Experimental Analysis on Concrete by Partial Replacement of Fine Aggregate with Powdered

C G Mohan Babu, [2]K Anand, [3]S Vinay Babu, [4]S Venkata Mahesh
Assistant Professor, [2]Assistant Professor, [3]Associate Professor, [4]Assistant Professor
Department of Civil Engineering
G Pullaiah College of Engineering and Technology (Autonomous), Kurnool, India

Abstract: Concrete is the most flexible substance in building construction. River Sand is infrequently available now and other substitute materials are being endeavour. Ceramic tiles are widely used in building industry in which about 25% becomes squander. This examination deals about change the sand incompletely with 10%, 20%, 30% and 40% of unused powdered ceramic tile in concrete. The test outcome for M30 grade concrete with water cement ratio of 0.4 and incomplete replacement by 30% shows a growth of 13% and 15% respectively in compressive and flexural strength. As 40% replacement of sand with ceramic tile, the compression and flexural strength are at par with normal concrete. The result leads to the successful performance of ceramic tile waste thus by decreasing the disposal and environmental issues.

Keywords: Ceramic Tile, Fine Aggregate, Compressive Strength, Flexural Strength

1. INTRODUCTION

Concrete plays a vital role in the construction industry. This paper is related with the lack of natural assets and its react on the environment. Always India is graded third in the manufacturing of ceramic tiles. 25% of ceramic tile is wasted during the manufacturing, transportation, and usage. Ceramic tile squander is found as an effective substitute and additional material in concrete as a renewal for fine aggregate which is acquire expensive nowadays. Crushed tiles were calm from the solid waste of ceramic production unit and from demolished building. The waste tiles were crushed into small pieces by manually and by using crusher. The required size of crushed tile aggregate was separated to use them as partial replacement to the natural coarse aggregate. The tile waste which is lesser than 4.75 mm size was neglected. The crushed tile aggregate passing through 16.5mm sieve and retained on 12mm sieve are used. Crushed tiles were partially replaced in place of coarse aggregate by the percentages of 10%, 20% and 30%, 40% and 50% individually and along with replacement of fine aggregate with granite powder also

2. Material:

2.1 Cement:

In this research 53grade of ordinary Portland cement (OPC) is used and is confirming to IS 12269:2013. The Specific gravity of cement is 3.15. The Initial setting time of the opc cement for is 30mts and final time is 9hr 45mts.

2.2 Fine Aggregate:

Here the fine grade aggregate was used from local available sources and it is falls under Zone III and confirming to IS 383:1970 .Fine aggregate which passes through 4.75mm size IS sieve and it's having a specific gravity of 2.67.

Source	Kurnool	IS383:1970
Zone	III	
Specific Gravity	2.67	
W.A.	0.5-1%	
Colour	Yellow Brown	

Properties of Fine Aggregate

2.3 Coarse Aggregate:

In this research 20mm to 10mm size of coarse aggregate material is used and its obtained from local available sources and is confirming IS 383:1970.Both the diameter of aggregate were sieved in separately and the portion of coarse aggregate was

Global Journal of Trends in Engineering

Evaluation of Silica Fume Cement Concrete's Compressive and Split Tensile Strengths

Syed Afzal Basha[1], P.Pavithra[2], J Ushasree[3]
[1,2,3] Dept. of Civil Engineering, G Pullaiah College of Engineering and Technology, Kurnool, A P, India

ABSTRACT: Cementations materials have been used by mankind for construction from time immemorial. The every rising functional requirement of the structures and the capacity to resist aggressive elements has necessitated developing new cementations materials and concrete composites to meet the higher performance and durability criteria. The environmental factors and pressure of utilizing waste materials from industry have also been the major contributory factors in new developments in the field of concrete technology. Concrete is an artificial material in which the aggregates both fine and coarse are bonded together by the cement when mixed with water. The concrete has become so popular and indispensable because of its inherent in concrete brought a revolution in applications of concrete. Concrete has unlimited opportunities for innovative applications, design and construction techniques. Its great versatility and relative economy in filling wide range of needs has made it very competitive building material. With the advancement of technology and increased field of applications of concrete and mortars, the strength workability, durability and other characters of the ordinary concrete need modifications to make it more suitable for a by situations. Added to this is the necessity to combat the increasing cost and scarcity of cement. Under these circumstances the use of admixtures is found to be an important alternative solution. Hence an attempt has been made in the present investigation to evaluate the workability, compressive strength, split tensile strength is evaluated with replacement of cement and micro silica fume (0 – 25%).

Keywords: Cement aggregate, compression, split and flexural strengths

I.INTRODUCTION

India is the second largest producer of cement on the globe after China. In total, India manufactures 251.2 Million Tons of cement per year. The cement industry in India has received a great impetus from a number of infrastructure projects taken up by the Government of India like road networks and housing facilities. While the Indian cement industry enjoys a phenomenal phase of growth, experts reveal that it is poised towards a highly prosperous future over the very recent years. The annual demand for cement in India is consistently growing at 8-10%. NCAER has estimated after an extensive study that the demand for cement in the country is expected to increase to 244.82 million tons by 2012. At the same time, the demand will be at 311.37 million tones if the projections of the road and housing segments are met in reality The word 'pozzolana' was derived from pozzolana, a town in Italy, a few miles from Naples and mount vacuous. The materials are of volcanic region containing various fragments of pumice, obsidian, feldspars, and quartz etc. the name 'Pozzolana' was first applied exclusively to this material. But the term has been extended later to diatomaceous earth, highly siliceous rocks and other artificial products. Thus, the pozzolanic materials are natural or artificial having nearly the same composition as that of volcanic tuffs or ash found at pozzolanas. Silica fume (SF) known as micro-silica is a by-product of the reduction of high-purity quartz with coal in electric furnaces in the production of silicon and ferrosilicon alloys. Because of its extreme fineness and high silica content, silica fume is a highly effective pozzolanic material. Silica fume is used in concrete to improve its properties like compressive strength, bond strength, and abrasion resistance; it reduces permeability and therefore helps in protecting the reinforcing steel from corrosion.

Silica fume has been used as a high pozzolanic reactive cementitious material to make high-performance concrete in the severe conditions. This mineral admixture has highly been used in severe environmental conditions despite its several mixing and curing problems because of its acceptable early-age strength development The hydration mechanism and properties of secondary C-S-H made by pozzolanic reaction have been studied by many investigators However, CSH formed by silica fume-calcium hydroxide reaction might be different with respect to the amount of molecular water, C/S ratio, and density Moreover, because of its rather different characteristics, pozzolanic gel has a high potential to contribute in reactions with other internal or external ions such as Al, Cl, and alkalis On the other hand, the search for a new environmentally friendly construction material that will match the durability of ancient concrete has provoked interest into the study of alkali-activated cementitious systems over the past decades. Alkali-activated cements refer to any system that uses an alkali activator to initiate a reaction or a series of reactions that will produce a material that possesses cementitious property Alkali-activated cement, alkali-activated slag and fly ash, and geopolymers are all considered to be alkali-activated cementitious systems; however, it is expected that the structures of these materials are vastly different and result from different chemical mechanistic paths. It is commonly acknowledged that calcium silicate hydrate (CSH) is the major binding phase in Portland cement and alkali-activated slag's, however, the binding property of geopolymers is generally assumed to be the result of the formation of a three-dimensional amorphous aluminosilicate network

A CASE STUDY ON PPA+SULPHUR MODIFIED BITUMEN WITH BASIC TESTS

[1]S.Akhil Tej, [2]R.Partha Sarathy, [3]S.Sudheer
[1]Assistant Professor, [2] Assistant Professor, [3] Assistant Professor
[1]Department of Civil Engineering,
[1] G Pullaiah College of Engineering and Technology Kurnool, AP, India

ABSTRACT: In India roads play a chief component of transferring goods and humans from one place to another. Major roads are laid with bitumen which have chemical composition with physical structure, but the present environmental parameters place a major role in the society. The temperature issues becoming higher in day to day life, to withstand these temperature issues the modification of bitumen with change in chemical properties is necessary. So many modifications have done before but in this report we have tried a modification of bitumen with PPA+Sulphur for VG-30 bitumen.PPA modified bitumen showed major results in finding the solution for temperature problems. so here we have tried a level of improvement. In this report VG30+PPA+SULPHUR of different percentages have been selected for modification with basic tests.

