five levels (20%, 30%, 40%, 50%, and 60%) of Steel slag by weight. Tests were carried out to assess the durability properties of concrete were determined for 28 and 56 days. Test results represents there is an significant amount of improvement in the durability properties of Steel slag concrete by the inclusion of steel slag as partial replacement for the filler material (fine aggregate) and can be used in structural concreting works.
***KEYWORDS**: Concrete; steel slag; Durability test*

1. INTRODUCTION

The availability of steel slag produced from steel making industries in India. Approximately 50 million tons each year and its percentage of utilization is less than 10%. The remaining steel slag was dumped into lands, which leads to the occupation of farm land and pollution of ground water and soil. Therefore steel slag was utilized in the construction industry as a fine and coarse aggregate. The compressive strength increase with increase in percentage of steel slag up to 70% by weight of fineaggregate.60% replacement of fine aggregate by steel slag is the optimum percentage of replacement of M30 grade Concrete and decreases considerably in further replacement of slag in concrete.(1).The steel slag proved to be better method or way in providing strong and durable concrete. It also gives a solution to disposal problem of steel slag and eco sand. It was also found that increase in replacement level of steel slag above 60% decreases the workability of concrete. However this property varies depending upon the source of steel slag its optimum replacement was found as 60% (2) .The consistency of cement depends upon its fineness. Silica fume is having greater fineness than cement and greater surface area so the consistency increases greatly, when silica fume percentage increases. The optimum 7 and 28 days compressive strength and flexural strength have been obtained in the range of 10-15% silica fume replacement level.(3)The results indicated that the durability characteristics of steel slag cement concretes were better than those of crushed limestone aggregate concrete. Similarly, some of the physical properties of steel slag aggregate concrete were better than those of crushed limestone aggregate concrete (4).

2. MATERIALS

2.1. Portland cement

Commercially available Portland cement conforming to IS 12269 was used for the control concrete. Its physical properties are given in Table2.1.

Table2. 1 Physical properties of Cement

S.No	Characteristics	Experimental results
1	Standard Consistency	32%
2	Initial Setting time	55 min
3	Fineness of cement	1%
4	Specific gravity	3.15

2.2. Aggregates

Crushed granite with a maximum nominal size of 12 mm was used as the coarse aggregate, and locally available natural sand was used as fine aggregate. The coarse and fine aggregates each had a specific gravity of 2.63 and 2.44 respectively, and water absorptions of 0.5% and 1%, respectively. Its physical properties are given in Table 2.

2.3. Steel Slag

This steel slag can be used in the construction industry as aggregates in concrete by replacing fine aggregates. Its physical properties are given in Table2.2 .

EMPLOYEE AND SAFETY MANAGEMENT ON CONSTRUCTION SITE

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ABSTRACT

Construction industry has accomplished extensive growth in worldwide particularly in past few decades. For construction project to be successful the employee and safety management to the labour is very important. Labours problem and safety needs to be seen by the company and to ensure it. In construction industry employee like skilled and unskilled labours subject to construction site accidents. This paper present the results of a questionary are survey which was distributed among various categories of Construction Company in Coimbatore, Erode and Salem. This paper discusses in detail about the employee welfare and safety provided by the company.

INTRODUCTION

Construction Industry is an unorganized sector and it is the least researched industries even today. The system of reporting data about internal working and safety is also minimal. The manpower driven industry is facing regular accidents in daily working, which cause heavy losses in terms of men, money and time. The past studies show that on an average, 60 to 80 accidents occur per 1000 workers in the manufacturing sector while, construction sector averages around 160 to 250 per 1000 workers. The main cause of the low safety standards and working conditions at the construction sites is the lack of exclusive legislations applicable to the construction industry. In developing country like India, there must be an effort to raise the level of awareness among both the employers and employees of the importance of safety at work sites. But construction in everyday life comprises of large number of small scale projects which are local contractors undertakings lacking in compliance of safety requirements and labour laws. It is the high time that the awareness regarding the present scenario of safety and labour conditions should spread adequately.

