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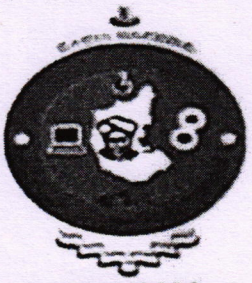

2022-2023

Project Report on

"PARTIAL REPLACEMENT OF CEMENT WITH SUGARCANE BAGASSE ASH"

Submitted in partial fulfillment of the requirement for the award of degree

BACHELOR OF ENGINEERING
IN
CIVIL ENGINEERING

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CERTIFICATE

Certified that a project report on entitled **"PARTIAL REPLACEMENT OF CEMENT WITH SUGARCANE BAGASSE ASH"** has been successfully carried out by **DEVIKA K PATIL (1SV18CV012), KAVYA B K (1SV18CV020), VITTHAL RUDRAPPA HANAMANNAVAR (1SV18CV037), HARISH KUMAR B (1SV19CV010),** students of **Shridevi Institute of Engineering and Technology, Tumakuru -572106,** in partial fulfillment of project for the award of **Bachelor of Engineering in Civil Engineering** of the **Visvesvaraya Technological University, Jnana Sangama, Belagavi - 590018** during the academic year **2022-2023**. It is certified that all corrections and suggestions indicated for internal assessment have been incorporated in the report deposited in the Department library. The report has been approved as it satisfies the academic requirement in respect of project on current topic prescribed for B.E Degree.

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2 M M KATTI	25/8/22

ABSTRACT

Massive development in the infrastructure sector has given an unforeseen rise in the demand for cement, and to accommodate this demand, the world expends 30 billion tonnes of cement concrete every year. In an effort to transform industrial wastes into a sustainable solution, researchers around the globe are providing several solutions for achieving carbon-neutral construction practices. Sugarcane bagasse ash is residual waste ash from sugar mills, rich in amorphous silica that can be accommodated as a pozzolanic material in concrete. A comprehensive review on the physical and chemical properties of sugarcane bagasse ash is presented in this study. The impact of different processing methods on sugarcane bagasse ash and its effect on the performance of concrete are deliberated. This review discusses the performance of concrete containing sugarcane bagasse ash (SCBA) with its varying dosage and evaluates the properties of concrete in terms of fresh and hardened properties. Durability properties have been evaluated on the basis of permeability, chloride penetration, electrical resistivity, thermal conductivity, acid and sulfate attack. Centered on an explicit review, regulations for the succeeding investigations on the effective employment of bagasse ash are highlighted. The results from the study suggest improvement in the performance of concrete containing sugarcane bagasse; strength gain was noticed due to increased pozzolanic reactions, low heat of hydration, reduced permeability could be due to pore refinement bagasse ash blended concrete.

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8.1.1.2 Cylindrical mould

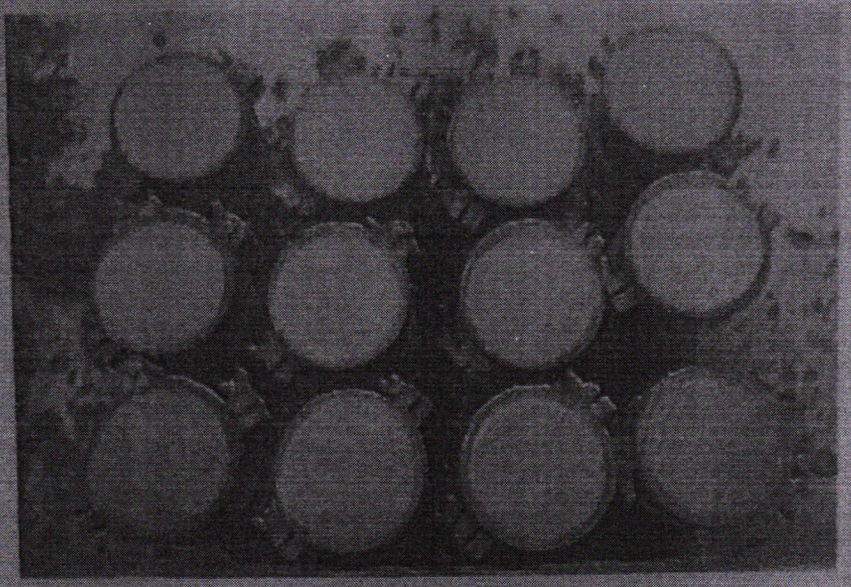

Fig: 8.2 cylindrical mould

The height of the mould shall be either 20.0+0.005cm, and the diameter of the mould shall be10.0+0.005cm respectively.