INTRODUCTION

The aim of this report to find the new modified binder so that it will help in improving the properties of bitumen related to major parameters. Bitumen is dark and has black and brown colour. it has sticky and viscous in its nature with hydrocarbons. it is obtained from the crude oil refiners. various crude oils are available in the world each has its own importance in its chemical and physical characteristics. it consists of hydrogen plus carbon, most of the mixes are carbon sulphur, nitrogen oxygen and hydrogen. here various types of standard of bitumen values are considered for modification which are related to loading and temperature. Every modified bitumen should contain good no of asphaltens and maltens which play a major role in developing various properties which are very important to sustain the environmental conditions. In India major Roads are related to only hard type of temperature issues. here the modification with PPA and SULPHUR is done with basic bitumen tests. in this report we have VG-30 bitumen, PPA (gel),Sulphur(powder) to make the modification for the improvement of design life.

SAMPLE PREPARATION

APPARATUS:VG-30 bitumen, PPA gel, Sulphur, temperature controller censor, stirrer
Here the vg-30 grade bitumen modification is done with PPA (Poly Phosphoric Acid) with a small amount of sulphur which is in the powder form, the vg-30 bitumen is heated up to 120^0c so that the bitumen is in liquid form. After heating the bitumen up to 160^0c the constant temperature is maintained and stirrer is attached to the bitumen, so that the stirrer will rotate -600rpm.then PPA of 1% by bitumen weight is added and mixed thoroughly with constant temperature for 10 minutes, then sulphur is added for various percentages of 0.2% & 0.4%. The sample preparation is done for 30 minutes then sample is poured in a sealed can and it is stored in dark place at 25^0c to retain morphology. Then similar procedure is followed for another sample preparation, bitumen is ready for basic testing.

TESTS ON BITUMEN

PENETRATION TEST

This test is used to identify the grade of modified bitumen. In this report the penetration values are less.

SOFTENING POINT TEST

This test is used to identify the softening value of modified bitumen. In this report the softening values are Satisfactory.

DUCTILITY TEST

This test is used to identify the sagging nature of modified bitumen. In this report the ductility values are less.

International Journal of Technical Innovation in Modern Engineering & Science (IJTIMES)
Impact Factor: 5.22 (SJIF-2017), e-ISSN: 2455-2585
Volume 5, Issue 04, April-2019

AN ALTERNATE FINE AGGREGATE AND ZEOLITE BLEND TO ASSESS COMPRESSION QUALITY OF CONCRETE

Syed Afzal Basha[1], Dr. B. Jayarami Reddy[2], Dr. C. Sashidhar[3]

[1]*Research Scholar, JNT University, Anantapur, A.P.*
[2]*Professor & HOD, Dept of Civil Engineering, YSR Engineering College of YVU, Prodattur, A.P.*
[3]*Director, Industrial Consultancy Services, JNT University, Anantapur, A.P.*

ABSTRACT
The current exploratory examination centers around the impact of Quarry residues and normal zeolite on the compression quality of concrete. Sand is mostly supplanted with Quarry residue and cement by natural zeolite in M30 grade of concrete. The present experimentation uncovers that zeolite can supplant cement, and quarry residue can substitute fine sand in concrete to some degree. At half supplanting of fine sand with Quarry dust, increment in compressive strength was taken note. At the same time, 30% supplanting of cement with zeolite, showed better compression quality. The test outcomes were observed to be palatable with the individual and joined substitutions of Quarry residue and zeolite regarding compression nature of concrete.

KEY WORDS: Zeolite, Quarry dust, Compressive strength, Partial Replacement

I. INTRODUCTION

Concrete is a composite material that comprises of a coupling medium inside which are inserted the pieces of particles of aggregates. Aggregates are the granular materials like sand, rock, smashed stone or annihilation squander that is utilized with the solidifying medium to create either mortar or concrete. The coarse aggregates are the items coming about because of characteristic breaking down by weathering of rocks. Waterway sand is most generally used fine aggregate in concrete yet as a result of exceptional insufficiency in various locales; openness, cost and characteristic impact are of critical concern. To overcome this crisis, halfway supplanting of sand with quarry buildups can be a financial option. Stone residue satisfies the reason for the elective material as a substitute for sand at insignificant expense. Concrete shows higher compressive quality subsequent to supplanting fine total with quarry sand. Pressure driven or water resisting cements utilized in concrete comprise of Portland cement and its few alterations. The properties of concrete containing Portland cement create because of substance responses between the Portland bond mixes and water, on the grounds that the hydration responses are joined by changes in issue and vitality. Choice of appropriate materials and blend extents are essential strides in producing a concrete meeting the requirements of strength and durability in a structural member. Portland cement, the principal hydraulic binder employed in trendy concrete mixtures, could be a factory-made product that isn't solely energy-intensive (4 GJ/ton of cement) however conjointly to blame for giant emissions of carbon-di-oxide. The manufacture of one ton of Portland cement clinker releases on the common 1 ton carbon dioxide into the atmosphere. The worlds yearly cement production of four billion plenty of principally Portland cement is to blame for nearly seven per cent of total world carbon dioxide emissions [1]. Typical ingredient of general use concrete mixtures could be a cementing material composed of Portland cement and one or additional supplementary cementing materials/mineral admixtures like fly ash, ground granulated blast furnace slag, rice husk ash, silica fume, zeolite, alcoffine, metakaolin, pulverized lime stone or lime stone dust from quarries and raw or calcined pozzolan, coarse and fine aggregates, mixing water, and one or more chemical admixtures.

Mineral admixtures are often finely divided siliceous materials that are added to concrete in relatively large amounts, generally, in the range of 20 to 70 per cent by mass of the total cementitious material. Although natural pozzolanas in the raw state or after thermal activation are being used in some parts of the world, due to economic and environmental considerations many industrial by-products have become the primary source of mineral admixtures in concrete. With proper quality control, large amounts of many industrial by-products can be incorporated into concrete, either in the form of blended Portland cement or as mineral admixtures. Whenever a pozzolanic and /or cementitious by-product can be used as a partial replacement of Portland cement in concrete, it represents significant energy and cost savings.

II. EXPERIMENTAL PROGRAM

A. Materials

The materials used for the project work were in accordance with the required standards. Ordinary Portland cement (Type-I) cement is an excellent general cement and is used most widely. Portland cement is produced by pulverizing clinkers consisting of crystalline hydraulic calcium silicates, and a small amount of one or more forms of calcium sulfate and up to

Special Issue Published in International Journal of Trend in Research and Development (IJTRD),
ISSN: 2394-9333, www.ijtrd.com

Study on Strength & Durability Properties of Self Compacting Geopolymer Concrete

[1]Mallikarjuna Reddy K and [2]Nagesh Kumar G
[1,2]Assistant Professor, G Pullaiah College of Engineering & Technology, Kurnool, Andhra Pradesh, India

Abstract— Geopolymer is a promising alternative binder to Portland cement. It is produced mostly from supplementary materials like flyash, GGBS, silica fume etc., recent studies have shown that the properties of geopolymers are similar or superior to those of the OPC binder that is traditionally used concrete. Self compacting geopolymer concrete (SCGC) can be considered as an advanced and innovative construction material in concrete technology. As name implies, it does not need any compacting efforts, to achieve full compaction and utilizes fly ash & GGBS together with alkaline solutions i.e. sodium hydroxide (NaOH) and sodium silicate (Na_2SO_4) and superplasticizer as a binder for matrix formation and strength. In the present study, low calcium flyash based GPC replaced with GGBS in 20%, 40%, 60%, 80%, 100% proportions of GGBS. The workability characteristics are decreased by the addition of GGBS with flyash as replacement & also the compressive strength increases with increase of binder content. The durability characteristics also shown that they are more durable, when GGBS replaced with flyash.

Index Terms*—Self Compacting Concrete, Geopolymer concrete, Strength properties, Durability properties*

I. INTRODUCTION

Geopolymer concretes are a type of Inorganic polymer composites, to form a substantial construction and building products industry by replacing/supplementing the conventional concrete. The term 'Geopolymer' was first introduced by Davidovits 1970's to name the three dimensional alumino-silicates which is a binder produced from the reaction of a source material or feedstock rich in silicon (Si) and Aluminum (Al) with a concentrated alkaline solutions. Geopolymers are chemically similar to zeolite but has amorphous microstructure consisting predominantly of Si and Al atoms.

