



Srishyla Educational Trust (R), Bheemasamudra.
GM INSTITUTE OF TECHNOLOGY, DAVANAGERE
DEPARTMENT OF CIVIL ENGINEERING



LIST OF PUBLICATIONS Academic Year: 2015-16						Total Publications=15	
Sl. No	Name of the Faculty	Title of the Paper	Published Date	Publication	National	Scopus Indexed	Citation
					International		
1	Mohammed Yaseen	Traffic volume count and signal optimisation at mothi circle Davanagere	September 2015	International Journal of Emerging Technology and advanced Engineering	International	--	--
2	Kirankumar H S	Traffic volume count and signal optimisation at mothi circle Davanagere	September 2015	International Journal of Emerging Technology and advanced Engineering	International	--	--
3	Swamy L V	Traffic volume count and signal optimisation at mothi circle Davanagere	September 2015	International Journal of Emerging Technology and advanced Engineering	International	--	--

4	B K Varun	The mechanical properties of concrete incorporating silica fume as partial replacement for cement	September 2015	International Journal of Emerging Technology and advanced Engineering	International	--	--
5	Harish B A	The mechanical properties of concrete incorporating silica-fume as partial replacement for cement	September 2015	International Journal of Emerging Technology and advanced Engineering	International	--	--
6	Hanumesh B M	The mechanical properties of concrete incorporating silica-fume as partial replacement for cement	September 2015	International Journal of Emerging Technology and advanced Engineering	International	--	--
7	Harish B A	Finite Element Analysis of Doubly Curved Thin Concrete Shells	September 2015	IJESIT	International	--	--
8	Dr.H S Govardhana Swamy	RIVER WATER POLLUTION (2015): A case study on Tunga river at Shimoga, Karnataka State	2015	International Journal of Engineering Research & Technology Vol 15	International	--	--

9	Harish B A	AN experimental study on The Behavior of M20Grade Cement concrete by Partial Replacement of Cement by Rice Husk Ash(RHA)	May-2016	IJSTE	International	--	--
10	Hanumesh B M	AN experimental study on The Behavior of M20Grade Cement concrete by Partial Replacement of Cement by Rice Husk Ash(RHA)	May-2016	IJSTE	International	--	--
11	Hanumesh B M	Influence of Polypropylene Fibers on Recycled Aggregate Concrete	September 2016	Elsevier	International	--	--
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13	Mohammed Yaseen	Effects of non-point source pollution in Ground Water near Avaragere Lake	JUNE-2016	International Research Journal of Engineering and Technology (IRJET)	International	--	--
14	Mohammed Yaseen	Hospital Waste Generation And Management – A Case Study For Major Hospitals of Davanagere	JUNE-2016	International Research Journal of Engineering and Technology	International	--	--

				(IRJET)			
15	Mohammed Yaseen	Davanagere Lakes – Issues and perspectives on pollution, Restoration and Management	OCTOBER -2015	International Research Journal of Engineering and Technology (IRJET)	International	--	--
16	Dr. S L Arunkumar	Morphometric analysis of Varada Drainage Basin, Sagar shivamogga District, Karnataka India	April-2016	IJCTER	International	--	--

Traffic Volume Count and Signal Optimisation at Mothi Circle Davanagere

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Abstract—Traffic analysis is basically the process of intercepting and examining the number of vehicles on the road and deducing the pattern of traffic movement. A traffic survey on Mothi circle intersection of Davanagere city has been carried out which includes calculation of present traffic density and analysis of traffic volume by adopting the Manual method of counting. PCU estimations are made and appropriate design corrections are suggested for highway geometry. For the proposed design geometry the signal time is optimized.

Keywords— *Signal Optimisation, Traffic volume Count, PCU estimation and Geometric Design.*

I. INTRODUCTION

Traffic Engineering is branch of engineering which deals with planning, geometric design and traffic operation of roads, highways, their networks, terminals, and also

is regularly increasing but the road area especially in the existing part of the cities and in city cores, remains the same, making the situation grim by increasing the congestion in central and the other important part of cities. Mass transportation systems are generally neglected or do not provide regular, adequate, safe and reliable quality of services there by people relying on the private vehicles, which leads to extreme congestion, increase in pollution, accidents and add to general deterioration of quality of life in cities. In metro cities there are about 15% car users and as 75% of the transport budget is used for widening roads, which primarily benefits the car and two wheelers and not the mass transportation systems. Beside this increase of commercial and institutional activities in central built up areas ,temporary and permanent encroachment on roads ,unauthorized parking of tempos ,Rickshaws , use of same road lanes by slow moving vehicles, intermediate transport



International Journal of Emerging Technology and Advanced Engineering
Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 5, Issue 9, September 2015)

The Mechanical Properties of Concrete Incorporating Silica Fume as Partial Replacement of Cement

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Abstract– Concrete is the most important engineering material and the addition of some other materials may change the properties of concrete. With increase in trend towards the wider use of concrete for prestressed concrete and high rise buildings there is a growing demand of concrete with higher compressive strength. Mineral additions which are also known as mineral admixtures have been used with cements for many years. Silica fume particles are 100 times smaller than the average cement particle. Its handling and disposal is a point of concern because of the environment concerns. Silica fume is usually categorized as a supplementary cementitious material. These materials exhibit pozzolanic properties, cementitious properties and a combination of both properties. Due to these properties, it can affect the concrete behavior in many ways. In the present work, an attempt has been made to

Silica fume, also referred to as micro silica or condensed silica fume, is used as an artificial pozzolanic admixture. It is the product resulting from reduction of high purity quartz with coal in an electric arc furnace in the manufacture of silicon or ferrosilicon alloy. Silica fume rises as an oxidized vapour. It cools, condenses and is collected in cloth bags. It is further processed to remove impurities and to control particle size. Condensed silica fume is essentially silicon dioxide (more than 90%) in noncrystalline form. Since it is airborne material like fly ash, it has spherical shape. It is extremely fine with particle size less than 1 micron and with an average diameter of about 0.1 micron, about 100 times smaller than average cement particles. Silica fume has specific surface area of about 20000 m²/kg.

ISSN: 2319-5967

ISO 9001:2008 Certified

International Journal of Engineering Science and Innovative Technology (IJESIT)

Volume 4, Issue 5, September 2015

Finite Element Analysis of Doubly Curved Thin Concrete Shells

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Abstract: A thin shell is a “Three-dimensional spatial structure made up of one or more curved surfaces whose thickness is small compared to their other dimensions”. Shells belong to the class of stressed skin structures which, because of their geometry and small flexural rigidity of the skin, tend to carry loads primarily by direct stresses acting in their plane. The shells are subjected to pure membrane state of stress, under appropriate loading and boundary condition the resulting bending and twisting moments are either zero or small which may be neglected. The coordinates of funicular shells are determined by masonry mould method by developing a computer program. In this study doubly curved thin shells are analysed using finite element software SAP 2000. Doubly curved shells which are in square plan having 10mX10m and 15mX15m are considered and shells in rectangular plan having dimensions 10mX15m and 15mX20m are considered. The behavior of shells under self-weight, live load varying from 0-20KN/m (UDL) is obtained. In this case study deflection curves, membrane stress and stress contour diagram are obtained. It is observed that with the increase in rise and thickness of funicular shell the deflection are reduced. The membrane stresses decreases with the increase in rise and thickness of concrete funicular shell. The aim of this study is to develop shells of different sizes and investigation is done on the shells by finite element analysis under given uniformly distributed load, to find out the behavior of shells in various cases using standard software, Structural Analysis Package (SAP 2000).

Keywords: Funicular shell, Membrane theory, Finite element models, Discretization, SAP 2000.

River Water Pollution:A Case Study on Tunga River At Shimoga-Karnataka

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Abstract— Tunga River has been one of the most prominent and important river of Karnataka in Shimoga District. Unfortunately, certain stretches of River Tunga are much polluted. Various urban centers are located on the banks of Tunga River, draw fresh river water for various activities. In almost the entire wastewater generated by these centers is disposed off into the river. The objective of the monitoring studies undertaken for water body is to assess variation in water quality with time. Four sampling stations were selected along the river for sampling purpose from August 2013 to August 2014. Water samples were analyzed in terms of physico-chemical water quality parameters.

Keywords— *Tunga River, water quality, point pollution, Physico-chemical parameters*

I. INTRODUCTION

In nature, water is the essential fluid from which all life begins. All living things need water to maintain their life too. In domesticity, it is very useful, such as for washing and cleaning. In industry, it is the common solvent for Paper and water, textile and electroplating. Besides, the generation of electricity also requires water. It has many uses. However, it can be easily polluted. Pollutants deteriorate the quality of the water and render it unfit for its intended uses [1]. The pollution of rivers and streams with chemical contaminants has become one of the most critical environmental problems of the century. It is estimated that each year 10 million people die from drinking contaminated water. Water is one of the most common and precious resources on the earth without there would be no life on earth [2]. Pollution is a serious problem as almost 70% of India's surface water resources and a growing number of its groundwater reserves have been contaminated. The quality of water is described by its physical, chemical and microbiological characteristics. Therefore a regular monitoring of river water quality not only prevents outbreak of diseases and checks water from further deterioration, but also provides a scope to assess the current investments for pollution prevention and control. In this study, seasonal variations of physico-chemical and bacteriological

2. MATERIALS AND METHODS

A. Study Area

Shimoga is town, situated between the North and South branches of river Tunga. It is located on the Bangalore – Honnavar highway. Though it is a town of medium population, the temples and historically significant monuments of this town attracts a large number of tourist people resulting in a very high floating population. Because of this reason the river Tunga along Shimoga town stretch is prone to anthropogenic activities such as bathing, washing and disposal of wastes. The ground level in the town slopes towards river so that most of the storm and sewerage drains discharge into river Tunga. There are two stream monitoring stations and 15 drains located in this town stretch.

B. Monitoring Stations

Station - S1

Station S1 is located on the north side of the river, near the Shimoga – Thirthahalli new bridge. It is an upstream station and near this station water is being drawn for supply to the town.

Station - S2

This station is about 300 m downstream of station S1. The station S2 is located on a drain that enters the river from the industrial town areas. The flow in the drain is mainly comprised of industrial waste.

Station - S3

The station S3 is an most affected station and is positioned near the Vinayaka temple (Ramanna shetty park). It is downstream of the sewage disposal point from the station S3. A bathing ghat exists near this Station.

Station – S4

Station S4 is located on the south side of the river, near the Shimoga – Bhadravathi new bridge. Two number of sewage drains dispose city sewage water in to the river directly.

An Experimental Study on The Behavior of M20 Grade Cement Concrete by Partial Replacement of Cement by Rice Husk Ash (RHA)

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Abstract

Concrete is no longer made of aggregates, Portland cement and water only. It is not always incorporate so it requires at least one of the additional ingredients such as admixtures, supplementary Cementitious material or fibers to increase the strength and durability. Rice husk ash is one of the pozzolanic materials that can be blended with Portland cement for the production of durable concrete. Supplementary Cementitious materials prove to be effective to meet most of the requirements of durable concrete. Rice husk ash is found to be greater to other supplementary materials like silica fume and fly ash. In the current study an attempt has been made to investigate the strength parameters of M20 concrete (compressive and split tensile). For control concrete, IS method of mix design is adopted. Partial replacement of cement has been made with different percentage of RHA namely, 5%, 10% and 15%. Large range of curing periods starting from 7, 14 and 28 days are considered in the present study.

Keywords: Rice husk ash (RHA), Pozzolanic, Mix-design, Workability, Compressive, Split tensile

I. INTRODUCTION

Concrete is by far the most widely used construction material today. Concrete has attained the status of a major building material in all branches of modern construction because of following reasons. It is possible to control the properties of cement concrete within a wide range by using appropriate gradients and by applying special processing techniques- mechanical, chemical and physical. It is possible to mechanize completely its preparation and placing process. It possess adequate plasticity for mechanical working. It is difficult to point out another material of constructions which is as versatile as concrete. Concrete is by far the best material of choice where strength, durability, permanence, permeability, fire resistance are required. In present world, inflation is one of the main problems faced by every country. It has become essential to lower the construction cost without much compromise as far as strength and durability of the structure is concerned. The lowering of cost can be brought about in number of ways. Among all the methods available the most optimum at our disposal is the use of waste material as substitute. The basic requirement of all mankind is shelter. Hence the shelter is based on the building construction in which the cement concrete is an essential requirement. The cement concrete is a well-known building material and has occupied an indispensable place in construction work. From the materials of varying properties, to make concrete of stipulated qualities and intimate knowledge of the interaction of various ingredients, that go into making of concrete is required to be known, both in plastic condition and in the harden condition. The strength of concrete depends upon the components such as aggregate, quality of cement, water-cement ratio, and workability, normal consistency of mix proportion and age of concrete. New building materials are used to accelerate the construction work, in which the mixture plays an important role in characteristics of concrete. The growth in various types of industries together with population growth has resulted in enormous increase in the production of various types of industrial waste materials such as rice husk ash, foundry sand, blast furnace slag, fly ash, steel slag, scrap tires, waste plastic, broken glass, etc.



PMME 2016

Influence of Polypropylene Fibres on Recycled Aggregate Concrete*

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Abstract

This article presents the behavior of Recycle Aggregate Concrete (RAC) with and without addition of Polypropylene (PP) fibers. The natural coarse aggregate was replaced by recycle aggregate in the proportion of 0, 25, 50, 75 and 100%. The Polypropylene fibers (PP) were used in the recycle aggregate concrete by 1 and 2% by volume. In the present experimental study compressive, split and shear strengths were evaluated. The results showed that, the incorporation of PP fibers increases the strengths in RAC. Few Regression Models were deduced to estimate the strengths for RAC with respect to compressive strength.

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Selection and Peer-review under responsibility of International Conference on Processing of Materials, Minerals and Energy (July 29th – 30th) 2016, Ongole, Andhra Pradesh, India.

Keywords: Recycled aggregate, polypropylene fibres, compressive strength, split tensile strength, shear strength, regression models.

1. Introduction

Cement concrete is most important material for construction industry. Basically the concrete consists of cement, fine and coarse aggregates, these all mixed with the help of water and also with super plasticizers if it requires as per design requirements. In the present scenario for making concrete very acute shortage of good quality aggregates. Hence, the concrete or industry people are looking towards alternative material for aggregates. Now days the researchers are focusing on recycle aggregate to establish as an alternative material for aggregates. In the

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Effects of non-point source pollution in Ground Water near Avaragere Lake.

