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EXPERIMENTAL STUDY ON COMPRESSIVE STRENGTH OF CONCRETE USING FLYASH AND SUGAR

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Abstract - *The compressive strength of concrete varies if we use different parameters. We test the compressive strength of concrete cube M25, of site 150X150x150 using selected above parameters. A set of 3 cubes are prepared to be tested on 7. 14. and 28 days after being properly mixed and cured. In this test case we observed that the compressive strength is increases as the days of curing increased*

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

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 used 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 pozzolanic 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.

1. OBJECTIVE

The objective of using SCBA is to increase the strength of concrete by means of compressive strength replacing cement. The use of SCBA will also reduce the cost of construction as well as the disposal problem of baggage

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 pozzolana. 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.

2. MATERIAL AND METHODOLOGY

Fly ash: known as flue-ash is one of the residues generated in combustion and comprises the fine particles that rise with flue gases. Ash that does not rise is called bottom ash. In an industrial context fly ash usually refers to ash produced during combustion of coal. Fly ash generally captured by electrostatics precipitators or other particles filtration equipment before the flue gases reach the chimneys of coal fired power plants and together with bottom ash is removed from the bottom of the furnace is in the case jointly known as coal ash. Depending upon the source and make-up of the coal being burned the component of the fly ash vary considerably but all the fly ash includes substantial amounts of silicon dioxide(Si02) and calcium oxide(Ca0), both being endemic ingredients in many coal bearing rocks strata.

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, cementum, cement, and cement.

Sugar: In Sugar production the beets are first shredded into cassettes from which the juice is extracted. The juice is then processed like that of sugar cane yielding sugar and beat molasses. The residue after juice extraction known as wet sugar beet pulp is 10-15% dry matter. It is high in water content, both from the point of view of transport and storage limits it is used to the vicinity of the sugar mill.

The wet pulp can be pressed to remove the excess water, thereby raising the dry matter content to 20%.Pressed pulp though easier to transport has the same poor keeping qualities if heaped and covered to exclude air, it can be stored up to two weeks. For Longer storage it should be ensiled.

3. MIX DESIGN:

1. Target Mean strength :

$f_{ck}' = f_{ck} + 1.65s$

= (25 + 1.65 x 4)

= 31.6 n/mm^2

S is calculated from IS : 10262-2009 Table-1

2. Water-Cement Ratio

As per IS 456 -2000, Table-5

Maximum w/c ratio = 0.5

Adopt w/c ratio = 0.45

3. As per lS:10262-2009 :

for 20mm coarse aggregate water required =186lit

For 100 mm slump value,
Estimated water =186+186X6/100
=197 lit

4. Cementing material(Cement +Fly ash +sugar)

w/c =0.45
=197/c= 0.45
=438 kg/m^3

Sugar, 5%of cementing material =21.9kg/m^3

Flay ash, 30%of cementing material=131.4kg/m^3
= 438-(131.4+21.9)

Cement =284.7kg/m^3

5. From table-3 I5:10262-2009

Volume of coarse aggregate =0.62
Volume of fine aggregate =1-0.62
= 0.38

6. Mix Calculations

Volume of concrete =1 m^3
Volume of cement = (284.7/3.15 x 1/1000)
=0.0904 m^3

Volume of water = (197/1 x 1/1000)
= 0.197m^3

Volume of fly ash = (131.4/2.4)x(1/1000)
=0.0548m^3

Volume of sugar =0.0085

Volume of all aggregate
=1 - (0.094+0.0548+0.0085+0.197)
=0.6493m^3

Mass of C.A. =(0.6493x0.62x2.74x1000)
=1103.03 kg/m^3

Mass of F.A. = (0. 6493x0.38X2.74x1000)
= 676.05 kg/m^3

7. Proportions:

Cement	F.A.	C.A.	Sugar	Fly Ash
287.7	67605	1103.03	21.9	131.4
1	2.375	3.874	0.077	0.462

8. Requirement for 3 Blocks:

Cement =2.88kg

Fine Aggregate =6.85kg

Coarse Aggregate=11.16kg

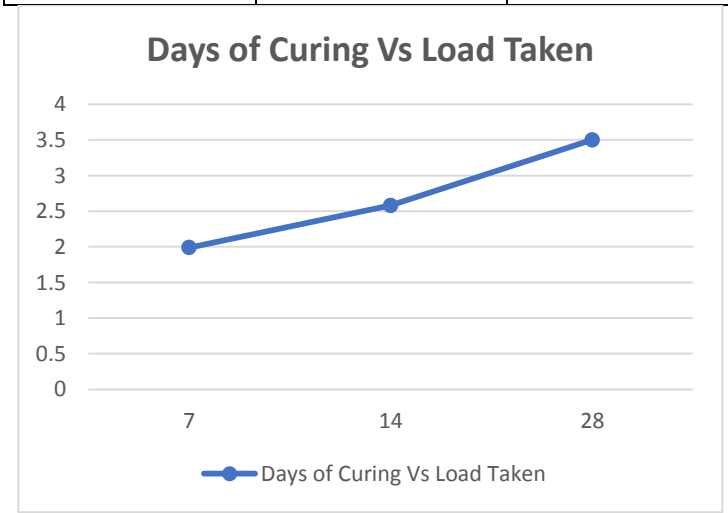
Sugar =0.223kg

Fly ash =1.33kg

Water =1.3kg

4. RESULT OF COMPRESSIVE STRENGTH TEST :

Days of Curing	Load taken by the Cube (KN)	Compressive Strength of Cubes
7	44.77	1.99 N/mm^3
14	58.00	2.58 N/mm^3
28	70	3.11 N/mm^3



Graph 1: Days of curing Vs Load Taken

5. CONCLUSION

1. The 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.
2. Thus S.C.B.A. are abundantly available in and it can be considered as a low cost material.
3. Environmental problem of disposal is getting sorted out by reusing the wastage in a better way.

6. REFERENCE

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7. BIOGRAPHIES

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