OBJECTIVES

- To study about employee and safety aspects in construction site
- To ensure employee with the knowledge work safely in a varies of workplaces.
- To minimize the chances of the adverse accidents occurring, by implementing and enforcing safety measures.
- Analyze and calculate the Relative Important factors affecting labour and safety
- To statistically analyze the factors affecting labour and safety
- To make recommendations to improve labour and safety in construction

LITERATURE REVIEW

Viability of Employee and Safety Conditions in Construction Sites: P.S.Sathish Kumar, M.Logesh Kumar

The concern of safety has to start from the design stage and continues till the facilities are delivered to the owner. Construction is also a high accident prone industry employing major work force, most of them being labourers and skilled workers. Besides, construction sector is a highly unorganized sector and is a high risk Industry for clients, contractors and workers. In India comprehensive and universal safety rules and regulations have not been developed.

Improving safety among small organisations in the construction industry, key barriers and improvement strategies: Riza Yosia Sunindijo

This paper said about construction industry has always been considered as one of the most dangerous industrial sectors. Large organisations have demonstrated good safety performance because they have the resources and leverage to develop and implement robust safety management systems. However, safety among small organisations is still far behind their larger counterparts and this issue is crucial because the majority of organisations in the construction industry are small organisations. These barriers include the use of lowest bid price to evaluate tender submissions, lack of safety commitment from construction clients, and fierce competition. Improving safety performance in this sector cannot be done in isolation. The government, clients, and large organisations have important roles to play to change the norms and culture in the industry so that small organisations are supported in their effort to improve their safety performance.

Knowledge Sharing of Research Information for Construction Health and Safety Practices: Sabarinah Sh Ahmad, Zarina Isnin, Zaharah Yahya, Mustapha Mahdi Salleh

ABC & VED ANALYSIS ON MODERN CONSTRUCTION MANAGEMENT

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ABSTRACT
An effective material management system is necessary to manage construction inventories of the project. This analysis can be done to manage cash flow and material flow for the smooth running of the project. Selecting appropriate cash flow analysis is essential for the success of any construction project. In this study, inventory management for the construction of an institutional building is considered. Those materials are classified under ABC (All Better Control) analyzing method and its efficiency of cash flow was plotted as ABC curve and VED bar graph. Further, random ranking was fixed to each material then it was short listed in hierarchy order to get ABC curve. This curve is used to classify all the materials in three categories and also used to prepare purchase order as well as to prepare cash flow statement.To minimise investment in inventory and to maximise the service level
KEY WORDS: ABC, cash flow, VED

1. INTRODUCTION

ABC is one of the Multi-criteria decision analysis (MCDA) system which is used as a branch of operations research destined to facilitate the resolution of cash flow and material flow issues. This method is usually used to classify construction materials and also manage cash inflow during construction time. Various issues in stock management can be rectified to do smooth running of project. There are 100 types of construction materials are used to do project well. /There are 12 number of papers are collected to do inventory management. Materials, money and time management must be done efficiently, otherwise various controversies will be arises at the time of project period.

ABC-VED analysis deals complex problems in managing inventory in medical stores at a tertiary care hospital. Two factors are considered such as cost and criticality of the item. Selective inventory control technique is used for an efficient management of medical stores, scientific approach in decision making for purchase, storage and distribution of specific items[2]. (Maj Sushil kumar, Brig A. Chokravarthy)

In an automobilie rubber components manufacturing industry, multi criteria inventory classification is (MCIC) is used for classification and AHP (Analytic Hierarchy Process) has been utilized for estimating the value of the inventory system. The genetic algorithm was used to classify the inventory items based on various criteria like ADU, number of requests, lead time, reparability for a university stationary inventory and unit price, number of requests, lead time, scarcity, durability, substitutability, reparability, order size and stock ability for an explosive invetory.[3] (Balaji and Senthil Kumar)

2. LITERATURE REVIEW

Kenneth D. Walsh's (2004), strategic positioning of inventory was studied about Industrial buyers of capital facilities have experienced and continue to experience pressure to reduce facility design and construction lead time. This pressure arises both internally (due to successes in manufacturing lead time reductions) and externally (due to competitive forces including narrowing product delivery windows). This paper presents case study dealing on owner's efforts to reduce the length and variability of delivery time for long-lead construction materials in order to improve overall project lead time. Reduction in lead time a 75% from order to delivery of the material resulted for individual projects within the owner's capital plan. As a result, the material was available at the construction site well in advance of its need for erection. In this case study, demand information was imprecise, allowing only the quantity of materials delivered to be considered rather than matching specific items to specific locations.