Self compacting geopolymer concrete (SCGC) can be considered as an advanced and innovative construction material and can be regarded as a revolutionary development in the field of concrete technology. As the name implies, it does not need any compacting efforts to achieve full compaction and SCGC that is produced by a polymeric reaction of alkaline liquid with a by-product material utilizes Supplementary cementitious Materials such as Fly Ash, Ground Granulated Blast Furnace Slag, Silica Fume, Rich Husk Ash, Metakaolin, etc., together with alkaline solution and superplasticizer as a binder for matrix formation and strength.

Unlike ordinary Portland/pozzolanic cements, geopolymers do not form calcium- silicate-hydrates (CSH) for matrix formation and strength, but utilize the polycondensation of silica and alumina precursors to gain structural strength. Two main constituents of geopolymers are source materials and alkaline liquids. The source materials on alumino-silicate should be rich in silicon (Si) and alumina (Al). They could be by-product materials such as fly ash, silica fume, slag, rice-husk ash, red mud, etc. Geopolymers are also unique in comparison to other alumino silicate materials e.g. alumino silicate gels, glasses, and zeolite. The concentration of solids in geopolymerisation is higher than the aluminosilicate gel or zeolite synthesis.

II. LITERATURE REVIEW

Madheswaran C. K. Gnanasundar G. Gopalakrishnan. N [1] In this paper they studied the geopolymerisation for the NaOH and Na2SiO3. Different molarities of NaOH solution are taken to prepare different mixtures. The geopolymer concrete specimens are tested for their compressive strength at the age of 7 and 28 days. GPC mix formulations with compressive strength ranging from 15 to 52MPa have been developed. Experimental investigations have been carried out on workability, the various mechanical properties of GPCs. The test results indicates the mixture of fly ash and ground granulated furnace slag can be used for development of geopolymer concrete.

Sourav Kr. Das1, Amarendra Kr. Mohapatra [2] This paper gives an overall view of the process and parameters which effect the geo-polymer concrete till date. It is an inorganic 3D polymer which is synthesized by activation of aluminosilicate source like fly ash or GGBS(waste materials). Due to its high mechanical properties combined with substantial chemical resistance (magnesium or sulphate attack), low shrinkage and creep and environment friendly nature (very less amount of CO_2 production in comparison with OPC), it is a novel construction material for future. Exhaustive studies in various processes and parameters show that geopolymer concrete is superior to cement concrete.

J.M. Khatib [3] The influence of including fly ash (FA) on the properties of self-compacting concrete (SCC) is investigated. Portland cement (PC) was partially replaced with 0–80% FA. The water to binder ratio was maintained at 0.36 for all mixes. Properties included workability, compressive strength, ultrasonic pulse velocity (V), absorption and shrinkage. The results indicate that high volume FA can be used in SCC to produce high strength and low shrinkage. Replacing 40% of PC with FA resulted in a strength of more than 65 N/mm^2 at 56 days. High absorption values are obtained with increasing amount of FA, however, all FA concrete exhibits absorption of less than 2%. There is a systematic reduction in shrinkage as the FA content increases and at 80% FA content, the shrinkage at 56 days reduced by two third compared with the control. A linear relationship exists between the 56 day shrinkage and FA content. Increasing the admixture content beyond a certain level leads to a reduction in strength and increase in absorption. The correlation between strength and absorption indicates that there is sharp decrease in strength as absorption increases from 1 to 2%. After 2% absorption, the strength reduces at a much slower rate.

Heba A. Mohamed [4] This study presents an experimental study on self-compacting concrete (SCC) with two cement content. The work involves three types of mixes, the first consisted of different percentages of fly ash (FA), the second uses different percentages of silica fume (SF), and the third uses a mixture of FA and SF. After each mix preparation, nine

Special Issue Published in International Journal of Trend in Research and Development (IJTRD),
ISSN: 2394-9333, www.ijtrd.com

Mechanical Properties of High Strength Concrete with Copper Slag as Fine Aggregate

[1]M. N. V. Dayakar Reddy, [2]K Mallikarjuna Reddy
[1]Assistant Professor, Brindavan Institute of Technology & Science, Kurnool, India
[2]Assistant Professor, G Pullaiah College of Engineering & Technology, Kurnool, India

Abstract-- During the past few years, high-strength concrete (HSC) has been increased in building structures. The use of HSC for construction, especially for buildings, bridges, has become very common in industrialized and developing countries. Now a day, the demand of natural sand is very high due to the large usage of concrete to satisfy the rapid infrastructure growth. In the present study in order to investigate the mechanical properties of high strength concrete with copper slag as a replacement of fine aggregate. High strength concrete (M80) is designed as per ACI 211.4R-08. The work is carried out in 2 phases, in the first phase fine aggregate is replaced with Copper slag (i.e., from 0 % to 100%). Concrete mix specimens were evaluated for compressive strength, split tensile strength, flexural strength. The test results indicate that replacement of 40% copper slag as maximum compressive strength compared to conventional concrete.

Index Terms—*Fine aggregate, Copper Slag, High Strength Concrete*

I. INTRODUCTION

Concrete is an important part of society's infrastructure. It is a useful construction material and innovations are constantly being made in new types and applications for it. However in recent years, the applications of high-strength concrete have increased, and high-strength concrete has now been used in many parts of the world. The growth has been possible as a result of recent developments in material technology and a demand for higher-strength concrete. Artificially manufactured aggregates are more expensive to produce, and the available source of natural aggregates may be at a considerable distance from the point of use, in which case, the cost of transporting is a disadvantage. Protecting the depleting natural sand resource and the shore line is a major concern of the day. It is essential today, to reduce excessive consumption of the natural river sand and there by prevent sand mining. It is possible by utilization of industrial by-products as well as other waste materials in the production of normal concrete and HSC. These products can be used as partial or full replacement of Aggregates. Copper slag is an industrial by-product material produced during the process of manufacturing of copper. About 2.2 tones of copper slag is generated, for every ton of copper production. Utilization of copper slag in applications such as aggregates has threefold advantages of eliminating the costs of dumping, reducing the cost of concrete, and minimizing air pollution problems.

II. LITERATURE REVIEW

ByungSik Chun et al., (2005)[1] conducted several laboratory tests and analyzed by monitoring the stress and ground settlement of clay, sand compaction pile and copper slag compaction pile. Wei wu et al., (2010)[2] observed that when copper slag was used to replace fine aggregate, up to 40% copper slag replacement, the strength of concrete was increases while the surface water absorption decreases. Al-Jabri et al., (2009, 2011)[3] observed that the water demand reduced by about 22% for 100% copper slag replacement. The strength and durability of High Strength Concrete improved with the increase in the content of copper slag of upto 50%. However, further additions of copper slag caused reduction in the strength due to increase in the free water content in the mix. Alnuaimi (2012)[4] results showed that the replacement of up to 40% of fine aggregate with copper slag caused no major changes in concrete strength, column failure load, or measured flexural stiffness (EI). R R Chavan & D B Kulkarni (2013)[5] concluded that Maximum Compressive strength of concrete increased by 55% at 40% replacement of fine aggregate by copper slag and flexural strength increased by 14 % for 40 % replacement. S. Chithra et.al., (2016)[6]studied the Multiple Regression Analysis (MRA) and Artificial Neural Network (ANN) models are constructed to predict the compressive strength of High Performance Concrete containing nano silica and copper slag as fine aggregate replacement respectively. Khanzadi et al(2010)[7] reported the influence of NS particles on the mechanical properties and durability of concrete through measurement of compressive and tensile strength, water absorption and the depth of chloride penetration. The splitting tensile strength assessments, thermal behaviour and microstructure of concrete containing different amounts of ground granulated blast furnace slag and SiO_2nano particles as binder were investigated by Nazari and Riahia(2011)[8].Min-Hong Zhang, JahidulIslam(2012)[9] has used NS to reduce setting times and increase early strength of concrete with high volumes of fly ash or slag. Based on the experimental results by using NS in pastes, mortars and concretes with about 50% of fly ash. Hou et al(2012)[10] showed that the pozzolanic activity of colloidal NS (instead of NS powder) was higher than that of SF and its hydration acceleration effect was also higher than SF in the early age, but this effect was comparable to that of SF in the later stage.

Based on the available literature review, Copper Slag is chosen as a replacement material for fine aggregate. In the present work, fine aggregate is replaced with Copper slag (i.e., from 0 % to 100%), optimum mechanical properties were determined. Thus, significance of the present work is to prove that copper slag is the better replacement for fine aggregate.

