ISSN 2394-3777 (Print)
ISSN 2394-3785
(Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology
(IJARTET) Vol. 3, Issue 1, January 2016

WASTE WATER TREATMENT IN TEXTILE INDUSTRY BY RAPID SAND FILTER

[1]Esaithendral T [2]DEEPA D [3]GOKILA G [4]THIVYA BHARATHY P

[1] (Assistant Professor of Civil Engineering, Dhanalakshmi Srinivasan College of Engineering & Technology, Chennai-603104)

[2 3 4] (UG Student, Department of Civil Engineering, Dhanalakshmi Srinivasan College of Engineering & Technology, Chennai-603104)

ABSTRACT:

It has very recently gained good attention to be used as an effective filler material instead of fine aggregate. Also, the use of quarry dust as the fine aggregate decreases the cost of concrete production in terms of the partial replacement for natural river sand**.** Design mix of M25grade concrete with replacement of 0%, 20%, 25%, 30%, and 35% of quarry dust organized as specimen S1,S2,S3,S4&S5 respectively have been considered for laboratory analysis viz. slump test, compaction factor test, compressive strength ,split tensile strength and flexural strength of hardened concrete. In the present paper, the hardened properties of concrete using quarry dust were investigated.

1.0 INTRODUCTION:

Continues research efforts have established concrete as a versatile material, concrete required for extensive construction activity can be made available, since all the ingredients of concrete are of geological origin. Concrete is an assemblage of cement, aggregate and water. In the production of concrete, granite/basalt stone and river sand are used as course and fine aggregate, respectively although these materials are usually available, at some places it is economical to substitute these materials by locally available once.

At the same time increasing quantity of crushed stone dust is available from crushers as waste. The disposal of this is a serious environmental problem. If it is possible to use this crushed stone dust in making concrete by partial replacement of natural river sand, then this will not only save the cost of construction but at the same time it will solve the problem of disposal of this dust.

On the other hand, the advantages of utilization of byproducts or aggregates obtained as waste materials are pronounced in the aspects of reduction in environmental load & waste management cost, reduction of production cost as well as improving the quality of concrete.

This paper covers the batching and mixing process of concrete manufacture. The processes of batching and mixing of concrete or mortar materials are very similar to preparations of a dish in cookery as per a recipe wherein various ingredients depending on their individual properties have to be mixed in correct proportions to give the required flavor andtaste.

1.1 ADVANTAGES AND DISADVANTAGES:

ADVANTAGE:

- Acetic acid is also used in the production of several other chemicals, which are the used to make preservatives, fungicides and pesticides, coatings and pigments.

ISSN 2394-3777 (Print)
ISSN 2394-3785
(Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology
(IJARTET) Vol. 3, Issue 1, January 2016

- The availability of sand at low cost as a fine aggregate in concrete is not suitable and that is the reason to search for an alternative material. Quarry dust satisfies the reason behind the alternative material as a substitute for sand at very low cost.
- The concept of replacement of natural fine aggregate by quarry dust highlighted in the present investigation could improve the utilization of generated quarry dust, thus reducing the requirement of land fill area and conserving the scarcely available natural sand sustainable development.
- 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.

DISADVANTAGE:

- Acetic acid can be a hazardous chemical if not used in a safe and appropriate manner.
- This liquid is highly corrosive to the skin and eyes and, because of this, must be handled with extreme care.
- Acetic acid can also be damaging to the internal organs if ingested or in the case of vapor inhalation.
- This chemical is especially dangerous when it comes in contact with either the skin or eyes. In any instance of acetic acid exposure, it is important to seek help from a medical professional right away to help prevent damaging health effects.

.

1.2 OBJECTIVES

- To provide a most economical concrete.
- It should easily adopt in field.
- To reduce the cost of construction.
- To make the maximum usage of locally available materials.
- To study the compressive strength of concrete with various percentage replacement of quarry dust.
- To compare the compressive strength of partial replacement of sand with quarry dust.
- To study the workability of concrete using quarry dust.

MATERIAL PROPERTIES

GENERAL

Cement concrete is the most extensively used construction material in the world. The reason for its extensive use is that it provides good workability and can be moulded to any shape.

MATERIALS

CEMENT

- Cement is a binding material which process very good adhesion and cohesive properties which make it possible to bond with other material to form a compact mass.
- Ordinary Portland cement is the most commonly used cement for general engineering works. The specific gravity of all grades namely 33,43 and 53 grades.

ISSN 2394-3777 (Print)
ISSN 2394-3785
(Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology
(IJARTET) Vol. 3, Issue 1, January 2016

- In this project ordinary Portland cement of 43 grade is used it is used of experimental work Portland pozzolana cement was used in the casting the specimen . Portland pozzolana cement (PPC) is manufactured by the intergrading of OPC clinker with 10 to 25 percent of pozzolanic material (as per latest amendment, it is 15 to 35 %)
- Initial and final setting time of the cement was 30 min to 360 min

-
-

FINE AGGREGATE

- Sand is either round or angular in grains and is often found mixed in various gradation of fineness.
- A concrete can be made from sand consisting of rounded grains as good as form that in which the grains are granular.
- River or pit sand should be used and not sae sand as it contains salt and other impurities which will affect the structure.