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Abstract - *The alarming rate of deterioration of water quality of fresh water resources is now a global problem. Fresh water ecosystems are considered as one of the most important natural resources for the survivability of all the living organisms of the biosphere. The decreasing fresh water availability is causing scarcity of water among surface sources which compels people to use and exploit ground water .Ground water exploitation is not only in India but also all over the world. Excessive use of ground water throughout the world has impacted the quality and quantity of water. Apart from the surface water sources ground water is also contaminated by various sources like point and non-point sources. In the present study an attempt has been made to study the*

due to anthropogenic activities and other biological activities. So the use of Ground water is more. Anthropogenic stresses, particularly the untreated waste water discharge and release of chemicals and agriculture run-off entering into water bodies and to the land may adversely effect the ground water.

The excess of salts content is one of the major concerns with water used for irrigation. A high salt concentration present in the water and soil will negatively affect the crop yields, degrade the land and pollute groundwater. Hence the Salinity content in water and soil is tested.

Urbanization and industrial development in the Davanagere City during the last decade have

“HOSPITAL WASTE GENERATION AND MANAGEMENT – A CASE STUDY FOR MAJOR HOSPITALS OF DAVANAGERE”

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Abstract - *In the present study it proposed to study the existing hospital waste management practices and disposal methods, by personally visiting the significant waste producing hospitals in city. Data is collected by visiting the D.C office regarding the hospital waste management and rules, also visit is made to Shushurutha Bio-medical Waste Management Society(R) Machenahalli, Shivamogga. to understand the process of incineration and autoclaving done for disposal of medical waste by various hospitals of shivamogga and Davanagere district. The best management practices have been suggested for hospitals and also an*

respective hospital and to study the current management practices, strategies and Disposal methods. To quantify the total quantum of bio waste generated in the hospital

1. 1. STUDY AREA

Davanagere city has more number of hospitals and it is the vast area to cover all the hospital in a project so, two major hospitals are selected. The name of two hospitals are S.S Institute of Medical Sciences & Research Center and Chigateri District Hospital. Chigateri district hospital is a govt. hospital and it is located in a heart of a city P. J Extension. The hospital was established in the year 1961.

Davanagere Lakes – Issues and perspectives on pollution, Restoration and Management

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Abstract - *The environmental conditions of any lake systems depend upon the nature of that wetland and its exposure to various environmental factors. These fragile ecosystems must maintain the state of environmental equilibrium with the existing surroundings-particularly from a special perspective of anthropogenic activities and pollution. Even though various efforts and restoration are now being undertaken in checking the degradation of water quality of lakes, these urban lake systems as a result of encroachment, reclamation, sedimentation, excessive nutrient discharge, untreated sewage and effluent discharge and deforestation around the lake systems in Davanagere, still the problem of pollution persists.*

trade and fisheries. The natural undulating terrain of the davanagere city, with small hills and valleys, lends itself perfectly to the development of lakes that can capture and store rain water. These lakes play a very important role in urban ground water recharging network. Urban aquaculture and agricultural activities solely depend upon on the availability of these impoundments and their tributaries.

The environmental conditions of any lake ecosystem depend upon the nature of that wetland and its exposure to various environmental factors. Their fragile ecosystems must maintain the state of environmental equilibrium with the existing surroundings particularly from a special perspective of anthropogenic activities and pollution.

Even though various efforts are now being undertaken in checking the degradation of water quality of lakes, these urban lake systems as a result of encroachment, reclamation, sedimentation, excessive nutrient discharge, untreated sewage and effluent discharge and deforestation around the lake systems in Davanagere, still the problem of pollution persists.

Morphometric analysis of Varada Drainage Basin, Sagar taluk Shivamogga District, Karnataka INDIA

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I. INTRODUCTION

Geomorphology deals with the study of landforms on the surface of the earth (King, 1962). Knowledge of landforms and drainage basin characteristics becomes an important pre-requisite to evaluate basin hydrology. The geomorphological processes comprise the physical and chemical interaction between the earth surface and the natural forces acting upon it to produce landforms. Geology, structural setting and weathering process of an area influence the development of landforms. The geomorphic character has an influence on the groundwater regime of a basin. The amount of water reaching a stream system is dependent upon the morphometry of the basin, total precipitation, losses due to evapo-transpiration and absorption by soils and vegetation. The morphological studies provide information on the lithology, structure, relative infiltration, runoff, erosional aspects and the stage of the maturity of the basin relief, which influences the occurrence of groundwater and its potential

Study Area:

Location and Extent:

The Varada river basin covers an area of 1,464 km² and is composed within latitudes 14⁰ 05' 25" to 14⁰ 42' 25" N and longitude 74⁰ 48' 15" to 75⁰ 12' 25" E. (Fig.1) in the survey of India

Academic Year: 2016-17				Total Publications=16			
Sl. No	Name of the Faculty	Title of the Paper	Published Date	Publication	National	Scopus Indexed	Citation
					International		
1	Kirankumar H S	Tannery wastewater treatment by electrocoagulation method using aluminium and iron electrodes	September 2016.	IJSART	International	--	--
2	Puttaraj M H	Mechanical Characterization Of Glass Fiber Reinforced Polymer (GFRP) Bars	Nov -2016	International Journal of Technology Enhancements and Emerging Engineering Research	International	--	--
3	B K Varun	The mechanical properties of concrete incorporating quarry dust and foundry sand as partial and complete replacement for fine aggregate	September 2016	International Journal of Emerging Technology and advanced Engineering	International	--	--
4	Harish B A	The mechanical properties of concrete incorporating quarry dust and foundry sand as partial and complete replacement for fine aggregate	September 2016	International Journal of Emerging Technology and advanced Engineering	International	--	--

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7	Harish B A	An Experimental Investigation on Partial Replacement of Cement by Glass Powder in Concrete	October 2016	IRJET	International	--	--
8	Harish B A	Finite Element Analysis of Funicular Shells With Rectanguar plan ratio 1:0.7 under Uniformly Distributed Load using SAP2000	October 2016	JOSR-JMCE	International	--	--
9	Hanumesh B M	Experimental Study on the M20 Grade of Cement Concrete Containing Crimped Steel Fibres	September 2016	IJSTE	International	--	--
10	Harish B A	Experimental Study on the M20 Grade of Cement Concrete Containing Crimped Steel Fibres	September 2016	IJSTE	International	--	--

11	Harish B A	An Experimental study on Silica Fume Concrete with Addition of Glass Fiber	May 2017	IJSTE	International	--	--
12	Hanumesh B M	The Mechanical Properties of Concrete Incorporating Silica Fume and Fly Ash as a Partial Replacement of Cement	May 2017	IJETAE	International	--	--
13	Hanumesh B M	Experimental Study on Effects of Aspect Ratio of Glass Fibers in Concrete	May 2017	IJETAE	International	--	--
14	Dr.Mohammed Yaseen	Quantification of Solid Waste and Management of Davanagere City	May 2017	Open Access International Access of Science and Engg. (OAIASE)	International	--	--
15	Dr.Mohammed Yaseen	Purification of Water Using Low Cost Adsorbents-Fly Ash and Activated Carbon	JUNE 2017	International Journal for Scientific Research & Development (IJSART)	International	--	--
16	Dr.Mohammed Yaseen	Comparative Analysis of Locally Available Adsorbents for Purification of Water	JUNE 2017	International Journal for Scientific Research & Development (IJSART)	International	--	--

Tannery Wastewater Treatment by Electrocoagulation Method Using Aluminium and Iron Electrodes

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Abstract- In this paper, treatment of tannery wastewater by Electro-Coagulation (EC) method using aluminum and iron electrodes has been investigated in a batch process. The tannery wastewater sample was collected from Ambur, Tamil Nadu. The effect of variables like voltage, time and distance were investigated on TDS, TSS, COD, BOD, Chloride and Chromium. The Electro-Coagulation process was carried out in a batch reactor of 1 liter capacity was taken out for batch at 10 and 15 voltages and corresponding times of 60, 90 and 120 min by keeping different distance between the electrodes viz., 2, 3 and 4cm. The results obtained showed that the highest removal efficiency of 92.75%, 97.5 %, 96.37 %, 85.74 %, 92.18% and 86.92 % of TDS, TSS, BOD, COD, Chloride and

a matter of incredible concern in the nation having leather tanning industry.

The tannery industries are considered as polluting due to the inherent manufacturing processes as well as type of technology employed in the manufacture of hides and skin into leather. During the tanning process no less than 30 kg of chemicals are added per ton of hides [4]. Tannery wastewater when released into water bodies modify the physical, chemical and biological characteristics of water and reduces the dissolved oxygen, increases alkalinity, suspended solids and sulfides which are harmful to fish and other aquatic lives. Aside from natural materials which discharge significant

Mechanical Characterization Of Glass Fiber Reinforced Polymer (GFRP) Bars.

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ABSTRACT: The objective of the present work is to evaluate mechanical tests (tensile, compression and Flexural) of pultruded bars which are made up of E-glass reinforced with Epoxy resin in short-term aged test conditions. Experiment on 151 FRP pultruded bar samples with varying diameters (12, 16 & 20 mm) being carried out at two phases. In the first phase FRP pultruded bars were exposed to different diffusion aging conditions to determine their structural credibility. The second phase involved in conduction of mechanical tests (tensile, compression & flexural) using Universal Testing Machine. The tensile test on bare and aged samples shows reduced physical strength. Maximum tensile strengths of unaged FRP bars of 12mm diameter found to be 463.6 MPa, as that of 60 days aged specimen found to be 412.6 MPa. The compression tests were conducted and a maximum compressive strength of bare specimens was found to be 408 MPa, as the specimens subjected to aging for 60 days in salt water, the strength of the specimen found to be decreasing by 19.64%. The reduced tendency of strength found in flexural mode, and found that 8.3% of decreased flexural strength. All the mechanical test results show the reduced physical strength when compared between aged and unaged specimens.

Keywords : GFRP bars, epoxy resin, Rebars.

1 INTRODUCTION

Historically, steel reinforcing bars (rebars, from here onwards referred to as bars) have been effectively used as concrete reinforcement. Steel bars perform well under chloride-free environment. When reinforcing bars undergo oxidation due to chloride attack, oxidation products of steel with considerably larger volume are produced. This oxidation product volume increase in turn generates additional radial tensile stresses around the bar, in matrix. With the advent of fiber reinforced polymers (FRP) consisting of high-strength fibers in a polymer matrix, an alternative has been found for reinforcing concrete structures to address corrosion problems. The fibers in FRP composites are the main load-carrying elements. The polymer matrix (cured resin) protects the fibers from damage, ensures good alignment of fibers, and allows load distribution among individual fibers. Fibers are selected based on the strength, stiffness, and durability requirement for specific applications. Resins are selected based on the function and manufacture of the FRP bar. Fiber types that are typically used in the construction industry are carbon and glass, with thermoset epoxy, vinyl ester, polyester, and urethane resins, even though aramid has been used occasionally.

Advantages of FRP bars:

Non-corrosiveness, high strength to weight ratio, non-conductivity, good thermal insulation, magnetic transparency, good impact resistance, and light weight. FRP bars are made up of continuous glass fibers, which are bound together with a resin and are manufactured using pultrusion process. GFRP bars have high strength to weight ratio and are good corrosion resistant. So it is necessary to know the rate of degradation of FRP bars and the mechanism driving the degradation. So to predict the strength retention properties of these bars under working conditions, the bars are subjected to aggressive accelerated (short term) ageing conditions for shorter time periods. This study deals with the strength degradation of FRP bars when exposed to salt solution and high temperature and also the moisture absorption property of the bars.

2 LITERATURE REVIEW

A major hindrance in using FRP reinforcing bars in engineering applications is the susceptibility of their behavior to weathering conditions. The research done has shown that FRP is prone to degradation when exposed to different environmental conditions. The scope of this literature review encompasses a brief overview of fibers and matrices used in FRP reinforcing bars and the various environmental conditions that causes the degradation.

2.1 Environmental Factors Affecting FRP Products

The environmental factors which causes the degradation of GFRP reinforcing bars and sheets are, temperature, moisture, alkalinity, freeze-thaw, ultraviolet rays and others. Considering the environmental effect on the degradation of FRP, ACI 440 has recommended environmental reduction factors for different fibers depending on their exposure condition. The environmental factors for FRP are 0.7-0.8 as per their exposure conditions. Hartman et al. (1994) observed that E-Glass fibers lose more strength than S-2 Glass fibers when exposed at 96°C to acidic environment (H₂SO₄ and HCl), alkali environment (Na₂SO₄) and water for a period of 24hrs and 168 hrs [1]. According to Fuji et al. (1993) there was a reduction of tensile strength to about 28% when E-Glass fibers were exposed to 5% HNO₃ after 100 hrs [2]. Chin et al. (1997) observed that when vinyl ester and polyester were exposed to water, salt water and cement pore water at temperatures 23°C, 60°C and 90°C there was not much change in the glass transition temperature (T_g) but there was considerable change in their tensile strengths. The change in tensile strength of polyester resin was so much that they could not be tested after 10 weeks at 90°C as they were degraded [3]. Bakis et al. (1998) studied E-Glass fiber reinforced plastic composite reinforcement rods made with different proportions of resins-100% vinyl ester, 50% vinyl ester and 50% iso-polyester, 20% vinyl ester and 80% iso-polyester following accelerated ageing. They observed that rods made up of 100% vinyl ester had the smallest reduction in modulus of elasticity and the least degradation in tensile strength as compared to the rods made with the other proportions[4].



