IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

# An Experimental Investigation On An Experimental Study On Concrete By Partially Replacement Of Cement And Aggregate With Sugarcane Baggash And Coconut Shell

**Prof. Ashish Moon**, Somendranath Roy*, Rohit jambhule*, Akash Raut*, Kabir Janbandhu*, Shital Donadkar*,**

*B. E. Student, Department of Civil Engineering, Smt. Radhikatai Pandav College of Engineering, Nagpur

**Assistant Professor, Department of Civil Engineering, Smt. Radhikatai Pandav College of Engineering, Nagpur.

**Abstract** The creation of cement causes a natural issue by rising of carbon di oxide gas in atmosphere or air. The regular natural resources, for example, petroleum derivatives and normal asset devoured at cement production industries. To decreasing the impact on climate and condition, we can substitute the OPC by the waste material of industries. This waste result of industries, for example, bagasse ash powder can be replaced by the OPC. Since sugarcane bagasse ash powder has some concrete properties in extensive sum than cement. The silica content found in bagasse ash powder in high
amount up to 65 to 82%. Bagasse is created at sugar enterprises in the wake of extricating the juice of sugarcane.

At that point after bagasse is acquired in wet condition. The bagasse is first dried then utilized as a fuel in sugar businesses in the boiler to generate heat energy. The bagasse created warm vitality in the sugar industries. After the consuming of agasse at 600 to 800-degree centigrade, the dark black ash found and this ash is called as bagasse powderThe manufactured sand does not have any ecological impact and it is likewise conservative in compared with riverbed sand. The river bed sand has some natural impact, for example, disintegration of waterway bed so ground dilute table can be. The cost of river bed sand is likewise high in compared with manufactured sand In is research paper the bagasse ash powder is partially replaced with ordinary Portland cement in the proportion of 0, 5, 10, 15, 20% by the heaviness of ordinary

Portland cement in concrete with utilizing manufactured sand. Then after we conduct the test on concrete specimen of compressive strength test and split tensile strength test at 7, 14 and 28 days and flexural strength of concrete specimen at 7
*and 14 days.*

## INTRODUCTION

India is one of the fast developing countries in the world and therefore agriculture and industrialization both needs a parallel growth. Industries growth is one of the biggest sign of growth of Indian economy but the saddest part is many of industries in view of its growth are neglecting our mother environment and thus polluting it by not taking proper care of waste management. A modern lifestyle, alongside the advancement of technology has led to an increase in the amount and type of waste being generated, leading to a waste disposal crisis.

In developing countries, accumulation of unmanaged agricultural waste has resulted in an increased environmental concern. Recycling of such agricultural wastes is the viable solution not only to pollution problem, but also the problem of land filling. The problem of waste accumulation exists worldwide, specifically in the densely populated areas. Most of these materials are left as stockpiles, landfill material or illegally dumped in selected areas. Large quantities of this waste cannot be eliminated. However, the environmental impact can be reduced by making more sustainable use of this waste. This is known as the "Waste Hierarchy".

## LITERATURE REVIEWS

- **Lavanya et al,** examined the partial replacement for cement in conventional concrete. The tests were conducted as per Bureau of Indian Standards (BIS), IS 516-1959 codes to evaluate the suitability of SCBA for partial replacements up to 30% of cement with varying water cement (ratio .The physical properties of Compressive strengths (7, 14 and 28 days) were determined in accordance with Indian Standards. The maximum strength increase happens at 15% with 0.35w/c ratio were tested for the compressive strength and the most optimum value was found out. Cost analysis was done on the account of the optimum replacement of the account of optimum replacement of the cement.

- **Jayminkumar A. Patel et al,** carried out the Use of Sugar Cane Bagasse Ash as Partial Replacement of Cement in Concrete for M20 grade of concrete were casted and tested to examine various properties of concrete like workability, compressive strength, split tensile strength, modulus of elasticity and flexural strength. Sugarcane bagasse ash was partially replaced with cement at 2, 4, 6and 8 % by weight of cement in concrete.
- **U.R.Kawade et al,** studied the effect of use of Bagasse Ash on Strength of Concrete, SCBA was chemically and physically characterized and partially replaced in the ratio of 0%, 10%,15%, 20%, 25% and 30% by weight of cement in concrete. The properties for fresh concrete are tested like slump cone test and for hardened concrete compressive strength at the age of 7 90 days. The test result indicate that the strength of concrete increase up to 15% SCBA replacement with cement.

- **Nunta chai et al**, examined the importance of bagasse ash for development as pozzolanic materials in concrete. The physical properties of concrete containing ground bagasse ash including compressive strength, water permeability, and heat evolution were investigated and all tests were done in accordance with American Standards. When bagasse ash is ground up into small particles, the compressive strength of concrete containing this ground bagasse ash improves significantly. The low water permeability values of concretes containing ground bagasse ash at 90 days were mostly caused by the pozzolanic reaction.