Ye Chen. Kavin W. Li (2006), In ABC analysis, a well-known inventory planning and control technique, stock-keeping units (SKUs) are sorted into three categories. Traditionally, the sorting is based solely on annual dollar usage. The aim of this paper is to introduce a case-based multiple-criteria ABC analysis that improves on this approach by accounting for additional criteria, such as lead time and criticality of SKUs, thereby providing more managerial flexibility. Using decisions from cases as input, preferences over alternatives are represented intuitively using weighted Euclidean distances which can be easily understood by a decision maker. Then a quadratic optimization program finds optimal classification thresholds. This system of multiple criteria decision aid is demonstrated using an illustrative case study.

Peng Zhou, Liwei Fan (2007) Ramanathan (R. Ramanathan, ABC inventory classification with multiple-criteria using weighted linear optimization. Computers & Operations Research 33 (2006) 695 – 700)

FABRICATION OF BRICKS BY FLY ASH, PAPER SLUDGE,CEMENT AND RIVER SAND

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ABSTRACT

The recent trends in the waste management are to reuse the industrial waste. Since bricks are one of the important masonry units as building materials due to its properties. Increasing amount of disposed paper sludge and fly ash has recently attracted concern for environmentally sustainable application. It is a practical solution for problem like cost expenditure on the waste management and its effects on the environment. As the paper sludge mainly comprises of the inorganic components and cellulose fibre. The inorganic components are kaolinite clay and calcium carbonate. As the fly ash consist of raw materials such as fly ash, cement or (lime + gypsum) and sand. From the study cement can be partially replaced by paper sludge. So in our study the cement was partially replaced with the percentage of 2%, 4%, 6%, 8%, 10%, 12%, 14%, and 16% paper sludge and the bricks where fabricated of size 230 x110 x 70 mm and water cured for 7 and 21 days. After the curing the bricks are tested by various tests such as water absorption test, bulk density test, hardness test, efflorescence test, capillarity test, initial rate of absorption, Sorptivity test.

KEY WORDS: *waste management, building materials, cost expenditure, inorganic components, partially replaced with cement, compressive strength of bricks*

1. INTRODUCTION

In order to reduce the non renewable material consumption as well as maintaining natural resources concepts of recycling and sustainability was globally introduced. The paper sludge was produced from the paper production and about 300 kg of sludge was produced in a year. The paper sludge was comprises of cellulose fibre and inorganic components like calcium carbonate and kaolinite clay. The raw dry paper sludge comprises silica, alumina, calcium carbonate and magnesium oxide so they can be used as one of the Portland cement ingredients. In previous few attempts the paper sludge can be used for making cement bonded paper sludge board, cellucrete and natural filler in rubber substance. Since the paper sludge consist of one of the cement ingredients the paper sludge can be used in fabrication of bricks. The class c fly ash also called as lignite fly ash was essentially comprises of the silica, alumina and calcium. The class c fly ash is essentially Pozzolanic in nature because of the 20% of lime present in the fly ash due to its Pozzolanic nature it was use as main raw material of 50% of fly ash was used in the bricks. The paper sludge was partially replaced with the cement with the percentage of 2%, 4%, 6%, 8%, 10%, 12%, 14% and 16%. Using the paper sludge and fly ash in the bricks was reduce cost expenditure in case of environmentally sustainable application

2. MATERIALS AND PROPERTIES

2.1 cement (ordinary Portland cement)

Ordinary Portland cement of Bharathi cement brand of 53 grade confirming to IS: 12269-1987 (9) was used in the study. Special care was taken to ensure that the cement was from the latest batch of packing cement used was fresh without the lumps

Table 2.1 Properties of cement

Test conducted	Results	Requirements as per IS 8112-1989
Normal consistency	20%	Not specified
Initial setting time	120 minutes	Shall not be less than 30 minutes
Final setting time	320 minutes	shall not be less than 600 minutes
Specific gravity	3.00	3.15
Fineness 90 micron sieve	1.5%	Shall not be more than 10%

