SSRG International Journal of Civil Engineering
ISSN: 2348 – 8352 /doi:10.14445/23488352/IJCE-V7I3P101
Volume 7 Issue 3, 1-4, March 2020

An Experimental Investigation on Impact of Glass Powder And Waste Asbestos Cement Sheet As A Partial Replacement of Fine Aggregate And Coarse Aggregate

V. Jayasri [#1], K.G. Vinothan[*2], K.Venkatesh[#3], K.Saranya[*4]

[#1] *M.E., Structural Engineering, S.K.P Engineering College, Thiruvannamalai(D.T) 606601*
[*2] *Professor, Civil Department, S.K.P Engineering College, Thiruvannamalai(D.T) 606601*
[#3] *Head of Department, Civil Department, S.K.P Engineering College, Thiruvannamalai(D.T) 606601*
[*4] *Assistant Professor, Civil Department, S.K.P Engineering College, Thiruvannamalai(D.T) 606601.*

Received Date: 31 January 2020
Revised Date: 07 February 2020
Accepted Date: 12 March 2020

ABSTRACT:
The management of reuse of crushed waste Asbestos cement sheet and Glass powder is rapidly growing because it may be a valuable resource of the development. The use of waste materials could also be a partial solution to the environment and ecological problems. And therefore, the use of waste materials as aggregate will reduce the value of construction and provides an honest strength for the structure roads. A study is formed on the use of the crushed waste asbestos cement sheet as coarse aggregate in concrete with a continuing percentage replacement of 10% and glass powder as fine aggregate starting from 5%, 10%, 15%, 20%, 25% on the strength criteria of M20 concrete. The strength of concrete with and without replacement of crushed waste Asbestos cement sheet as coarse aggregate and glass powder as fine aggregate was observed, which exhibits an honest strength. Keywords- Asbestos cement sheet, glass powder, fine aggregate, coarse aggregate.

Keywords - *Asbestos cement sheet, glass powder fine aggregate, coarse aggregate.*

I. INTRODUCTION

Concrete is a crucial artefact is widely utilized within the development of infrastructures like buildings, bridges, highways, dams, and much of other facilities. Most concretes used Portland cement concrete or concretes made with other hydraulic cement. Almost altogether, countries within the world, various experiments are done at reducing the utilization of primary aggregates are introducing, which is economically technical or environmentally acceptable. As an end in developing countries like India, the informal sector and secondary industries recycle 15-20% of solid wastes in various building materials and components. During this research, Asbestos sheet waste used as a rough aggregate within the concrete mixes with 10% constant rate. When asbestos is used for its resistance to fireside or heat, the fibres are often mixed with cement or woven into fabric or mats. Similarly, Fine aggregate was partially replaced by waste glass powder as 5%, 10%, 15%, 20% and 25% by weight of fine aggregate. Concrete specimens were tested for compressive strength obtained were compared with results of M20 concrete.

II. LITERATURE REVIEW

Puppala jyothsna et al., 2017 The Concrete has low lastingness, partial ductility and tiny resistance to cracking, so on avoid these failures concrete is introduced with fibres to possess an added strength in the tension zone. A study has been conducted to figure out the effect of the addition of glass fibre in concrete. Within this work glass fibres in several percentages are varied as 0.5%, 1%, 2%, 3% are added to the amount of concrete are to be studied for the effect on mechanical properties of optical fibre ferroconcrete.

Rajalakshmi et al., 2017 The waste asbestos sheet utilized in concrete making results in greener Eco-Friendly environment. Use of waste asbestos sheet in concrete could also be an interesting possibility for an economy on waste disposal sites and conservation of natural resources. This project examines the likelihood of using the waste asbestos sheet as a replacement in coarse aggregate for a replacement concrete preparation. coarse aggregate partially replaced (0%,5%, 10%, and 15%) with waste asbestos sheet. Compressive strength and flexural strength up to the age of 28 days are compared with those age of concrete made with natural coarse aggregates. Fineness modulus, density, moisture content, water absorption for aggregate are studied. The test results indicate that it's possible to manufacture concrete containing a waste asbestos sheet with characteristics almost like those of natural coarse aggregate concrete as long

because the share of waste asbestos sheet as coarse aggregate is restricted to 10-15%, respectively.

Manu Chaudhary et al., 2015, during this research, I even have replaced the coarse aggregate partially by using asbestos cement sheet waste. It's a waste so by using asbestos cement sheet waste as a replacement we'll solve the issues of the price rising.

Patel et al., 2015 Concrete is that the leading construction material within the region of the earth and utilized in structural works, including infrastructure, low and high-rise buildings. It's a human-made artefact, essentially consisting of a mixture of cement, aggregates, admixture(s) and water. Inert granular materials like natural sand compacted stone or gravel form the foremost an area of the aggregates. Conservatively aggregates are available at economic prices also as of qualities to suit the entire purposes. But, the continued wide removal of aggregates has been questioned as of the depletion of main quality aggregates and a greater understanding of environmental safety. This paper reviews the literature associated with the effect of asbestos cement sheet waste on the flexural strength of concrete.