III. MATERIALS

CEMENT:- In this work ULTRATECH cement of Ordinary Portland Cement (OPC) 53 grade was used for all concrete mixes. The various tests conducted on cement are initial and final setting time, specific gravity, fineness and compressive strength are shown in table 1.

Fly Ash:- The flyash used in this study is of class F, Obtained from RTTP, Kadapa.

Fine Aggregate:- Fine Aggregate for the Experimental Program had been locally obtained and conformed to grading Zone II as per IS:383-1970. Fine Aggregate was initially sieved through 4. 75 mm sieve to remove any particles greater

STRENGTH OF CONCRETE REPLACING FINE AGGREGATES BY STONE DUST

S.V Mahesh , K. Mallikarjuna Reddy , Coral Thejaswini Veena

[1,2,3] (Assistant Professor, Depatrment of civil Engineering, G.Pullaiah College of Engineering & Technology, Kurnool, Andhra Pradesh, India)

Abstract: Quarry dust is a byproduct of the crushing process which is a concentrated material to use as aggregates for concreting purpose, especially as fine aggregates. In quarrying activities, the rocks have been crushed into various sizes, during the process the dust generated is called quarry dust and it is formed as waste. So it becomes as a useless material and also results in air pollution. Therefore, quarry dust should be used in construction works, which will reduce the cost of construction and the construction material would be saved and natural resources can be used properly. Most of the developing countries are under pressure to replace fine aggregate in concrete by an alternate material also to some extent or totally without compromising the quality of concrete. Quarry dust has been used for different activities in the construction industry, such as building materials, road development materials, aggregates, bricks, and tiles.

The present research work mainly deals with the influence of different replacement proportion of sand with quarry dust on the properties of concrete. The present study is planned to study the effects of quarry dust addition in normal concrete and to assess the rate of compressive strength development.

Keywords: Quarry dust, Fine aggregates

1. INTRODUCTION:

1.1 OBJECTIVE: To reduce the cost of construction.

- To reduce landfill area.
- To overcome the problem of scarcity of sand.
- To reduce environmental pollution.

1.2 CONCRETE:

Concrete a composite man-made material is the most widely used building material in the construction industry. It consists of a rationally chosen mixture of binding material such as lime or cement, well graded fine and coarse aggregates, water and admixtures(to produce concrete with special properties). In a concrete mix, cement and water form a paste or matrix which in addition to filling the voids of the fine aggregate, coasts the surface of fine and coarse aggregates and binds them together. The matrix is usually 22-34% of the total volume. Freshly mixed concrete before set is known as wet or green concrete whereas after setting and hardening it is known as set or hardened concrete. The moulded concrete mix after sufficient curing becomes hard like stone due to chemical action between the water and binding material.

1.2.1 Properties of concrete:

The concrete in the plastic state should have the following properties.

Workability: The concrete should have good workability. It is defined as the ease with which it can be mixed, transported and placed in position in a homogeneous state. It depends up on the quantity of water, grading of aggregates and percentage of fine materials in the mix.

Segregation: The concrete should be free from segregation. It is defined as the breaking up of cohesion in a mass of concrete. It results in honey combing, decrease in density, and ultimately loss of strength of hardened concrete.

Bleeding: The concrete should not have bleeding. It is defined as the separation of water - cement mixture from the freshly mixed concrete. It makes the concrete porous and weak.

1.2.2 Materials in concrete:

The materials used in concrete mix design are:

- Cement
- Fine aggregate (sand)
- Coarse aggregate (20mm size)
- Water

1.3 Quarry dust:

Quarry dust is a byproduct of the crushing process which contains particle size from 0.75 to 5 mm. These stone dust are not usable and dumped for land filling. But for few past years it has been utilized more than dumping to the other works like making concrete blocks and landscaping. Quarry dust is a great alternative product for natural river sand also cost efficient at the same time. Since it's a waste product also provides availability. If quarry dust will be used for some construction purpose, the dust release from it will not affect the environment. Therefore, quarry dust should be used in construction works, which will

A Performance of Fine-Grained Concrete with Rice Husk Ash

K ANAND[1], C G MOHAN BABU[2], S VINAY BABU[3], S AKHIL TEJ[4], P PAVITHRA[5]

[1] Assistant Professor, G Pullaiah College of Engineering & Technology

[2] Assistant Professor, G Pullaiah College of Engineering & Technology.

[3] Associate Professor, G Pullaiah College of Engineering & Technology

[4] Assistant Professor, G Pullaiah College of Engineering & Technology.

[5] Assistant Professor, G Pullaiah College of Engineering & Technology

Abstract: **Rice husk ash (RHA) is classified as a highly reactive Pozzolana cement. It takes very high silica content like that of silica fume. Using low cost and locally existing of rice husk ash as a mineral admixture in concrete carries advantagesin costs, the technical properties of concrete as well as to the nature. A new study of the effect of rice husk ash combination on workability, strength and durability of high-performance fine-grained concrete is presented. The results show the addition of ash to high performance fine-grained concrete improved significantly compressive strength, splitting tensile strength and chloride penetration resistance. Captivatingly, the ratio of compressive strength to splitting tensile strength of HPFGC was lower than that of ordinary concrete, especially for the concrete made with 20 % RHA. Compressive strength and splitting tensile strength of HPFGC containing RHA was similar and slightly higher than for HPFGC containing SF. Chloride penetration resistance of HPFGC containing 15–20 % RHA was comparable with that of HPFGC containing 15 % SF.**

Keywords: High performance fine-grained concrete, rice husk ash, workability, compressive strength, splitting tensile strength, chloride penetration resistance.

1. INTRODUCTION

The use of locally presented materials as well as the use of manufacturing process and agricultural waste in building industry has become a potential solution to the economic and environ-mental problems of particularly developing countries. Coarse aggregate is considered as the core ingredient to produce Portland cement concrete. But, the resources of this material are depleting in many countries or in specific regions, therefore outcome of a probable take for the coarse aggregate is crucial. The use of sand as a substitute for coarse aggregate to produce sand concrete and studied it. This kind of concrete has strength comparable with predictable Portland cement concrete. By the definition of sand concrete is thus the defined as a fine aggregate concrete, in which the coarse aggregate is replaced by sand and fine aggregate is by filler material.

High performance of finegrained concrete is considered as a new generation of sand concrete, and it can be comparable with high performance concrete in strength and durability.

RHA is the residue of completely burned rice husk under proper conditions. Rice husk, the outer covering part of rice grains, is a farming of waste from the milling process of pady. Rice husk is ample in many parts of the world, especially in rice cultivating countries, like India. Each heap of paddy rice can produce approximately 200 kg of rice husk, which on burning produces about 40 kg of ash. Rice husk from paddy rice mills is disposed directly into the environment or sometimes is dumped or burnt in open fields. This results in serious ecological pollution, especially after it is disintegrated under wet conditions.

RHA is classified as a highly reactive pozzolan. It has a very high silica content like that of SF. Using less cost and locally existing RHA as a mineral admixture in concrete takes benefits to the cost and the technical properties of concrete and the atmosphere as well. RHA is a porous material. Pore structure is the most important representative of this material. The change of this representative results in a different specific surface area (SSA) and therefore a different pozzolanic reactivity and different water absorption of RHA. Rice husk ash has been studied to replace SF as a partial Portland cement additional, and the results show that RHA can fully addition of SF in terms of calcium hydroxide consumption, autogeneous shrinkage, compressive strength and durability of high-performance concrete and ultra high-performance concrete. However, the effect of Rice husk ash on properties of High performance fine- grained concrete needs to additional investigation.

The objective of this study is to examine effects imposed by RHA blending on properties of High performance fine- grained concrete. Blending percentages were varied. Slump, compressive and splitting tensile strength, abrasion resistance and chloride penetration resistance of concrete containing RHA were estimated. These properties were measured for the reference and SF containing samples as well. The knowledge obtained in this study can be helpful for optimizing strength and durability of mortar and concrete in future applications.

2 EXPERIMENTAL PROGRAMM

2.1 COLLECTING OF MATERIALS

Portland cement, RHA, SF, limestone powder (LSP) and two kinds of natural sand, i.e. fine sand and coarse sand stood used to study. RHA was produced by burning rice husk under proper temperature circumstances in a simple furnace prototype in India. It was designed based on the principle of the atmospheric bubbling fluidized bed. The obtained ash was ground in a ball mill. The physical properties and the chemical composition of the cement, RHA, SF and LSP are takenin Table 1. The physical properties of fine and coarse sand are existing in Table 2. In addition, a polycarboxylate-based superplast- icizer was used.