EXPERIMENTAL INVESTIGATION OF STRENGTH PARAMETERS BY PARTIAL REPLACEMENT OF CRUMB RUBBER WITH FINE AGGREGATE

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ABSTRACT

This project consists of experimental study on crumb rubber as partial replacement of fine aggregate.There is no doubt that the increasing piles of used tires create environmental concern. As waste continues to accumulate the availability and capacity of land fills are diminished. It is in need to increase the application and reuse of recycled materials such as crumb rubber from tires in construction.Crumb rubber is recycled rubber produced from automotive and truck scrap tires. The basic building materials in concrete are primarily aggregate and cement which can be replaced with some percentage of recycled materials. The use of recycled materials can result in reduction of cost and may also enhance the performance. However, not all the materials can be used in the process of replacement. The materials used have to increase the strength aspect and also should not be expensive. Crumb rubber which is used as a partial replacement for fine aggregate in this project tends to increase the strength of concrete and is also less expensive. Quarry dust is add with rubber in order to enhance the strength of concrete. The compressive strength of the rubber concrete cubes is calculated at the end of 7 and 28 days.

***KEYWORDS**: Crumb rubber, Quarry dust, rubber concrete.*

INTRODUCTION

Millions of tires are discarded across the world every year. Disposal of these waste rubber tires is a challenging task because tires are non-biodegradable materials with long life. The traditional method of disposal of these tires are stock piling or illegal dumping or land filling. All these methods provide only short term solutions and also occupies lot of space. Hence, it can be reused in any sorts. For effective solution, it can be reused in construction industry as alternatives or as partial replacement of some materials. In 1998, Dr. Raghavan, H. Huynh, C.F.Ferraris stated that the addition of rubber particles resulted in reduction of flexural strength of mortar mixes. Preliminary results appear to show that the addition of rubber particles to mortar reduces the severity of the plastic shrinkage crack compared with control mortar. EshmaielGanjian, MortezaKhorami and Ali Akbar Maghsoudi explained about the replacement and filler of crumb rubber in concrete. O. Youssf& M. A. ElGawady conducted compressive strength test, splitting tensile test, workability test which shows various results such as ReplacingFA by CR resulting in concrete mechanical properties higher than replacing Flyash. In addition, replacing up to 10% of FA by CR and has neither significant effect on strength nor workability. The rate of compressive strength losses up to concrete age of 28 days is approximately constant. However, at later ages it exhibits greater losses. Replacing Up to 50% FA by CR resulted in about 30% tensile strength reduction compared to conventional concrete. The maximum reduction in both of them reaches about 30% at rubber content of 45%. A. Suribabu, DrU.Rangaraju, Dr.M. Ravindra Krishna explained that for the designed mix proportions of M25 and M40 grades of concrete the desired characteristic strengths for cubes are achieved in both conventional concrete and Quarry Stone dust concrete. The strength achieved in concrete made with sand as fine aggregate achieved high strengths when compared with Quarry stone dust concrete. B.S. Waziri, A.G Bukar and Y.Z.A. Gaji states that compressive strength increased with curing age for all the mixes but decrease with increasing percentages of quarry sand.

In this project work, crumb rubber and quarry dust are replaced by 10, 20, 30 and 40% by the weight of fine aggregate.

MATERIALS

a) Cement

A cement is a binder, a substance used in construction that sets and hardens and can bind other materials together. Cement used in this project is Ordinary Portland cement (OPC) 53 grade. The various tests, were carried out as per IS: 2386 – 1968 part III

Table 2.1 Propertiesof Cement

Properties	Value
Specific gravity	3.15
Initial setting time	120 min
Final setting time	238 min

UTILIZATION OF CONSTRUCTION DEBRIS IN CONCRETE MIXTURE

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ABSTRACT
Concrete is a versatile engineering composite material made with cement, aggregates and admixtures in some cases. Due to the day by day innovations and developments in construction field, the global consumption of natural fine aggregates is very high and at the same time production of solid wastes from the demolitions and manufacturing units are also very high. Extensive use of concrete leads to the scarcity of natural fine aggregates. Because of this reasons solid wastes from demolition and manufacturing units and as well as to decrease the scarcity of natural fine aggregate. This paper is to study the suitability of construction demolition waste in the concrete mix. In this experimental study, different mixes are casted, construction demolition waste are used to partially replace the fine aggregate by 10%, 20% and so on. For the combinations of compressive strength, split tensile strength, flexural strength is increased for all mixes and maximum strength is obtained for the mix.
KEYWORDS: Construction Debris, Compressive strength, Flexural Strength, Split tensile test.

