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RESEARCH ARTICLE

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UTILIZATION OF BAGASSE ASH AS PARTIAL REPLACEMENT OF CEMENT IN HIGH STREGTH CONCRETE

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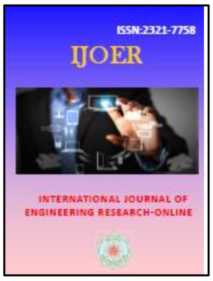

ABSTRACT
The environmental pollution by industrial and agricultural waste is tremendously increasing day by day. Concrete is also one of the building materials which are responsible for the pollution in least concentration. In this project a research study is carried out in making of concrete by the partial replacement of industrial and agricultural wastes to control the environmental pollution and also to reduce overall cost. Several agro wastes are using in different ways for different products but the bagasse ash is mostly used for land filling. This type of waste material is used in high strength concrete to heat of hydration and CO_2. Cement production gives rise to CO_2 emissions generated by the calcinations of $CaCO_3$ and by the combustion of fossil fuels, being responsible for about 5% of the global CO_2 emissions in the world. This can be substantially reduced if cement replacement materials such as Sugar Cane Bagasse Ash (SCBA) are used. Within the framework of a comprehensive research concerning this residual of the sugar and ethanol agro –industries, studied some durability characteristics of concretes made with SCBA. In this project sugar cane bagasse ash is taken from KCP sugar factory located at vuyyuru in Krishna district and partially replaced with cement at 0%, 5%, 10%, 15%, 20% and 25% by weight of concrete and tests conducted like compressive strength, tensile strength, flexural strength are carried for 7 and 28 days and comparing the results with the normal high strength concrete.
Keywords— SCBA; bagasse ash; strength concrete

INTRODUCTION

Increment sought after, use of concrete and in the background of waste administration, researchers what's more, scientists everywhere throughout the world are continually looking for something new to develop exchange folios that are condition agreeable and contribute towards future development and administration. Normal Portland Concrete is perceived as a noteworthy development material all through the world. Analysts everywhere throughout the world today are concentrating on methods for using either modern or farming waste, as a wellspring of crude materials for industry. This waste usage would be temperate, as well as result in outside trade procuring and natural contamination. Mechanical squanders, for example, impact heater slag, fly fiery remains and silica smoke are being utilized as supplementary bond substitution materials. As of now, there has been an endeavor to use the extensive measure of bagasse fiery debris, the buildup from an in-line sugar industry and the bagasse-biomass fuel in electric era industry. At the point when this waste is singed under controlled conditions, it likewise gives slag having formless silica, which has pozzolanic properties. A couple ponders have been completed on the fiery remains got specifically from the enterprises to contemplate pozzolanic movement and their reasonableness as covers, in part supplanting concrete. In this manner, it is conceivable to utilize sugarcane bagasse powder as bond substitution material to enhance quality and lessen the cost of development materials, for example, mortar, solid pavers, solid rooftop tiles and concrete interlocking block.(According to paper reference 26) Cement is the most well-known development material on the planet since it consolidates great mechanical and toughness properties, workability and relative ease. Be that as it may, concrete generation transmits nursery gasses, for the most part CO2, being in charge of around 5% of worldwide anthropogenic CO2 emanations on the planet . Since 1 kg of concrete delivers around 1 kg of CO2, the utilization of low outflow pozzolans as bond substitution is one of the potential outcomes to decrease nursery gasses emanations. Despite the fact that the planet warming is an issue that might be respected from a worldwide point of view, the utilization of pozzolans as concrete substitution is an issue that would have nearby arrangements since transport is one of the fundamental cost parts for cementitious materials. Sugarcane bagasse (SCB) which is a voluminous by-item in the sugar plants when juice is extricated from the stick. be that as it may, by and large utilized as a fuel to flame heaters in a similar sugar, the majority of it is utilized to create steam and power in a co-era plant at the ethanol plant . After the bagasse burning, another by - item is the Sugar Stick Bagasse Cinder (SCBA). It comprises essentially of silica (SiO2), which demonstrates its potential as mineral admixture for use in cement. The aftereffects of this examination program demonstrated that SCBA can be utilized as a pozzolan and substitute concrete. Around 8-10% fiery debris containing high amount of unburnt matter, silicon, aluminum, iron and calcium oxides. Be that as it may, the cinders gathered straightforwardly are not receptive in light of these are singed under controlled conditions and at high temperatures; thusly it turns into a modern waste and stances transfer issues. For getting formless andreactive sugarcane bagasse fiery debris (SCBA), trials were led to characterize ideal consuming time and temperatures. SCBA utilized as a part of this review was gotten by consuming SCB at 6000 C for 5 hours under controlled conditions and its portrayal of different properties were done to assess the likelihood of its utilization as folio. That is typically fused into cement blends to create concrete with outstanding properties. The ordinary cement utilized bond, fine aggregate course total and water. The cost of the traditional materials like concrete is expanding spirally hence they can be supplanted with sugar stick bagasse powder, which is a modern waste accessible requiring little to no effort. As very little of writing is accessible for experimentation techniques has been received for determination of water bond proportion. The present review was completed on SCBA gotten by controlled ignition of sugarcane bagasse, which was acquired from KCP sugar manufacturing plant situated at vuyyuru in Krishna locale at India. Sugarcane generation in India is more than 300 million tons/year leaving around 10 million tons of as unutilized as squanders material. This venture breaks down the impact of SCBA in cement by halfway substitution of bond at the proportion of 0%, 5%, 10%, 15%, 20% and 25% by weight. The test contemplate inspects there compressive quality of cement. The fundamental fixing comprises of normal Portland concrete (53grade), SCBA, waterway sand, coarse total, super plasticizer and water. In the wake of blending, solid examples were threw and along these lines all test examples were cured in water at 7 days, 28days. The development in different sorts of enterprises together with populace development has brought about the gigantic increment in the generation of different sorts ofindustrial squander materials, for example, rice husk fiery debris, foundry sand, impact heater slag, fly powder , steel slag, scrap tires, squander plastic, broken glass, and so forth.