International Journal of Emerging Technology and Advanced Engineering

Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 6, Issue 9, September 2016)

The Mechanical Properties of Concrete Incorporating Quarry Dust and Foundry Sand as Partial and Complete Replacement of Fine Aggregate

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Abstract— Concrete is the world's most consumable product next to water. Concrete is the most used construction material in the civil engineering. The quarry dust and foundry sand has been used as a partial replacement of the fine aggregate in the concrete. The quarry dust is obtained as a waste product in the quarry mines as a residue. The foundry sand is obtained as a waste from the metal foundries. By utilizing these two products as a partial replacement of fine aggregate in concrete. The concrete can be made more eco-friendly by reducing the use of natural sand. In the present work, fresh properties and

Unlimited quarrying of sand are now available which are used as fine aggregate in the preparation of cement mortar resulted in lowering of water table, soil erosion etc. Cost of construction can be effectively reduced if quarry dust is available near the site. The Quarry dust may be used in the place of river sand fully or partly. Foundry sand is high quality silica sand with uniform physical characteristics. It is a by-product of ferrous and non-ferrous metal casting industries, where sand has been used for centuries as a material because of its thermal

An Experimental Investigation on Partial Replacement of Cement by Glass Powder in Concrete

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Abstract - Non-degradable wastes has been a major issue now in the 21st century as more and more of these wastes are piling up in our world today and being disposed of in landfill areas without being recycled. These wastes take up a very long period of time to decompose. Because of this problem, researches have been done to fully utilize these wastes as the final products for construction materials such as concrete. Increasing emphasis on the use of sustainable materials in construction has led to the use of variety of cement replacement materials in concrete. One such material, with an underutilized potential is glass powder, given the vast amounts of glass that is present in the solid waste stream of any major city. This paper summarizes information on the mechanical & durability properties of cementitious systems containing a fine glass powder. It is shown on this paper that concrete mixtures could be proportioned to achieve stiffer or higher compressive strengths. A better understanding of the performance of a non-standard cement replacement material such as glass powder could lead to increased usage of this material, consequently contributing to sustainability.

Key Words: Glass powder, Fine aggregate, Coarse aggregate, Compressive strength, Split tensile strength, Flexural strength.

1. INTRODUCTION

The waste glass generated in the US in 2008 was about 12.2 million tons, 77% of which was disposed of in landfills. The bulk of waste glass can be collected in mixed colours, and has limited markets. It is realized that mixed-colour waste glass gives desired chemical composition and reactivity for use as a supplementary cementitious material (SCM) for enhancing the chemical stability, pore system characteristics (pore refinement, discontinuity, and pore filling), moisture resistance and durability of concrete. To achieve these benefits, waste glass needs to be milled to micro scale particle size for accelerating its beneficial chemical reactions in concrete. These beneficial effects of milled waste glass can enhance the residual cement (which forms the interface in new concrete) occurring on the surface of recycled aggregates and are thus expected to improve the performance characteristics of recycled aggregate concrete. Earlier researchers have investigated the use of glass in normal concrete. They observed that the long term

compressive strength of concrete containing glass was higher than that of control mix. A glass is defined as an inorganic product of fusion which has been cooled to a rigid condition without crystallization. The glass being mainly a silica-based material in amorphous form can be used in cement-based applications. The main concerns for the use of crushed glasses as aggregates for Portland cement concrete are the expansion and cracking caused by the glass aggregates due to alkali silica reaction. Due its silica content, ground glass is considered pozzolanic materials and as such can exhibit properties similar to other pozzolanic materials such as fly ash, metakaolin, slag and wheat husk ash. This paper reports the preliminary results of an experimental investigation on the use of glass powder to partially replace cement in concrete applications.

Although there is strength reaction in the presence of glass powder, however, glass powder can be used to replace 30% of the cement in a concrete mix with satisfactory strength development due to its pozzolanic reaction. Authors found that using glass in mortar applications caused more expansion compared with mortars without glass particles. This expansion can in some cases cause deterioration to the material.

Efforts have been made in the concrete industry to use waste glass as partial replacement of coarse or fine aggregates. However, due to the strong reaction between the alkali in cement and the reactive silica in glass, studies of the use of glass in concrete as part of the coarse aggregate were not always satisfactory due of the marked strength reduction and simultaneous excessive expansion.

It was found that if the glass was ground to a particle size of 300 μ or smaller, the alkali-silica reaction (ASR) induced expansion could be reduced. In fact, data reported in the literature show that if the waste glass is finely ground, under 150 μ , this effect does not occur and mortar durability is guaranteed. It also well know that typical pozzolanic materials might features high silica content, an amorphous structure and have a large surface area.

One of the possible channels for the recycling of mixed glass is cement-based materials, but most of existing studies recommend its use only as fine powders. Fine particles of glass usually present pozzolanic activity beneficial to the concrete, while coarse particles are usually deleterious to

Finite Element Analysis of Funicular Shells with Rectangular plan ratio 1:0.7 under Uniformly Distributed Load using SAP2000

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Abstract: A thin shell is a "Three-dimensional spatial structure made up of one or more curved surfaces whose thickness is small compared to their other dimensions". Shells belong to the class of stressed skin structures which, because of their geometry and small flexural rigidity of the skin, tend to carry loads primarily by direct stresses acting in their plane. The shells are subjected to pure membrane state of stress, under appropriate loading and boundary condition the resulting bending and twisting moments are either zero or small which may be neglected. In this study doubly curved thin shells are analyzed using Finite Element software SAP 2000 with new version. Doubly curved shells which are in rectangular plan having 1mX0.7m are considered. The behavior of shells under uniformly distributed load varying from 1to5KN/m² is studied and compared with the slabs of same dimension and thickness. In this case study deflection curves, membrane stress and stress contour diagram are obtained. It is observed that with the increase in rise and thickness of funicular shell the deflection are reduced. The membrane stresses decreases with the increase in rise and thickness of concrete funicular shell.

Keywords – Edge beam, Funicular shell, Rise, Thickness, Stress contour.

Experimental Study on the M20 Grade Cement Concrete Containing Crimped Steel Fibres

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Abstract

Plain Portland cement concrete is a brittle material. The strength of concrete in tension is much lower than in compression. A growing tensile crack in plain concrete can very soon lead to failure. In the presence of reinforcement, the tensile load is transferred to the steel. An alternative to increasing the load carrying capacity of concrete in tension is the addition of fibers. Well dispersed fibers in concrete act to bridge the cracks that develop in concrete. The incorporation of fibers in a cement matrix leads to an increase in the toughness and tensile strength, and an improvement in the cracking and deformation characteristics of the resultant concrete. An attempt has been made to investigate the influence of crimped steel fibers of aspect ratio 60 on the compressive and split tensile strength for M20 grade of concrete. Few Regression Models were deduced to estimate the strengths for CSFRC with respect to curing period and percentage of fiber. Conclusions are made by comparing the experimental and analytical results.

Keywords: Aspect Ratio, Compressive Strength, Regression Models, Steel Fibres, Split Tensile Strength

I. INTRODUCTION

Plain concrete possesses a very low tensile strength, limited ductility and little resistance to cracking internal micro cracks are inherently present in the concrete & its poor tensile strength is due to the propagation of such micro cracks, eventually leading to brittle fracture of the concrete. In the past, attempts have been made to impart improvement in tensile properties of concrete members by way of using conventional reinforced steel bars & also by applying restraining techniques. Although both of these methods provide tensile strength to the concrete members, they however, do not increase the inherent tensile strength of concrete itself. In plain concrete & similar brittle materials, structural cracks (micro-cracks) develop even before loading, particularly due to drying shrinkage or other causes of volume change. The width of these initial cracks seldom exceeds a few microns, but their other two dimensions may be of higher magnitude. It has been recognized that the addition of small, closely spaced uniformly dispersed fibers to concrete would act as crack arrester & would substantially improve its static & dynamic properties. This type of concrete is fibre reinforced concrete. Fibre reinforced concrete can be defined as a composite material consisting mixture of cement, mortar, or concrete & discontinuous, discrete, uniformly dispersed suitable fibres.

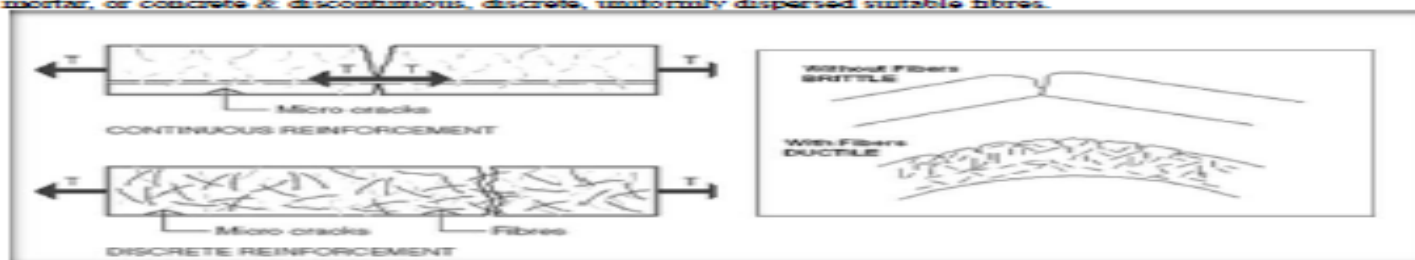


Fig. 1: Difference between conventional concrete and FRC

An Experimental Study on Silica Fume Concrete with Addition of Glass Fiber

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Abstract: - The experiment work carried out by silica fume as a supplementary material for cement and evaluates cement for M20 grade of concrete. We are adding 0%, 5%, 10%, and 15% by weight of cement in concrete and also added glass fiber. The aim of investigation is study the possibilities to use glass fiber in addition to other constituents of concrete and strength properties. The influence of 0%, 0.5%, 1%, and 1.5% fiber content by mass of cement and aspect ratio 857, fiber cut length 12mm is investigated to evaluate the effect of glass fibers improving the properties of concrete. At 1% addition of glass fiber, 10% silica fume with water cement ratio 0.50 the compressive strength test and split tensile strength gives best result in concrete. To validate the experimental results finite element analysis is carried out by using ANSYS 11 software.

Keywords: - Glass Fiber (GF), Silica fume (SF), Aspect Ratio, Compressive Strength (CS), Split Tensile Strength (SPT), ANSYS.

I. INTRODUCTION

In the world, concrete is most widely used construction material they are made in any form and shape. The strength and durability of concrete can be changed by making appropriate changes in its ingredient like cementation material, aggregate and water and by adding some special ingredient like silica fume and Glass fiber. They are produced better strength in concrete. The presence of micro cracks in the mortar aggregate produce weakness in concrete they can be removed by inclusion of silica fume with Glass fiber. They are composite material can be introduced into it resist crack growth. The Glass fiber are resist the axial compressive force in the cube form so they produce better compressive strength in concrete Silica fume is known to produce a high strength concrete and is used in two different ways as a cement replacement, in order to reduce the cement content (usually for economic reasons) and as an additive to improve concrete properties (in both fresh and hardened states).in general, the character and performance of fiber concrete changes with varying

II. OBJECTIVES OF THE STUDY

The following are the main objectives of the study

- 1) To determine the fresh properties of concrete by slump test and compaction factor test.
- 2) To evaluate the compressive strength of control concrete of grade M20 and silica fume concrete produced by replacing cement in 0%, 5%, 10% and 15% with addition of glass fiber in 0%, 0.5%, 1% and 1.5% by weight of cement.
- 3) To evaluate the split tensile strength of control concrete of grade M20 and silica fume concrete produced by replacing cement in 0%,5%,10% and 15% with addition of glass fiber in 0%,0.5%,1% and 1.5% by weight of cement.
- 4) To carry out ANSYS analysis and comparing it with experimental results.

III. STATE OF ART

3.1 An experimental investigation on glass fiber reinforced high performance concrete with silica fume as admixture. By Vaishali ghorpade

High performance concrete (HPC) has been used in various structures all over the world since last two decades. Recently a few infrastructure projects have also seen specific application of high-performance concrete. The development of high performance concrete (HPC) has brought about the essential need for additives both chemical and mineral to improve the performance of concrete. Most of the developments across the work have been supported by continuous improvement of these admixtures. Hence variety of admixtures such as fly ash, rice husk ash, stone dust have been used so far. Also different varieties of fibers have below tried as additions. Hence, an attempt has been made in the present investigation to study the behavior of Glass fibers in High Performance Concrete. To attain the setout objectives of the present investigation, an aggregate binder ratio of 2.0 has been chosen and cement has been replaced partially with Silica fume in four different percentages viz. 0, 10, 20, and 30%. Glass fiber in 0, 0.5, 1% and 1.5% by



The Mechanical Properties of Concrete Incorporating Silica Fume as Partial Replacement of Cement

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Abstract— Concrete is the most important engineering material and the addition of some other materials may change the properties of concrete. With increase in trend towards the wider use of concrete for prestressed concrete and high rise buildings there is a growing demand of concrete with higher compressive strength. Mineral additions which are also known as mineral admixtures have been used with cements for many years. Silica fume particles are 100 times smaller than the average cement particle. Its handling and disposal is a point of concern because of the environmental concerns. Silica fume is usually categorized as a supplementary cementitious material. These materials exhibit pozzolanic properties, cementitious properties and a combination of both properties. Due to these properties, it can affect the concrete behavior in many ways. In the present work, an attempt has been made to use silica fume as a supplementary material for cement and to evaluate the limit of replacement of cement for M20 grade concrete. The main aim of this work is to study the mechanical properties of M20 grade control concrete and silica fume concrete with different percentages (5, 10, 15 and 20%) of silica fume as a partial replacement of cement.

Keywords— Silica Fume, Pozzolanic, Mix-Design, Compressive strength, Split Tensile Strength.

I. INTRODUCTION

Concrete is one of the most common material used in the construction industry. In the past few years, many research and modifications has been done to produce concrete which has the desired characteristics. There is always a search for concrete with higher strength and durability. Particularly mineral admixtures are indispensable in production of high strength concrete for practical application. The use of mineral admixtures as a pozzolana has increased worldwide attention over the recent years because when properly used it as certain percent, it can enhance various properties of concrete both in the fresh as well as in hardened states like cohesiveness, strength, permeability and durability. The best mineral admixtures in optimum proportions mixed with OPC improves many qualities of concrete such as lowers the heat of hydration, increases the watertightness, reduces alkali-aggregate reaction, improves workability and resistance to attack by sulphate soils, sea water.

Silica fume, also referred to as micro silica or condensed silica fume, is used as an artificial pozzolanic admixture. It is the product resulting from reduction of high purity quartz with coal in an electric arc furnace in the manufacture of silicon or ferrosilicon alloy. Silica fume rises as an oxidized vapour. It cools, condenses and is collected in cloth bags. It is further processed to remove impurities and to control particle size. Condensed silica fume is essentially silicon dioxide (more than 90%) in amorphous form. Since it is airborne material like fly ash, it has spherical shape. It is extremely fine with particle size less than 1 micron and with an average diameter of about 0.1 micron, about 100 times smaller than average cement particles. Silica fume has specific surface area of about 20000m²/kg, as against 250 to 300m²/kg.

