



INVESTIGATION ON STRENGTH CHARACTERISTICS OF CONCRETE BY USING DISCRETE WASTE

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ABSTRACT: The mechanical and monetary development saw in late decades has carried with it an expansion in the age of various kinds of waste (urban, modern, development, and so forth.) in spite of the waste administration arrangements which have been embraced broadly and universally the act of dumping as well as the insufficient administration of waste from the different assembling divisions have notably affected the getting condition. Simultaneously, these practices speak to a financial expense. Nonetheless, if squander is overseen effectively, it tends to be changed over into an asset that adds to investment funds in crude materials, preservation of characteristic assets and the atmosphere, and advances feasible turn of events. Sugar stick is one of the most significant agrarian plants that developed in India. Bagasse is a side-effect of the sugarcane business. The consuming of bagasse leaves bagasse debris as a waste, which has a pozzolanic property that would conceivably be utilized as a concrete substitution material. It has been realized that the overall complete creation of sugarcane is more than 1500 million tons. Regardless of assortment utilization of bagasse, for creation of wood, papers, creature food, manure and warm protection, insights show that around one million tone extra of bagasse debris stays in the nation.

KEYWORDS: Bagasse, pozzolana, Slump, Compressive Strength, SCBA

1.0 INTRODUCTION

The mechanical and monetary development saw in ongoing decades has carried with it an expansion in the age of various sorts of waste (urban, modern, development and so on.) in spite of the waste administration arrangements which have been embraced broadly and globally the act of dumping as well as the deficient administration of waste from the different assembling parts have notably affected the getting condition. Simultaneously, these practices speak to a monetary expense. Be that as it may if squander is overseen effectively it tends to be changed over into an asset which adds to reserve funds in crude materials, protection of common assets and the atmosphere, and advances reasonable turn of events. Sugar cane is one of the most significant farming plants that developed in India. Bagasse is a result of the sugarcane business. The consuming of bagasse leaves bagasse debris as a waste, which has a pozzolanic property that would possibly be utilized as a concrete substitution

material. It has been realized that the overall complete creation of sugarcane is more than 1500 million tons. Regardless of assortment utilization of bagasse, for creation of wood, papers, creature food, manure and warm protection, measurements show that around one million tone extra of bagasse debris stays in the nation.

Sugarcane comprises about 30% bagasse though the sugar recouped is about 10%, and the bagasse leaves about 8% bagasse debris (this figure rely upon the quality and sort of the kettle, present day heater discharge lower measure of bagasse debris) as a waste. As the sugar creation is expanded, the amount of bagasse debris delivered will likewise be enormous and the removal will be an issue.

Sugarcane Bagasse Ash

The sugarcane bagasse debris comprises of around half of cellulose, 25% of hemicelluloses and 25% of lignin. Every ton of sugarcane produces roughly 26% of bagasse (at a dampness substance of half) and 0.62% of remaining debris and generally limited quantities of dissolvable solids. Almost all bagasse created in India is scorched for vitality required for sugar handling. The overflow vitality is gathered into power. The buildup after ignition presents a substance sythesis rules by silicon dioxide (SiO₂). Regardless of being a material of hard corruption and that presents not many supplements, the debris is utilized on the ranches as a compost in sugarcane harvests. In this sugarcane bagasse debris was gathered during the activity of evaporator working in the Nava Bharat Ventures Sugar Factory, situated in the Samalkot, East Godavari District, and Andhra Pradesh.

The creation of sugarcane shifts from year to year, the fundamental factor for such varieties being climatic conditions, the normal yearly yield being about 5.6 million tons Bagasse. Bagasse debris is at present viewed as a waste item with practically zero use. It has negative worth, in that, the sugar production lines need to go through cash to discard it. Besides, it is a possible ecological contamination. It is evaluated that 20,000 tons of bagasse debris are created each year. This speaks to about 0.3 percent of stick squashed or about 2.8 percent of the dry load of bagasse.

The prime utilization of bagasse debris in cement would be as pozzolana, that is, as a halfway swap for concrete. Another chance is its utilization as a fine total, despite the fact that the amounts accessible are little contrasted and the national yearly utilization of about 1.2 million tons of fine total. The last necessity is at present being fulfilled by pulverizing basalt rock and quarrying in lessening stores of common coral sand. Just a modest quantity (around 3750 tons for every year) is utilized for making tar fortified sheets.