Literature review

The outcomes help advance the utilization of modern SCBAs as a SCM, given that their molecule sizes are lessened preceding use, to increment both the filler and the pozzolanic impacts and to make the impact of the indistinct SiO 2 content on the compressive quality increase less separating. (Sirirat, Janjaturaphan and Supaporn Wansom)

The comes about demonstrated that consideration of Sugar stick Bagasse Ash in cement up to 20% level altogether upgraded the compressive quality of cement at all ages; the most astounding compressive quality was acquired at 5% SCBA substitution level. (Asma Abd Elhameed Hussein , et all). Various physico-mechanical properties of the concrete and mortar joining sugarcane bagasse fiery remains are audited and proposals are recommended as the result of the review. The review thusly is helpful for different asset people required in utilizing SCBA material to create economical development material (Sagar Dhengare)Compressive quality outcome demonstrates that up to 10% substitution of sugar stick bagasse powder in solid gives equivalent outcome with ordinary cement with no admixture, yet 5% substitution give most extreme compressive quality. Likewise the measure of sugar stick bagasse fiery debris increment, workability of solid increments. (Jayminkumar A.Patel*, Dr. D. B. Raijiwala) Bagasse fiery debris halfway supplanted in the proportion of 0%, 5%, 10%, 15% and 20% by weight of bond in four diverse trial to discover most extreme compressive quality and contrast it and the quality of typical at 7days and 28 days.(PIYUSH KUMAR, ANIL PRATAP SINGH)Using waste item as a fixing in cement turns out to be practical as well as may improvethe compressive, flexural and rigidity of cement and abatements the contamination stack.(Khansaheb A.P)

The usage of modern and rural waste created by mechanical process has been the concentration of waste decrease explore for conservative, ecological, and specialized reasons. Sugarcane Bagasse Ash is a stringy waste result of the sugar refining industry, alongside ethanol vapor. Bagasse fiery remains chiefly contains aluminum particle and silica. The present review is gone for using sugarcane bagasse cinder concrete, with fractional substitution of bond. The substitution is done at different rates like 0%, 5%, 10%, 15% and 20% and its impact on properties of cement was researched.. New and solidified properties were practiced with different substitution levels. The review showed that sugarcane bagasse powder can adequately be utilized as bond substitution (up to 10%) without significant change in quality (Dr.M.Vijaya Sekhar Reddy , K.Ashalatha , M.Madhuri2, P.Sumalatha)