II. OBJECTIVES OF THE STUDY

The following are the main objective of the study

- To evaluate the compressive strength of control concrete of grade M20 and silica fume concrete produced by replacing cement in different percentage.
- To evaluate the split tensile strength of control concrete of grade M20 and silica fume concrete produced by replacing cement in different percentage.

III. LITERATURE REVIEW

Many researchers have been studied the effect of replacement of cement by silica fume on strength and durability aspects of concrete.

K.C.Birral and Suresh Chandra Sadangi their journal entitled "Effect of superplasticizer and silica fume on properties of concrete" (March 2011). Nowadays high strength and high performance concrete are widely used in many civil engineering constructions. To produce them it is required to reduce the water/powder ratio and increase the binder content. Superplasticizers are commonly used to achieve the workability. Silica fume is one of the popular pozzolanas used in concrete to get improved properties.

Exeperimental Study on Effects of Aspect Ratio of Glass Fibers in Concrete

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Abstract— Concrete is the world's most consumable product next to water. Concrete is the most used construction material in the civil engineering. Fiber reinforced concrete (FRC) is the concrete containing fibrous material which increases its structural integrity. Glass-fiber reinforced concrete (GFRC) is a material made of a cementitious matrix composed of cement, sand, water in which various lengths of glass fibers are dispersed. It has been widely used in the construction industry for non-structural elements, like façade panels, piping and channels. In the present work, fresh properties and hardened properties of glass fiber reinforced concrete are compared. To evaluate the fresh properties, slump cone and compaction factor tests are conducted. To evaluate the hardened properties, compression and split tensile tests are conducted for 7 days and 28 days of curing. M20 grade concrete is designed using IS 10262:2009 provision.

Keywords— Aspect ratio; Compressive strength; Split tensile strength; Slump test; Compaction factor test

I. INTRODUCTION

"Concrete is a composite material composed of coarse aggregate bonded together with fluid cement which hardens over time". Fiber reinforced concrete it contains short discrete fibers that are uniformly distributed and randomly oriented. Fibers include steel fibers, glass fibers, synthetic fibers and natural fibers each of which lend varying properties to the concrete. In addition, the character of fiber reinforced concrete changes with varying concretes, fiber materials, geometries, distribution, orientation and densities. Glass fiber is a material consisting of numerous extremely fine fibers of glass. Glass fibers can also occur naturally, as Pale's hair. Glass fiber has roughly comparable mechanical properties to other fibers such as polymers and carbon fiber. Although not as strong OR as rigid as carbon fiber, it is much cheaper and significantly less brittle when used in composites. Glass fibers are therefore used as a reinforcing agent for many polymer products; also popularly known as "fiber glass".

1.1. Advantages And Disadvantages Of Glass Fibre

The following are the advantages of Glass Fibers:

1. Glass fiber is high temperature resistance.

2. Nonflammable.
3. Corrosion-resistance.
4. Heat-insulation.
5. Good- sound-insulation (especially glass wool).
6. High tensile strength.
7. Good insulation

Following are the disadvantages of Glass Fibers:

- 1) Glass Fibers are Brittle in nature.
- 2) It having weak abrasive-resistance.

1.2. Roles Of Fibers In Concrete

The major roles of fiber in concrete are

1. Controls cracking:

The synthetic fibers prevent the micro shrinkage cracks developed during hydration, making the structure/plaster/components inherently stronger. When the loads imposed of concrete approach that of failure cracks will propagate, sometimes rapidly. Addition of synthetic fibers to the concrete and plaster arrests cracking caused by volume change (expansion and contraction), simply by adding of fibers which supports mortar/ concrete in all directions.

2. Increase in strength:

By adding of synthetic fibers to the conventional concrete the compressive strength, split tensile strength and flexural strength will increases. Due to the reduction in crack formation and reduction in water permeability.

3. Reduction in water permeability:

A structure free from micro cracks prevents migration of water or moisture throughout the concrete. This in turn helps prevent the corrosion of steel used for primary reinforcement of the structure. This results in longevity of the structure.

4. Reduction in rebound loss:

Synthetic fibers reduce rebound "splattering" of concrete and shotcrete. This reduces wastage of mortar and speeds up the pace of work. More importantly it saves a great deal of labor employed for the job.



OPEN ACCESS INTERNATIONAL JOURNAL OF SCIENCE & ENGINEERING

QUANTIFICATION OF SOLID WASTE AND MANAGEMENT OF DAVANAGERE CITY

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Abstract: Solid wastes are posing serious problems as the available technologies are not adequate for their safe disposal. The amounts of solid wastes generated each day per capita are increasing as a result of social, economical and technological changes. The great increase in production of wastes is not only posing problems in storage, collection and transport but also in treatment and ultimate disposal of Solid waste management is a serious problem faced by most of the countries of the globe and there is an urgent need to solve this burning issue. Municipal Solid waste management comprises of scientific collection, storage, transportation, treatment and disposal of waste without causing any harm to the humans and environment. In this study the current scenarios of Municipal solid waste management of Davanagere city is studied which has the population of about 4,27,128. Out of 37 Wards of the Davanagere City based on the priority and as per standard of living 3 wards are selected for this study. Door to door survey is done in all the 3 wards to collect the data of quantity of waste generated along with the population. Using a questionnaire, the ward wise data and current solid waste management procedures are collected from Davanagere city Municipal Corporation. The quantity of waste generated for all the wards is calculated by establishing relationship between population and quantity of waste generated. The study reveals that approximately 150 Tons/day of solid waste is generating in Davanagere city. Analysis is made by

Purification of Water Using Low Cost Adsorbents-Fly Ash and Activated Carbon

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Abstract- As we know that, surface water and ground water are polluted because of anthropogenic activity. Adequate Supply of fresh and clean drinking water is essential for all human beings on the earth, yet it has been observed that millions of people worldwide are still drinking water that is contaminated by bacteria, toxic chemicals and other pollutants. Hence there is a need for purification of water. In the present study a low cost water filter is designed for 7 litre capacity. The filter media consists of layers pebbles, sand, corncob, and adsorbents (Fly ash, activated carbon,) 4cm each. The objective of this project is to remove the fluoride from water by using adsorption technique. The water is also tested for various parameters like acidity, alkalinity, turbidity, total dissolved solids, Hardness and pH. From this study it can be concluded that the fly ash is an effective adsorbent. Since it maintains pH, Acidity, Alkalinity, and removes Turbidity, Fluoride Effectively with removal efficiencies of 4.95%, 42.85%, 21.22%, 97.24%, 20.78% respectively.

Basic domestic water quantity needs can be divided into categories including water for drinking, cooking, hygiene, and other domestic purposes, including productive uses. Drinking water comes from surface and ground waters. Large-scale water supply systems rely on surface water resources, and smaller water systems use ground water. Drinking water needs can vary according to the water content of food consumed, manual labour performed and climatic conditions. In addition, men, children and women have varying needs. The ground water supplies have become highly contaminated by the addition of undesirable substances that have rendered it unfit and toxic for various purposes, especially for drinking. The quality of groundwater is generally slower to change, especially when it comes from deeper aquifers. The groundwater is not directly exposed to wastewater discharge, air pollution, or contamination from run-off (if the well is properly constructed). Natural filtration can remove some contaminants as the water percolates through the soils and rock thus protecting the quality of ground water.

Keywords: Adsorbent, filter, fluoride, sand, pebbles, Fly ash,

Comparative Analysis of Locally Available Adsorbents for Purification of Water

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Abstract-It is well known fact that clean water is absolutely essential for healthy living. Adequate Supply of fresh and clean drinking water is essential for all human beings on the earth, yet it has been observed that millions of people worldwide are still drinking water that is contaminated by bacteria, toxic chemicals and other pollutants. Hence there is a need for purification of water. In the present study a low cost water filter is designed for 7 litre capacity. The filter media consists of layers pebbles, sand, corncob, and adsorbents (sugarcane bagasse, rice husk, fly ash, activated carbon, and blended activated carbon & fly ash) 4cm each. The main focus in this project is the removal of fluoride from water by using adsorption technique. The water is also tested for various parameters like acidity, alkalinity, turbidity, total dissolved solids, Hardness and pH. From this study it can be concluded that Sugarcane Bagasse is an effective adsorbent. The removal efficiencies of Sugarcane Bagasse for Acidity, Alkalinity, Turbidity, and Fluoride are 40%, 2.5%, 94.84%, and 31.42% respectively. Rice Husk has removed hardness upto 18.18%

Keywords-Adsorbent, filter, fluoride, rural areas, treated water.

Water pollution occurs when undesirable effluents disperse in a water system and so water quality change. Water pollution has many sources like thermal and acid effluents from volcanic areas and are not common on the earth, domestic sources that are primarily sewage and laundry wastes and waste generated in houses, apartments, and other dwellings. In rural and some suburban areas, domestic wastes are handled at the individual residence and enter the environment through the soil either in partially treated or untreated fashion. In urban areas, domestic wastes are collected in sewage pipes and transmitted to control location either for treatment or discharge into a watercourse without treatment. Industrial wastes vary from industry to industry and from location to location. Some industries generate wastes high in organic matter, and these wastes can usually handled by methods similar to those used for domestic wastes, such industries include dairy and food-processing plants, meat-packing houses. Other industries, however, generate wastes that are low in organic matter but high in toxic chemicals such as metals, acids or alkalis. These include chemical plants, mining facilities, and textile mills. All these above sources contribute to water pollution to the greater extent.

Academic Year: 2017-18					Total Publications=11		
Sl. No	Name of the Faculty	Title of the Paper	Published Date	Publication	National	Scopus Indexed	Citation
					International		
01	Puttaraj M H	Potential Usage of Construction and Demolition waste in the Manufacture of Concrete Blocks	Sept-2017	International Research Journal of Engineering and Technology	International	--	--
02	Puttaraj M H	Potential Usage of Solid Waste Composites in the Manufacturing of Eco friendly Cement Bricks	May - 2018	International Journal for Science and Advance Research in Technology	International	--	--
03	Puttaraj M H	Strength Characteristics of Eco-friendly Cement Bricks Using Solid Waste Composites	May - 2018	International Journal for Science and Advance Research in Technology	International	--	--
04	Mohammed Yaseen	Strength Characteristics Of Eco-friendly Cement Bricks Using Solid Waste Composites	May - 2018	International Journal for Science and Advance Research in	International	--	--

				Technology			
05	Mohammed Yaseen	Potential Usage of Solid Waste Composites in the Manufacturing of Eco friendly Cement Bricks	May 2018	International Journal for Science and Advance Research in Technology	International	--	--
06	Dr.Arunkumar S L	Land capability of Dandavathi River Basin, Soraba Taluk, Shimoga District using Remotesensing and GIS Technique	July 2018	International Journal for Science and Advance Research in Technology	International	--	--
07	B K Varun	Effect of addition of fly ash and GGBS on cement concrete in fresh and hardened state	February 2018	International Journal of Advance Engineering and Research Development	International	--	--
08	Harish B A	Effect of addition of fly ash and GGBS on cement concrete in fresh and hardened state	February 2018	International Journal of Advance Engineering and Research Development	International	--	--
09	Hanumesh B M	The Mechanical Properties of Steel Fibre Reinforced Concrete with Quarry Dust as a Partial Replacement of Fine Aggregate	May 2018	IJRASET	International	--	--
10	Dr.Mohammed Yaseen	Strength Characteristics of Eco friendly Cement Bricks Using Solid Waste Composites	May 2018	International Journal for Scientific	International	--	--

				Research & Development (IJSART)			
11	Kruthika D M	Strengthening of soft Sub grade Soil using Industrial waste Iron Powder and recycled plastic mesh	JULY 2018	IJRCT	International	--	--

Potential Usage of Construction & Demolition Waste in the Manufacture of Concrete Blocks

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Abstract - *The huge quantity of construction & demolition(C & D) waste is being deposited as a landfill even though it is having potential to reuse. In this work an attempt has made to utilize the C & D waste to form a useful product, i.e. Concrete block at commercial standards. Thus main intention of the work establishment of zero waste concepts in the construction industry was satisfied. The Concrete blocks were tested for its physio-mechanical properties and are successfully satisfy the Indian standard recommendations. The compressive strength is 11.12MPa, water absorption 9.3%, block density 1846Kg/m³ and satisfy durability tests, at 100% replacement. So it is suggested to use C & D waste as replacement of natural aggregates in the concrete blocks.*

Key Words: Construction and demolition waste, zero waste concept, Concrete block.

INTRODUCTION

Now days, concrete blocks are becoming very popular and are commonly used as a primary building material in the construction of masonry walls in all type of constructions such as residential, commercial and industrial buildings. A concrete block is one of the several precast concrete products which are used in construction. The term precast refers to the fact that the blocks are formed and hardened before they are brought to the construction site. The materials used for the manufacture of concrete blocks according to IS 2185:2005 are cement and combined aggregate i.e. Combination of coarse aggregate and fine aggregate, there is no any specific proportion requirements for coarse and fine aggregate. In none of the case the Cement and combined aggregate proportion should not be richer than 1:6.

When it comes to the history of the concrete blocks and concrete, the Romans were firstly used concrete mortar as early as 200 B.C. to bind the shaped stones together in the construction of structures or buildings. During the reign of the Roman Emperor Caligula, in 37-41 A.D., small rectangular shaped precast concrete blocks were used as construction material in the region

around Naples, Italy. Much of the concrete technology developed by the Romans was lost after fall of the Roman Empire in the fifth century. Harmont Palmer designed the first Concrete block in 1890 at United States, blocks were 20.3X 25.4X 76.2 cm, and are so heavy that they had to be lifted into place with small crane. Concrete blocks were firstly used in the United States as a substitute for the Stone or wood in building of homes. The houses built of concrete blocks were showed creative use of common inexpensive materials made to look like the more expensive and traditional wood-framed stone masonry building. This new type of construction became a popular form of house building technology in the early 1900's through the 1920. Later the precast methods, materials usage etc. had different faces of growth. Time saving in the construction of masonry structures, early work done, and flexibility in the manufacturing of the precast units are the reasons to become very popular for concrete blocks.