- **S.Dharanidharan et al**, research scrutinizes the possibility of using sugarcane bagasse ash as partial replacement of specific ingredients in concrete. In this paper SCBA has been chemically and substantially categorized and partially replaced fine aggregate in

the ratio of 0%, 10%, 20%, 30% and 40% and 10% by the weight of cement in concrete.

## OBJECTIVES

- To find economical solution for high cost construction material

- To prepare lightweight concrete by using coconut shell as course aggregate

## MATERIALS

**1: Cement**

In this research work Cement used is ordinary Portland cement according to I.S 4031-1988.

**2. Bagasse ash**

The Bagasse ash is acquired from the Kisan Sahkari Chini mills limited, Mahmoudabad in Uttar Pradesh. The compressive, flexural strength and split tensile strength increments by expanding the rate of sugarcane bagasse ash.
This material contains an extensive measure of silica which is the sign of cement properties.

**3. Manufactured Sand**

The M-Sand is a substitute of river bed sand or fine aggregate for construction purposes and manufactured sand delivered from hard rock stone by smashing. The manufactured sand is of cubical shape with grounded edges, washed and reviewed to as a construction material. The size of M-Sand is under 4.7mm. Because of quickly developing of construction industry, the interest for manufactured sand has expanded enormously, bringing about lack of reasonable river bed sand in most piece of the word. Because of the exhaustion of good quality river sand for the utilization of construction, the utilization of manufactured sand has been expanded. The sand must be of legitimate degree (it ought to have particles from 150 microns to 4.75 mm in appropriate extent). At the point when fine particles are in appropriate extent, the sand will have fewer voids. The cement amount required will be less by using manufactured sand. Such manufactured sand will be more efficient and more economical. Interest for manufactured sand is for making concrete is expanding; now a day□s river sand can't take care of the rising demand of construction activities.

**4. Coarse Aggregate**

The coarse aggregate were utilized with maximum size of nominal 20mm. The sieve examination of combined and consolidated aggregates affirms to the determinations of IS 383: 1970 for well graded aggregates.
-Specific gravity of coarse aggregate =2.67
-Fineness Modulus of coarse aggregate=6.7

**5. Water**

The Mixing water ought not to contain undesirable natural substances or inorganic constituents in over the top extents. In this research clean consumable water is utilized.

**6. Mix Design for M25 grade Concrete**

The Compressive Strength of M25 concrete required toward the end of 28 days curing: 25 N/mm2 Maximum coarse Aggregate size: nominal 20mm

**7. Test Data of materials**

Specific Gravity of Manufactured sand: 2.63 Specific Gravity of ordinary Portland Cement: 3.157 Specific Gravity of 20mm nominal Coarse Aggregate: 2.70

**8. Target strength of concrete**

For the tolerance factor is 1.65, the acquired target strength for the M-25 grade of concrete = 25 + 4 x 1.65 = 31.6N/mm2

## MIXING, CURING AND CASTING OF CONCRETE

### 3.1 Mixing

The design mix proportioning of concrete was done by the
Indian Standard Recommended Method IS 10262:2009. The objective mean strength was 31.6MPa for OPC control concrete, the total cement substance in concrete is 380kg/m3, Manufactured Sand is taken 691.58 kg/m3, coarse aggregate is taken 1158kg/m3 the water-cement proportion was taken consistent 0.47. Hence cement was
supplanted by bagasse ash at the different rate of
substitution 0%, 5%, 10%, 15%, and 20% by weight of cement.

### 3.2 Casting

After the concrete was set up than we cast the mould of the cube of
size150mmX150mmX150mm for acquiring the compressive strength of concrete. Before casting the mould the oiling is readied on internal surface of the cube. After Subsequent oiling on the internal surface of the cube than we
filled the concrete in the cube and compact that concrete using a tamping rod. The casting of cylinder specimen is same as casting of cube the cylinder is casted for obtaining the split tensile strength of concrete. The diameter of this
cylinder specimen is 150mm and length of this cylinder is 300mm. The casting of beam for flexural tensile strength is casted and the size of specimen is 500mmX100mmX100mm.
Oil is spread in the inner surface specimen before casting of beam .The entire specimen of cube, cylinder and beam should be cast in three layers and Compact each layer with at the very least 25 strokes for every layer by using tamping rod.

### 3.3 Curing

After the casting of all specimen then we demould the specimen after 24 hours of casting and then after specimens are cured under water for 7, 14 and 28 days.

