International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 04 Issue: 06 | June -2017 www.irjet.net p-ISSN: 2395-0072

EXPERIMENTAL STUDY ON STRENGTH OF CONCRETE USING SUGGAR CANE BAGASSE ASH

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Abstract - *Cement is the most imp ingredient of the concrete which produces carbon dioxide which is may harmful. So it is a main concern to reduce the usage of cement. Some alternatives of cement should to used such as fly ash, RHA, Sugar cane baggage ash. The sugar cane baggage ash is available abundantly in India which is having disposal problem. Also it has property of which can produce high strength and reduce permeability of concrete. The silica present in the baggage ash reacts with the cement during hydration and produces additional properties such as chloride resistance corrosion restudies.*

Therefore the usage of baggage ash not only reduces the environment problem bat also improves quality of concrete. (This we are using SCBA replacing cement by 0%, 5%, 10%,15%, 20% and 25%. The Cubes and Cylinder were casted and tested for workability, compression and tensile strength at 7, 14 , 28 and 60 day.

Keyword: Sugar cane ash, cement, sand, aggregate, Compressive Strength, Tensile strength etc.

1. INTRODUCTION

Ordinary Portland cement is recognized as a major construction material through our world. Many researchers all over the world are focusing on utilizing the industrial or agricultural waste material industrial waste such as blast furnace slag fly ash and silica fume are uesel as replacement of cement and RHA and baggage ash are agricultural waste replaced by cement when agricultural waste is buried under controlled condition that gives good properties like amorphous silica pozzolonic properties etc. Therefore it is possible use sugar cane baggage ash as cement replacement to improve strength and reduce cost of construction material fiber is also used to improve tensile strength of concrete and reduce the concrete.

2. OBJECTIVE

The objective of using SCBA is to increase the strength of concrete by means of compressive strength And tensile strength replacing cement. The use of SCBA will also reduce the cost of construction as well as the disposal problem of baggage. As well as fiber is used to concrete the tensile strength of concrete and reduce the micro crack.

3. LITERATURE REVIEW

The beneficial reuse of waste products from industrial and agriculture seems to be the new trend now. Baggage is the by-product of sugar cane milling. About 33% of the baggage produced supplies the fuel for the generation of steam (Bilba et al 2003). According to ahmad and sheikh (1992), the physical and chemical properties of sugar cane baggage ash as found to satisfactory requirements for pozzolona . Which makes it good for replacing by cement partially. Researchers has said that the usage of sugar cane baggage ash as a partial replacement of cement.

4. MATERIAL AND METHODOLOGY

Bagasse is the fibrous matter that remains after extracted their juice form sugar cane. It can also be used to generate electricity. Dry bagasse is burnt to produce steam. For every 10 tonnes of sugar cane. Sugar factory produce nearly 3 tonnes of wet bagasse. T he high moisture content of bagasse is 40-50%.

Cement : volcanic ash and pulverized brick supplements that were added to the burnt lime, to obtain a hydraulic binder, were later referred to as cementum, cimentum, cäment, and cement. Sand grains are between gravel (with particles ranging from 2 mm up to 5 mm. Coarse Aggregate of graded 20mm size is used.

Concrete is the main port of construction. Which consent of cement sand and aggregate with water. The cement material is having high content of carbon dioxide which is very harmful as well as cement is costly. The alternative of cement should be found to improve the strength property of concrete. Sugar cane baggage ash has the property which can full fill the required of cement. This SCBA can be partially replaced by cement in various proportions as 0%, 5%, 10%, 15%, 20% and 25%. The moulds are prepared and curing for 7, 14 and 28, 60 day then strength compression and tensile will be obtainable.

5. RESULT AND ANALYSIS

All the materials are tested for their strength so can material will contribute better result for compressive strength and spilt tensile strength.

Table 1. Cement Test

All the cement tests were performed and results were taken. All reading were within permissible value.