The outcomes demonstrated a lessening in solid thickness with increment in % substitution of SCBA. Normal compressive quality of 26.8N/mm2 was acquired for control examples at 28days (i.e. 0% SCBA) while 22.3, 20.1 and 17.3N/mm2 compressive quality at 28days were acquired for 10%, 20% and 30% substitution individually. Pozzolanic action record (PAI) of 83.2%, 75% and 64.5% were acquired. This demonstrated just 10% and 20% substitution of concrete by weight of SCBA fulfilled ASTM-595(1985) detail for PAI. It was inferred that SCBA is a low weight material and 10% substitution of SCBA has the most elevated PAI. Additionally, 10% and 20% supplanting of SCBA with compressive qualities of 22.3N/mm2 and 20.1N/mm2 are suggested for fortified solid.(T. S. ABDULKADIR, D. O. OYEJOBI, A. A. LAWAL)

The compressive quality of mortars containing Portland pozzolana concrete with bagasse cinder at 5%, 10%, 15% &20% substitutions were likewise explored. Compressive quality, flexural quality, split rigidity and thickness of M25 cement containing Portland pozzolana bond with sugar stick bagasse fiery debris at 5%, 10%, 15% and 20 % substitutions were additionally explored at water concrete proportion 0.44,0.45,0.46. The outcome demonstrates that consistency, starting setting time, last setting time increments with increment in rate of sugarcane bagasse slag where as soundness and compressive quality of mortar declines with increment in rate of sugarcane bagasse fiery remains. Compressive quality, flexural quality, split elasticity and thickness of cement containing Portland pozzolana bond with sugarcane bagasse fiery debris diminishes with increment in rate of sugarcane bagasse powder. (Amrita Kumari, Prof. Sheo Kumar)

The solid blends, to a limited extent, are supplanted with 0%, 10%,15%, 20%,25% and 30% of BA individually. What's more, the compressive quality, the flexural quality, the split tractable tests were resolved. The bagasse fiery remains was sieved through No. 600 strainer. The blend configuration utilized for making the solid examples depended on past research work from writing. The water - concrete proportions differed from 0.44 to 0.63. The tests were performed at 7, 28,56 and 90 days of age with a specific end goal to assess the impacts of the expansion SCBA on the solid. The test outcome demonstrate that the quality of solid increment up to 15% SCBA supplanting with bond. (Sagar W. Dhengare, Dr.S.P.Raut , N.V.Bandwal, Anand Khangan)

The concrete could be profitably supplanted with SCBA up to most extreme point of confinement of 20%. In spite of the fact that, the ideal level of SCBA substance was accomplished with 20% substitution. It is found that 20% substitution of concrete by mechanical waste give greatest outcome in quality and quality angles than the traditional cement. Along these lines the natural impacts from the mechanical waste can be fundamentally diminished and furthermore the cost of bond can be lessened parcel by this substitution of material.(R.Geerthana , J.Gnanasoundari, T.Madheswari , K.Vetriselvi, Mrs.S.Selvarani)

MATERIALS AND TESTS ON MATERIALS

1. Materials

A. Cement: Common Portland bond accessible in the nearby market of standard brand (KCP concrete) was utilized as a part of the examination. Mind has been taken to see that the acquisition produced using a solitary cluster is put away in sealed shut holders to keep it from being influenced by the climatic and rainstorm dampness and stickiness. The bond obtained was tried for physical prerequisites as per IS: 12269-1987 and for compound necessities as per IS: 4032-1977. The points of interest are given in Table 1. The concrete fits in with 53 Grade.

b. Aggregates (fine & coarse): Aggregates are inactive granular materials, for example, sand, rock, or pounded stone that, alongside water and Portland bond, are a basic fixing in cement. For a decent solid blend, totals should be spotless, hard, solid particles free of ingested chemicals or coatings of earth and other fine materials that could bring about the decay of cement. Totals, which represent 60 to 75 percent of the aggregate volume of cement, are isolated into two unmistakable classes - fine and coarse. Fine totals by and large comprise of characteristic sand or pounded stone with most particles going through a 3/8-inch strainer. Coarse totals are any particles more prominent than 0.19 inch, however for the most part range between 3/8 and 1.5 crawls in distance across. Rock constitute the dominant part of coarse total utilized as a part of cement with squashed stone making up the vast majority of the rest of.