The internal surface of the mould shall be plane surface with a permissible variation of 0.02mmin0.0cm and 0.1mm overall.

The base plate shall be such dimensions as to support the mould during the filling without leakage and it shall be preferably attached to the mould by spring or screws

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8.2 Preparation of materials

The cement samples on arrival at the laboratory shall be thoroughly mixed dry either by hand or in a suitable mixer in such a manner as to ensure the greatest permissible blending and uniformly in the material caste is being taken to avoid the intrusion of foreign matter The cement shall taken be stored in a dry place preferbly on airtight metal containers samples of aggregates for each batch of concrete shall be of the desired grading and shall be in an air-dried condition.

8.3 Proportioning

The proportions of the materials including water, in concrete mixes for determining the Suitability of the materials available, shall be similar in all respects to those to be employed in The work. Where the proportions of the ingredients of the mortar as used on the site are to be Specified by volume, they shall be calculated from the proportions by weight used in the test Cubes and the unit weights of the material

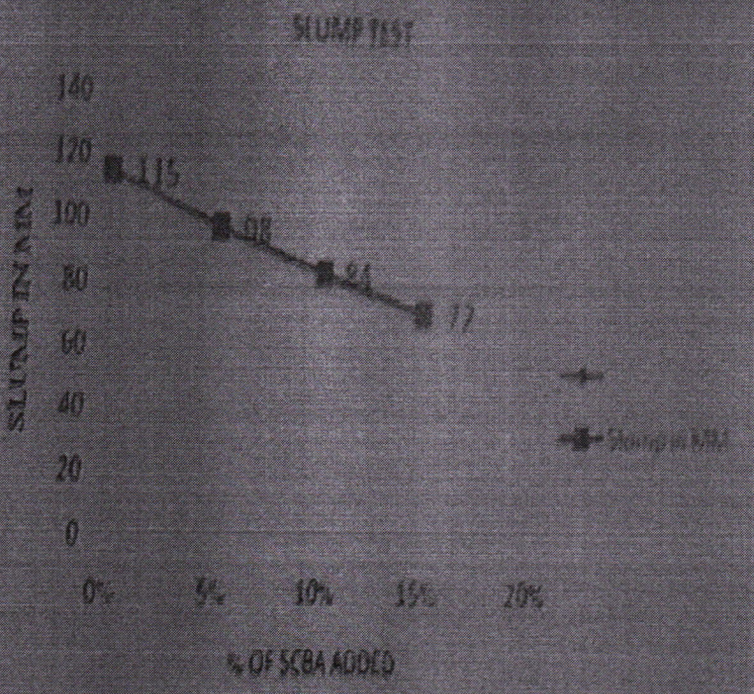

Fig 9.3 Slump test

9.2.2 Compaction factor test

Aim: To measure the workability of concrete by compaction factor test

Apparatus required: Compaction factor test apparatus

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PROCEDURE

1. The sample of concrete to be tested is placed in the upper hopper up to the brim. The Trap-door is opened so that the concrete falls into the lower hopper.
2. Then the trap-door of the lower hopper is opened and the concrete is allowed to fall in to the cylinder. In the case of a dry-mix, it is likely that the concrete may not fall on opening he trap-door
3. In such a case, a slight poking by a rod may be required to set the concrete in motion. The excess concrete remaining above the top level of the cylinder is then cut off with the help of Plane blades.
4. The outside of the cylinder is wiped clean. The concrete is filled up exactly up to the Top level of the cylinder.
5. It is weighed to the nearest 10 grams. This weight is known as "weight of partially Compacted concrete"

placed on the plate. The amount of cement, fine aggregate, SCBA and coarse aggregate required for cubes are weighed. The materials are first dry mixed and then mixed with water, concrete is poured into the mould in three layer being vibrated using mechanical vibrator, the top surface is finished using trowel. After 24 hrs concrete cubes are demoulded and the specimens are kept for water similarly for 5%, 10% and 15% of SCBA.