Urbanization growth rate is very high in India due to the rapid growth of industrialization. Also the growth rate of India is about to reach 9% of GDP this needs more improvements in the basic facilities. Rapid infrastructure development requires a huge quantity of construction materials, construction land requirements and the site. Now days for the construction, concrete is more preferred one as it has longer life, low maintenance cost and better performance. For achieving GDP rate, the basic amenities, facilities etc. are to be provided for industrialization for that infrastructures are in need to be developed, for doing so smaller structures are demolished and new towers are constructed. Even during the construction of new structures there is a production of waste from the cutting of bricks, stones, concrete blocks, plastering works, putty finishing, concreting, sanitary & water fittings and flooring etc.

Protection of environment is a basic thing which is directly related and connected with the survival of the human race. According to the Central Pollution Control Board (CPCB) Delhi, report in India, 48 million tons Solid waste is being produced out of which 14.5 million ton waste is produced from the construction industries, out of which only 3% waste is reused for Embankment. In the total construction and demolition waste, concrete is of

Potential Usage of Solid Waste Composites in the Manufacturing of Eco friendly Cement Bricks

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Abstract- The disposal of solid waste is a major problem faced by many countries of the globe and this problem continues to grow with the growth of population and development of industries. Disposal of waste in landfills, incineration and open dumping are the routine methods in majority of places which causes environmental impacts. In the present study an attempt is made to use the inert solid waste fractions i.e inorganic solid waste fractions like waste plastic, waste glass, bed ash is used in the preparation of moulded bricks, road kerbs, Manhole inspection chambers covers. In this study the cement, waste glass, waste plastic bed ash is used in various proportions of combined aggregate for the casting of Eco friendly Cement bricks. The brick with 1:6 proportions of the Binder to combined aggregate will result in the compressive strength of 5.45MPa and water absorption of 17.21% which satisfy the IS codal provisions for the bricks. Hence the attempt of using solid waste in the preparation of Eco friendly bricks is a sustainable method of brick manufacturing and can be adopted for practical purposes which will reduce the environmental impacts caused due to the disposal of inorganic solid waste fractions.

Keywords- Eco friendly brick, plastic waste recycling

I. INTRODUCTION

Solid waste is generated worldwide in large quantities. Rapid industrialization and population growth has led to exponential growth of solid waste generation. Solid waste disposal is a major challenge for most of the countries and especially the developing nations.

Presently in India, about 960 million tons of solid waste is being generated annually as by-products during industrial, mining, municipal, agricultural and other processes. Of this 350 million tons are organic wastes from agricultural sources; 290 million tons are inorganic waste of industrial and mining sectors and 4.5 million tons are hazardous in nature. Advances in solid waste management resulted in alternative construction materials as a substitute to

traditional materials like bricks, blocks, tiles, aggregates, ceramics, cement, lime, soil, timber and paint.

Solid waste is the unwanted or useless solid materials generated from human activities in residential, industrial or commercial areas. It may be categorized in these ways.

- Biodegradable waste
- Recyclable waste
- Inert waste
- Electrical and electronic waste
- Hazardous waste
- Biomedical waste

A. PLASTIC

Not all plastics are recyclable. There are 4 types of plastic which are commonly recycled

- Polyethylene (PE) - both high density and low-density polyethylene
- Polyvinyl chloride (PVC)
- Polystyrene (PS)
- Polypropylene (PP)

B. BRICKS

A brick is building material used to make walls, pavements and other elements in masonry construction. Traditionally, the term brick referred to a unit composed of clay, but it is now used to denote any rectangular units laid in mortar. A brick can be composed of clay-bearing soil, sand, and lime, or concrete materials.

Types: Common Burnt Clay Brick, Sand lime Bricks, Engineering bricks, Concrete fly ash brick.

C. NEED FOR THE STUDY

Mass production of plastics, which began just six decades ago, has accelerated so rapidly that it has created 8.3 billion metric tons, 6.3 billion metric tons has become plastic waste. Of that, only nine percent has been recycled. The vast

Strength Characteristics Of Ecofriendly Cement Bricks Using Solid Waste Composites

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Deciphering Groundwater Potential Zones in Dandavathi river Basin of Sorab Taluk, Shivamogga District Using Remote Sensing and GIS

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OAST cell, Mangalagangothri,
Mangalore University
Konaje, Mangalore.

Abstract - Water is a vital resource for sustenance of life and economic development of a region. Increase in population, trade and industry have resulted in increased demand for fresh water and more than 90% of the people depend on ground water resources. In hard rock terrain, occurrence of groundwater depends on various geo-environmental parameters such as lithology, lineament, slope, hydro geomorphology, land use and land cover, water level fluctuations, rainfall, soil and drainage density. Therefore, an attempt is made to identify the ground water potential zones in Dandavathi basin of Sorab taluk in Shimoga district, Karnataka by integrating various geo-environmental limitations using multi criteria evaluation technique on GIS platform. Based on the results, the groundwater potential zones in the basin have been grouped into (a) Very Good (7.18 %) (b) Good (13.33 %) (c) Moderate (25.97 %), (d) Poor (39.49%) and (e) 14.01 % is Very Poor zones.

I. INTRODUCTION

Ground water is a dynamic and replenishable natural resource. However, in hard rock terrain, availability of groundwater is of limited and its occurrence is confined to fractured and weathered zones (Saraf and Choudhury, 1998). It is a well-established fact that in any region geology, geomorphology, lineament, soil and the terrain parameters have a direct bearing on the occurrence and

(Krishnamurthy and Srinivas, 1995, Jothiprakash, V, et al 2003, Amareshsingh, et al, 2003, Sikdar, et al, 2004, Chakraborty et al. 2004, Deota et al, 2005 and Acharya.T, et al, 2005). In the present study, an attempt has been made to assess the groundwater potential zones of Dandavathi river Basin for future development by multi criteria techniques.

2. METHODOLOGY

The satellite data (IRS-1D, LISS-III geocoded FCC dated, 16th Nov 2000, 11th Dec 2000, 08th Jan 2001 and 24th Dec 2001) at 1:50,000 scale was visually interpreted to delineate various geomorphological units based on structural trends, lineaments, soil tones, vegetative cover and relief linearity, SOI topographic maps were used to prepare slope and stream order units. The water-level fluctuation in dug wells were monitored for pre- and post-monsoon seasons from a network of 15 wells uniformly spread over the area during 1985-2006, representative wells in various lithologies were selected. Isohyets were drawn using rainfall data of 25 years (1985-2006). Lithology units were delineated using Geological map of Karnataka prepared by Geological Survey of India at 1:250,000 scales. A combined map of the features (geomorphology, soil, slope, water levels fluctuation, streams, rainfall, lithology, land use and land cover, rainfall and drainage density) was prepared to correlate them with



Scientific Journal of Impact Factor (SJIF): 5.71

e-ISSN (O): 2348-4470

p-ISSN (P): 2348-6406

International Journal of Advance Engineering and Research Development

Volume 5, Issue 02, February -2018

EFFECT OF ADDITION OF FLYASH AND GGBS ON CEMENT CONCRETE IN FRESH AND HARDENED STATE

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Abstract: - Concrete is the most used construction material in the civil engineering. Concrete is the world's most consumable product next to water. The fly ash and GGBS has been used as partial replacement of cement in the concrete. The fly ash is obtained as combustion of pulverized coal and collected by mechanical dust collector or electro static precipitator. The GGBS is a by – product of iron and steel making industry, obtained by quenching of molten iron slag from a blast furnace in water or steam to produce a glassy granular product that is then dried and ground into a fine powder. By utilizing these two products as a partial replacement of cement in concrete, the concrete can be made more eco-friendly by reducing the use of cement. In the present work, an attempt has been made to use a fly ash and GGBS as a partial replacement of cement. The main aim of this work is to study the fresh and hardened properties of M-30 grade control concrete and concrete made with partial replacement of fly ash and GGBS with various percentages. To study the fresh properties slump tests, compaction factor tests and Vee-bee consistometer tests are conducted. To study hardened properties compressive and splitting tensile strength tests are conducted and comparison study will be done.



The Mechanical Properties of Steel Fibre Reinforced Concrete with Quarry Dust as a Partial Replacement of Fine Aggregate

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Abstract: This present work is an attempt to use Quarry Dust as partial replacement for Sand in concrete along with the steel fibres. Attempts have been made to study the properties of concrete and to investigate some properties of Quarry Dust reinforced concrete with steel fibres; this article presents the compressive and split tensile strengths of Crimped steel fibre reinforced concrete with Quarry dust. In the experimental work natural Sand was replaced by Quarry dust in the proportion of 50% and 100%. The Crimped steel fibres (CSF) were used in the concrete by 1 and 1.5% volume fraction. After conduction of experiments on the cube and cylinder specimens, the results showed that, the incorporation of Crimped steel fibre reinforced concrete with 50% Quarry dust for M20 grade of concrete increases the mechanical properties of concrete.

Keywords: Crimped steel fibre, quarry dust, compressive strength, split tensile strength, slump and compaction factor test.

I. INTRODUCTION

Concrete is the most widely used man-made construction material in the world. In the last fifty years, there has been significant progress in concrete technology, the concrete without any fibre will develop the cracks due to plastic shrinkage, drying shrinkage and other reasons of changes in volume of concrete, the development of these micro-cracks causes elastic deformation of concrete. Plain concrete is a brittle material and having the values of modulus of rupture and strain capacity is low. The addition of fibres in the plain concrete will control the cracking due to shrinkage and also reduce the bleeding of water. Fibres help to improve the post peak ductility performance, pre crack tensile strength, fatigue strength, impact strength and eliminate temperature. Now a day's river erosion and other environmental issues have led to the scarcity of river sand. So that excess river erosion is prevented and high strength concrete is obtained at lower cost. One such material is Quarry stone dust, Quarry dust is a sand replacing material by-product obtained during quarrying process. In concrete production quarry dust could be used as a partial or full replacement of natural sand. Besides, the utilization of quarry waste, which itself is a waste material, will reduce the cost of concrete production.

II. LITERATURE REVIEW

A. Several Experimental work has to be Conducted on Steel Fibre reinforced concrete some of them are Given below

- 1) Hammesh B.M et. al. (2016).: in his experimental shows that the compressive and split tensile strength of concrete increases and workability decreases with increase in the percentage of steel fibres
- 2) Nitin Kumar et al. (2015).: In his study the addition of 1% 2% and 3% crimped steel fibres to the concrete with w/c ratio 0.35 and M40 grade of concrete shows increase strength toughness ductility and flexural strength of concrete
- 3) Elson John et. al. (2014).: in his experimental study the addition of 0.5% and 1.0% crimped steel fibres to the concrete shows more compressive and split tensile strength than plain concrete
- 4) Vikrant Patvagade et. al. (2012). : "experimental investigation on mechanical properties of steel fibre reinforced concrete" with addition of 0% and 0.5% steel fibres it observed that for addition of 0.5% fibres shows slightly more compressive and tensile strength than normal concrete

Several experimental work has to be conducted on replacement of natural sand with quarry dust some of them given below

- 5) P. Jagadeesh et. al. (2016). : in his study he was partial replace the quarry dust with 20%,30%,40% and 50%, finally he was concluded that 50% replacement of sand with quarry dust shows an improvement in the compressive strength of the concrete.

Strength Characteristics Of Ecofriendly Cement Bricks Using Solid Waste Composites

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Strengthening Of Soft Subgrade Soil Using Industrial Waste Iron Powder And Recycled Plastic Mesh

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Abstract—Construction of pavement on expansive or soft subgrade soil demands great deal of attention. It is more important to concentrate on strength of subgrade soil during the surface course. However, the strength, thickness and depth etc of pavement are directly depends upon the subgrade strength. There are many alternative methods available to solve the problem the strength of subgrade soil. This paper is an attempt to study of improving soil properties. Subgrade strengthening using organic geotextiles and geogrids as soil reinforcement are used widely used recently. Now a day use of industrial waste as substitute for soil reinforcement has become widely method in order to reduce the environmental hazard.

In the present study an attempt was made to strengthen the soft subgrade soil using industrial waste iron powder (IP) as an substitute and recycled plastic mesh as soil reinforcement. Black cotton soil was collected from Kharsangh Hole, Bidar District. Three test was conducted with different percentages of iron powder i.e. 4, 8, 16, 24, and 32% and for all these percentages CBR test were performed both at saturated and laboratory CBR test were conducted for standard and soaked condition. From the test we get 4% as the optimum percentage of iron powder. Similar to geogrid, three type of recycled plastic mesh having different colour and aperture size i.e. black grid mesh (BGM), light green mesh (LGM), dark green mesh (DGM) were used as soil reinforcement, but specimen reinforced by 2 layer of each type of plastic mesh were prepared and for all these specimens laboratory CBR test were performed in both soaked and standard condition. Further work is carried out to know the combined effect of iron powder and plastic mesh on soft subgrade soil. Finally in order to know the interaction of black cotton soil-iron powder-plastic mesh, all specimens were prepared by combining optimum percentage of iron powder i.e. 4%, and plastic mesh with highest CBR value i.e. BGM mesh. The combined specimens are as follows: BGM soil-4% IP- single layer of BGM mesh positioned at the center, BGM soil-8% IP- single layer of BGM mesh positioned at the center, BGM soil-16% IP- single layer of BGM mesh positioned at the center, BGM soil-24% IP- single layer of BGM mesh positioned at the center and BGM soil-32% IP- single layer of BGM mesh positioned at the center. The combined CBR value show considerable increase in strength than soaked CBR value.

Keywords— Iron Powder, recycled plastic mesh, BGM, DGM, LGM

1. INTRODUCTION

Strengthening of soft subgrade soil using traditional materials like Cement, Lime and Bitumen has become common method. But in order to minimize the environmental hazard which has taken place due to rapid urbanization and industrialization, it is more important to concentrate on proper utilization of industrial waste materials. Soil reinforcement using industrial waste materials has become widely from the point of view of environment and economy.

Iron is the 5th most common element in the earth's crust and it makes up about 5.2% of the earth crust by weight. The per capita consumption of iron is taken as an important indicator of the level of economic development and also living standards of the people in that country. Iron is an important metal which is widely being used in every field. As a result a large quantity of iron powder or iron sludge generated from different fields.

