Study the Effect of Sugarcane Bagasse Ash Waste on Behaviour of Cement Mortar and Concrete as the Partial Replacement

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Abstract – India is the second largest in major sugar producing countries after Brazil. Bagasse is the waste generated after the sugar production process and further can be utilized in various other products as a raw material and also combusted directly in the boiler for power generation in sugar mill itself. There is generation of ash after direct combustion. Sugar cane bagasse ash is the waste product of the combustion of bagasse for energy in sugar factories. It is further disposed of in landfills and is now becoming an environmental burden.

In this exploratory research work solid 3D squares, shafts and chambers of M20 review were threw with various level of Bagasse fiery debris substance and tried to look at different properties of solid like workability, compressive quality. The concrete mortar comprising distinctive level of Bagasse fiery remains likewise analyze by leading tests like compressive quality, setting time and consistency test. Sugar stick bagasse fiery remains was mostly supplanted with bond at 3, 6, 9, 12, 15, 18 and 21 % by weight of bond in mortar and 5, 10, 15 and 20 % by weight of concrete in concrete. From the outcomes we can presume that ideal measure of sugar stick bagasse fiery debris that can be supplanted with bond is 5-10% by weight in cement and 9-12 % by weight in concrete mortar with no admixture.

Index Terms – Partial Replacement, Concrete, Workability, Durability Compressive Strength, Tensile and Flexural Strength.

1. INTRODUCTION

All through the world Ordinary Portland Cement is perceived significant development material. Standard Portland bond is the customary building material that really is in charge of around 5% - 8% of worldwide CO_2 discharges. This ecological issue will no doubt be expanded because of exponential request of Ordinary Portland Cement (OPC). (Bangar Sayali S et al)

Bond added substances are basic nowadays to improve the designing properties of concrete glue and cement. In writing, extraordinary added substance materials were utilized, for example, silica smolder, rice husk fiery remains, fly slag, and electric-curve heater tidy.

As of late, there has been an expanding pattern towards more proficient use of agro-mechanical buildups, including sugarcane bagasse. A few procedures and items have been accounted for that use sugarcane bagasse as a crude material. These incorporate power age, mash and paper generation, and items in view of aging.

1.1 Materials

Customary Portland concrete is utilized for the examination. The bagasse fiery remains utilized as a part of the examination is gotten from a Corporate Sugar Factory (Kareli Sugar Mill) in the adjacent region. The sugarcane bagasse comprises of around half of cellulose, 25% of hemicellulose and 25% of lignin. Every ton of sugarcane creates roughly 26% of bagasse (at a dampness substance of half) and 0.62% of leftover cinder. The deposit after ignition exhibits a concoction piece overwhelms by silicon dioxide (SiO_2).

2. LITERATURE REVIEW

Most of the researchers has been carried out there research work based on to find out the various alternative material to mix with the cement and find out there performance. The latest researches in this era are as follows:

"A new treatment for coconut fibers to improve the properties of cement based composites – Combined effect of natural latex/pozzolanic materials" (2017), Everton Jose da Silva, Maria Lidiane Marques, Fermin Garcia Velasco, Celso Fornari Junior, Francisco Martínez Luzardo, Mauro Mitsuuchi Tashi

This paper presents the results of experimental study with a new coconut fiber-cement composite (CFC). To get a material with enhanced execution so as to diminish the measure of calcium hydroxide introduce on the fiber surface, four types of coconut fiber treatment were tried. A few blends of regular latex, water and pozzolanic materials (silica smolder or metakaolin) were assessed by corruption test and quickened maturing through cycles of wetting and drying CFC tests.

"Quantitative investigation of fly powder in solidified concrete glue", (2017) by Yue Li, Hui Lin, Zigeng Wanga, Construction and Building Materials 153 (2017) 139– 145Fly ash (FA) is one of the common supplementary cementitious materials used in cement and concrete. Because of the complexity of morphology, component, hydration and other factors of FA, it is very difficult to measure the content of FA in hardened concrete. As per the normal for the unburned carbon in FA neither dissolving in concrete nor taking part in the synthetic response, three various types of FA were utilized to get ready FA-bond glues with various volumes.