IMPACT OF QUARRY DUST & DOLOMITE POWDER ON COMPRESSIVE STRENGTH OF CONCRETE

Syed Afzal Basha[1],
Research Scholar, JNTUA, Anantapur, A.P.,
Dr. B. Jayarami Reddy[2],
Professor & HOD, Dept of Civil Engg, YSR Engineering College of YVU, Prodattur, A.P.
Dr. C. Sashidhar[3],
Director, Industrial Consultancy Services, JNTUA, Anantapur, A.P.

ABSTRACT-The purpose of this work is to describe the effect of quarry dust and dolomite on the compressive strength of concrete. The present examinations indicate that dolomite may be used as partial replacement of cement in concrete and quarry dust may be suitably replaced with fine aggregate in concrete to some extent. The results are found to be satisfactory with the individual replacements but the combination of both quarry dust and dolomite did not yield the positive results with respect to compressive strength of concrete.

KEY WORDS: **Dolomite, Quarry dust, Compressive strength, Partial Replacement**

INTRODUCTION

Concrete is a composite material that consists of binding medium, such as mixture of Portland cement and water, within which are embedded particles or fragments of aggregate, usually a combination of fine and coarse aggregate. Concrete is by far the most versatile and most widely used construction material worldwide. Today, the rate at which concrete is used is much higher than it was 50 years ago. It is estimated that the present consumption of concrete in the world is of the order of 33 billion metric tonnes every year.

The construction industry has shown great gains in the utilization of recycled industrial by-products and wastes, including Quarry dust waste. If fine aggregate is replaced by Quarry dust waste by specific percentage and in specific size range, it will decrease fine aggregate content and thereby reducing the ill effects of river dredging and thus making concrete manufacturing industry sustainable. By using these recycled by-products and wastes we can, not only save the landfill space but also it reduces the demand for fine aggregate.

The reduction in the consumption of cement will not only reduce the cost of concrete/project but also the emission of carbon-di-oxide. Dolomite powder obtained by powdering the sedimentary rock forming mineral dolostone can be used as a replacement material for cement in concrete up to certain percentage. Dolomite powder has some similar characteristics of cement. Using dolomite powder in concrete can reduce the cost of concrete and may increase the strength to some extent.

LITERATURE REVIEW

Eldhose M Manjummekudy et al., studied the effect of eco sand (extracted dolomite) as a partial replacement for fine aggregate and the results indicates that 25% of fine aggregate replacement with eco sand had maximum compressive strength and also stated that the voids are minimized with dense packing.

Huseyin Temiz et al. studied the performance of dolomite in concrete. In this research, it was found that the setting time was increased on addition of dolomite. Heat of hydration was less when compared with the cement concrete made with Ordinary Portland Cement. Compressive strength of mortar cubes were increased on addition of dolomite.

Durga.B et al. studied the effects of silica when used as a partial replacement to fine aggregate. The nearer optimal replacement percentage arrived in case of compressive strength was 60% with 39.30 N/mm^2.

K.Chinnaraju et al. studied the effects of eco sand (extracted dolomite) as a partial replacement of fine aggregates in cement mortar and cement concrete. The study revealed that the replacement of fine aggregate with eco sand beyond 40% shows higher rate of water absorption and demanded more water. The optimum replacement of eco sand was found to be 40%. The cement mortar cubes were tested for 7 days and 40% replacement showed higher compressive strength. The compressive strength was increased by 12.7%.

Olesia Mikhailova et al., conducted research on dolomite powder. From the results it is observed that the 25% of dolomite powder addition enhanced the early strength and structure of concrete was dense in the early stages without any detrimental effect to later ages.

MATERIALS AND METHODOLOGY

Cement: Ultra tech Ordinary Portland cement (OPC) conforming to Grade 53, is used in the proposed work. Cements produced by Ultra tech manufacturers conform to the following IS Codes: IS: 8812-1989 & IS: 12269-1987 respectively.

Quarry dust: The concept of replacement of natural fine aggregate by quarry dust which is highlighted in the investigation could boost the consumption of quarry dust generated from quarries. By replacement of quarry dust, the requirement of land fill area can be reduced and can also solve the problem of natural sand scarcity. Quarry dust is a byproduct of the crushing process

EXPERIMENTAL INVESTIGATION OF REPLACING FINE AGGREGATE WITH STONE DUST IN CONCRETE

Syed Afzal Basha[1], Sakevalla Vinay Babu[2], Pamtee Pavithra[3]

[1]Professor, Department of Civil Engineering, G. Pullaiah College of Engineering and Technology
[2]Associate Professor, Department of Civil Engineering, G. Pullaiah College of Engineering and Technology.
[3]Assistant Professor, Department of Civil Engineering, G. Pullaiah College of Engineering and Technology.

ABSTRACT

BACKGROUND

Concrete is an assemblage of cement, aggregate and water. The most commonly used fine aggregate is sand derived from river banks. The global consumption of natural sand is too high due to its extensive use in concrete. The demand for natural sand is quite high in developing countries owing to rapid infrastructural growth, which results supply scarcity. Therefore, construction industries of developing countries are in stress to identify alternative materials to replace the demand for natural sand. On the other hand, the advantages of utilisation of by-products or aggregates obtained as waste materials are pronounced in the aspects of reduction in environmental load and waste management cost, reduction of production cost as well as augmenting the quality of concrete. River sand is most commonly used as fine aggregate in concrete, but due to acute shortage in many areas, availability, cost and environmental impact are the major concern. To overcome from this crisis, partial replacement of sand with stone dust can be an economic alternative. Design mix of M25 grade of concrete with replacement of 0%, 10%, 20%, 30%, 40% and 50% of stone dust respectively have been considered for laboratory analysis. Slump test, compaction factor test, compressive strength, split tensile strength are carried out in our investigation.

KEYWORDS

Stone Dust, Compressive Strength, Split Tensile Strength.

HOW TO CITE THIS ARTICLE: Basha SA, Babu SV, Pavithra P. Experimental investigation of replacing fine aggregate with stone dust in concrete. J. Technological Advances and Scientific Res. 2018; 2(4):195-197, DOI: 10.14260/jtasr/2016/36

BACKGROUND

The natural sand deposits are depleting and illegal sand mining is becoming uncontrollable issue. In-stream, sand mining has become a common practice and resulted in a mushrooming of river sand mining activities, which have given rise to various problems that require urgent action by the authorities.

Also, when we use the river sand as fine aggregate, it leads to the exploitation of natural resources, sinking of bridge piers, lowering of water table and erosion of river bed. The construction industry has shown great gains in the utilisation of recycled industrial by-products and wastes including Stone dust waste. If fine aggregate is replaced by Stone dust waste by specific percentage and in specific size range, it will decrease fine aggregate content and thereby reducing the ill effects of river dredging and thus making concrete manufacturing industry sustainable. By using these recycled by-products and wastes, we can not only save the landfill space, but also it reduces the demand for fine aggregate.

Experimental Program

The present experimental programme includes casting and testing of specimens for Compression, Split tensile strength. Specimens are prepared for M25 grade of concrete. Total of 108 specimens (shown in table) with various percentages of stone dust are casted.

Cement, sand and aggregate were taken in mix proportion 1:1.22:2.15, which correspond to M25 grade of concrete. Fine aggregate is replaced with stone dust as 10%, 20%, 30%, 40% and 50%. All the ingredients were dry mixed homogeneously. To this dry mix, required quantity of water was added (W/C=0.45) and the entire mix was again homogeneously mixed. This wet concrete was poured into the moulds, which was compacted through hand compaction in three layers and then kept into the vibrator for compaction. After the compaction, the specimens were given smooth finishes. After 24 hours, the specimens were demoulded and transferred to curing tanks wherein they were allowed to cure for respective 3, 7 and 28 days.

Financial or Other, Competing Interest: None.
Submission 17-11-2016, Peer Review 30-11-2016,
Acceptance 04-12-2016, Published 10-12-2016.
Corresponding Author:
Sakevalla Vinay Babu,
#46/50a/508,
Sreerama Nagar,
Kurnool-518002.
E-mail: vinaysake@gmail.com
DOI: 10.14260/jtasr/2016/36

Materials used in the Investigation

Cement

Portland Pozzolana Cement was used and which is manufactured by Ultratech Company conforming to IS 8112:1989. The specific gravity of the cement was noticed as 3.10. The initial and final setting times were found as 40 minutes and 380 minutes, respectively.