III. MATERIALS COLLECTION AND TESTING

Locally available in A.C. sheet waste and glass wastes were the first material utilized during this project work. Besides that, for concrete mixing purpose, ordinary hydraulic cement, crushed stone coarse aggregate, the fine aggregate was used. Normal water used for both concrete mixing and curing.

A. CEMENT:

The selection of the cement content depends on the strength requirements, exposure classes for durability, and thus, the minimum amount of fine aggregate requires within the mixture. The cement used for this study is ordinary hydraulic cement of 43-grade RAMCO.

B. FINE AGGREGATE:

The sand is of river sand screened and washed to urge obviate all the organic and inorganic components that are likely to present in it. Sand has been sieve in 4.75mm. Sand is taken from local construction material suppliers.

C. COARSE AGGREGATE:

The coarse aggregates that are used for the concrete are 20mm of the maximum size which they need to be angular and well graded. It's taken from local construction material suppliers.

D. ASBESTOS CEMENT SHEET:

Asbestos cement sheet waste is taken from roof sheet; they are crushed into the required size of 12mm to 20mm.

E. GLASS:

Glass waste is taken from girls hostel (S.K.P.). They were crushed into required size of to 36mm by sieve shaker.

F. PHYSICAL PROPERTIES:

a) CEMENT PROPERTIES

PARTICULARS	RESULTS OBTAINED	REQUIREMENTS AS PER IS 12269-1970
Fineness of cement(%)	4.3	3-7
Specific gravity	3.1	3.1-3.15
Normal consistency	32	30-35
Initial setting time(min)	32	30
Final setting time(hrs)	8	10

b) FINE AGGREGATE PROPERTIES

PARTICULARS	RESULTS OBTAINED	REQUIREMENTS AS PER IS 12269-1970
Specific gravity	2.54	2.60-2.90
Fineness modulus	2.89	-
Water absorption	0.7%	MAX 1%

c) COARSE AGGREGATE PROPERTIES

PARTICULARS	RESULTS OBTAINED	REQUIREMENTS AS PER IS 12269-1970
Specific gravity	2.707	2-3
Impact value	12.5	15-20
Water absorption	2.5%	1%-3%

d) ASBESTOS SHEET PROPERTIES

PARTICULARS	RESULTS OBTAINED
Specific gravity	1.59
Fineness modulus	7.33
Water absorption	4.41%

E. GLASS WASTE PROPERTIES

PARTICULARS	RESULTS OBTAINED
Specific gravity	2.55
Fineness modulus	2.65
Water absorption	1.66

IV. EXPERIMENTAL SETUP

A. CASTING OF THE SPECIMENS

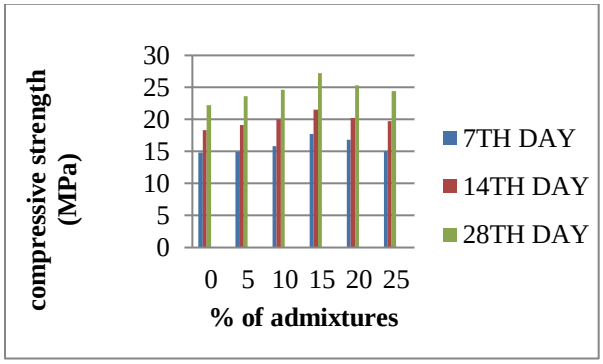
Specimens are cast using A.C. sheet waste is 10% constant rate because a load of coarse aggregate and glass waste are using different percentage like 0%, 5%, 10%, 15%, 20% and 25% because of the weight of fine aggregate for every specimen. Mixing is adopted in hand mixing. The materials are measured and mixed thoroughly. The steel moulds are cleaned well and bolded tightly then oiled.

V. RESULT AND DISCUSSION

A. COMPRESSIVE STRENGTH

The compressive strength is administered for the cubical specimens. The standard test results of compressive strength of concrete are graphically represented.