"Influence of Polymer Powder on Properties of Cemented Paste Backfill", (2017) by Babak Koohestani, Bruno Bussière, Tikou Belem, Ahmed Kouba, International Journal of Mineral Processing

This study investigates the influence of ethylene-vinyl acetate/vinyl ester of versatic acid (EVA/VE), a redispersible polymer powder, on the mechanical, chemical, and microstructural properties of sulfidic and non-sulfidic cemented paste backfill (CPB). Different EVA/VE amounts (7.5 to 20 wt% of cement mass) are examined in CPB mixtures. To assess the influence of EVA/VE on the CPBs consistency (fresh state), slump height was measured using a small Abram's cone. Uniaxial compressive quality (UCS) testing was led to decide the impact of polymer powder on the mechanical strength development of CPBs, and mercury intrusion porosimetry (MIP), scanning electron microscopy (SEM), and differential thermo-gravimetric analysis (DTG) were used to determine the influence of polymer powder on the microstructure and mineralogy of hardened CPBs.

3. RESEARCH METHODOLOGY

3.1 General

Now days Sugarcane is measured as one of the best converters of solar energy into biomass with glucose i.e. sugar. It is a huge resource of food (sucrose, jaggery and syrup), fibre (cellulose), fodder (green leaves with tops of cane plant, bagasse, and molasses and to some extent press mud), fuel with chemical. The key by-products are bagasse, molasses with press mud.

3.2 Composition of bagasse

Bagasse consists of approximately 50% cellulose and 25% each of hemicellulose and lignin. Chemically, bagasse contains about 50% a-cellulose, 30% pentosans, and 2.4% ash. Because of its low ash content, bagasse offers numerous advantages in comparison to other crop residues such as rice straw and wheat straw, which have 17.5% and 11.0%, respectively, ash contents, for usage in bioconversion processes using microbial cultures. Also, in comparison to other agricultural residues, bagasse can be considered as a rich solar energy reservoir due to its high yields (about 80 t/ha in comparison to about 1, 2, and 20 t/ha for wheat, other grasses and trees, respectively) and annual regeneration capacity. *(Ashok Pandey et al)*

3.3 Sugar Cane Processing

Locally available sugarcane waste (Bagasse) is used for the study. Figure 3.1 shows the Bagasse as a by-product generated from sugar mill.

Figure 3.1 Bagasse as a Waste from Sugar Industry

The Bagasse is burned properly in an oven and maintained for 6 h until it was fully transformed into ashes. After that the oven is turned off and ashes were allowed to cool. After cooling, the material passed sieve #200 were used.

Figure 3.2 Bagasse burned in Muffle type Furnace

Figure 3.3 Ashes passed through sieve # 200

The sieved ashes is then used in the cement mix as a partial cement replacement for making the concrete and mortar.

Cement: The furthermost commonly used cement is ordinary portland cement of 53 Grade compatible to BIS 12600-1989(2009).

Fine Aggregate: Locally available river (Narmada) sand is used as fine aggregate. The sand particles should also pack to give minimum void ratio, higher voids contented leads to necessity of added mixing water. In the present study the sand confirms to zone I as per Indian standards. (BIS: 10262, BIS: 383). The specific gravity of sand is 2.62. The bulk density of fine aggregate is 1715 kg/m^3.

Coarse Aggregates: The crushed aggregates used were 20mm and 10mm nominal maximum size and are tested as per Indian standards and results are within the permissible limit. (BIS: 10262, BIS: 383). The specific gravity and bulk density of 10mm and 20 mm aggregate are 2.74 and 2.79 and 1472 kg/m^3 and 1438 kg/m^3 respectively.

Water: Water available in the college campus conforming to the requirements of water for concreting and curing as per BIS: 456-2000.

3.4 Preparation of Specimens and Testing

Different mix quantities were designed to study the consequence of sugarcane by product as filler on cement concrete performances in addition to the control mix that was prepared without sugarcane by product.

Bagasse ash were added in different percentages ranging from 0% to 21% with continuous 3% increments.

To analyse the performance of the mix the following tests have been performed.