The void substance between particles influences the measure of bond glue required for the blend. Rakish totals increment the void substance. Bigger sizes of all around evaluated total and enhanced reviewing diminish the void substance. Assimilation and surface dampness of total are measured when choosing total in light of the fact that the interior structure of total is comprised of strong material and voids that might possibly contain water. The measure of water in the solid blend must be changed in accordance with incorporate the dampness states of the aggregate.

Scraped spot and slide resistance of a total are fundamental when the total is to be utilized as a part of cement continually subject to scraped area as in overwhelming obligation floors or asphalts. Diverse minerals in the total wear and clean at various rates. Harder total can be chosen in exceptionally grating conditions to limit wear.

c. water: The regular details with respect to nature of blending water will be water ought to be fit for drinking. Such water ought to have inorganic strong under 1000 ppm. This substance prompt a strong amount 0.05% of mass of concrete when w/c proportion is given 0.5 coming about little impact on quality. However, some water which is definitely not consumable might be utilized as a part of making cement with any critical impact. Dull shading or terrible stench water might be utilized if they don't forces harmful substances. Ph of water to even 9 is permitted in the event that it not tastes harsh. In beach front territories where neighborhood water is saline and has no substitute sources, the chloride focus up to 1000 ppm is even took into consideration drinking. Yet, this over the top measure of soluble base carbonates what's more, bicarbonates, in some normal mineral water, may bring about soluble alkali-silica reaction.

The amount of water in the blend assumes a fundamental part on the quality of the solid. A few water which have unfavorable impact on solidified cement. Here and there may not be safe or even helpful amid blending. So clear qualification ought

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to be made between the impact on solidified cement and the nature of blending water.

D. Sugar cane bagasse ash: Sugarcane bagasse comprises of around half of cellulose, 25% of hemicelluloses of lignin. Every ton of sugarcane produces around 26% of bagasse (at a dampness substance of half) and 0.62% of leftover fiery remains. The deposit after burning presents a concoction creation rules by silicon dioxide (Sio2). Despite being a material of hard corruption and that presents couple of supplements, the slag is utilized on the ranches as a compost in the sugarcane harvests. In this sugarcane bagasse cinder was gathered amid the cleaning operation of a kettle in the KCP sugar processing plant, situated in the town of vuyyuru, Andhra Pradesh.

Fig 3.1: Site view of KCP sugarcane factory at vuyyuru, Andhra Pradesh

Fig 3. 2: Site view of Raw sugar cane bagasse

Fig 3.3: Site view of Burnt sugarcane bagasse ash

Table 3. 1: Chemical composition, loss on ignition, and specific gravity of OPC and SCBA.

Chemical composition (%)	OPC	SCBA
Calcium oxide, CaO	63.9	12.4
Silicon dioxide, SiO2	20.7	54.4
Aluminium oxide, Al2O3	5.4	9.1
Ferric oxide, Fe2O3	3.2	5.5
Sulfur trioxide, SO3	4.0	4.1
Sodium oxide, Na2O	0.2	0.9
Potassium oxide, K2O	1.1	1.3
Magnesium oxide, MgO	2.0	2.9
Loss on Ignition, L.O.I.	1.0	9.4
Specific gravity	3.2	2.16

Standard consistency test

For discovering the underlying setting time, last setting time and soundness of concrete, a parameter is known as standard consistency must be utilized .it is imagined as bond glue is characterized as that consistency at which will allow a vicat mechanical assembly having 10mm dia,50mm length in a profundity of 33-35mm shape the highest point of the form. The device is called as vicat device. This mechanical assembly is utilized to discover the water to require delivering a concrete glue of standard consistency. The standard consistency of concrete glue is once in a while called ordinary consistency