CEMENT TEST	RESULT
Fineness Test	4.6%
Consistency Test	32%
Initial Setting Time	31min 35 Sec
Final Setting Time	10 Hours
Specific gravity of Cement	3.15

Table 2 . Aggregate Test

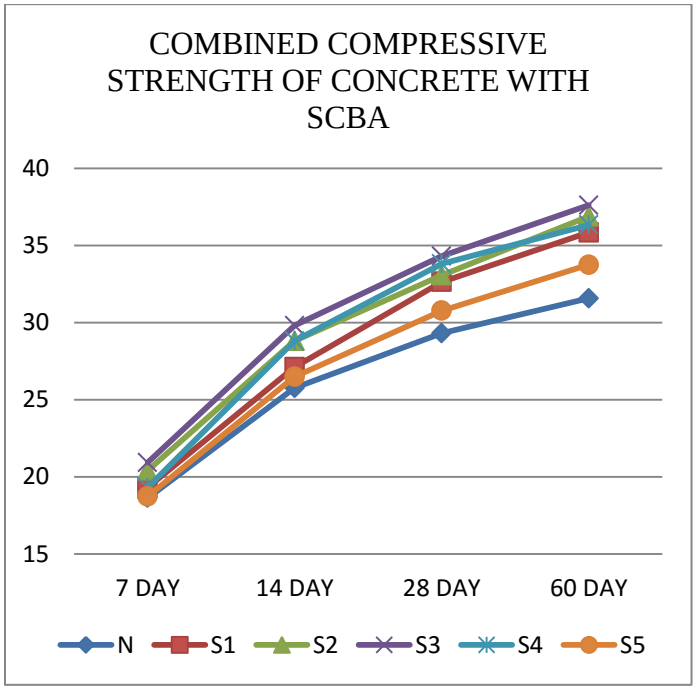
AGGREGATE TEST	RESULT
Bulk Density	1490 Kg/m^3
Specific Gravity: Fine aggregate Course aggregate	2.6 2.6
Fineness Modulus	6.66
Abrasion Test	26.3
Impact Value	13.95
Crushing Value	19.11

5.1 COMPRESSIVE STRENGTH TEST:

As it is evident from Table 3, an enhancement in 60 days compressive strength compared to control sample occurs for the sugar cane ash.. Higher compressive strength of LWC specimens as 37.60 KN/mm^2 in 15% replacement of SCA by cement on 60th day of curing. The result of the compressive strength of concrete cubes show that the compressive strength increases by using some amount of SCA.

Table 3 . Compressive Strength Test of Concrete with SCA

Name	Quantity of SCBA with respect to cement	Compressive Strength Of Concrete (N/mm^2)			
		7Day	14Day	28Day	60 day
N	-	18.63	25.75	29.30	31.56
S1	5%	19.30	27.10	32.63	35.84
S2	10%	20.40	28.80	33.06	36.87
S3	15%	20.92	29.80	34.30	37.60
S4	20%	19.30	28.80	33.80	36.32
S5	25%	18.72	26.48	30.76	33.74



Graph 1. Combined graph of Compressive strength with SCBA

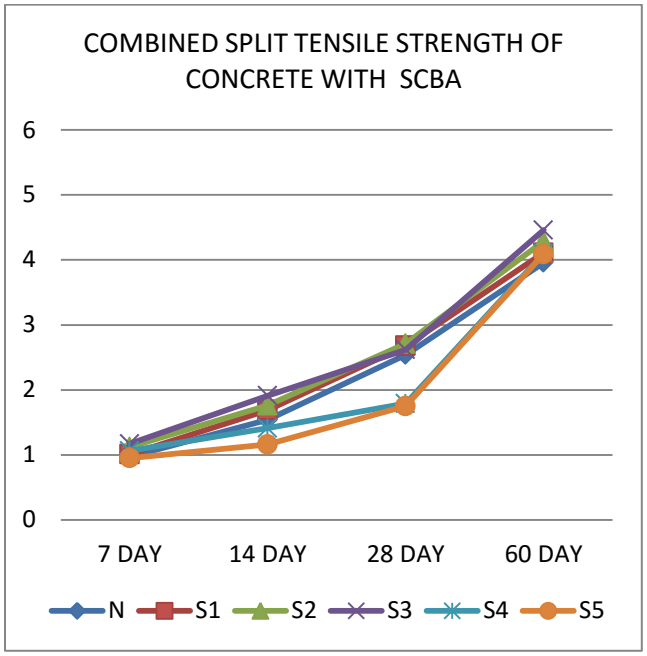
The combined Graph 1, compressive strength of various proportions by replacing cement with sugarcane baggage ash. The baggages are collected from near shops and burnt, the ash has been collected and sieved for using as a replacement of cement because it is having Pozzolana property. The proportions of SCBA replaced cement are taken as 0%, 5% 10%, 15%, 20% and 25%. and compressive test is 31.56 N/mm2, 35.84 N/mm2, 36.87 N/mm2, 37.60 N/mm2, 36.32 N/mm2 and 33.74 N/mm2 on 60th day respectively. The compressive strength of concrete using SCBA increases upto use of 15% replacement of cement and after 15% that is 20% and 25% strength of concrete deduces. The maximum result is by replacing 15% of cement by SCBA is20.92 N/mm2, 29.80 N/mm2, 34.30 N/mm2 and 37.60 N/mm2 on 7th, 14th, 28th and 60th day of curing.