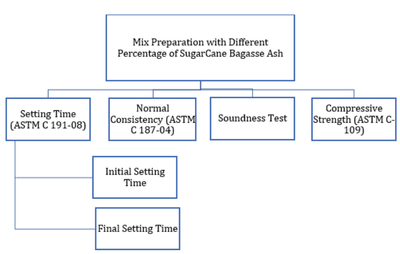

Figure 3.4 Process Flow Chart for Cement Mortar

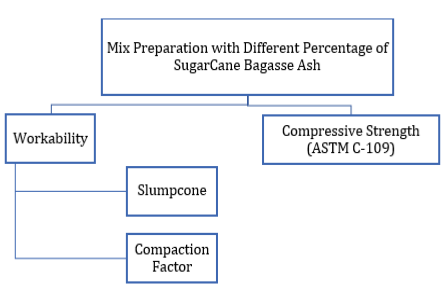

Figure 3.5 Process Flow Chart for Cement Concrete

3.4.1 Testing for Cement Mortar

3.4.1.1 Setting time (ASTM C191-08)

A paste that is proportioned and mixed to normal consistency, as described in the Test Method C187, is moulded and placed in a moist cabinet and allowed to start setting.

Figure 3.6 Initial and Final Setting Time Test

Periodic penetration tests are performed on this paste by allowing a 1-mm Vicat needle to settle into this paste. The Vicat initial time of setting is the time elapsed between the initial contact of cement and water and the time when the penetration is measured or calculated to be 25 mm. The Vicat final time of setting is the time elapsed between initial contact of cement and water and the time when the needle does not leave a complete circular impression in the paste surface.

Vicat time of setting to the nearest 1 min can be calculated as follows:

$$\left(\left(\frac{(H-E)}{(C-D)}\right)\times(C-25)\right)+E \quad (3.1)$$

Where:

E= time in minutes of last penetration greater than 25mm

H= Time of minutes of first penetration less than 25m.

C= penetration reading at time E, and

D= penetration reading at time H

3.4.1.2 Normal consistency Tests (ASTM C187-04)

Standard consistency testing was carried out to determine the water requirement to achieve the same paste consistency, according to ASTM C187.

This testing performed in sequence of

- Preparation of Cement Paste—650 g of cement is mixed with a measured quantity of water.
- Procedure for mixing pastes C305: The dry paddle and the dry bowl are placed in the mixing position in the mixer. Then the materials is introduced for a batch into the bowl and mix in the following manner:

1. All the mixing water is placed in the bowl.
2. The cement is added to the water and allow 30 s for the absorption of the water.
3. Start the mixer and mix at slow speed (140 ± 5 r/min) for 30 s.
4. Stop the mixer for 15 sec with also during that time scrape down into the batch any paste that may have collected on sides of the bowl.
5. Twitch the mixer at medium speed (285±10 rad/min) and mix for 60 sec

Molding Test Specimen: - the bond glue is immediately framed, into the estimated state of a ball with gloved hands. At that point hurl six times through a free way of around 150 mm (6 in.) starting with one hand then onto the next in order to deliver an almost round mass that might be effortlessly embedded into the Vicat ring with a base measure of extra control. Press the ball, resting in the palm of one hand, into the bigger end of the funnel shaped ring G held in the other hand, totally filling the ring with glue. Expel the overabundance at the bigger end by a solitary development of the palm of the hand. Place the ring on its bigger end on the base plate H, and cut off the abundance glue at the littler end at the highest point of the ring by a solitary sideways stroke of a sharp-edged trowel held at a slight edge with the highest point of the ring, and smooth the best, if vital, with a couple of light touches of the pointed end of the trowel. Amid these operations of cutting and smoothing, take mind not to pack the glue.

Consistency Determination—Center the glue restricted in the ring, laying on the plate, under the pole B, the plunger end C of which might be gotten contact with the surface of the glue, and fix the set-screw E. At that point set the mobile marker F to the upper zero sign of the scale, or take an underlying perusing, and discharge the pole instantly. This must not surpass 30s after culmination of blending.

Figure 3.7 Vicat apparatus, Normal Consistency Test

The mechanical assembly should be free of all vibrations amid the test. The glue might be of typical consistency when the bar settles to a point 10±1 mm beneath the first surface in 30 s in the wake of being discharged. Make trial glues with shifting rates of water until the point that the typical consistency is acquired. Make every trial with crisp concrete.

3.4.1.3 Soundness Test (IS: 4031-PART 3-1988)

Soundness Test on Cement is done to recognize the nearness of un-joined lime in bond. The test is performed utilizing Le Chatelier mechanical assembly. It comprises of a metal form of width 30 mm and tallness 30 mm. There is a part in shape and it doesn't surpass 0.50 mm. On either side of split, there are two markers with pointed closures. The thickness of shape chamber is 0.50 mm.