The accompanying method is embraced to discover standard consistency. Take about Take 400 g of bond and place it in the enameled plate. Blend around 25% water by weight of dry concrete completely to get a bond glue. Add up to time taken to acquire completely blended water concrete glue i.e. "Gaging time" ought not be more than 3 to 5 minutes. Fill the vicat shape, resting upon a glass plate, with this bond glue. In the wake of filling the form totally, smoothen the surface of the glue, making it level with top of the shape. Put the entire get together (i.e. form + bond glue + glass plate) under the bar bearing plunger. Bring down the plunger tenderly in order to touch the surface of the test square and rapidly discharge the plunger permitting it to sink into the glue. Measure the profundity of infiltration and record it. Get ready trial glues with fluctuating rates of water substance and take after the means (2 to 7) as depicted above, until the profundity of infiltration progresses toward becoming 33 to 35 mm from top and specific rate of 33-35mm from the top is known as the rate of water required to deliver to a bond glue of standard consistency. This rate generally indicated as "p"

METHODOLOGY

1. Experimental investigation: In these trial work solid examples of 36 3D shapes, 36 shafts, 36cylinders were threw. The standard sizes are taken after as indicated by IS code particulars. The blend outline of cement was done by Indian Standard rules. In view of the amounts of fixings. The amount of SCBA for 0, 5%, 10%, 15%, 20% and 25% substitution by weight was evaluated. The elements of cement were completely blended till uniform consistency is accomplished. Preceding the throwing, grease was connected on the inward surfaces of the cast press form. Cement was filled the form and compacted completely utilizing packing pole. The surface of form was done by methods for a trowel. Demoulding was done following 24 hours and after that cured for a time of 7 and 28 days. The examples were taken out from the curing tank simply earlier hours to the test. The compressive test, pliable test and flexural test was directed utilizing pressure testing machine and UTM. This test was led according to the pertinent Indian Standard determinations.

Table 4.1: Table shows the Mix Proportions of concrete

Cement	450 kg/m^3
Sand	710 kg/m^3
Coarse aggregate 20 mm	784 kg/m^3
Coarse aggregate 10 mm	336 kg/m^3
Super plasticizer	0.6% (policarboxy ether)
Water content	0.3

Design of mix for m60 grade concrete

a. Concrete mix design

The grade of cement OPC 53 (KCP) concrete utilized as a part of this examination is M25 without utilization of sugar stick bagasse powder. The blend configuration depends on quality criteria and solidness criteria utilized for direct condition. The proportions by weight bond, fine total and coarse aggregate are gotten utilizing the conditions given in IS: 10262-1982 procedure to get a uniform standard and workable solid blend. Solid shapes are tried for compressive test following 3 day, 7day, 14 days and 28 days curing. Chambers were tried for compressive quality and split elasticity following 28 days curing crystals were tried for flexural quality following 28 days curing.

Details of mix design (durability criteria) as per is: 456-2000

a) **Design Specification:**
Characteristic compressive strength at 28 days (f_{ck}) = 68.25 N/mm^2 (M_{60})
Minimum size of aggregate = 20 mm
Degree of work ability (assumed) = 0.90 compaction factor
Degree of quality control (assumed) = good
Assume type of exposure = moderate

b) **Test Data For Materials:**
Cement used = OPC 53 grade
Specific gravity of cement = 3.2
Specific gravity of coarse aggregate 20mm = 2.86
10mm = 2.42
Specific gravity of fine aggregate = 2.86(zone-II)
Standard deviation from M_{60} grade and good degree of control(s) = 5 N/mm^2
(It is taken as grater of the two values given in IS:10262 - 1982)
Target average compressive strength at 28 days,
$F_{ck} = f_{ck}+f_{cx}$
= 60+ (1.65x5) = 68.25 N/mm^2

c) **Selection of Water – Cement Ratio :**
For moderate exposure form durability point view maximum water content ratio is 0.5. Hence water cement ratio is adopted in this investigation is 0.3.

d) **Estimation of Air Content:**

For 20 mm size coarse aggregate percentage of entrapped air = 2.0%

e) Selection of Water And Sand Content:

Approximate sand and water content per cubic meter

For w/c = 0.6; compaction factor = 0.8 up to M_{35} & 20mm maximum size coarse aggregate