### 3.4 Testing

The compressive strength of any material is characterized as the imperviousness to failure or deflection under the activity of compressive loads. Particularly for concrete, compressive strength is a critical parameter to decide the execution of the
material amid service conditions.
Concrete mixture can be

**COMPOSITION OF MIXES FOR NINE BLOCKS:**

**a) For mix : 0.46: 1: 2.58: 3.17**

The mix is nominal mix with 1 part of cement, 2.58 parts fine aggregate and 3.17 parts of coarse aggregate in full proportions.

**Quantity of Materials required for nine cubes:**

Quantity of cement added = 1.21x8=9.68 kg
Quantity of fine aggregate added = 2.58x8 = 20.64 kg
Quantity of coarse aggregate added = 4.79x8= 38.32 kg
Quantity of water added = 0.5x8 =4 liter = 4000ml
Water cement ratio w/c = 0.46

**b) For mix :0.46:(95% cement + 05%SCBA):2.58:( 95%CA+05%Coconut shell)**

The mix is nominal mix with cement is replaced by 05% of bagasse ash, 2.58 parts of fine aggregate and 3.82+ 5% coconut shell parts of coarse aggregate.

**Quantity of Materials required for 9 cubes:**

Quantity of cement added = 8 x 1.149= 9.196 kg
Quantity of bagasse ash added = 8 x 0.0605= 0.484 kg
Quantity of fine aggregate added = 20.64 kg
Quantity of coarse aggregate added = 4.551x8= 36.408kg

Quantity of coconut shell added =8 x 0.239 =1.921 kg
Quantity of water added = 0.5x8 =4 liter = 4000ml
Water cement ratio w/c = 0.46

## CONCLUSION

The compressive strength, split tensile strength andflexural tensile strength increments by expanding
rate of Sugarcane bagasse ash up to 10%.

After 10% replacement of cement the strength of concrete abatements. This is because of amount of sugarcane bagasse ash is higher than the quantity required.

In case of los Angeles abrasion test, the value goes on increasing in case of usage of coconut shell in coarse aggregates upto 25%. As per IRC, the abrasion value less than 30% is used for bituminous road concrete surface and the value above 30 % is suitable for different type of roads surfaces such as bituminous bound macadam, water bound macadam, water bound macadam surfacing course, bituminous surface dressing, and water bound macadam base course with bituminous surfacing.
In our case the resultant value is 29.15% in case of usage of 15% coconut shell in coarse aggregate. Therefore, it is used for bituminous concrete surface.

- Ordinary Portland cement substitution by sugarcane bagasse ash brings about decrease of creation cost of concrete in scope of 6 to 10%.

- Higher substitution of ordinary Portland cement by sugarcane bagasse ash brought about higher consistency and longer setting time of concrete. The workability of bagasse ash concrete has additionally demonstrated a slight lessening as the sugarcane
bagasse ash substance expanded.

- Density and thickness is low so that light weight concrete can be obtained.

- By using bagasse ash and manufactured sand in concrete the construction cost of any structure can be reduced and the structure will be become
economical.

## REFERENCE


1]. Vol. 2, Issue 7, July 2013,pp 2997-3000.

2]. Nuntachai Chusilp, Napongsatorn Likhitsripaiboon and Chai Jaturapitakkul. “Development of bagasse ash as a pozzolanic material in concrete”. Asian Journal on Energy and Environment, As. J. Energy Env. 2009, 10(03), pp 149-159.

3]. S.Dharanidharan*, L.Rajkumar & B.Karthick. “an experimental study on mechanical properties of concrete by using sugarcane bagasse ash”. International journal of engineering sciences & research technology, March, 2015,pp 401-405.

4]. Shruthi H R,Dr.H Eramma,Yashwanth M K & Keerthi gowda B S. “A Study On Bagasse Ash Replaced Plain Cement Concrete”. International Journal of Advanced Technology in Engineering and Science www.ijates.com, Volume No.02, Issue No. 08, August 2014,pp 96-103.

5]. Chetna Yadav, Shubhlakshmi Tiwari & Dr. D. K. Sharma. “Effect Of Use Of Sugarcane Bagasse Ash And Foundry Slag On Strength Of Concrete”. Integrated Journal of Engineering Research and Technology, Vol 2 (4), 19th Aug 2015,pp 306-311.

6]. Parag S. Kambli1, Sandhya R. Mathapati, “Compressive Strength of Concrete by Using Coconut Shell,” IOSR Journal of Engineering (IOSRJEN) ISSN (e): 2250-3021, ISSN (p): 2278-8719 Vol. 04, Issue 04 (April. 2014), ||V7|| PP 01-07.

7]. S.J.Nagathan, Sarfraj Jahagirdar, Matiurrehman Mulla, Shruti Katti,

"Comparative Study on Coconut Shell Aggregate Concrete with Conventional Concrete," in International Journal of Civil and Structural Engineering Research ISSN 2348-7607 (Online) Vol. 4, Issue 1, pp: (198-202), Month: April 2016 - September 2016.