Fine Aggregate

Locally available river sand passing through 4.75 mm I.S. Sieve was used. The specific gravity of the sand was found to be 2.7.

Coarse-Aggregate

Crushed cement aggregate available from local sources has been used. To obtain a reasonably good grading, 60% of the aggregate passing through 20 mm I.S. Sieve and retained on 12.5 mm I.S. Sieve and 40% of the aggregate passing through 12.5 mm I.S. Sieve and retained on 10 mm I.S. The specific gravity of the combined aggregate is 2.7.

Water

Potable fresh water available from local sources was used for mixing and curing.

Analysis of Test Results

The fresh and hard concrete properties were presented in the table 2 to 5. All the tests were conducted in the laboratory. The mixes were denoted differently in the tables. The detailed nomenclature of the mixes were read as-

Global Journal of Trends in Engineering

Effect Of Compressive Strength On Rigid Pavements By Using Synthetic And Glass Fibers In Cement Concrete Pavement

C Thejaswini Veena [1], Syed Afzal Basha[2], B.Shweetha[3]

[1] Assistant Professor, Department of Civil Engineering, G Pullaiah College of Engineering and Technology, Kurnool, A.P State India
[2] Assistant Professor, Department of Civil Engineering, G Pullaiah College of Engineering and Technology, Kurnool, A.P State India
[3] Assistant Professor, Department of Civil Engineering, G Pullaiah College of Engineering and Technology, Kurnool, A.P State India

ABSTRACT: The cost of petroleum products are going up every day and its availability is also depleting very rapidly. The situation has now made engineers reconsider the option of rigid pavement or cement concrete roads as a long term solution for connectivity. Many improvements were made in performance concrete using admixtures and by using innovative techniques to reduce heat of hydration. One among the innovative technique is addition of fibers to the concrete, basically started as an ingredient to control or prevent cracks, later on the engineers have learnt the additional strength gain achieved when fibers are added. There are different types of fibers available in the market polyester, polypropylene, glass, steel etc under various trade names and for various applications. We are studying the relative performance of concrete by adding different types of non-metallic fibers namely Poly Propylene, polyester, glass fibers of high dispersion and high performance comparing with the standard control concrete. The objective is to arrive at a mix proportion using 20 mm & 12.5 mm coarse aggregates, manufactured sand as fine aggregate and high-level water reducing PCE based admixture with a control slump of 60 mm. Fibers are added as per manufacturer's specification. Compressive strength are found out by conducting tests on 1day, 3 days, 7 days & 28 days. The strengths of the samples are compared against standard control sample and their efficiency with respect to control sample are calculated.

I. INTRODUCTION

Transportation contributes to the economic, industrial, social and cultural development of a country. Even though there are four modes of transportation, namely, roadways, railways, waterways and airways the transportation by road is the only mode which can give maximum service to one and all. This mode has maximum flexibility for travel with reference to route, direction, time and speed of travel etc. Therefore the construction of roads and its maintenance has got much importance than other modes of transportation.

A. Types of pavements— Based on the structural behavior, pavements are generally classified into two categories:

- Flexible pavements(Bitumen)
- Rigid pavements(Concrete)

B. Flexible pavements—The pavements which are surfaced with bituminous (or asphalt) materials are known as flexible pavements. These types of pavements are called "flexible "because the total pavement structure bends or deflects due to traffic loads. A flexible pavement structure is generally composed of several layers of materials which can accommodate this "flexing". Flexible pavements are those, which on the whole have low or negligible flexural strength and are rather flexible in their structural action under the loads.

2. *Fiber reinforced concrete* —Plain concrete possesses a very low tensile strength, limited ductility and little resistance to cracking. Internal micro cracks are inherently present in the concrete and its poor strength is due to the propagation of such micro cracks, eventually leading to brittle fracture of the concrete.

In plain concrete and 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.

When loaded, the micro cracks propagate and open up, and owing to the effect of stress concentration, additional cracks form in places of minor defects. The structural cracks proceed slowly or by tiny jumps because they are retarded by various obstacles, change of direction in bypassing the more resistant grains in matrix. The development of such micro cracks is the main cause of inelastic deformations in concrete.

It has been recognized that the addition of small, closely spaced and uniformly dispersed fibers to concrete would act as crack arrester and would substantially improve its static and dynamic properties. This type of concrete is known as Fiber Reinforced Concrete.

Fiber reinforced concrete can be defined as a "composite material consisting of mixtures of cement mortar or concrete and discontinuous, discrete, uniformly dispersed suitable fibers".

The concept of using fibers as reinforcement is not new. Fibers have been used as reinforcement since ancient times. Historically, horsehair was used the concept of composite materials came into being and fiber-reinforced concrete was one of the topics of interest. Once the health risks associated with asbestos were discovered, there was a need to find a replacement

Global Journal of Trends in Engineering

Design of shear walls in response spectrum method using etabs-2013

K Sowjanya[1], Syed Afzal Basha[2], C Thejaswini Veena[1]

[1] Assistant Professor, Department of Civil Engineering, G Pullaiah College of Engineering and Technology, Kurnool, A P State India
[2] Assistant Professor, Department of Civil Engineering, G Pullaiah College of Engineering and Technology, Kurnool, A P State India
[3] Assistant Professor, Department of Civil Engineering, G Pullaiah College of Engineering and Technology, Kurnool, A P State India

ABSTRACT: The shortage of housing is acutely felt in urban areas more so in the 35 Indian cities, which according to the 2001 census have a population of more than a million. In order to overcome this problem construction process should be quick, tall and effective to accommodate huge population in a given area. Constructions made of shear walls are high in strength, they majorly resist the seismic force, wind forces and even can be build on soils of weak bases by adopting various ground improvement techniques. Not only the quickness in construction process but the strength parameters and effectiveness to bare horizontal loads are very high. Shear walls generally used in high earth quake prone areas, as they are highly efficient in taking the loads. Not only the earth quake loads but also wind loads which are quite high in some zones can be taken by these shear walls efficiently and effectively.

I. INTRODUCTION

1.1 Definition-Shear walls are vertical elements of the horizontal force resisting system. Shear walls are constructed to counter the effects of lateral load acting on a structure. In residential construction, shear walls are straight external walls that typically form a box which provides all of the lateral support for the building. When shear walls are designed and constructed properly, and they will have the strength and stiffness to resist the horizontal forces.Shear wall buildings are usually regular in plan and in elevation. However, in some buildings, lower floors are used for commercial purposes and the buildings are characterized with larger plan dimensions at those floors. In other cases, there are setbacks at higher floor levels. Shear wall buildings are commonly used for residential purposes and can house from 100 to 500 inhabitants per building.

1.2 Scope of the work

The aim of constructing the shear wall is to investigate the different ways in which the tall structures can be stabilized against the effects of strong horizontal wind loading and seismic loading. Some other reasons why we use shear walls are tall structures can be constructed which reduces the area used and we can accommodate a large population in that particular area. Other objective is to construct a cost effective structure in less period of time. This study helps in the investigation of strength and ductility of walls. The scope is to analyze the constructed shear wall that is to be constructed. Firstly the model is implemented into known computer software and then it is analyzed based on the investigation of strength and ductility. The strength of shear walls tested is compared with the calculated strengths based on design codes.

1.3 Purpose of Constructing Shear Walls

Shear walls are not only designed to resist gravity / vertical loads (due to its self-weight and other living / moving loads), but they are also designed for lateral loads of earthquakes / wind. The walls are structurally integrated with roofs / floors (diaphragms) and other lateral walls running across at right angles, thereby giving the three dimensional stability for the building structures.

Shear wall structural systems are more stable. Because, their supporting area (total cross- sectional area of all shear walls) with reference to total plans area of building, is comparatively more, unlike in the case of RCC framed structures.

Walls have to resist the uplift forces caused by the pull of the wind. Walls have to resist the shear forces that try to push the walls over. Walls have to resist the lateral force of the wind that tries to push the walls in and pull them away from the building. Shear walls are quick in construction, as the method adopted to construct is concreting the members using formwork.