Water content including surface water per cum. Concrete = 186kg

Sand as the % total aggregate by absolute volume = 35%

Increase in water content for increase in value of compaction factor by 0.1 = 3%

Adjusted water content = 186*0.8 $=148.8 kg/m^3$

Required sand content as % of total aggregate by absolute volume = 35-3 = 32%

f) Calculation of Cement Content:

Water cement ratio (w/c) =0.35

Cement content = 148.8/0.35 = 425.14 kg/m^3 > 300

g) Calculation of aggregate content:

For 20mm maximum size of aggregate entrapped air % of volume of concrete = 2%

Weight of fine aggregate $V= [W+(C/S_C) + (1/P) * (f_a /S_{fa})] * (1/1000)$

$(1-0.02)= [191.58 + (426/3.2) + (1/0.32) * (f_a/2.47)] * (1/1000)$ $f_a=710 kg/m^3$

Weight of coarse aggregate $C_a= [((1-p)/P)*(f_a). (S_{ca}/ S_{fa})]=1120 kg/m^3$

Ratio of design mix is 1: 1.69: 2.66

COMPOSITION OF MIXES

Table 6.1: table shows the composition mix for cubes (compressive strength)

%	Cement (Kg)	Fine aggregate (Kg)	Coarse aggregate (Kg)	Water (liter)	SCBA
0%	5.47	7.69	14.56	1.98	0
5%	4.33	7.69	14.56	1.98	208
10%	4.10	7.69	14.56	1.98	416
15%	4.58	7.69	14.56	1.98	624
20%	4.37	7.69	14.56	1.98	832
25%	4.16	7.69	14.56	1.98	1040

Table 6.2: table shows the composition mix for beams (flexural strength)

%	Cement	Fine aggregate	Coarse aggregate	Water	SCBA
0%	7.69	11.38	21.53	2.92	0
5%	7.38	11.38	21.53	2.92	307
10%	7.07	11.38	21.53	2.92	615
15%	6.78	11.38	21.53	2.92	923
20%	6.45	11.38	21.53	2.92	1230
25%	6.152	11.38	21.53	2.92	1538

Mixing procedure of concrete

a. Mixing procedure of concrete: Blending system of solid: Concrete is blended by any two techniques, in view of prerequisite according to quality and amount of cement required. Ordinarily for mass solid, where great nature of cement is required, mechanical blender is utilized. Blending by hand is utilized just to particular situations where quality control is not of much significance and amount of cement required is less. Stone total is washed with water to expel earth, clean or some other outside material before blending. In the event that the amount of cement is very sufficiently little to do with prepared blend with hand blending then blend machine is accustomed to blending concrete. It is accommodation to utilize blend machine for blending little amount of cement. Creating concrete with blend machine is substantially speedier than hand blending. Ordinarily the limit of blend machine is 4 to 9 cubic feet of cement.

Figure 7.1: site view of mixer machine

A concrete blender is a gadget that homogeneously consolidates concrete, total, for example, sand or rock, and water to frame concrete. A regular concrete blender utilizes a rotating drum to blend the segments. For littler volume works compact concrete blenders are frequently utilized so that the solid can be made at the development site, giving the labourers abundant time to utilize the solid before it solidifies. A contrasting option to a machine is blending concrete by hand. This is normally done in a wheelbarrow; be that as it may, a few organizations have as of late sold altered canvases for this reason.

Tests on hard concrete and results

1. Testing of specimens

a. Cubes and cylinders for strength

1.Take the examples from curing tank and expelling anticipating blades, if any kept air up to dry the water from surface. Take note of the measurement of the example to the closest 0.2mm and their weight.

2. Clean the bearing surfaces of the testing machine. Put the cubical examples in such a way, to the point that the heap is connected to inverse sides of the 3D squares as a cast (i.e. not to the through and through) the chamber ought to be put in vertical bearing no pressing ought to be utilized between the fest example and steel platen of the testing machine.

3. Apply stack with no stun and persistently increment at the rate of roughly at 140 kg/sq.cm every moment until no more prominent load is supported by the example. Take note of the most extreme load is connected to the specimen. And afterward ascertain the solid shape quality.