We all know that due to urbanization and industrialization, a large quantity of waste plastic is generated from every field. For the present study, similar to geogrids recycled plastic mesh is used as reinforcement for soft subgrade soil. Here an attempt was made to strengthen the soft subgrade using recycled plastic mesh as soil reinforcement. In the current work we have used three types of plastic mesh having different colour and aperture size.

Many of the researchers worked on the strengthening of black cotton soil using iron powder. Many researchers studied the problem due to soft subgrade and provided solution namely geogrids and geogrids and curing fill for construction on these soils. Thus at the end of the project and scarcity of fill material they are effectively used locally available soil with by adopting the soil with strengthening techniques namely soil reinforcement.

In the current work weak subgrade soil is improved by using industrial waste iron dust as an alternative and plastic mesh as soil reinforcement. We have conducted the

Academic Year: 2018-19					Total Publications=011		
Sl. No	Name of the Faculty	Title of the Paper	Published Date	Publication	National	Scopus Indexed	Citation
					International		
1	Y B Bharatharaj Etigi	Water Quality Analysis of Avaragere Lake- A Case Study	December 2018	IRJET	International	No	--
		Effect of Red Mud and Silica Fume on Cement Concrete in the Fresh and Hardened State	December 2018	IJRASET	International	No	--
		Strength Characteristics of Slurry Infiltrated Hybrid Fibrous Ferrocement	2019	IJETAE	International	No	--
		Strength Characteristics of Slurry Infiltrated Hybrid Fibrous Ferrocement	2019	JETIR	International	No	--
2	Kiran Kumar H S	Water Quality Analysis of Avaragere Lake- A Case Study	December 2018	IRJET	International	No	--
3	Varun B K	Water Quality Analysis of Avaragere Lake- A Case Study	December 2018	IRJET	International	No	--
4	Punith C G	Water Quality Analysis of Avaragere Lake- A Case Study	December 2018	IRJET	International	No	--
4	Varun B K	Effect of Red Mud and Silica Fume on Cement Concrete in the Fresh and Hardened State	December 2018	IJRASET	International	No	--
5	Harish B A	Effect of Red Mud and Silica Fume on Cement Concrete in the Fresh and Hardened State	December 2018	IJRASET	International	No	--

6	Kiran Kumar H S	Effect of Red Mud and Silica Fume on Cement Concrete in the Fresh and Hardened State	December 2018	IJRASET	International	No	--
7	Hanumesh B M	Effect of Red Mud and Silica Fume on Cement Concrete in the Fresh and Hardened State	December 2018	IJRASET	International	No	--
8	Kiran Kumar H S	Water Quality Analysis of Aghanashini Estuary, Karnataka- A Case Study	December 2018	IRJET	International	No	--
9	Varun B K	Water Quality Analysis of Aghanashini Estuary, Karnataka- A Case Study	December 2018	IRJET	International	No	--
10	Y B Bharatharaj Etigi	Water Quality Analysis of Aghanashini Estuary, Karnataka- A Case Study	December 2018	IRJET	International	No	--
11	Kiran kumar C M	“Proposed Bus Rapid Transit System from Davanagere to Harihara” “Fourth National Conference on Road and Infrastructure”4-5 April, 2019 Organized by RASTA. Publisher- Himalaya Publishing House Pvt. Ltd., ISBN-978-93-5367-163-1	4-5 th April 2019	Himalaya Publishing House Pvt.	National	No	--
12	Kiran kumar C M	“Sustainable Traffic Management and Signal Optimization at Aruna Intersection, Davanagere” “Fourth National Conference on Road and Infrastructure”4-5 April, 2019 Organized by RASTA. Publisher- Himalaya Publishing House Pvt. Ltd., ISBN-978-93-5367-163-1	4-5 th April 2019	Himalaya Publishing House Pvt.	National	No	--
13	Dr. S L Arunkumar	Land use and Land Cover of Shikaripura City area using GIS and Remote Sensing Techniques	December 2018	IJCTER	International	No	--

14	Dr. S L Arunkumar	Land use and Land Cover In and Around Devarabelekere Reservoir Using Remote Sensing And GIS	December 2018		International	No	--
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Water Quality Analysis of Avaragere Lake-A Case Study

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Abstract – The present investigation was carried out in Avaragere Lake, it belongs to Davanagere taluk and district, Karnataka. The investigation deals with the physico-chemical parameters of Avaragere Lake. Twenty two physical and chemical parameters of water samples were analyzed to know the bi-monthly changes in turbidity, TDS, pH, DO, Totalhardness, chlorides, alkalinity, phosphates, nitrates and certain heavy metals were analyzed for a period of two months from Feb. 2013 to April 2013. The results show fluctuations throughout the sampling periods. Higher amount of alkalinity, pH, TDS, poor DO and the parameters were within the permissible limits. The lake was found to be under the influence of major parameters like nitrate, pH, chlorides, TDS, calcium, magnesium and two or more parameters have been reported above permissible limits of drinking water, this is due to the chemical nature of pollutants and sediments entering in to systems from various point and non-point sources. The overall investigation results indicate that The tank is non-polluted and can be used for domestic, irrigation and fisheries and even it is fit for potability.

Key Words: DO, pH, TDS, Turbidity, point source, on point source

1. INTRODUCTION

Water along with land is most important natural resources gifted to man by nature the proper combination of these two primary resources in space and time sets the upper limit of the population and carrying capacity of the area. Population also influences the quality and availability of water resources for human use. Lack of community perception, irrational use, widespread negligence for conservation among various stake holders, systematic encroachment of water bodies made them merely a dump yard for domestic and industrial waste.

Water is very essential and precious natural resources for sustaining life of this planet. Owing to the increase in population and indiscriminate utilization, this vital resource is now under tremendous pressure. In the rural areas the water quality of lakes is being deteriorated due to human and other biological activities. The provision of safe drinking water reduces the incidences of many water borne diseases. The interaction of chemicals into water may adversely affect many species of aquatic flora and fauna.

Though, the majority of our planet is covered by water, only a very small proportion is associated with the continental areas to which humans are primarily confined,

of the water associated with the continents, a large amount (more than 99%)

1.1 STUDY AREA

Avaragere Lake is located at 5km from the centre of the city at the out skirts near JIT, Davanagere beside NH-4. Lake is located in flat terrain at 14° 24' 15" N and 75° 54' 00" W and at an average elevation of 560m. It is a large and shallow lake with a surface area of 1.12m². The lake is 1.8Km long with a mean depth of 2.44m and maximum depth of 4.27m.

Table No - 1.1: Details of Avaragere Lake

Location	Latitude - 14° 24' 15" Longitude - 75° 54' 00"
Mean Sea Level	560 m
Distance from Davanagere	5 Km
Village, Taluk	Avaragere, Davanagere
District	Davanagere
Volume	2.73 X 10 ⁶ m ³
Surface area	1.12 m ²
Maximum depth	4.27 m
Mean depth	2.44 m
Length	1.8 Km



Plate No - 1.1: Satellite view of Avaragere Lake

1.2 NEED FOR THE STUDY

The problems posed by the pollution of environment due to anthropogenic (human) activities are fast becoming a point that should not be overlooked in today's world. There are tendencies that suggest that pollution of all



Effect of Red Mud and Silica Fume on Cement Concrete in the Fresh and Hardened State

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Abstract: Concrete is most used construction material in the civil engineering structure. Concrete is the world's most consumable product next to water. The red mud and silica fume has been used as a partial replacement of cement in cement concrete. The red mud is by product of alumina from bauxite ore and silica fume is obtained from silicon industry. By utilizing these two products as a partial replacement of cement in cement concrete, the concrete can be made as environmental friendly. In the present work, fresh properties and hardened properties of control concrete are compared with concrete made with red mud and silica fume. To test fresh properties slump cone and compaction factor tests are conducted. To test hardened properties compression test and split tensile tests are conducted at 28 and 56 days of curing. Control concrete of M30 grade is designed using IS 10262:2009 provision. To make concrete with red mud and silica fume, cement is replaced by 6%, 12%, 18%, 24% and 30% of red mud by its weight and silica fume is varied from 2%, 4%, 6%, 8% and 10% by the weight of cement.

I INTRODUCTION

Concrete as it is known today came into use in 1824 with the invention of Portland cement by Joseph Aspdin. Until then, pozzolanic binders i.e., lime-pozzolana mortars and concrete were used throughout the world. The large-scale production of ordinary Portland cement is posing environmental problems and also causing unrestricted depletion of natural resources. The raw materials used for the production of ordinary Portland cement are limestone, clay, silica, iron oxide materials and gypsum. The fuel for producing cement is coal. It is learnt that for every tonne of ordinary Portland cement produced, about one tonne of carbon dioxide is released into the atmosphere leads to global warming. Increased use of suitable industrial waste materials having pozzolanic characteristics that can replace energy consuming Portland cement is one of the ways to meet the challenge. Replacement of certain amount of Portland cement with industrial by-products such as Red mud, Silica fume derives the technical advantage of modification of the properties of the fresh and hardened concrete. This includes slower rate of setting and hardening, lower heat of hydration, improved durability in acidic environments. Industrial by-products that would otherwise be discarded as harmful environment pollutants can thus be efficiently used as cement replacement in concrete. Some of the important industrial by-products are:

- 1) **Red Mud:** Red mud is a waste material generated by the Bayer process widely used to produce alumina from bauxite. Bauxite has the highest content of alumina with minerals like silica, iron oxide and impurities in minor or trace amount. The primary alumina production process consists of three stages; mining of bauxite followed by refining of bauxite to alumina by the Bayer process and finally melting of alumina to aluminium. In the Bayer process the insoluble product generated after bauxite digestion with sodium hydroxide at elevated temperature and pressure to produce alumina is known as a red mud or bauxite residue. About 1 tonne of alumina is produced from 3 tonnes of bauxite and about 1 tonne aluminium is produced from 2 tonnes of alumina. Depending on the raw materials processed, 1-2.5 tonnes of red mud is generated per tonne of alumina produced.
- 2) **Silica Fume:** Silica fume, also known as microsilica, is an amorphous (non-crystalline) polymorph of silicon dioxide. It is an ultrafine powder collected as a by-product of the silicon and ferrosilicon alloy. Production and consists of spherical particles with an average particle diameter of 150 nm. The main field of application is as pozzolanic material for high performance concrete. It is sometimes confused with fumed silica. However, the production process, particle characteristics and fields of application of fumed silica are all different from those of silica fume. Silica fume is a by-product in the carbothermic reduction of high-purity quartz with carbonaceous materials like coal, coke, wood-chips, in electric arc furnaces in the production of silicon and ferrosilicon alloys. Because of its extreme fineness and high silica content, silica fume is a very effective pozzolanic material. Addition of silica fume also reduces the permeability of concrete to chlorides, which protects the reinforcing steel of concrete from corrosion.

II. STATEMENT OF PROBLEM

A comparative evaluation of strength characteristics of control concrete of grade M₃₀ and concrete produced by replacing cement by red mud (6%, 12%, 18%, 24% & 30%) and silica fume (2%, 4%, 6%, 8% and 10%) by weight of cement as a partial replacement.

Strength Characteristics of Slurry Infiltrated Hybrid Fibrous Ferrocement

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Abstract— Main objective of this experimentation programme was to study the strength characteristics of slurry infiltrated hybrid fibrous ferrocement (SIBFF). Different types of fibres used in this experimentation programme were steel fibres (SF), carbon fibres (CF), basalt fibres (BF), galvanized iron fibres (GIF) and polypropylene fibres (PPF). Different combinations of hybrid fibres used in this experimentation programme were (SF+CF), (SF+BF), (SF+GIF) and (SF+PPF) and percentage of fibres used was (1%+1%). The monofibres were added at 2% by volume fraction. The strength characteristics studied in this paper include shear strength and impact strength. Water absorption and sorptivity were also studied.

Keywords—Impact strength, shear strength, sorptivity, water absorption.

I. INTRODUCTION

Concrete is widely used man made construction material in the civil engineering field all over the world. However concrete has many deficiencies such as low tensile strength, low post cracking capacity, brittleness, low ductility and low impact strength. To overcome these deficiencies discontinuous, discrete, uniformly dispersed suitable fibres are added to the normal concrete. The purpose of addition of short fibres is to improve the tensile strength and impact-resistance and to reduce the brittleness of concrete. A composite can be termed as hybrid, if two or more types of fibres are rationally combined in a common matrix to produce a composite that derives benefits from each of the individual's fibres and exhibits a synergetic response. Debonding and pull out of the fibre require more energy absorption, resulting in a substantial increase in the toughness and fracture resistance of the materials to the cyclic and dynamic loads. In 1979 a new material, slurry-infiltrated fibre concrete (SIFCON), was introduced by Dr. David Lankard of the Lankard Materials Laboratory (LML) in Columbus, Ohio. Dr. Lankard had done some pioneer work in the development of the material, as well as some applications using the material in the paving and metal fabrication industries.

Ferrocement is a type of thin-wall reinforced concrete commonly constructed of hydraulic-cement mortar reinforced with closely spaced layers of continuous and relatively small wire mesh. The recent trend in ferrocement has been rightly summarized by Prof. A. E. Naaman "The history of ferrocement as a modern construction material is longer than that of reinforced concrete, prestressed concrete and steel. Its path for the future as a laminated cementitious composite combining advanced cement based matrices, high performance reinforcing meshes and fibres and new construction techniques, promises to be as bright". Ferrocement is environmentally sound technology since it is found to be ideal for rehabilitation and re-strengthening of existing structures. The ferrocement construction reduces labour cost, improves quality of the material, reduces or eliminates repair and maintenance by reducing the use of raw materials. The present experimental study was planned to study shear strength, impact strength, water absorption and sorptivity of slurry infiltrated hybrid fibrous ferrocement.

II. MATERIALS USED

Main objective of this investigation was to find out the structural behavior of slurry infiltrated hybrid fibrous ferrocement and its application as a structural material. The study was basically oriented towards the usage of different hybrid fibre combinations such as (SF+CF), (SF+GIF), (SF+BF) and (SF+PPF). The percentage of hybrid fibres adopted in the experimentation was (1%+1%). Welded mesh and chicken mesh were also used. The properties such as shear strength, impact strength, water absorption and sorptivity of slurry infiltrated hybrid fibrous ferrocement were studied in detail. For experimental work the following materials were used.