5.2 SPLIT TENSILE STRENGTH TEST:

The results show that the Split Tensile strength at 60 days increased with the replacement of 15 percent cement with SCA. This is due to the higher specific area of the SCA which accelerated the pozzolanic reaction.

Table 4.Split Tensile Strength of S.C.A. Concrete:

S.No.	Split Tensile Strength of Concrete (N/mm^2)			
	7 Day	14Day	28Day	60 day
N1	0.97	1.54	2.54	3.96
S1	1.01	1.69	2.68	4.11
S2	1.12	1.76	2.71	4.29
S3	1.17	1.91	2.62	4.46
S4	1.06	1.41	1.79	4.10
S5	0.95	1.16	1.75	4.09



Graph 2. : Split Tensile strength of Concrete with SCBA

Graph 2, shows that the result of the Split Tensile strength of concrete cubes shows variation of Tensile strength of concrete with respect to SCBA replacement is **3.96 N/mm², 4.11N/mm², 4.29N/mm², 4.46N/mm2, 4.10N/mm² and 4.09N/mm2** for 0%, 5%, 10%, 15%, 20% and 25% respectively on the age of 60th day. However, the Tensile strength increased as the no. of days of curing increased for each percentage S.C.A. replacement. The maximum tensile strength is in 15% replacement of cement by SCBA. The Split Tensile Strength of 15% replaced concrete with SCBA is 1.17 N/mm2, 1.91 N/mm2, 2.62 N/mm2 and 4.46 N/mm2 at 7th, 14th, 28th and 60th day of curing.

6. CONCLUSION

1. Due to addition of S.C.B.A. it is observed that early strength gain is slightly increasing with addition of 05%, 10% and 15% S.C.B.A. when compared with normal concrete at 28thdays and 60th day.
2. As we take S.C.B.A. by varying percentage 0%, 5%, 10%, 15%, 20% and 25%, we find Compressive strength is 31.56N**/mm², 35.84N/mm², 36.87N/mm², 37.6N/mm², 36.32N/mm² and 33.74N/mm²** respectively on 60th day. It means that Compressive strengths of concrete increases upto 15% replacement of cement by S.C.A. Thereafter if replacement is more than 15% strength of concrete reduces.
3. As we take S.C.B.A. by varying percentage 0%, 5%, 10%, 15%, 20% and 25%, we find tensile strength is **3.96N/mm², 4.11N/mm², 4.29 N/mm², 4.46 N/mm²,**

4.1 N/mm² and 4.09N/mm² respectively on 60th day. It means that tensile strengths of concrete increases. upto 15% replacement of cement by S.C.A. Thereafter if replacement is more than 15% strength of concrete reduces.

4. Thus S.C.B.A. are abundantly available in Utter Pradesh, there it can be considered as a low cost material.
5. Environmental problem of disposal is getting sorted out by reusing the wastage in a better way.

7. REFERENCE

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8. BIOGRAPHIES

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