Figure 8.1: Picture showing the compressive testing for cubes

B. flexural strength test

1. Put the steel rollers of 38mm distance across, divided at 40n cm focus to focus 10cm crystals and 60 cm focus to focus if there should arise an occurrence of 15 cm specimen.

2. Evacuate any free sand of the material from the example surface and wipe clean the bearing surface of supporting and stacking steel rollers.

3. Note rollers in such a way, to the point that the connected load ought to connected to the upper most surface as cast in the form.

4. Mount the stacking rollers at the third focuses i.e. at a separation of 13.33 cm for 10 cm example and 20 cm in the event of 15 cm example, from the focal point of supporting rollers.

5. Precisely adjust the pivot of the example with the hub of the stacking bit of the testing machine.

6. Take note of the greatest load taken by shaft without break.

Figure 8.2: pictures indicating the flexural strength

Split tensile strength test

1. After determined time of curing take the round and hollow examples from curing tank and wipe off the coarseness and surface water. Draw distance across lines on the two end of the example utilizing a reasonable strategy.

2. Clean the bearing surface of the testing machine. Put one of the plywood strips focused along the focal point of the lower platen.

3. Put the example on the strip in flat course and adjust so that the distance across lines set apart on the closures of the examples are vertical and focused over the plywood strip.

4. Put the second plywood strip on the chamber long astute and fixated on the checked lines and settle the example by cutting down the upper platen.

5. Tenderly apply stack until no more noteworthy load is managed by the example.

Figure 8.3: Picture shows the Split tensile strength

Figure 8.4: Pictures shows the Casted specimens

Strength results and graphs

Strength results & graphs hardened properties of trail mixes sugarcane bagasse ash as an admixture

The outcomes got from analysis of compressive quality, rigidity and flexural quality as indicated by Indian determination by substitution of bond substance are 0%,5%,10%,15%,20% and 25% with bagasse fiery remains are as per the following

Table 9.1: Table shows the **Results** compare with normal concrete

	Compressive strength (N/mm^2)		Split tensile strength (N/mm^2)		Flexural strength (N/mm^2)	
SCBA	7 days	28 days	7 days	28 days	7 days	28 days
0%	41.2	62	2.5	3.2	4.8	6.2
5%	42	66.8	2.8	3.5	5	6.4
10%	45.4	64.3	2.4	3.4	4.6	5.5
15%	39.3	55.4	1.7	2.8	3.2	4.8
20%	30.5	40.5	1.5	2.5	2.1	4
25%	20.3	35	1.3	2.3	1.5	3.2

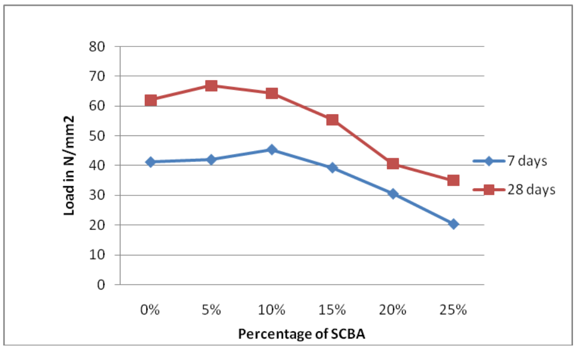

Fig 9.1: line diagram shows the compressive strength

The extent of every example (solid shapes) is 150mmx150mmx150mm which are set up for each blend. By the table 8 expresses that the pressure quality at 5% and 10% are 66.8 N/mm2 and 64.3 N/mm2 individually for 28 days remain rate pressure quality are lessened.

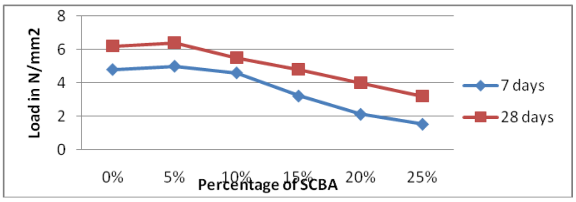

Fig 9.2: line diagram shows the split tensile strength

Chambers (examples) of size 150 mm x 150 mm x 300 mm are set up for each blend. By the above table 4 expresses that the split elasticity at 5% are 3.5 N/mm2 individually for 28 days remaining rate split rigidity are diminished.

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