A. Cement: 43 grade ordinary Portland cement (OPC) was used in this experimentation programme with specific gravity 3.15 and conforming to IS: 8112-1989.

Strength Characteristics of Slurry Infiltrated Hybrid Fibrous Ferrocement

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Abstract : Main objective of this experimentation programme was to study the strength characteristics of slurry infiltrated hybrid fibrous ferrocement (SIHFF). The different types of fibres used in this experimentation programme were steel fibres (SF), carbon fibres (CF), basalt fibres (BF), galvanized iron fibres (GIF) and polypropylene fibres (PPF). The different combinations of hybrid fibres used in this experimentation programme were (SF+CF), (SF+BF), (SF+GIF) and (SF+PPF) and percentage of fibres used is (1%+1%). The monofibres were added at 2% by volume fraction. The strength characteristics studied in this paper include compressive strength, flexural strength and flexural toughness factor.

Index Terms - Compressive strength; flexural strength; flexural toughness factor; slurry infiltrated hybrid fibrous ferrocement.

I. INTRODUCTION

Concrete is widely used man made construction material in the civil engineering field all over the world. However concrete has many deficiencies such as low tensile strength, low post cracking capacity, brittleness, low ductility and low impact strength. To overcome these deficiencies discontinuous, discrete, uniformly dispersed suitable fibres are added to the normal concrete. The purpose of addition of short fibres is to improve the tensile strength and impact resistance and to reduce the brittleness of concrete. A composite can be termed as hybrid, if two or more types of fibres are rationally combined in a common matrix to produce a composite that benefits from each of the individual's fibres and exhibits a synergistic response. Debonding and pull out of the fibre require more energy absorption, resulting in a substantial increase in the toughness and fracture resistance of the materials to the cyclic and dynamic loads. In 1979 a new material, slurry-infiltrated fibre concrete (SIFCON), was introduced by Dr. David Lankard of the Lankard Materials Laboratory (LML) in Columbus, Ohio. Dr. Lankard had done some pioneer work in the development of the material, as well as some applications using the material in the paving and metal fabrication industries. Ferrocement is a type of thin-wall reinforced concrete commonly constructed of hydraulic-cement mortar reinforced with closely spaced layers of continuous and relatively small wire mesh. The recent trend in ferrocement has been rightly summarized by Prof. A. E. Naaman "The history of ferrocement as a modern construction material is longer than that of reinforced concrete, prestressed concrete and steel. Its path for the future as a laminated cementitious composite combining advanced cement based matrices, high performance reinforcing meshes and fibres and new construction techniques, promises to be as bright". Ferrocement is environmentally sound technology since it is found to be ideal for rehabilitation and re-strengthening of existing structures. The ferrocement construction reduces labour cost, improves quality of the material, reduces or eliminates repair and maintenance by reducing the use of raw materials. The present experimental study was planned to evaluate compressive strength, flexural strength and flexural toughness factor of slurry infiltrated hybrid fibrous ferrocement.

II. EXPERIMENTAL PROGRAM

The main objective of this investigation was to find out the structural behavior of slurry infiltrated hybrid fibrous ferrocement and its application as a structural material. The study was basically oriented towards the usage of different hybrid fibre combinations such as (SF+CF), (SF+GIF), (SF+BF) and (SF+PPF). The percentage of hybrid fibres adopted in the experimentation was (1%+1%). Welded mesh and chicken mesh were also used. The strength characteristics such as compressive strength, flexural strength and flexural toughness factors of slurry infiltrated hybrid fibrous ferrocement were studied in detail.

2.1 MATERIALS:

Cement: 43 grade ordinary Portland cement (OPC) was used in this experimentation programme with specific gravity 3.15 and conforming to IS: 8112-1989.

Fine aggregate: Locally available river sand was used in this experimentation programme with specific gravity 2.60 and belongs to zone II of IS: 383-1970.

Water: Water which is free from acids, oils, alkalis and other impurities was used.

Steel fibres: In the present work flat crimped steel fibres of length 20mm were used. Steel fibres were obtained from Ryan International Pune.

Carbon fibres: In the present work carbon fibres of length 18 mm were used. Carbon fibres were obtained from Nickunj Enterprises Pvt. Ltd. Mumbai.

Basalt fibres: In the present work basalt fibres of length 18 mm were used. Basalt fibres were obtained from Nickunj Enterprises Pvt. Ltd. Mumbai.

Galvanized iron fibres: Round GI wire of 1mm diameter was cut to the required length of 20 mm and were used as fibres.

Polypropylene fibres: In the present work polypropylene fibre of length 20mm were used. Polypropylene fibres were obtained from Bajaj Reinforcements Niggar.

Welded mesh: Welded mesh used for the experimentation was having a rectangular opening of 30 mm x 35 mm with 20 gauges.

Chicken mesh: Chicken mesh used for the experimentation was having a hexagonal opening with 0.5 mm diameter.

Water Quality Analysis of Aghanashini Estuary, Karnataka –A Case Study

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Abstract:- The present study deals with the assessment of water Aghanashini Estuary. Ten physico-chemical parameters were studied and analyzed during January 2017 to May 2017. The results show that there is high concentration of chlorides, EC, TDS, Nitrates and hardness in four different sampling stations which were brought in two different seasons, in the pre-monsoon season. The estuary shows variations in samplings in different seasons due to the windward movement of sea water during the pre monsoon season. Hence there is higher concentration of various parameters. The results obtained indicate that the water from the estuary can be effectively used for irrigation purpose with necessary treatment methods. The conveyance of water to Bengaluru city also being discussed briefly.

Key Words: Estuary, Water quality, Physico-chemical analysis, Sampling, Seasons

1. INTRODUCTION



PROPOSED BUS RAPID TRANSIT SYSTEM FROM DAVANAGERE TO HARIHARA

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Abstract

Due to the rapid pace of urbanization, which is characterized by motorization, the co-existence of motorized and non-motorized modes, deteriorating public transport services and air quality. Presently, public transport becomes financially less viable, speeds reduce, and congestion levels increase and transportation becomes a source of environmental problems. Hence, for the developing countries like India, BRTS is the best way to overcome these problems. BRT is high speed rapid transit system using high capacity vehicles, physically separated bus ways, with modern stations. It is necessary to upgrade the current system of transportation in case of increase in traffic volume, BRTS would be best choice since it is cheaper, easily adaptable, flexible. This paper presents an overview of BRTS and corridor selection in Davanagere city for the selected stretches.

Keywords: BRTS, Traffic congestion, Transportation, Performance evaluation, Public transport.

Introduction

Bus rapid transit system is a key component which plays a key role in development of smart cities in any developing countries like India, from social as well as economical point of view. It is a innovative high capacity and most easily accessible to all kind of peoples, comparatively flexible, moreover it improves the performance of transport system in urban and suburban environments. When compared to regular mode of transportation, the operation of BRTS is a bit challenging. That is because there will be some frequency between the buses. At the time of traffic jams, the buses will give the estimated time of arrival to signals using the intelligent transport system (ITS).

In India, roads are often designed to take a particular number of users, say 30,000 persons per hour per direction. A single dedicated lane BRTS is known to carry 20,000 passengers per hour per direction. A well implemented efficiently-run BRTS will also cause citizens to switch travel modes from car to bus, which will further alleviate the traffic situation. It is observed that almost all developing countries including India faced problems of congestion growth of private vehicles. Hence, in most of Indian cities, due to cost from congestion and delay have a huge economic loss of individual as well as bus rapid transit operators both. It was 17.29% in 1951 and touched 27.75% in just five decades. The urban population in India has been 285 million out of 1027 million in 2001. It has built up more pressure particularly in metropolitan cities.



SUSTAINABLE TRAFFIC MANAGEMENT AND SIGNAL TIME OPTIMISATION AT ARUNA INTERSECTION, DAVANAGERE

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Abstract

Traffic analysis is basically the process of intercepting and examining the number of vehicles on the road and deducing the pattern of traffic movement. A traffic survey on Aruna Circle Intersection of Davanagere city has been carried out which includes calculation of present traffic density and analysis of traffic volume by adopting the manual method of counting. PCU estimations are made and appropriate design corrections are suggested for highway geometry. For the proposed design geometry, the signal time is optimized.

Keywords: Signal Optimisation, Traffic volume Count, PCU estimation and Geometric Design.

Introduction

Traffic Engineering is branch of engineering which deals with planning, geometric design and traffic operation of roads, highways, their networks, terminals, and also achieves efficient and convenient movement of person and goods.

Traffic is generally defined as the movement of people, goods or vehicles between spatially separated points, and thus includes pedestrians and all types of vehicles mechanized, motorized or non-motorized. Today, man and his transport vehicles occupy a large share of the urban space. Traffic congestions, air pollution and noise pollution and the resultant ill effects and frustration have become the order of the day. The demand for traffic survey and analysis is likely to increase for future development of Transport Network. Traffic analysis is fundamental to planning of roads and flyovers. It also provides the basis for determining the number of traffic lanes to be provided for different road sections having regards to volume, composition and other parameters of traffic [1].

Traffic analysis can therefore help further in the evaluation of investment needed for the future road constructions and improvements. Such traffic surveys are a valuable source of data for planning of highways, flyovers, roads, etc. As such, these should be a regular feature in all the traffic departments.

Land use and Land cover of Shikaripura City area using GIS and Remote Sensing techniques

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Abstract- Land use and Land cover change as become a central component in current strategies for managing natural resources and monitoring environmental changes. Urban expansion is bringing serious losses of agricultural land, vegetation land and water bodies. Urban sprawl is responsible for a variety of urban environmental issues with decreased agricultural area and water bodies due to population increase, during the study period. The land use and land cover analysis on the study area has been attempted based on thematic mapping of the area consisting of built-up land, cultivated land, water bodies, forest and uncultivated land using the toposheets and satellite images and Softwares like GIS and Erdas Imagine. The research concludes that there is a rapid expansion of built-up area. Land use and land cover information, when used along with information on other natural resources, like water, hydro-geomorphology etc., will help in the optimal land use planning at the macro and micro level.

Octa Journal of Environmental Research

International Peer-Reviewed Journal

Oct. Jour. Env. Res. Vol. 6(4): 153-159

Available online <http://www.sciencebeingjournal.com>

Oct. – Dec., 2018

ISSN 2321 3655

Research Article



Octa Journal of Environmental Research

(Oct. Jour. Env. Res.) ISSN: 2321-3655

Journal Homepage: <http://www.sciencebeingjournal.com>



LAND USE AND LAND COVER IN AND AROUND DEVARABELEKERE RESERVOIR USING REMOTE SENSING AND GIS

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Received: 14th Dec. 2018 **Revised:** 28th Dec. 2018 **Accepted:** 30th Dec. 2018

Abstract: The present study deals with the land use / land cover mapping and change detection studies in and around the Devarabelekere Reservoir. The study involves identifying the current land use pattern and changes occurred over a period due to the urbanization by adopting satellite remote sensing technologies and GIS tools. IRS-1D, LISS-III geocoded data of 2000 and IRS-P6, LISS-IV geocoded data of 2008 satellite data and Toposheets from Survey of India (SOI) are acquired as primary and secondary data for analysis. Interpretation techniques are used to identify the land use/ land cover information by applying both pre- interpretation, ground truth and post visual interpretation of the satellite image layers like land use/ land cover such as agriculture, waste land, water bodies, forest etc. are prepared. The interpreted maps topology is created by linking the spatial data file and attribute data file. The overlay analysis was carried out to find out the changes in the land use pattern over eight years period. The images of the study area were categorized into five different classes namely vegetation, agriculture, barren, built-up and water body. The

Academic Year: 2019-20				Total Publications=06			
Sl. No	Name of the Faculty	Title of the Paper	Published Date	Publication	National	Scopus Indexed	Citation
					International		
1	Dr S L Arunkumar	Assessment of Ground water fluoride using GIS in Shahapur Taluk, Hyderabad - Karnataka region, India.	January 2020	IJCS	International	No	--
2	Kirankumar H S	Treatment of Tannery Wastewater by Electrocoagulation using Aluminium and Iron Electrodes.	November 2019	IJRTE	International	No	--
		Model Analysis for the Treatment of Tannery Wastewater by Electrocoagulation using Aluminium and Iron Electrodes.	November 2019	IRJET	International	No	--
3	Dr Mohammed Yaseen	Use of redox mediators for the enhanced degradation of selected nitrophenols	7/10/2019	AWS	International	Yes	--
4	Hanumesh B M	Hybrid fiber reinforced concrete using steel and polypropylene fibers	July 2020	JETIR	International	No	--
5	Hanumesh B M	Mechanical properties of recycled aggregate concrete with steel fibres	July 2020	JETIR	International	No	--



P-ISSN: 2349-8528
E-ISSN: 2321-4902
IJCS 2020; 8(1): 231-233
© 2020 IJCS
Received: 04-11-2019
Accepted: 06-12-2019

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Assessment of groundwater fluoride using GIS in Shahapur Taluk, Hyderabad-Karnataka region, India

Basavaraja D, MA Bellakki and SL Arunkumar

Abstract

This study aims to identify high fluoride concentration in ground water of Shahapur taluk, Yadgir district of Karnataka (India). For this purposes sixty five ground water samples were collected during the pre and post monsoon season. The fluoride concentration in ground water samples was determined as per the standard methods for the examination of water and wastewater. The concentration of fluoride in the groundwater samples varies from 0.25 to 4.85 mg/L. Among the sixty five samples analyzed, 26.14% and 6.15% of the samples exceeded the maximum permissible limits of fluoride during pre and post monsoon season respectively. A fluoride zonation map has been prepared using ArchGIS software. The areas below 1.5 mg/L of fluoride have been labeled as safe zones and the areas above 1.5 mg/L as risk zones.

Treatment of Tannery Wastewater by Electrocoagulation using Aluminium and Iron Electrodes

Kiran Kumar H S, Lokeshappa B, Mohammad Rizwan M R

Abstract—This Tannery industry is one of oldest industry the effluent is highly complex and characterized by high Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), suspended solids, dissolved solids, total solids, and color. Untreated Tannery wastewater when discharged directly into the water bodies or into open lands cause irreversible damage to environment. Electrocoagulation is one of the most important electrochemical treatment employed for industrial wastewater treatment to treat highly polluted industrial effluents which have high suspended and colloidal materials, BOD, COD in wastewater.