The bond glue is readied. The level of water is taken as decided in the Consistency test. The shape is put on a glass plate and it is filled by bond glue. It is secured at top by another glass plate. A little weight is set at top and the entire get together is submerged in water for 24 hours. The temperature of water ought to be between 24°C to 35°C.

The separation between the purposes of pointer is noted. The shape is again set in water and warmth is connected such that breaking point of water is come to in around 30 minutes. The bubbling of water is proceeded for 60 minutes. The form is expelled from water and it is permitted to chill off. The separation between the purposes of marker is again estimated. The contrast between the two readings demonstrates the development of concrete and it ought not surpass 10 mm.

3.4.1.4 Compressive Strength (ASTM C39/C39M - 17b)

This test strategy comprises of applying a compressive pivotal load to shaped chambers or 3D squares at a rate which is inside an endorsed extend until the point that disappointment happens. The compressive quality of the example is computed by separating the greatest load accomplished amid the test by the cross-sectional territory of the example.

Pressure trial of soggy cured examples should be made when practicable after expulsion from sodden capacity. Test examples might be kept wet by any helpful strategy amid the period between expulsions from sodden capacity and testing. They might be tried in the damp condition.

Place the plain (lower) bearing piece, with its solidified face up, on the table or platen of the testing machine straightforwardly under the roundly situated (upper) bearing square. Wipe clean the bearing appearances of the upper and lower bearing pieces and of the test example and place the test example on the lower bearing square. Precisely adjust the pivot of the example to the focal point of push of the circularly situated square. — apply the heap persistently and without stun.

For using pressurized water worked machines, the heap might be connected at a rate of development (platen to crosshead estimation) comparing to a stacking rate on the example inside the scope of 20 to 50 psi/s [0.15 to 0.35 MPa/s]. The assigned rate of development might be kept up in any event amid the last 50% of the foreseen stacking period of the testing cycle. Amid the utilization of the principal half of the expected stacking stage a higher rate of stacking might be permitted. Make no change in the rate of development of the platen whenever while an example is yielding quickly promptly before disappointment.

Figure 3.9 Compression Testing machine

Apply the load until the specimen fails, and record the maximum load carried by the specimen during the test.

3.4.2 Testing for Cement Concrete

3.4.2.1 Workability Testing

Workability of concrete describes the ease or difficulty with which the concrete is handled, transported and placed between the forms with minimum loss of homogeneity.

Workability of concrete mixture is measured by:

a) Vee-bee consist-meter test

b) Compaction factor test

c) Slump test

For this work two test are conducted for measuring the workability i.e.

(a) Compaction Factor Test (IS 1199)

Compaction factor test for workability is used when the nominal maximum size of the aggregate does not exceed 38 mm. Compaction factor test is primarily design as laboratory test but if required this test can be done in field also. Compared to slump test, Compaction factor test is more sensitive and accurate. This test is suitable for concrete mixes of very low workability.

The sample of concrete is placed in the upper hopper up to the brim. The trap-door is opened so that the concrete falls into the lower hopper. The trap-door of the lower hopper is opened and the concrete is allowed to fall into the cylinder. The excess concrete remaining above the top level of the cylinder is then cut off with the help of plane blades. The concrete in the cylinder is weighed nearest to 10 gms. This is known as weight of partially compacted concrete. The cylinder is filled with a fresh sample of concrete in layers of 5 cms and vibrated to obtain full compaction. The concrete in the cylinder is weighed again. This weight is known as the weight of fully compacted concrete.

(b) Slump Test

The slump test is the most well-known and widely used test method to characterize the workability of fresh concrete. The inexpensive test, which measures consistency, is used on job sites to determine rapidly whether a concrete batch should be accepted or rejected. Additional qualitative information on the mobility of fresh concrete can be obtained after reading the slump measurement. Concretes with the same slump can exhibit different behaviour when tapped with a tamping rod. A harsh concrete with few fines will tend to fall apart when tapped and be appropriate only for applications such as pavements or mass concrete. Alternatively, the concrete may be very cohesive when tapped, and thus be suitable for difficult placement conditions.

4. RESULTS AND ANALYSIS

4.1 Test Results for Cement Mortar

In this experimental work a total number of 96 of cement mortar specimen were casted. Water cement ratio was taken as 0.47 throughout the work. The size of specimen was 150 ×150×150 mm^3 considered.