1.4 Comparisons of Shear Wall with Construction of Conventional Load Bearing Walls

Load bearing masonry is very brittle material. Due to different kinds of stresses such as shear, tension, torsion, etc., caused by the earthquakes, the conventional unreinforced brick masonry collapses instantly during the unpredictable and sudden earthquakes. The RCC framed structures are slender, when compared to shear wall concept of box like three-dimensional structures. Though it is possible to design the earthquake resistant RCC frame, it requires extraordinary skills at design, detailing and construction levels, which cannot be anticipated in all types of construction projects. On the other hand even moderately designed shear wall structures not only more stable, but also comparatively quite ductile. In safety terms it means that, during very severe earthquakes they will not suddenly collapse causing death of people. They give enough indicative warnings such as widening structural cracks, yielding rods, etc., offering most precious moments for people to run out off structures, before they totally collapse. For structural purposes we consider the exterior walls as

Special Issue Published in International Journal of Trend in Research and Development (IJTRD),
ISSN: 2394-9333, www.ijtrd.com

Effect of Utilization of Quarry Dust in Concrete

Syed Afzal Basha,
Research Scholar, JNTUA, Ananthapuramu, A.P., India

Abstract- Concrete is a mixture which generally consists of cement, fine aggregate, coarse aggregate and water. Natural river sand is the most commonly used material as fine aggregate in concrete. Concrete has found its wide application in buildings throughout the world because of positive attributes such as durability, high resistance to loads, and the possibility of using local raw materials in the preparation of concrete. Sand is a naturally occurring granular material composed of finely divided rock and mineral particles. River sand is used along with cement, gravel, water and steel for making reinforced concrete. Along with cement and water, it is used as concrete for joint filling and plastering. Sand Mining is an activity referring to the process of the actual removal of sand from the foreshore including rivers, streams and lakes. Sand is mined from beaches and inland dunes and dredged from ocean beds and river beds. The reduction in the sources of natural sand and the requirement for reduction in the cost of concrete production has resulted in the increased need to identify substitute material to sand as fine aggregates in the production of concretes especially in Concrete. The concept of replacement of natural fine aggregate by quarry dust which is highlighted in the study could boost the consumption of quarry dust generated from quarries. By replacement of quarry dust, the requirement of land fill area can be reduced and can also solve the problem of natural sand scarcity. Quarry dust satisfies the reason behind the alternative material as a substitute for sand at very low cost. It even causes burden to dump the crusher dust at one place which causes environmental pollution.

I. INTRODUCTION

Quarry dust is a byproduct of the crushing process which is a concentrated material to use as aggregates for concreting purpose, especially as fine aggregates. In quarrying activities, the rock has been crushed into various sizes; during the process the dust generated is called quarry dust and it is formed as waste. So it becomes as a useless material and also results in air pollution. Therefore, quarry dust should be used in construction works, which will reduce the cost of construction and the construction material would be saved and the natural resources can be used properly. Most of the developing countries are under pressure to replace fine aggregate in concrete by an alternate material also to some extent or totally without compromising the quality of concrete. Quarry dust has been used for different activities in the construction industry, such as building materials, road development materials, aggregates, bricks, and tiles. The present work mainly deals with the influence of different replacement proportion of sand with quarry dust on the properties of concrete. The present study is planned to study the effects of quarry dust addition in normal concrete and to assess the rate of compressive strength development.

II. LITERATURE SURVEY

1. Mahendrana et al studied on feasibility of the usage of Quarry Rock Dust as hundred percent substitutes for Natural Sand in concrete. It is found that the compressive, flexural strength and Durability Studies of concrete made of Quarry Rock Dust are nearly 10% more than the conventional concrete.
2. Kathirvel. P et al studied the Durability of SCC with Partial replacement of cement by Quarry and limestone (dust) Powder by (10%, 20%, and 30%) and comparing the properties like Density Variation, Compressive Strength, Water Sorptivity for 28, 60, 90 and 120 Days age with respect to control SCC.
3. Santhosh Kumar.P.T et al made an attempt to study the effect of type of fine aggregate on the 28 day compressive strength of concrete. The result of the investigation indicate that the ratio of the 28 day compressive strength of concrete with crushed stone sand to that of river sand is 1.06 with a coefficient of variation of 11 %.
4. Felekoglu et al. observed that the incorporation of quarry waste at the same cement content generally reduced the super plasticizer requirement and improved the 28 days' compressive strength of SCC. Normal strength SCC mixtures that contain approximately 300–310 Kg of cement per cubic meter can be successfully prepared by employing high amount of quarry waste.
5. Sukumar et al. found that the relations have been established for the increase in compressive strength at premature ages of curing (12 h to 28 days) for different grades of SCC mixes and are compared with the IS Code formula for straight concrete as per IS: SP 23-1982.
6. Ho et al. explained that the granite fines can be used in the SCC production. However, it is important to spot out that, as a waste material, the properties of stone fines are likely to vary with time. Then, after that, the fineness of granite fines could solve durability problems, such as silica-alkali reactions. These two issues would require to be addressed if the material is to be used with assurance.
7. Muhit et al. determined that passing from 200 mm sieve is used as cement replacement whereas retaining from 100 mm sieve is used as sand replacement. Cement was replaced with stone dust in percentage of 3, 5, and 7 percent. Similarly, sand was replaced with stone dust in percentage of 15 to 50 with an increase of 5 percent. Test result gives that compressive strength of mould with 35% of sand and 3% of cement replacing dust increases to 21.33% and 22.76% in that order compared to the normal concrete mould at 7 and 28 days for tensile strength which increased to 13.47%.
8. According to Soutsos et al., the physical characteristics of recycled destruction aggregates may unfavorably affect the properties of the blocks. However, levels of replacement of quarried stone aggregates with destruction recycled aggregates determined that it will not have significant harmful effect on the compressive strength.

III. PROPERTIES OF MATERIALS

A. Cement

The cement used for this work is ACC 43-grade Portland pozzolana cement. The various properties of cement are tabulated in Table below.

Global Journal of Trends in Engineering

Use of Recycled Plastic in Railway Sleepers

S.G.Bhagya Sree[1], G.Tayaba[2], Syed Afzal Basha[3]

[1,2]Dept of Civil Engineering,G Pullaiah College of Engineering and Technology, Kurnool, Andhra Pradesh, India

[3]Sr Asst ProfessorDept of Civil Engineering, G Pullaiah College of Engineering and Technology, Kurnool, Andhra Pradesh, India

[s.g.bhagya66,g.tayaba,syedafzal74]@gmail.com

ABSTRACT:The change that plastic bought can't be replaced by other resources. Mostly known fact that the mother earth is a facing a global environmental problem. This problem can be least reduced by plastic recycling. INDIA is the country that largely depends on railway networks. So the material used in the railway manufactures should of good quality, economical, eco-friendly and strong. Most used is timber, steel, concrete that becomes exhaust after several decades. So, as to prevent this we need the material that can be replaced these sources. Now a-days, plastic is considered as main fuel in many production industries. The plastic has a good quality about its duration and life span against decomposition so that this make it most eco-friendly these days. It lead to rapid change that all sleepers are replaced by plastic sleepers in most of the railways. So our work is to observe the working and performance of recycled plastic railway sleepers employed in the railway networks.

I. INTRODUCTION

Railway sleepers made from waste plastic, including recycled bumper scrap and old computer cases could putting in an appearance on railway tracks soon. It is made by using sleepers from waste polystyrene and polyethylene. Polystyrene is commonly used in disposable coffee cups, and polyethylene is more likely to be seen hanging from trees in the form of plastic bags. But the longevity of this plastic means that railway sleepers made using it can potentially last for century compares to a few decades for sleepers made from wood or concrete. Wood and concrete also have other disadvantages. Concrete sleepers are very heavy and crack easily, and wooden sleepers require a lot of maintenance and chemical treatments to prevent them from rotting in both cases, the sleepers have a lifetime of a few decades maximum .Stress test have demonstrated that the plastic sleepers are at least as strong as concrete sleepers. With the cost of maintaining the railway and underground systems spiraling, plastic sleepers therefore offer an affordable alternative. And they could help Network Rail hit its target of using 23% recycled material.

II. PLASTIC SLEEPERS

Plastics used in our everyday life can be used to manufacture composite plastic sleepers provided we dispose the plastics in recycling bins rather than on lands or water bodies. Recycling plastics for manufacturing sleepers for railways is an effective way in overcoming the environmental issues related to plastics. Plastics sleepers are more durable and efficient when compared to the traditionally used sleepers made from wood and concrete. So we should encourage the use of plastics in our country and rest of the world. It is essential in the production of recycled plastic sleepers and other tools used for laying tracks by railway sector. Plastics used in our everyday life can be used to manufacture composite plastic sleepers provided we dispose the plastics in recycling bins rather than on lands or water bodies. Recycling plastics for manufacturing sleepers for railways is an effective way in overcoming the environmental issues related to plastics. Plastics sleepers are more durable and efficient when compared to the traditionally used sleepers made from wood and concrete.