1. INTRODUCTION

Following a normal growth in population, the amount and type of waste materials have increased accordingly many of the non-decaying waste materials will remain in the environment for hundreds, perhaps thousands of years.The non-decaying waste materials cause a waste disposal crisis, thereby contributing to the environmental problems. However, the environmental impact can be reduced by making more sustainable use of this waste. This is known as the Waste Hierarchy.Its aim to reduce, reuse, or recycle the construction and demolition waste.Construction waste recycling is the separation and recycling of recoverable waste materials generated during construction and remodelling.Construction by nature is not an eco-friendly activity.Construction wastes are 90% reusable.

1.1 OBJECTIVE OF THE WORK

Basic intention is to efficiently utilize the waste debris in constructive way so that it can be beneficial to society however main objectives of current project work are:
The objective of construction waste management is to divert construction and demolition debris from landfills and give it a higher value purpose.
The objective of this study is to compile relevant literature which will given an insight into demolition waste management strategies of different countries and role of regulatory authorities in demolition waste management.To encourage the recycle and reuse of C&D debris.

2. MATERIALS USED

2.1 CEMENT

Cement is a binder, a substance used in construction that sets and hardens and can bind other materials together. The various tests, were carried out as per IS: 2386-1968 part III.

2.2 NATURAL COARSE AGGREGATE:

Aggregate for concrete are generally derived from natural sources. This may have been naturally reduced to size or may be required to be crushed.

2.3 NATURAL FINE AGGREGATE:

Clean and dry river sand availability locally will be used. Sand passing through IS 4.75 mm sieve will be used for casting all the specimens.

2.4 WATER

In the present investigation, potable water was used as per IS456-2000 for the plain and reinforced cement concrete.

2.5CONSTRUCTION DEBRIS

Construction Debris were collected from the site in the form of solid waste. Crushed them into small pieces by manually. And separated the fine materials to use them the partial replacement to the natural fine aggregate.

FLEXIBLE PAVEMENT DESIGN FOR DIFFERENT TYPES OF SOIL

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ABSTRACT

As per IRC Recommendation,California Bearing Ratio (CBR) value is an important soil parameter for design of flexible pavements. It is one of the most engineering properties of soil for design of sub grade. CBR value may depends on many factors like Maximum Dry Density(MDD), Optimum moisture content(OMC),Liquid Limit(LL), Plastic Limit(PL), Plastic Index(PI). Besides soaked or unsoaked condition of soil also affects the value. These tests can easily be performed in the laboratory. Determination of CBR is to get the information about the strength of sub grade over the length of roads. Different soil sample collected from different locations of salem district. Different types of Soil such as Clay soil, Laterite soil, Red soil and Calcareous soil are collected and the CBR test is carried out for these types of soil and find the thickness composition of flexible pavement. By comparing these four types of soil the highest CBR value for a soil is determined.

Keywords: *California Bearing Ratio (CBR), Soaked, Unsoaked, Flexible pavement*.

1. INTRODUCTION

California bearing ratio (CBR) is an empirical test and widely applied in design of flexible pavement over the world. This method was developed during 1928-29 by the California Highway Department. Use of CBR test results for design of roads, introduced in USA during 2nd World War and subsequently adopted as a standard method of design in other parts of the world, is recently being discouraged in some advanced countries because of the imperialness of the method (Brown, 1996). The CBR test was originally developed by the California State Highway Department and was thereafter incorporated by the Army Corps of Engineers for the design of flexible pavements.

Most of the Indian highways system consists of flexible pavement; there are different methods of design of flexible pavement. The California Bearing Ratio (CBR) test is an empirical method of design of flexible pavement design. It is a load test applied to the surface and used in soil investigations as an aid to the design of pavements. The design for new construction should be based on the strength of the samples prepared at optimum moisture content (OMC) corresponding to the Proctor Compaction and soaked in water for a period of four days before testing. In case of existing road requiring strengthening, the soil should be moulded at the field moisture content and soaked for four days before testing. It has been reported that, soaking for four days may be very severe and may be discarded in some cases, Bindra 1991. This test method is used to evaluate the potential strength of subgrade, subbase, and base course material for use in road and airfield pavements. Bindra 1991 reported that design curves (based on the curve evolved by Road Research Laboratory, U.K) are adopted by Indian Road Congress (IRC: 37-1970).*Er. D Kumar Choudhary Int. Journal of Engineering Research and Applications* www.ijera.com *ISSN : 2248-9622, Vol. 4, Issue 6(Version 5), June 2014, pp.239-253* www.ijera.