Fig.1 Sugarcane Bagasse

Despite the fact that India is saving little exertion in building up its modern area, its economy will keep on relying upon sugar creation for a long time to come. The sugar industrial facilities on their side will keep on relying altogether upon bagasse consuming for vitality. The gracefulness of bagasse debris is, in this way, guaranteed for a considerable length of time ahead

Objective of the Work

The principle target of the work is contemplating the impact on the quality on fractional supplanting of concrete with bagasse debris. In this work, we study the examination between quality minor departure from NCC and bagasse debris supplanted concrete. From the examination we can discover out how much economy can be accomplished on utilizing bagasse debris as halfway swap for concrete. The targets of the work are as per the following:

- To improve the quality properties of eco-effective cements so as to use them in significant development ventures including high quality necessities.
- Develop frameworks to alleviate and eventually stay away from modern waste material.

2.0 LITERATURE REVIEW

[1] **R.Srinivasn,(2010)** had studied on “Experimental study on use of bagasse ash in concrete”. Bagasse ash mainly contains aluminum ion and silica. In this paper, Bagasse ash has been chemically and physically characterized, and partially replaced in the ratio of 0%, 5%, 15% and 25% by weight of cement in concrete. Fresh concrete tests like compaction factor test and slump cone test were undertaken as well as hardened concrete tests like compressive strength, split tensile strength, flexural strength and modulus of elasticity at the age of seven and 28 days was obtained

[2] **Sugumaran.B, Pradeep.T (2012)** have studied on “Experimental study on the compressive strength of concrete by partial replacement of cement with sugarcane bagasse ash”. In this paper the feasibility of using sugarcane Bagasse Ash (SBA), a finely ground waste product from the sugarcane industry, as partial replacement for cement in conventional concrete is examined

[3] **Marcos Oliveira de Paula (2010)** has examined the “Sugarcane bagasse ash as a partial Portland cement replacement material”. This investigation is focused on the evaluation of the effects of the partial replacement of Portland cement by sugar cane bagasse ash (CBC) in mortars.

[4] **Manu Santhanam (2014)** have studied “Development of sugarcane bagasse ash-based Portland pozzolana cement and evaluation of compatibility with super plasticizers”. Sugarcane bagasse ash is a by-product from sugar industries and can be used as supplementary cementitious material in concrete.

3.0 EXPERIMENTAL WORK

The way toward choosing reasonable elements of cement and deciding their relative sums with the target of creating a solid of the required, quality, solidness, and functionality as monetarily as could be expected under the circumstances, is named the solid blend structure. The proportioning of elements of cement is administered by the necessary execution of cement in two states, to be specific the plastic and the solidified states. In the event that the plastic cement isn't serviceable, it can't be appropriately positioned and compacted. The

property of usefulness, along these lines, is the fate of indispensable significance. The compressive quality of solidified solid which is commonly viewed as a list of its different properties, contingent on numerous components, for example w/c proportion quality and amount of concrete, water, total, bunching, putting, compaction and restoring. The expense of cement is comprised of the expense of material, plant and work. The variety in the expense of material emerge from the way that the concrete is a few times exorbitant than the totals, subsequently the point is to create as lean a blend as could be expected under the circumstances.

Table 3.1 No. of specimens prepared for determining hardened properties.

Specimens	No. of specimen cured in water					
	NORMAL MIX	SCBA 5%	SCBA 10%	SCBA 15%	SCBA 20%	SCBA 25%
Cubes	9	9	9	9	9	9
Cylinders	9	9	9	9	9	9
Beams	9	9	9	9	9	9
Total	27	27	27	27	27	27

OBSERVATIONS:

Slump Cone Test:

This test is used extensively in site all over the world. The slump test does not measure the workability of concrete, but the test is very useful in detecting variations in the uniformity of a mix of given nominal proportions.