The mixing done by weight based upon the quantity of ingredients of the mixes are depicted in table 4.1.

Table 4.1 Quantity of ingredients in the mixes

Sr. No.	Cement (kg/cum)	Sand (kg/cum)	Coarse Agg. (kg/cum)	Bagasse Ash (kg/cum)	Water (kg/cum)
1	406	609	1218	0	190.82
2	393.82	609	1218	12.18	190.82
3	381.64	609	1218	24.36	190.82
4	369.46	609	1218	36.54	190.82
5	357.28	609	1218	48.72	190.82
6	345.10	609	1218	60.9	190.82
7	332.92	609	1218	73.08	190.82
8	320.74	609	1218	85.26	190.82

4.1.1 Setting Time Test

When water is mixed to cement, a reaction start, this reaction is known as hydration. Due to this reaction the mixture of cement and water starts changing from one fluid state to a solid state this is called setting of cement. In the first few minute the setting action is more predominant and after some time hardening action becomes rapid.

Table 4.2 Variation in Initial and Final Setting Time

BAGASSE ASH %	INITIAL SETTING TIME, min	FINAL SETTING TIME, min
0	165	380
3	143	378
6	131	375
9	119	371
12	111	369
15	103	366
18	95	363
21	91	360

As shown in Table 4.2 and Fig. 4.1, the initial setting time considerably decreases with the partial replacement of cement by Sugarcane bagasse ash. This is due to the high rate of hydration. The bagasse ash contents SiO_2, Al_2O_3, CaO and Fe_2O_3 *(J Paya et al).* Silicates hydrates and hardens rapidly and is largely responsible for initial set and early strength, while the Aluminates hydrates and hardens the quickest. Liberates a large amount of heat almost immediately and contributes somewhat to early strength. Generally the initial setting time of cement is not less than 30min.

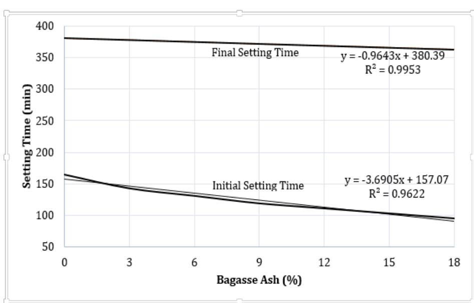

Figure 4.1 Variation in Initial and Final Setting Time with respect to Bagasse Ash percentage Content

All of these contents reduces the Final and Initial setting time of the mixture about 4.4 % and 42.4% respectively. However, final setting time is slightly lower for blended cement paste as compared to the ordinary cement paste. To increase the setting time Gypsum can be added. The R^2 values obtain are about 0.9953 and 0.9622 for Final and Initial setting time respectively, which shows the best curve fit.

4.1.2 Normal consistency

Normal consistency of cement was conducted to determine the changes in water requirements of cement due to bagasse ash. The normal consistency of the blended cement with bagasse ash is shown in Table 4.3 and Figure 4.2. The thickness or the viscosity of the cement paste is called consistency.

By conducting this test we will be able to know the amount of water that is to be added to obtain the required viscosity. And also the results can be used to obtain the amount of water to be added for different tests like soundness test, setting time, and compressive strength tests

Table 4.3 Results obtained by Normal Consistency Test

BATCH NUMBER	CEMENT CONTENT, (g)	BAGASSE ASH (%)	BAGASSE ASH CONTENT, (g)	WATER CONTENT (g)	W/C Ratio
1	500	0	0	145.0	29
2	485	3	15	147.0	30.3
3	470	6	30	149.0	31.7
4	455	9	45	151.0	33.18
5	440	12	60	154.0	35
6	425	15	75	157.0	36.9
7	410	18	90	159.0	38.78
8	395	21	105	161.0	39.9

It is obvious from the results that the normal consistency of the cement paste containing different percentage of Bagasse ash is going to increase as the percentage of Bagasse ash increases. About 33.72% increment in W/C ratio occurs with respect to 18% increment in Bagasse ash content. The Bagasse ash absorbs more water, which results in increase cement hydration and then reduced porosity which increases the material capability to take water. This increase in water absorption with increase in waste amount is due to the increase of open pore volume in the pieces. Since the sugarcane bagasse ash contains high amount of organic matter, increases open pore volume. Figure 4.1 shows the Plot in between two variables Water Content and Bagasse Ash Percentage.