The design of the pavement layers to be laid over subgrade soil starts off with the estimation of subgrade strength and the volume of traffic to be carried. The Indian Road Congress (IRC) encodes the exact design strategies of the pavement layers based upon the subgrade strength which is most commonly expressed in terms of the California Bearing Ratio (CBR). For the design of pavement CBR value is invariably considered as one of the important parameter. With the CBR value of the soil known, the appropriate thickness of construction required above the soil for different traffic conditions is determined using the design charts, proposed by IRC. CBR value can be measured directly in the laboratory test in accordance with IS:2720 (Part-XVI) on soil sample procured from the work site. Laboratory test takes at least 4 days to measure the CBR value for each soil sample under soaked condition. In addition, the test requires large quantity of the soil sample and the test requires skill and experience without which the results may be inaccurate and misleading.

2. EXPERIMENTAL PROGRAM

Grain Size Analysis (IS: 2720 - Part 4)

Weight of Dry Sample : 1000gms

Table 2.1 Sieve Analysis for different soil sample

Soil Sample	% Grain Size Analysis	Permissible Value
Red	4.38	0.12-5.26
Clay	9.05	5.00-11.26
Calcareous	6.30	0.4-7.65
Earthy	8.85	6.26-9.45

MECHANICAL PROPERTIES OF BOTTOM ASH GEOPOLYMER CONCRETE

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ABSTRACT

The present study aims to carry out the mechanical properties on bottom ash geopolymer concrete (BAGPC). Sodium based alkaline was used as chemical activators. In case of BAGPC, the molarity of sodium silicate solution was maintained as 8 M. The curing mode was adopted as ambient temperature. Concrete cubes, cylinder and beam with ten different mixes were casted. Among them 6 mixes (ratio of Na_2SiO_3/NaOH is 0.5 to 2.5%) were bottom ash geo-polymer concrete and remaining 4 mixes (super plasticizer dosage 0.5 to 2%) were conventional concrete (CC). The mechanical properties of the bottom ash geo-polymer concrete were evaluated and compared it with the mechanical properties of conventional concrete. From the test results mechanical properties of the bottom ash geo-polymer concrete gradually reduced due to lack of binding of coarse aggregate with the bottom ash.

1.INTRODUCTION

Concrete is a composite material consisting of coarse aggregate, cement and sand. During the past 5-6 years, mega construction project involves the use of concrete have been undergone. Cement is the most widely used binding material in concrete. In 2016, cement consumption has reached up to 359 million metric tons in India. Scientist had undergone numerous studies to bring out the awareness about the usage of cement.In other hand bottom ash is the coarse, granular, non-combustible by product obtained from the bottom of furnace. It principally consist of silica, alumina and iron with a smaller percentage of calcium, magnesium and sulphates. The bottom ash is usually as well graded material with a very porous surface texture.It is formed by alkali activation of alumina silicate material under warm atmosphere. The exact react mechanism which explains the setting and hardening of alkali- activated binders is not yet understood on the prime material as well as on the alkaline activator. Davidovits (1978) proposed two stages in the reaction mechanism for the formation of geo polymer, namely the chemical reaction of geo polymeric precursors (like alumina silicate oxides with alkali silicate forming Monomers – Orthosialate ions) and the exothermal poly condensation of monomer. According to Davidovits depending on the of silica and alumina in the source material, there are three types of amorphous to semi- crystalline three dimensional alumina – silicate structure (geo polymer) namely,

The poly (sialate) type (Si-O-Al-O)
The poly (sialate - sil- o$_n$o) type (Si-O-Al-O-Si-O)
The poly (sialate – disil- o$_n$o) type (Si-O-Al-O-Si-O-Si-O)