The apparatus for conducting the slump test essential consists of a metallic mould in the form of a cone having the internal dimensions as under

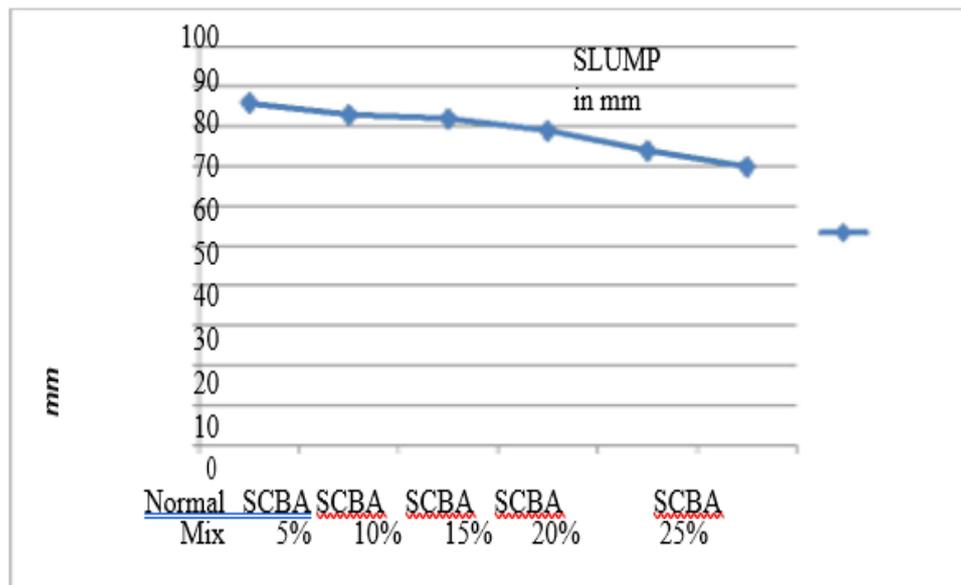
Bottom diameter: 200 mm

Top diameter : 100 mm

The mould for slump is a frustum of a cone, 300 mm high. It is placed on a smooth surface with the smaller opening at the top, and filled with concrete in three layers. Each layer is tamped twenty-five times with a standard 16 mm diameter steel rod, rounded at the end, and the top surface is struck off by means of sawing and rolling motion of the tamping rod. The mould must be firmly fixed against its base during the entire operation; this is facilitated by handles or foot-rests brazed to the mould. Immediately after filling, the cone is slowly lifted vertically up, and the unsupported concrete will now slump – hence the name of the test. The difference in level between the height of the mould and that of highest point of subsided concrete is measured. This difference in height in mm is taken as slump of concrete.

Table 3.2 Slump Cone Test Result

<u>S.No</u>	Mix Id	Slump (mm)
1	NORMAL MIX	85
2	SCBA 5%	84
3	SCBA 10%	81
4	SCBA 15%	78
5	SCBA 20%	73
6	SCBA 25%	71

**Graph 3.1 Slump test VS mixes****Types of Mix**

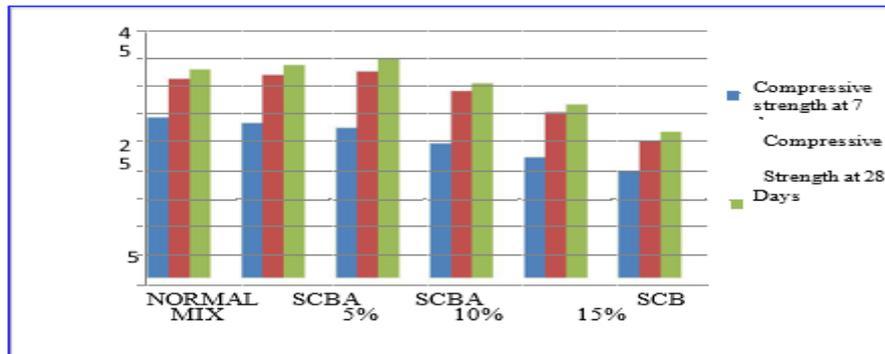
From the above graph the slump for SCBA 5% has decreased 4.7% when compared with the Normal Mix. The slump for SCBA 10%, SCBA 15%, SCBA 20% and SCBA 25% has reduced by 6.9 %, 10.5%, 16.3% and 21% when compared with Normal mix. The slump value was gradually decreasing when compared with normal mix. To get the required slump we can use the chemical admixture.