Production Process of Composite Plastic Sleepers

The composite plastic sleeper constitutes of mixture of plastics, rubber from postconsumer tires, rubber buffering from retreaters, chemical additives, and various fillers, waste materials and reinforcement agents like fiber glass or vermiculite. There are five stages involved in the manufacturing process which establishes efficiency and consistency in production.

Below are the stages involved in the process:

- Raw Material Selection and Handling
- Compounding and Mixing
- Shaping, Forming and Cooling
- Texturing
- Quality Assurance

e-ISSN 2751-2009

Global Journal of Trends in Engineering

Performance of Underground Dams as a Solution for Sustainable Management of Drought

A.R.M.N.V.Tharun Kumar[1], K.Mahesh Babu[2], Syed Afzal Basha[3]
[1,2] IV B.Tech, Dept. of Civil Engineering, G.Pullaiah College of Engineering and Technology, Kurnool, Andhra Pradesh, India
[3] Sr.Asst.Professor ,Dept of Civil Engineering, G.Pullaiah College of Engineering and Technology, Kurnool, Andhra Pradesh, India
[tharun447, babumahesh.k2011,syedafzal74]@gmail.com

ABSTRACT: In this study, underground dams are briefly described and detailed information regarding the design and construction aspects are provided and various types of dam wall are discussed. The use and usefulness of the underground dams as a means sustainable development and their performance in the management of the ground water resources are analyzed by taking **KURNOOL** district an example ground water dam is built, in a coastal aquifer, the recharged water that would flow towards the sea could be prevented by providing the additional storage. This is the contribution to the sustainable development. It is also demonstrated that the approaches utilized in this study are useful for the planning and design of groundwater dams.

I. INTRODUCTION

As surface water resources become fully developed, for new development, ground water offers the only possible option. In arid regions where surface water resources are very scarce or even non-existent, the ground water is the only available water resource. Groundwater sustainability may be defined as development and use of ground water in a manner that can be maintained for an indefinite time without causing unacceptable environmental, economical or social consequences in coming decade's sustainability of water resources will be one of the key issues and the shift towards groundwater will be inevitable.

REVIEW ON GROUND WATER DAMS

A groundwater dam is a structure that obstructs the natural flow of ground water and stores water below the ground surface. There are basically two types of groundwater dams. They are:

1. Sub-Surface dams
2. Sand-Storage dams

Sub-Surface dams:

A sub-surface dam is constructed below ground level and arrests the flow in a natural aquifer. The principle of a sub-surface dam is relatively simple; a trench is dug across the valley, reaching down to bed rock or their impervious, solid, impervious layer at a suitable location. In the trench an impermeable wall or barrier is constructed and the trench is refilled with excavated material. A sub-surface reservoir created this way retains water during wet season and may be used as a water resource throughout the dry season. Various construction materials has been used for the impermeable barrier such as clay, concrete, stone masonry, reinforced concrete, brick, plastic, tarred-felt, sheets of steel, corrugated iron or PVC.

The average height of sub-surface dams generally vary in the range of **2 to 6 mts**. Injection screens may, however grow up to 10 mts or more. The crest of a sub-surface dam is usually kept at some depth below the surface to avoid water logging in the upstream area. Sub-surface dams are generally built at the end of dry season, when there is minimum water in the aquifer.

Sand-Storage dams:

A sand-storage dam impounds water in sediments caused to accumulate by the dam itself. The general principle of a sand-storage dam is a weir of suitable size is constructed across the stream bed, sand carried by heavy flows during the rains is deposited, and the reservoir is filled up with sand. This artificial aquifer is replenished each year during the rains, and the water stored is used during the dry season. Types of sand-storage dams include concrete, stone masonry, gabion with clay cover, and gabion with clay core, stone-fill concrete and stone-storage dams.

The height of a sand-storage dam is typically **1 to 4 mts**. Water is generally extracted by placing a drain at the reservoir bottom along the upstream side of the dam and connecting the drain to a well or to a gravity supply pipe through the dam wall. Sand-storage dams are more suitable for gravity extraction than sub-surface dams.

e-ISSN 2751-2009

International Journal of Engineering Research and Development
e-ISSN: 2278-067X, p-ISSN: 2278-800X, www.ijerd.com
Volume 7, Issue 4(Jan 2019), PP. 11-16

Analysis of the Compressive Strength of PET Fibre Reinforced Recycle Aggregate Concrete using Regression Models

N.Venkata Ramana[1], R.Harathi[2], S.Narasimha Babu[3], S.Vinay Babu[4]
[1]*Assistant Professor, Civil Engineering Department, JNTUA college of Engineering, JNTUA Anantapur, Andhra Pradesh (State), India (Country).*
[2] *Assistant Executive Engineer, I and CAD Department, HLC Division, Anantapur, Andhra Pradesh (State), India (Country).*
[3]*Assistant General Manager, Ramky Infrastructure, Hyderabad, Andhra Pradesh (State), India (Country).*
[4]*Asst.Professor, Departmnent of Civil Engineering,G Pullaiah College of Engineering, Kurnool, Andhra pradesh (State), INDIA (country).*

Abstract:-This paper presents the compressive strength of PET fibre reinforced recycles aggregate concrete. The Natural Aggregate (NC) was replaced by recycle aggregate (RA) in the proportion of 25, 50, 75 and 100%. PET fibres were added to the Recycle Aggregate Concrete (RAC) by 1 and 2% volume. Total 45 cubes were cast and tested. The results showed that as the % of RA and volume fraction of PET fibre content increases the strength was decreased. For obtained experimental results three simple Regression Models (RMs) were synthesized and the same are presented in this article.

Key words:- RAC, PET fibres, Compressive strength, Cube, Regression Models.

I. INTRODUCTION

The aggregate occupies about 75 to 80% of the concrete volume and play a substantial role in different concrete properties such as fresh and harden concrete properties, dimensional stability and durability. Conventional concrete consists of sand as fine aggregate and gravel, limestone or granite in various sizes and shapes as coarse aggregate. There is a growing interest in using waste materials as alternative aggregate materials. In this context Demolished Waste Material (DWM) of building or any structure (after completing of its lifespan) or during modernization, waste is generated. This can be utilized in the concrete as RA. Many research works has been carried out on RAC. Now days the plastic is also is a waste and this waste is using for many works as recycle products. Among the plastics family Polyethylene Terephthalate (PET) is one of the major product using by the society in the form of various articles. In this connection a review is presenting below related to PET fibres and RAC.

Marzouk et.al. [1] conducted the experimentation on concrete with plastic waste. The plastic material was used as sand substitution in the concrete. The results showed that the use of plastic bottle waste was effective and it attracts as low cost material. Siddique et.al.[2] investigated the effective utilization of waste products (tires, plastic, glass etc) in concrete. The study showed that the use of waste product in concrete not only makes it economical but also helps in reducing disposal problem. Kou et.al.[3] reported that splitting tensile strength of PVC concrete. From their study it is noticed that as PVC content increases the strength was decreased. Akcaozoglu et.al. [4] investigated the use of shredded waste polyethylene using two types of binders. The authors found that the compressive strengths of mortar with PET aggregate is higher with combination of binders. Kandasamy and Mrugesan [5] reported the behavior of composite material consisting of cement based matrix with an ordered or random distribution of fibre of steel, nylon, polythene. The results showed that the addition of fibres increases the properties of concrete. Baboo Rai et.al.[6] reported the concrete properties produced with waste plastic with and without plasticizer. The study showed that reduction in workability and compressive strength with inclusion of plastic. But they also specified that with addition of Plasticizer the strengths were increased marginally. Bhogayata et.al.[7] presents a comparative study of compressive strength of concrete made by mixing of plastic bags as concrete constituent. The results showed that as increase of plastic the compaction factor and compressive strength decreases. Jianzhuang Xial et.al[8] has given a overview of study on recycle aggregate concrete. In this paper different properties and behavior was described.Xiao.J.Zh. et.al [9] has shown relationships between mechanical properties of RAC. From literature it is observed that there is a little work has been focused on PET fibres with combination of RA. So the authors had planned to evaluate compressive strength (CS) of PET fibre recycle aggregate concrete. To find CS of PET fibre reinforced recycle aggregate concrete 45 cubes were cast and tested in the laboratory.