- In this project river sand has been used as fine aggregate. The specific gravity of sand is found to be 2.67 by experiment.

Fine aggregate (River sand)

COARSE AGGREGATE

- Hard granite broken stones of less than 20mm size were used as coarse aggregate.
- The specific gravity, fineness modulus and water absorption of the coarse aggregate were tested.

Coarse aggregate

WATER

- Portable water available in laboratory with pH value of not less than 6 and conforming to the requirement of

ISSN 2394-3777 (Print)
ISSN 2394-3785
(Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology
(IJARTET) Vol. 3, Issue 1, January 2016

IS456-2000 was used for mixing concrete and curing the specimen as well.

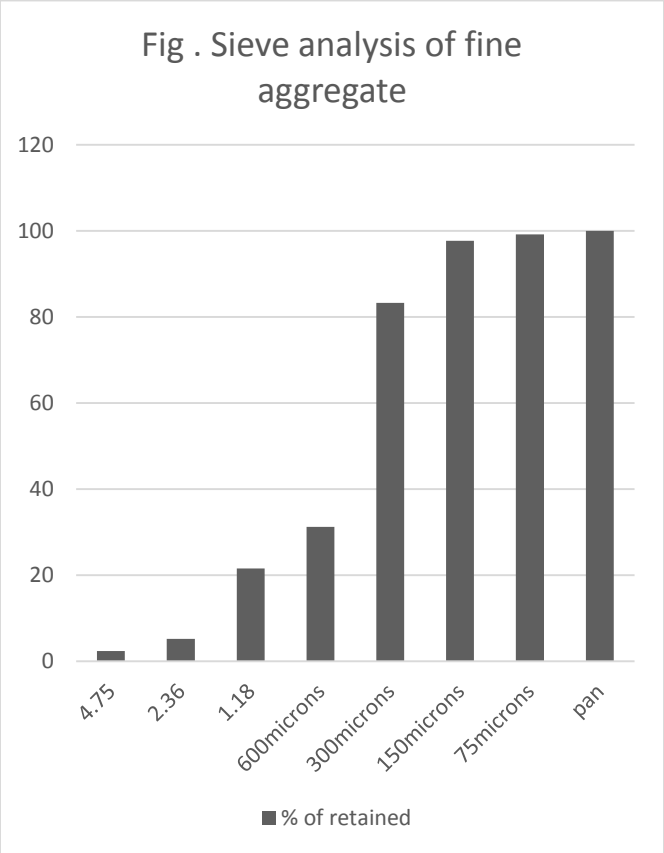
It is reduce corrosion resistance concrete structures and it respectively have been considered for investigation of to resisting

S. NO	Sieve size (mm)	Wt. of aggregate retained in gm	cumulative wt. of aggregate retained in gm	Cumulative percentage retained	Cumulative percentage passing
1	4.75	24	24	2.4	97.6
2	2.36	28	52	5.2	94.8
3	1.18	164	216	21.6	78.4
4	600microns	96	312	31.2	68.6
5	300 microns	521	833	83.3	16.7
6	150 microns	144	977	97.7	2.3
7	75 microns	15	992	99.2	0.8
8	pan	8	1000	100	0

Fineness modulus = cumulative % of weight retained/ 100

= 342/100

= 3.42%



SPECIMEN CASTING DETIALS

Specimen were cast to study the mechanical properties of the mixture.

- The Compressive strength of the concrete was determine by cubes of size 150mm×150mm×150mm.
- The Split tensile strength of the concrete was determine by cylinder of size 150mm ×300mm.

ISSN 2394-3777 (Print)
ISSN 2394-3785
(Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology
(IJARTET) Vol. 3, Issue 1, January 2016

- The Flexural strength of concrete was determine by prism size 100mm×100mm×500mm.
-

Cylinder

MIXING OF CONCRETE

- Through mixing of materials is essential for the production of uniform course.
- The mixing should ensure that the mass becomes homogeneous, uniform in colour and consistency.
- The mixing was done by hand mixing of coarse aggregate and cement.

POURING OF CONCRETE

- After mixing, the moulds are filled immediately by pouring the concrete inside.
- Concrete is filled in three layers, each layer is compacted well by using tamping rod, so as to avoid entrapped air inside the concrete cubes and honey combing effects on the sides.
- During pouring of concrete, is better to avoid wasting of concrete for effective and economical usage.