In statistics, a value is often required to determine how closely a certain function fits a particular set of experimental data. To find out the relation R^2 value is calculated and it is about 0.9931. R^2 values range from 0 to 1, with 1 representing a perfect fit between the data and the line drawn through them, and 0 representing no statistical correlation between the data and a line.

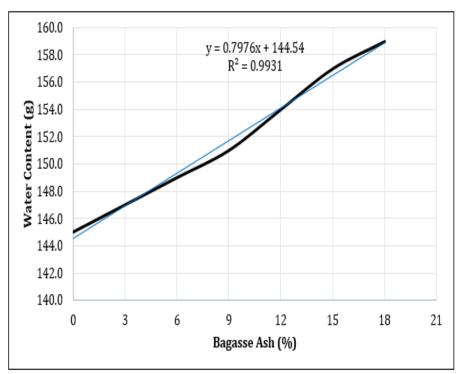

Figure 4.2 Relation between Water Content and Bagasse Ash Content Percentage

4.1.3 Compressive strength

Compression testing of cubes was carried out on compression testing machine having capacity of 200 T. Compressive strength of sugar cane bagasse ash contain Cement Mortar cubes is resolute after 7, 14, 21 and 28 days moist curing as per ASTM C-109.

Table 4.4 Results obtained after Compressive strength Test

Mix. No.	W/C	Bagasse Ash Content %	Compressive Strength after 7 days, MPa	Compressive Strength after 14 days, MPa	Compressive Strength after 21 days, MPa	Compressive Strength after 28 days, MPa
1	0.47	0	12.43	19.18	20.14	21.5
2	0.47	3	13.8	21.03	21.77	23.42
3	0.47	6	15.46	22.21	22.88	24.73
4	0.47	9	14.74	24.81	26.19	27.4
5	0.47	12	12.19	24.13	26.1	27.07
6	0.47	15	9.79	22.69	24.49	25.22
7	0.47	18	8.6	21.29	23.18	24.11
8	0.47	21	8.88	20.79	21.79	23.12

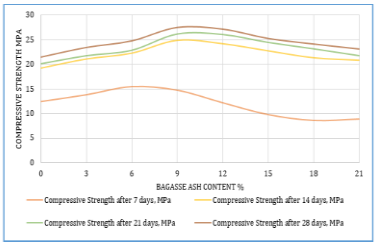

Figure 4.4 Variation in Compressive Strength with respect to Bagasse Ash Content %

4.2 Test Results for Cement Concrete

In this experimental work a total of 180 no of concrete specimen were casted. The specimen considered in this study consist of 36 no of 150 mm side cubes, 108 no of 300mm long cylinders and 36 no of 750 mm ×150 mm × 150 mm size prism based upon the quantity of ingredients of the mix, the quantities of SCBA for 0, 5, 10, 15, 20 and 25 % replacement by weight were estimated. M20 grade of concrete was used.

The following test results have been obtained for the cement concrete with different percentage of Bagasse ash.

4.2.1 Workability

Droop is an estimation of solid's workability, or ease. It's a roundabout estimation of solid consistency or firmness. The droop test result is a measure of the conduct of a compacted altered cone of cement under the activity of gravity. It gauges the consistency or the wetness of cement.

A top notch concrete is one which has worthy workability in the new condition and creates adequate quality. Essentially, the greater the deliberate tallness of droop, the better the workability will be, demonstrating that the solid streams effectively however in the meantime is free from isolation. With higher level of bagasse the tallness of the droop is greatest in this manner the higher workability appeared.

The outcomes demonstrate that by expanding the sugarcane bagasse fiery debris in the bond concrete there is augmentation in workability. This might be because of the expanding in the surface territory of sugarcane slag in the wake of including sugar stick bagasse powder that necessities less water to wetting the bond particles.

Table 4.5 Workability of Cement Concrete with Different Mixes

Mix. No.	Bagasse Content (%)	Slump (mm)	Compaction Factor
1	0	60	0.95
2	5	187	0.96
3	10	200	0.96
4	15	225	0.97
5	20	220	0.97
6	25	230	0.97

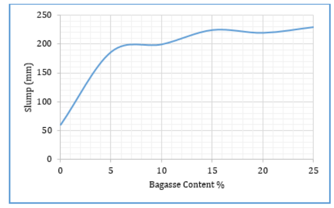

Figure 4.5 Variation in Slump Test results with respect to Bagasse Ash percentage Content

Maximum strength of concrete is related to the workability and can only be obtained if the concrete has adequate degree of workability because of self-compacting ability.