The factors influencing the pelletrazatum and properties of light weight aggregate using bottom ash through alkali activation and curing at ambient temperature were investigated. The alkali activities for the synthesis of geo-polymer aggregate are NaOH and Na_2SiO_3.Adddition of Ca (OH) $_2$ resulted in the increase of pellitazation efficiency. The open porosity and water absorption of aggregate reduced considerably with an increase in NaOH molarity and Na_2SiO_3/NaOH ratio (S.Geetha and K.Ramamurthy 2013).Various laboratory tests to access the possibility of use of coal bottom ash as a substitute material of river sand in concrete. The test resulted 28 days compressive strength and pulse velocity through concrete core not affected on the use of coal bottom ash in concrete, bottom ash concrete mixture displayed marginally lesser resistance to abrasion that control concrete (Malkit singh and Rafat siddique 2015). The compressive strength atomic ratio and micro structure of geo-polymer mortars (GM) made from circulating fluidised bed combustion coal bottom ash to observe the effect of air curing at ambient temperature at 20° were actually higher comparing normal concrete(Ilker Bekirtopeer et.al 2010). Compressive strength, split tensile strength surface abrasion resistance, density, thermal conductivity and ultrasonic pulse velocity results of bottom ash indicated that strength were lower than those of the geo-polymer concrete containing natural aggregate (Ampol Wogsh et .al, 2016). Investigation of the compressive strength and durability of lignite bottom ash geo-polymer mortars in 3% sulphuric acid 2.5%, sodium sulphate solution. Sodium silicate, sodium hydroxide and curing temperature of 75 C degree for 48 hours were used to activate the geo-polymerisation.It was found that the bottom ash was more reactive and gave geo-polymer motors with higher compressive strength than those of the coarse fly ashes **(**Vanchi Sata et.al 2012). Bottom ash and granulated blast furnace slag (GBFS) were used as source materials with sodium hydroxide and sodium silicate activator in geo-polymer concrete. They attempted elevated temperature 55ºC and ambient temperature is 35ºC. In this experiment fly ash and bottom ash based geo-polymer was used as the binder and fillers, in the replacement of Portland cement and natural sand to produce geo-polymer concrete. The alkaline liquid that been used in geo-

ANALYSIS OF ANTIQUATES AND IMPACTS IN CONSTRUCTION PROJECTS

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ABSTRACT
In construction projects, changes are very common and likely to occur at any stage of the project. Construction project is a complex process, which requires close cooperation and coordination among the stake holders. The process also consists of stages, which ultimately make it more complicated and difficult to manage. A good design will enhance value generation, reduce dispute and improve the work flow. As the designing work begin undertaken there are tendencies for changes in design to happen.These changes can't take place right from the drawing stage up till the construction phase. The later the changes are made; the more of it will affect the project. In the actual design environment, changes inevitably and continuously affect the properties of many building components at various stages in a construction project. Such changes may occur due to the needs to satisfy the new or modified requirements specified by the owner, to reduce project cost, or to rectify existing design mistake. To make things worse most of the changes were made during construction stage. These will generate change orders, contractual disputes, cost overrun, time delay, compromising on quality and frustration. In addition to that parties which are involved in the process of making the changes into reality will need to submit fresh claims on the extra work done. This paper reviewed the various causes & effects procedure for changes based on the basic ideas ,the legal aspects, the cost and pricing aspects, and the management and administration of change orders. The outcome of this review may help the engineers and contractors to improve productivity, to control the changes in the field and to enhance the effective change management process and initiate further research in this field.
KEYWORDS: Construction industry, Change, Change order, Causes, Effects, Change management

INTRODUCTION
Construction industry is one of the rapid growing sectors in India. A number of construction projects are currently undergoing in various fields of civil engineering. Large and complex projects have been built which attracting contractors and construction companies from all over the country. Most of the contractors and their companies lack sufficient understanding of the local social, cultural and physical environment. During the development phases of any of the construction project, many decisions have to be made based on the in complete information, personal experiences, assumptions, or generally uncertain conditions which can lead to adjustment at a later stage of the project. Incomplete information on the project variables at the early stages of projects leads to inadequate knowledge of future conditions; This situation coupled with inexperienced owners has led to inadequate design resulting in changes to plans, specifications, and contract terms. Consequently, it may result in imprecise estimates arising from ambiguity in project parameters. It may be inferred hat the clients" dis satisfaction is likely caused by change orders running through the construction projects. The effort of managing change orders has imposed a huge burden on project management, and it is a nightmare that industry people wished they never have to face. Changes in construction also cause serious ethical problems and disputes .Change management is a pure application-oriented issue and requires engineering innovation to solve the problem. Based on our investigation of the construction change order process, and a pressing need from industry versus the scarcity of literature and software tools in the domain, poses a promising opportunity for research and development in construction. The following section summarizes the various impacts of construction change order process and provides some in sight full thoughts on this topic.