Electrocoagulation treatment is used in this study to study the removal efficiency of BOD, COD, Chromium (Cr) Total Dissolved Solids (TDS) and the effect of pH of tannery wastewater. The experiments were conducted using aluminium

Untreated wastewater if discharged to the stream, high inorganic solids cause hardness and high alkalinity in the waste leads to the formation of slimy layers on the streams. High BOD depletes the DO contents in the streams causes lack of oxygen to the aquatic life. High suspended solids increase the load to the treatment plants. Degradable matter leads to the propagation of pathogens. High chromium as carcinogenic to the human health. Untreated wastewater if discharge to the streams not only affects fish but also affects the health of the cattle and vegetative system along the shore line. It also leads to the pollution of soil, it affects the soil fertility alters soil pH, due to high organic contents it causes clogs to the soil and impair soil structure leads to soil degradation. [4].

Model Analysis for the Treatment of Tannery Wastewater by Electrocoagulation using Aluminium and Iron Electrodes

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Abstract - The electro-coagulation treatment using aluminium and iron electrodes was studied for the removal of organic and inorganic pollutants from the tannery wastewater. A linear regression model was applied in order to obtain optimal values of the variables. The electro-coagulation (EC) process efficiency was based on the biochemical oxygen demand (BOD), chemical oxygen demand (COD) and Chromium. Linear regression model has confirmed the predicted model by the experimental design within a 95% confidence level. The reactor working conditions sets to pH of 7, 8 and 9 voltage was set to 10, 15 and 20 volts electrode distance was set to 1cm, 1.5cm and 2cm electrolysis time in the

like zinc chloride and mercuric chloride is used as disinfectants, bleaching powder and sodium fluoride is used to prevent skin and hides from putrefaction. Hence the tannery effluent characterized by its strong Colour, excessive COD, high pH, and high dissolved solids. [2] There are two varieties of tanning vegetable tanning and chrome tanning are commonly practiced. Vegetable tanning is not often used due to its excessive contaminated load and much less treatability in nature. Moreover, vegetable tanned leather having its own properties and physical nature but biodegradable in nature. Presently more than 90% of world wide produces 18 billion Sq feet of leather. is through



Use of redox mediators for the enhanced degradation of selected nitrophenols

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Received: 17 December 2018 / Accepted: 7 October 2019
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Abstract

In the present study, sequential anaerobic–aerobic treatment was used for the enhanced degradation of selected nitrophenols. Five identical reactors were used to assess the degradation of 2-nitrophenol and 2,4-dinitrophenol. Reactor 1 was used as control, and another four reactors were operated in anaerobic phase followed by sequential aerobic treatment. The performance of reactors was studied for nitrophenol concentrations of 5, 10, 20 and 40 mg/l and in next phase effect of redox mediators [lawsone and anthraquinone sulphonic acid (AQSA)], along with kinetics of degradation studied for 40 mg/l of nitrophenols. More than 98% degradation of nitrophenols was achieved at lower concentrations but for 40 mg/l removal percentage was reduced, and also COD inhibition was observed. However, with the addition of redox mediators, both nitrophenols and COD removal percentage were greater than 95% and 85%, respectively. Kinetics of degradation revealed that the rate of degradation was found to increase with the increase in concentration of redox mediators from 10 to 20 mg/l, and it was found that degradation was faster with the use of AQSA in comparison with lawsone solution. It indicates that use of redox mediators is favourable for the enhanced degradation of nitrophenols. Sequential anaerobic–aerobic treatment is possible potential treatment method for treating nitrophenolic wastewaters.

Keywords Redox mediators · Sequential anaerobic–aerobic treatment · Enhanced degradation

Introduction

One of the characteristics that best define today's society in what are known as developed countries is the production of waste; approximately, 23% of the world's populations live in developed countries, consume 78% of the resources and produce 82% of the waste products. At present, there are

some five million known substances registered, of which approximately 70,000 are widely used worldwide, and it is estimated that 1000 new chemical substances are added to the list each year.

Nitrophenols are produced industrially by the reaction of chlorides with sodium hydroxide at temperatures close to 200 °C. Nitration of benzene to produce nitrobenzene and dinitrobenzene is commercially important technology. They have been used worldwide as an intermediate in the production of explosives, pharmaceuticals, pesticides, pigments, dye, wood preservatives and rubber chemicals (Karim and Gupta 2000). Nitrophenols are among the most widely used industrial organic compounds.

These nitrophenols are environmentally undesirable being noxious in nature and causing intense colouration of process waste water (Du et al. 2006). In particular, these compounds tie up the oxygen that is necessary to support

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HYBRID FIBER REINFORCED CONCRETE USING STEEL AND POLYPROPYLENE FIBERS

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Abstract: Concrete is the most widely used construction material because of its specialty of being cast into any desired shape. But it is well known that conventional concrete does not meet many functional requirements such as tensile strength, resistance to cracking, permeability to liquids, chemical attack, etc. These deficiencies have led the researchers to investigate and develop a suitable material which could perform better in areas where the conventional concrete poses several limitations. The recent development in concrete technology has resulted in the arrival of new products such as High Performance Concrete, Fibre Reinforced Concrete, etc. The main requirements of disaster resistant structures are good ductility and energy absorption capacity. Conventional concrete does not fulfill all the requirements of earthquake resistant structures. Fibre reinforced concrete possesses a high flexural and tensile strength, improved ductility, high energy absorption than the conventional concrete against dynamic loads. Because of the advantages of FRC, it can be used in earthquake resistant structures. When the concrete is reinforced with randomly dispersed fibres it prevents micro cracks from widening. The combination of various types of fibres in a mix results in the formation of hybrid fibre composites. One type of fibre improves the properties of fresh concrete and prevents early shrinkage cracks while the other type of fibre contributes to the improvement of strength and ductility of hardened concrete. The scope of the present study is to investigate the influence of different combination of hybrid fibres. The investigation was carried out on two different types of fibres namely round crimped steel fibres and polypropylene fibres. The mechanical properties such as compressive strength and split tensile strength were investigated in the laboratory tests. The reinforced concrete structural elements have been designed with M20 grade concrete.

Index Terms –Steel Fibres, Polypropylene Fibres, Hybrid Fibre Reinforced Concrete (HFRC). Compressive strength, Split

MECHANICAL PROPERTIES OF RECYCLED AGGREGATE CONCRETE WITH STEEL FIBRES

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Abstract: Concrete is most widely used construction material in the world. Now days the world is witnessing the construction of more and more challenging and difficult Engineering structures. So the concrete need to possess very high strength and sufficient workability. Researchers all over the world are developing high performance concrete by adding various fibers, admixtures in different proportions. Various fibers like glass, carbon, poly propylene and aramid fibers provide improvement in concrete properties like tensile strength, fatigue characteristics, durability, shrinkage, impact, erosion resistance and serviceability of concrete. Because of such characteristics Fiber Reinforced Concrete as found many applications in civil engineering field. The present work aims at evaluating the compressive strength and split tensile strength of fiber reinforced concrete for M20 grade of concrete with varying dosage of steel fiber by volume of mould and varying dosages of recycled aggregates.

IndexTerms – Recycled Coarse Aggregate, Steel Fibres, Compressive strength, Split tensile strength.

I. INTRODUCTION

One of the major challenges of the present society is the protection of environment. Some of the important elements in the respect are the reduction in the consumption of energy, natural materials and extensive use of waste materials. Nowadays these are getting considerable attention under sustainable development. The use of recycled aggregates from the construction and demolition wastes is showing prospective application in construction as an alternative to the natural, aggregate. It conserves natural resources and reduces the spaces required for the landfill disposal. India is presently generating construction and demolition (C&D) waste of

LIST OF PUBLICATIONS Academic Year: 2020-21**Total Publications=04**

Sl. No	Name of the Faculty	Title of the Paper	Published Date	Publication	National	Scopus Indexed	Citation
					International		
01	Swamy L V	An experimental study on compressive and flexural Strength behavior of steel fiber reinforced concrete	August 2020	JETIR	International	No	
02	B K Varun	Effect of addition of silica fume and ggbs on cement concrete in fresh and hardened state	July 2020	JETIR	International	No	
03	B K Varun	Strength characteristics of polymer modified high volume fly ash concrete	August 2020	Materials Today Proceedings	International	YES	
04	B K Varun	Flexural and shear characteristics of polymer modified high volume fly ash concrete	August 2020	Materials Today Proceedings	International	YES	

AN EXPERIMENTAL STUDY ON COMPRESSIVE AND FLEXURAL STRENGTH BEHAVIOR OF STEEL FIBER REINFORCED CONCRETE

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Abstract — This paper deals with experimental investigation on mechanical properties of M30 grade concrete by incorporating steel fibers in the mix. Crimped steel fibers of 1%, 2%, 3% and 4% by the weight of cement are added to the mix. A comparative analysis has been carried out for conventional concrete to that of the fiber reinforced in relation to compressive and flexural strengths. Up to 20% increment in compressive strength of the concrete was achieved and up to 40.82% increment in the flexural strength in concrete was achieved with the 4% of crimped steel fibre addition in normal concrete for curing period of 28days. The results shows that as the fiber content increases compressive and flexural strengths are proportionally increasing.

Keywords — *Steel Fiber Reinforced Concrete, Mix proportions, Compressive strength, Flexural strength.*

I. INTRODUCTION

EFFECT OF ADDITION OF SILICA FUME AND GGBS ON CEMENT CONCRETE IN FRESH AND HARDENED STATE

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Abstract : Concrete is the most used construction material in the civil engineering. Concrete is the world's most consumable product next to water. The silica fume and GGBS has been used as partial replacement of cement in the concrete. The silica fume is obtained from electric arc furnace by burning the coal, coke, and wood-chips and collected by mechanical dust collector or electro static precipitator. The GGBS is by-product of iron and steel making industry, obtained by quenching of molten iron slag from a blast furnace in water or steam to produce a glassy granular product that is then dried and ground into a fine powder. By utilizing these two products as partial replacement of cement in concrete, the concrete can be made more eco-friendly by reducing the use of cement.

In the present work, an attempt has been made to use a silica fume and GGBS as a partial replacement of cement. The main aim of this work is to study the fresh and hardened properties of M-30 grade control concrete and concrete made with partial replacement of silica fume and GGBS with various percentages. To study the fresh properties slump test, compaction factor test are conducted. To study hardened properties of concrete, compressive and split tensile strength tests are conducted and comparative study is carried out.



Strength characteristics of polymer modified high volume fly ash concrete

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ARTICLE INFO

Article history:

Received 6 June 2020

Accepted 4 August 2020

Available online xxxx

Keywords:

Fly ash

Styrene Butadiene Rubber Latex

Compressive strength

Tensile strength

Regression model

ABSTRACT

Portland cement concrete due to its many desirable properties lends itself to a variety of innovative designs. Under normal environmental conditions concrete possesses good compressive strength and stiffness with satisfactory durable properties, because of its relatively low cost and also useful physical properties materials from cement based makes, the widely used materials of civil engineering. The use of pozzolanas can induce better durability properties to concrete. For many years polymers are used in concrete. Polymers in different forms like latexes or emulsions are most common and cost-effective. In this study a combination of high volume fly ash and polymer is considered. The polymer was added in a range from 0.5% to 5.0% with an increment of 0.5% and the strength properties were analyzed. The strength increases as polymer content increases and it will reach maximum at 2% polymer addition then it starts to decline.

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Selection and peer-review under responsibility of the scientific committee of the 2nd International Conference on Manufacturing Material Science and Engineering



Flexural and shear characteristics of polymer modified high volume fly ash concrete

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ARTICLE INFO

Article history:

Received 20 June 2020

Accepted 4 August 2020

Available online xxxxx

Keywords:

Fly ash

Styrene Butadiene Rubber Latex

Regression model

ABSTRACT

Cement concrete due to its many advantageous properties can be used in many of civil engineering works. In spite of having advantageous properties the concrete lacks some of the qualities like porosity and tensile strength to bridge the gap in between pozzolanic materials like fly ash and special materials like polymer are used in the concrete. In this study a combination of high volume fly ash and polymer is considered. Polymer was added in a range from 0.5% to 5.0% with an increment of 0.5% flexural and shear characteristics were analyzed using prismatic and L shaped specimens respectively. The flexural experimental results obtained are compared with various codes and a linear regression model is developed. The shear experimental results obtained are compared with various equations developed by researchers and a linear regression model is developed. The flexure and shear strength increases as polymer content increases and it will reach maximum at 2% polymer addition after that it starts to decline.

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GM INSTITUTE OF TECHNOLOGY, DAVANAGERE
DEPARTMENT OF CIVIL ENGINEERING



RESEARCH SCHOLARS DETAILS and STATUS of Ph.D Work

Sl. No.	FACULTY NAME	USN	Ph.D REGISTRATION CENTRE	UNIVERSITY	GUIDE NAME	YEAR OF REGISTRATION	STATUS
1	Y B Bharatharaj Etigi	4UB11PCN02	UBDTCE, DVG	VTU, Belagavi	Dr. H R Prabhakara	2011	Ph.D. awarded
2	B K Varun	4BD13PCN01	BIET, DVG	VTU, Belagavi	Dr. C P AnilaKumar	2013	Ph.D. awarded
3	Kiran Kumar H S	4UB13PCN03	UBDTCE, DVG	VTU, Belagavi	Dr. B Lokeshappa	2013	Ph.D. awarded
4	Mohammed Yaseen	4BD11PCM01	BIET, DVG	VTU, Belagavi	Dr. S Suresh	2011	Ph.D. awarded
5	Swamy L V	4UB17PCA02	UBDTCE, DVG	VTU, Belagavi	Dr. H Eeramma	2017	Comprehensive viva completed
6	Harish B A	4UB16PCJ01	UBDTCE, DVG	VTU, Belagavi	Dr. N Venkata Ramana	2015	Thesis submitted
7	Hanumesh B M	4UB17PCA03	UBDTCE, DVG	VTU, Belagavi	Dr. H R Prabhakara	2017	Open Seminar 2 completed