COMPACTION OF CONCRETE

- Compaction of concrete is process adopted for expelling the entrapped air from the concrete. In the process of mixing, transporting and placing of concrete air is likely to get entrapped.
- Concrete is filled in layers of 15 to 20mm, and each layer is compacted using tamping rod.
- During compaction the strokes should be distributed in a surface of concrete, and should not forcibly strike the bottom of the mould.
- After the top layer has been compacted, a strike off bar is used to strike out the excess concrete.

DEMOULDING

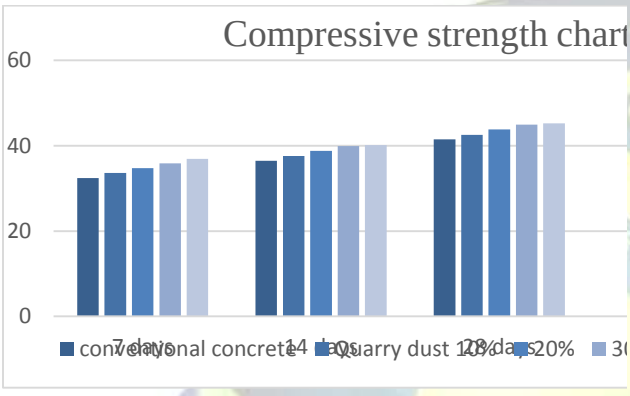
- The cube specimens are demoulded after 24 hours from the process of moulding.

ISSN 2394-3777 (Print)
ISSN 2394-3785
(Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology
(IJARTET) Vol. 3, Issue 1, January 2016

- If the concrete has not achieved sufficient strength to enable demoulding the beam specimen, then the process must be delayed for another 24 hours

(150mm×150mm)



Grade	% of replacement of quarry dust	Acetic acid adding in (ml)	Compressive strength of concrete(M/mm2)		
			7 days	14 days	28 days
M25	Nill	Nill	32.45	36.45	41.46
M25	10	0.5	33.62	37.62	42.53
M25	20	1	34.73	38.78	43.81
M25	30	1.5	35.83	39.91	44.97

Table Compressive strength test

SPLIT TENSILE STRENGTH OF CONCRETE

- The tensile strength of concrete is one of the basic and important properties which greatly affect the extent and size of cracking in structures.
- Moreover, the concrete is very weak in tension due to its brittle nature. Hence. it is not expected to resist the direct tension. So, concrete develops cracks when tensile forces exceed its tensile strength.
- Therefore, it is necessary to determine the tensile strength of concrete

ISSN 2394-3777 (Print)
ISSN 2394-3785
(Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology
(IJARTET) Vol. 3, Issue 1, January 2016

to determine the load at which the concrete members may crack.

- ❖ Calculate the splitting tensile strength of the specimen as follows:

T= 2P/ pi LD

Where:
T = splitting tensile strength, MPa

P: maximum applied load indicated

CONCLUSION

- ❖ As the percentage of Quarry Dust gradually increases, the Compressive strength of concrete will also increase with condition that percentage of Quarry Dust should not exceed 50%.
- ❖ The compressive strength of compressed concrete increase with the increase of age of maturity. The value of strength for 28 days higher than the strength for 7 days.
- ❖ In addition of acetic acid to the concrete specimen lead high corrosion and fungus resistance to the structure.
- ❖ According to the value of compressive strength collected, the value is high and it show that quarry dust suitable to use as sand replacement. All the value of compressive strength surpasses the minimum value of compressive strength for normal concrete that is 7N/mm .So, quarry dust can apply as sand replacement in concrete mix for construction industry.

- ❖ The following conclusion are presented based on experimental results from the present investigation.

14.0 REFERENCES:

- Beitzel H. Concrete production plants and mixers some aspects of their design and operation, Part 2. Beton + Fertigteil-Technik. 1984;5:305–310. [Google Scholar]
- ACI Committee 304. Guide for the use of volumetric-measuring and continuous-mixing concrete equipment. ACI; 1991. [Google Scholar]
- Standard test method for slump of hydraulic cement concrete, ASTM C143-90, 04.02, (1990).
- BEHAVIOUR OF REINFORCED CONCRETE BEAMS WITH COCONUT SHELL AS COARSE AGGREGATESby Cordilia Marboh1, Amrita Agnihotri , Rajni Raja Tomar ,Rahul Kumar Satbhaiya.
- PARTIAL REPLACEMENT OF AGGREGATE BY COCONUT SHELL AND CEMENT by Clay bySangeetha, Nirmala, Pugazhselvi, Ramya ,Er. K. Jeganmohan.
- PERFORMANCE OF WASTE COCONUT SHELL AS PARTIAL REPLACEMENT OF NATURAL COARSE AGGREGATE IN CONCRETE by Abdullah Anwar, Sabih Ahmad, Syed Aqeel Ahmed.
- A REVIEW ON PARTIAL REPLACEMENT OF COARSE AGGREGATE WITH COCONUT SHELL IN THE CONCRETEby Prof. Shrikant M. Harl.