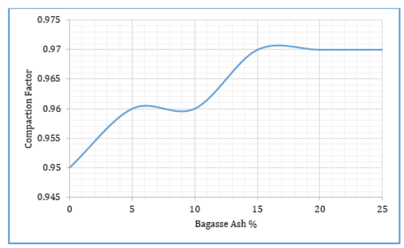

Figure 4.6 Variation in Compaction Factor results with respect to Bagasse Ash percentage Content

The compaction factor test is carried out to measure the degree of workability of fresh concrete with regard to the internal energy required for compacting the concrete thoroughly.

The compaction factor results shows the value 0.95 minimum without the bagasse content and it increases with the increment of bagasse ash content up to 0.97. This indicates the increasing workability.

4.2.2 Compressive Strength

The compressive strength obtained from the experimental investigation are shown in table 4.6. All the values are the average of three results in each case of the testing program of this study.

Compression testing of cubes was carried out on compression testing machine having capacity of 200 T. Compressive strength of sugar cane bagasse ash contain Cement Concrete cubes is resolute after 7 and 28 days moist curing as per ASTM C-109

Table 4.6 Compressive strength results for Cement Concrete with different percentage of Bagasse Content

Mix. No.	Bagasse Ash Content %	Compressive Strength after 7 days, MPa	Compressive Strength after 28 days, MPa
1	0	13.8	21.47
2	5	15.83	29.5
3	10	12.33	24.7
4	15	8.79	19.32
5	20	8.3	18.85
6	25	7.55	17.73

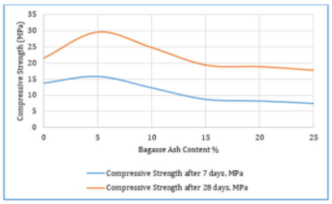

Figure 4.7 Variation in Compressive Strength results with respect to Bagasse Ash percentage Content

The results obtained are shown in Fig. 4.7 and Table 4.6. The results designated that the compressive strength of hardened cement concrete containing different percentages of Bagasse ash slightly increases with the increment of bagasse ash content up to 5% of bagasse ash content and thereafter it decreases.

The results shows that the SCBA in blended concrete has significantly higher compressive strength compare to that of cement concrete without SCBA. It is found that the cement could be advantageously replaced with SCBA up to maximum limit of 5 % SCBA in concrete.

5. CONCLUSION

The use of Sugarcane Bagasse Ash as a partial replacement of cement, especially at low percentages of replacement, is promising. This study investigated the behaviour of cement concrete and mortar after using Sugarcane Bagasse Ash waste. It can be concluded

For Cement Mortar

- The initial setting time considerably decreases with the partial replacement of cement by Sugarcane bagasse ash. This is due to the high rate of hydration. Bagasse contents reduces the Final and Initial setting time of the mixture about 4.4 % and 42.4% respectively. However, final setting time is slightly lower for blended cement paste as compared to the ordinary cement paste.
- It is obvious from the results that the normal consistency of the cement paste containing different percentage of Bagasse ash is going to increase as the percentage of Bagasse ash increases.
- The results designated that the compressive strength of hardened cement mortar containing different percentages of Bagasse ash slightly increases with the increment of bagasse ash content up to 9 to 12 % of bagasse ash content and thereafter it decreases

And for Cement Concrete

- The results show that by increasing the sugarcane bagasse ash in the cement concrete there is increment in workability.
- The compaction factor results shows the value 0.95 minimum without the bagasse content and it increases with the increment of bagasse ash content up to 0.97. This indicates the increasing workability.
- The results designated that the compressive strength of hardened cement concrete containing different percentages of Bagasse ash slightly increases with the increment of bagasse ash content up to 5% of bagasse ash content and thereafter it decreases.

Based on exploratory examination did it can be expressed that the division of concrete i.e. 10% to 20% can be adequately supplanted with a bagasse fiery debris (untreated) without an impressive loss of workability and quality properties. In its purest shape the bagasse slag can turn out to be a potential element of bond concrete since it can be a viable substitution to concrete.

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