Compressive Strength:

The compressive strength of the concrete was done on 150 x 150 x 150 mm cubes. A total of 54 cubes were cast for the five mixes. i.e., for each mix 9 cubes were prepared. Testing of the specimens was done at 7 days, 28 days and 90 days, at the rate of three cubes for each mix on that particular day. The average value of the 3 specimens is reported as the strength at that particular age.

Table: 3.3 Compressive Strength Test Results

S.NO	Mix id	Compressive Strength (N/mm ²)		
		7 Days	28 Days	90 Days
1	NORMAL MIX	29.15	36.25	37.82
2	SCBA 5%	28.09	36.92	38.58
3	SCBA 10%	27.15	37.55	39.72
4	SCBA 15%	24.33	33.85	35.33
5	SCBA 20%	21.93	30.18	31.24

**Graph: 3.3 flexural strength****Observations:**

1. From the above diagram, the flexural quality qualities got by testing standard solid shapes made with various SCBA blends of 0-25%. The typical blend has quality above 30Mpa in pressure just as in flexure which is required quality
2. It was seen that the Flexural quality of SCBA 5% at 7 years old days has diminished by 3% when contrasted and typical blend. It was seen that the Flexural quality of SCBA 5% at 28 years old days has expanded by a 4.42% when contrasted and ordinary blend. It was seen that the Flexural quality of SCBA 5% at 90 years old days has expanded by 4.32% when contrasted and ordinary blend.
3. It was seen that the Flexural quality of SCBA 10% at 7 years old days has diminished by 3% when contrasted and typical blend. It was seen that the Flexural quality of SCBA 10% at 28 years old days has expanded by 9.5% when contrasted and ordinary blend; it was seen that the Flexural quality of SCBA 10% at 90 years old days has expanded by 10.72% when contrasted and typical blend.
4. It was seen that the Flexural quality of SCBA 15% at 7 years old days has diminished by 28.7% when contrasted and typical blend. It was seen that the Flexural quality of SCBA 15% at 28 years old days has diminished by 2.4% when contrasted and typical blend. It was seen that the Flexural quality of SCBA 15% at 90 years old days has diminished by 6.4% when contrasted and ordinary blend.
5. It was seen that the Flexural quality of SCBA 20% at 7 years old days has diminished by 31.5% when contrasted and typical blend. It was seen that the Flexural quality of SCBA 20% at 28 years old days has diminished by 16.1% when contrasted and ordinary blend. It was seen that the Flexural quality of SCBA 20% at 90 years old days has diminished by 14.88 % when contrasted and typical blend.

6. It was seen that the Flexural quality of SCBA 25% at 7 years old days has diminished by 34.32% when contrasted and ordinary blend. It was seen that the Flexural quality of SCBA 25% at 28 years old days has diminished by 29.35% when contrasted and ordinary blend. It was seen that the Flexural quality of SCBA 25% at 90 years old days has diminished by 26% when contrasted and ordinary blend.

Closure

In this project exploratory work results are introduced. Usefulness of new concrete and testing of solidified solid systems are clarified in detail. The perceptions on test results were introduced and will be utilized to contemplate the conduct of new and solidified solid properties. In the following part ends and extent of future exploration work were introduced.

CONCLUSIONS:

In light of the investigation, following determinations can make.

- There is an adjustment in droop for SCBA 5% has diminished 3.5% when contrasted and ordinary blend.
- The droop for SCBA 10%, SCBA 15%, SCBA 20% and SCBA 25% has diminished by 4.7%, 8.2%, 14% and 18.7% separately when contrasted and the typical blend.
- The compressive qualities of SCBA blends at 7 years old days was steadily diminishes its quality when contrasted with ordinary blend due with pozzolanic action.
- It was seen that the compressive quality of SCBA 5% and SCBA 10% at 28 years old days has arrived at its objective mean quality; anyway, the compressive quality was expanded by 2.04% and 6.55% when contrasted and typical blend.
- The split elasticity of blends SCBA 5% and SCBA 10% at 28 years old days has builds its qualities by 4.42% and 9.5% separately when contrasted and the typical blend.
- The flexural quality of SCBA 15%, SCBA 20% and SCBA 25% at 28 years old days has diminishes it quality by 2.4%, 16.1% and 26.5% when contrasted and typical blend.

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