9.3.1.2 Testing of cube specimen

At each desired curing periods specimens of normal concrete, and concrete blocks are taken out of water and dried. The cubes are tested in 2000KN capacity compression testing machine to get the compressive strength of concrete. The compressive strength is calculated using the formula.

Compressive strength, fc-P/A

Where, fc = cube compressive strength in n/mm^2

P = Cube compressive load causing failure in N

A = cross sectional area of cubes in mm2

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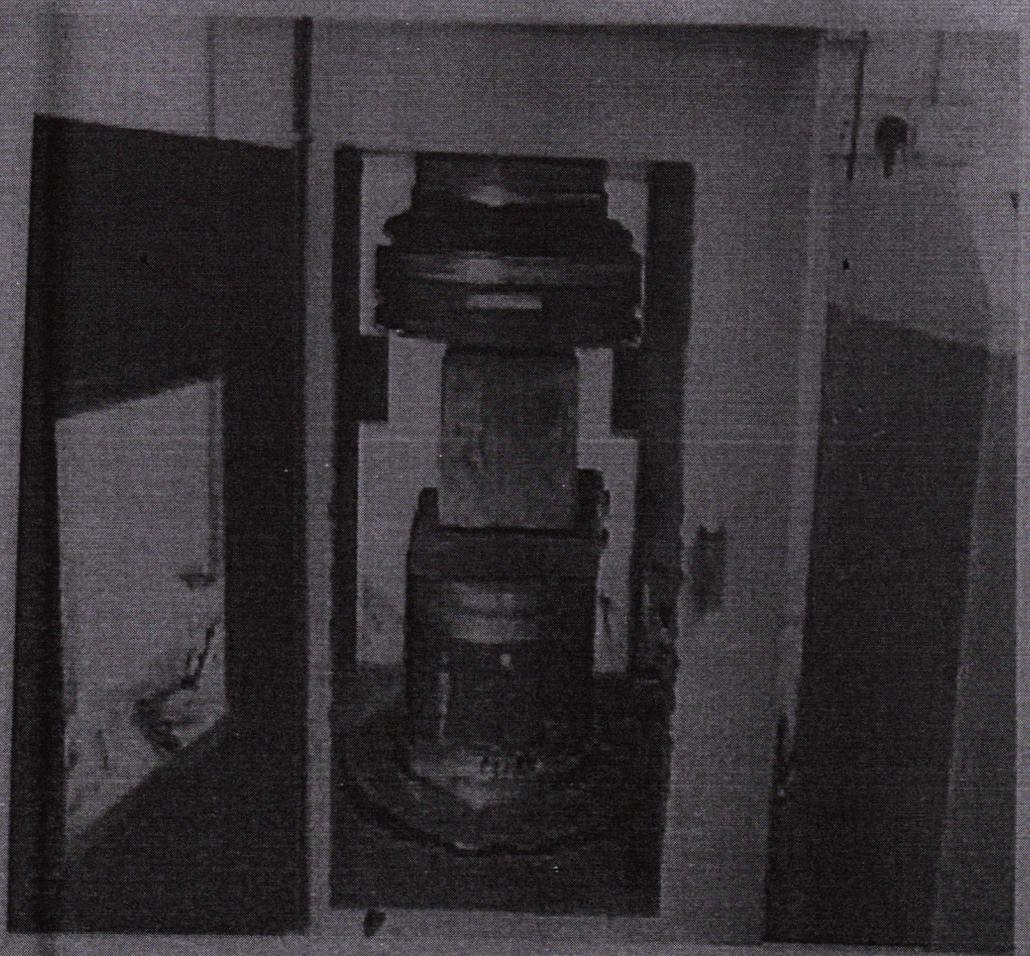