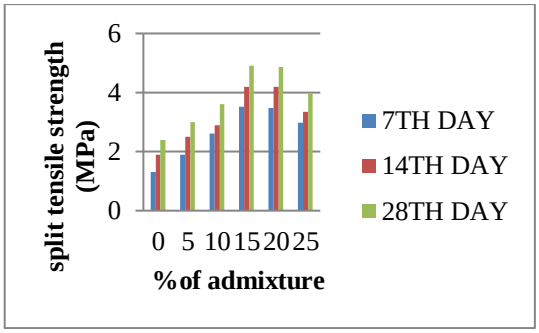
a) RESULT OF COMPRESSION STRENGTH TEST



B. SPLIT TENSILE STRENGTH:

The split lastingness is run for the cylindrical specimens. The standard test results of split lastingness of concrete are graphically represented.

a) RESULT OF SPLIT TENSILE STRENGTH TEST

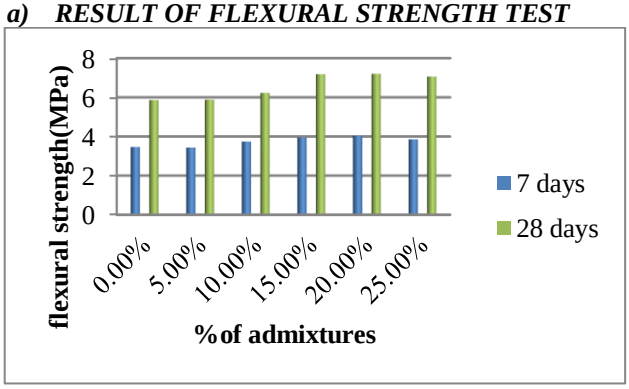


C. FLEXURAL STRENGTH TEST

TEST For the determination of flexural strength of concrete, beam specimens of dimension 500mmx100mmx100mm specimens were dried in outdoors after 7,14 and 28 days of curing and subjected to the flexural test under the flexural testing machine. The flexural strength (f) was obtained using the formula,

$$F = PL/bd^2 \ (N/mm^2)$$

a) RESULT OF FLEXURAL STRENGTH TEST



VI. CONCLUSION

From the experimental results and its analysis, that the compression strength of concrete initially increases with the replacement of concrete by A.C. sheet waste and glass waste.

From the experimental test result, we can conclude that,
In case of replacement of coarse aggregate by 10% asbestos cement sheet, waste and replacement of fine aggregate by 15% glass waste content can be taken as the optimum dosage for compressive strength.

The compression strength of concrete with constant replacement of A.C. sheet waste as coarse aggregate and increasing replacement of glass waste as fine aggregate for 7, 14 and 28 days at 15% (17.69, 21.52 & 27.25 N/mm^2) and it is comfortable to normal concrete.

It is waste material and abundantly available in the area of its production. Near the industry used in asbestos cement sheet waste, one can reduce the effective cost of the concrete, and it also helps full for the environmental point of view.

REFERENCES

[1] Gowthaman M, Devika K, Rajalakshmi.S., Experimental Investigation on Concrete by Partial Replacement of Waste Asbestos Sheet as Coarse Aggregatem, 5(11)(2017).

[2] Jahir Hussain .S, Jose Ravindra Raj. B.,Experimental Investigation on Partially Replacement of Fluorescent Lamp Powder With Cement And Fully Replacement of Fine Aggregate Based Concrete, (IJAER), 13(2017).

[3] Kara P, Korjakins A., Investigation of thermal properties of cement paste with lamp waste glass, Journal of Sustainable Architecture and Engineering, K.T.U., Kaunas, Lithuania, 2(3)(2013).

[4] Kaviya K, Seema.P., Strength and sturdiness properties of concrete by using fluorescent light tube waste replacing as fine aggregate, 6(06)(2017).

[5] Pappu Sharma, Parveen Berwal,Partially Replacement of Coarse Aggregate with Asbestos Sheet Waste in Concrete., 5(8)(2017).

[6] Puppala Jyothsna, Syed Moizuddin ,A Study On Strength Properties Of optical Fibre Reinforced Concrete, 6(2) (2017).

[7] V. Jayasri, K.G. Vinothan, K.Venkatesh, K.Saranya, A Experimental Investigation on Impact of Glass Powder And Waste Asbestos Cement Sheet As A Partial Replacement of Fine Aggregate And Coarse Aggregate, SSRG International Journal of Civil Engineering 7(3)(2020) 1-4.

[8] Sureshkumar E, Gobinath R, Shobana K, Prabhu V, Sivanesan K, Rathinamoorthy S, Manimuthu S.,Studies on properties of concrete with fluorescent waste glass powder, 2(11)(2013).

[9] S.M. Chikhalikar, S.N. Tande, Walchand ,An Experimental Investigation On Characteristic Properties Of Fibre ferroconcrete Containing Waste Glass Powder As Pozzolana, (2012).

[10] Abhishek Arya, ,Analyzing Self-consolidating Concrete with Glass Powder , International Journal of Engineering Trends and Technology, 59(1)(2018).

[11] Tomas U. Ganiron J ,Use of Recycled Glass Bottles as Fine Aggregates in Concrete Mixture, International Journal of Advanced Science and Technology ,61(2013).

[12] I.S.: 456-2000, Indian Standard code of practice for plain and ferroconcrete.

[13] IS 10262-2009, Indian Standard code of practice for recommended guidelines for concrete mix design.