Definition
"In construction projects, a change refers to an alteration or a modification to pre-existing conditions, assumptions and basic information, or requirements (project or client)" (EPSCR,2004).It includes work, time, cost and method of performance. Change of planned design, construction procedure and contract terms during execution of work leads to the change order. A change order is a written order to the contractor, signed by the owner, and issued after execution of the contract, authorizing a change in the work or an adjustment in the contract sum or the contract time.

OPTIMUM MIX PROPORTION FOR ARTIFICIAL COARSE AGGREGATE

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ABSTRACT

Geopolymer Aggregate (GPA) is an innovative construction material which shall be produced by the chemical action of inorganic molecules. Flyash is a product of coal obtained from the thermal power plant which is plenty available worldwide. Class F fly ash is rich in silica and alumina which reacts with alkaline solution. It is an excellent alternative construction material to the existing plain cement concrete. The geopolymer Aggregate with different composing molarities of sodium hydroxide with 8M, 10M, 12M, 14M and 16M were adopted. The Geopolymer balls were casting to form a hard mass and are pulverized. The properties of these artificial aggregates were determined. The results obtained are to be compared with conventional 20 mm aggregates.

KEYWORDS: Geo-polymer, Fly Ash, Artificial Aggregate, Alkaline Solution.

INTRODUCTION

The alkali activation of waste materials is a chemical process that allows the user to transform glassy structures into very compact well cemented composites. Now a days the knowledge concerning the mechanisms controlling the alkali activation process is considerably advanced. There are still many things to investigate, the mechanism of activation of a flyash with highly alkaline solution is described. These solutions made with sodium hydroxide and sodium silicatethe artificial aggregate is made by the combination of alkaline solution and the fly ash. The aggregate part in the concrete is very important one. It is avoid shrinkage in the concrete. If the world is meet the aggregate demand, at the time this artificial aggregate made by geopolymerisation process is more useful one.

GEOPOLYMER AGGREGATE

Geopolymeraggreates are nothing but artificial aggregates made up of Flyash using alkali activation process. Davidovits(1988, 1994) proposed that an alkaline liquid could be used to react with the silicon (Si) and the aluminium (Al) in a source material of geological origin or in by-product materials such as fly ash and rice husk ash to produce binders. The reaction takes place in this case is polymerization process and hence, he termed these binders as Geopolymers. Palomo et al., (1999) suggested that pozzolans such as blast furnace slag might be activated using alkaline liquids to form a binder and hence totally replace the use of OPC in concrete. In this scheme, the main contents to be activated are silicon and calcium in the blast furnace slag. The main binder produced is a C-S-H gel, as the result of the hydration process.

In the present study, low-calcium (Class F) fly ash-based Geopolymer is used as the binder, instead of Portland or other hydraulic cement paste, to produce aggregate. The fly ash-based Geopolymer paste binds the loose coarse aggregates, fine aggregates and other un-reacted materials together to form the Geopolymer concrete, with or without the presence of admixtures. The manufacture of Geopolymeraggreate is carried out using the usual geopolymer concrete technology methods. As in the case of OPC concrete, the aggregates occupy about 75-80 % by mass, in Geopolymer concrete. The silicon and the aluminium in the low-calcium (Class F) fly ash react with an alkaline liquid that is a combination of sodium silicate and sodium hydroxide solutions to form the Geopolymer paste that binds the aggregates and other unreacted materials. Based on the previous studies available and laboratory experience, it's found that the cost of geopolymer concrete per cubic meter is approximately the same as that of Portland cement concrete. But on considering the impact of the possible carbon dioxide emission and cost of production of cement and the environmental advantage of utilization of fly ash, the geopolymer concrete may prove to be economically and environmentally advantageous.

2.1 MATERIALS

2.1.1 FLY ASH

In the present experimental work, low calcium, Class F fly ash was obtains from Thermal Power Plant in Mettur, Tamil Nadu. The chemical composition of fly ash as given in following table. The class F-fly ash is shown in the following figure 2.1.