Fig 9.5 Compression test for cube

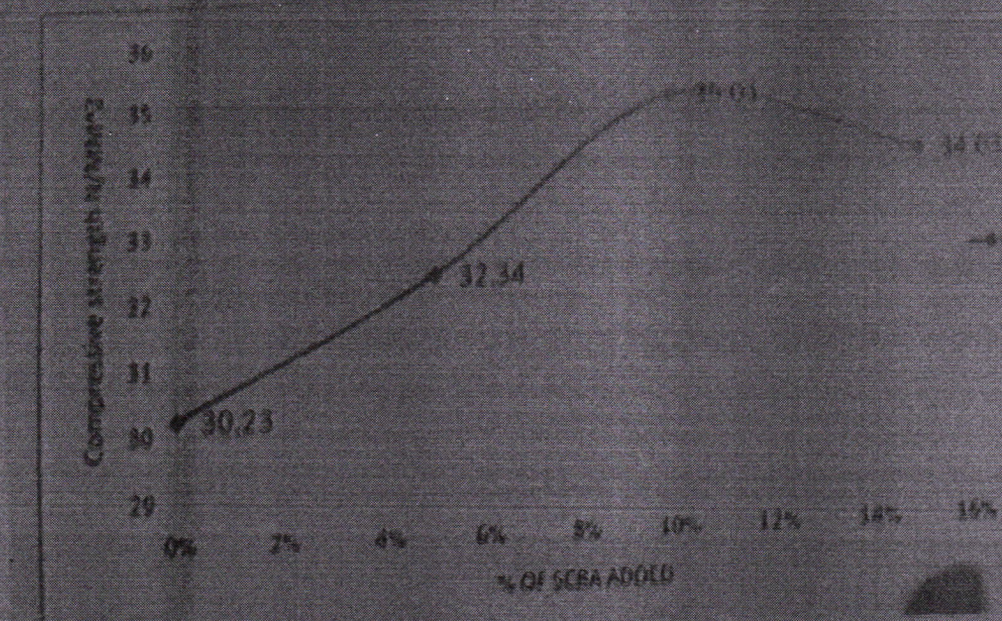

Fig. 9.8 Compressive strength of M30 concrete with SCBA replacement up to 15% for 28 Days strength.

9.3.2 Split tensile test:

Cylinder of size 100*200mm casted and test results are compared with that of conventional concrete. The test is carried out by placing a cylindrical specimen horizontally between the loading surface of a compression testing machine and the load is applied until the failure of cylinder, along the vertical diameter. When the load applied along the generatrics, an element on the vertical diameter of the cylinder is subjected to a horizontal stress

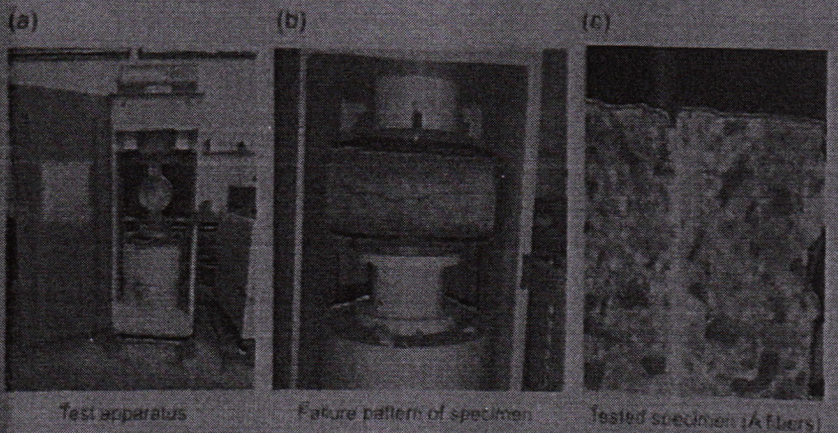

FIG 9.9 Tensile strength test

The main advantages of this method is that same type of specimen and same testing machine as used for the compression test can be employed for this test. This is why this test is gaining popularity. The splitting test is simple to performed and gives more uniform results than the other tension test. Strength determined in splitting test is believed to be closer to the true

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