

Evolution of Concrete using Sugarcane Bagasse Ash as Partial Replacement of Cement in Concrete

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Abstract— India is farming based nation, here products like rice, wheat, sugarcane develops in copious and in development industry cement is a multilateral material and it is utilized as a part of almost every sort of development. As we look the utilization of cement in present situation it continues expanding step by step. Cement is a blend of bond, fine total, coarse total and water in an appropriate extent, when we utilize cement is expanded naturally utilization of concrete expanded and because of this environment impact contrarily due to freedom of noxious gasses. To reduce the consumption sugarcane bagasse ash is partially replaced by cement. In this project sugarcane ash will replace cement upto 10%, 20% and 30% and this concrete will checked for Compressive strength.

Key words: Sugarcane Bagasse Ash, Cement, Concrete

I. INTRODUCTION

Distinctive materials with pozzolanic properties, for example, Sugarcane Bagasse Ash. Consolidated silica smolder, impact heater slag and rice husk powder have had imperative influence in the generation of superior cement. Amid the late twentieth century, there has been an increment in the utilization of mineral admixture by the bond and solid commercial ventures. The expanding interest for bond and cement is met by the fractional swap for vitality escalated Portland concrete. Pozzolanic materials have long showing their viability in creating superior cement. Fake pozzolanas, for example, supplementary solidifying material in numerous piece of the world. This work evaluates the compressive strength of Sugarcane Bagasse Ash, (SBA) as a partial replacement for OPC in concrete. The main aim of this work is to determine the optimum % (10, 20, 30) Sugarcane Bagasse Ash, (SBA) as partial replacement of cement for M40 grade of concrete. In addition, results show that Sugarcane Bagasse Ash, (SBA) as an artificial pozzolanic material has enhanced the durability of concrete.

II. METHODOLOGY

Sugarcane bagasse is collected from sugar mill and then bagasse is sun-dried then bagasse is burnt nearly 8 hours, to make it fine this is collected and grinded. The particle which passes from 90 micron sieve is used in this project, along with this OPC cement of specific gravity 3.15 and fineness modulus 3.12, Fine aggregate which is natural river sand of specific gravity 2.65, fineness modulus 4.56 and water absorption 0.6%, coarse aggregate which is crushed stone of specific gravity of 0.70, fineness modulus 5.74 and water absorption 0.5% and water is used which conformed specification given under IS456. Mix proportion is designed by IS 10262 : 2009, 4 mix is design which contain 0% to 30% of sugarcane bagasse ash and named as CC, S1, S2 and S3. 15 * 15 * 15 cm cube is casted which is tested after 7th and 28th days of curing and curing is done in clear water and at room temperature. On fresh concrete workability test is

performed and on concrete cube compressive strength test is performed.

III. RESULT AND DISCUSSION

Graph 1 and graph 2 shows compressive strength of the concrete, Compressive Strength of sugarcane bagasse ash concrete varies from 44.61 N/mm² to 38.67 N/mm² which contains 10% to 30% of sugarcane bagasse ash respectively, whereas conventional concrete possess 47.39 N/mm² compressive strength and we observed that only S1 mix is matching the standard of the grade of the concrete and it is also observed that with the increase in the percentage of sugarcane bagasse ash in concrete compressive strength of the concrete is decreased. Graph 3 and graph 4 shows workability of the sugarcane bagasse ash concrete in the form of slump (mm), slump of the sugarcane bagasse ash concrete varies from 81 mm to 105 mm which contains 10% to 30% of sugarcane bagasse ash respectively, whereas conventional concrete possess 55 mm slump, and it has been observed that sugarcane bagasse ash increases the workability (slump) of the concrete with the increase in the percentage of sugarcane bagasse ash.

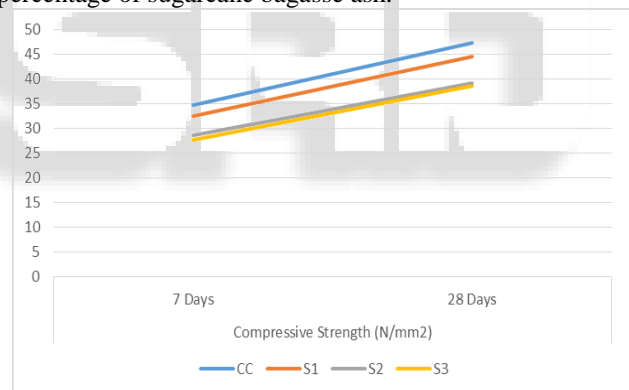


Fig. 1: Graph 1: Compressive Strength of Sugarcane Bagasse Ash Concrete

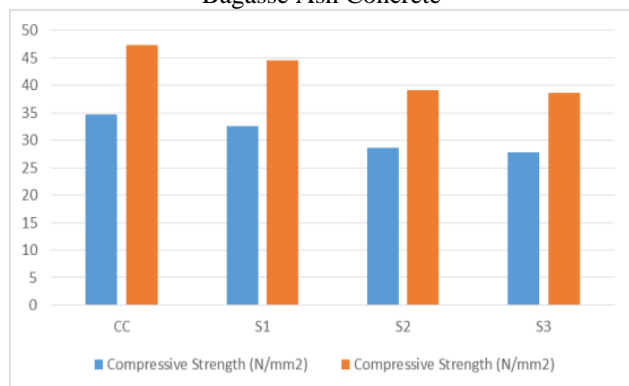


Fig. 2: Graph 2: Compressive Strength of Sugarcane Bagasse Ash Concrete

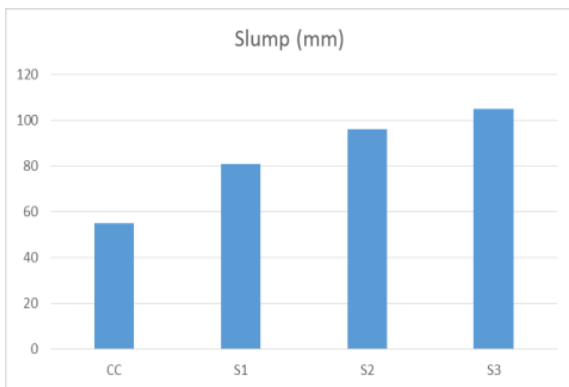


Fig. 3: Graph 3: Workability of Sugarcane Bagasse Ash Concrete

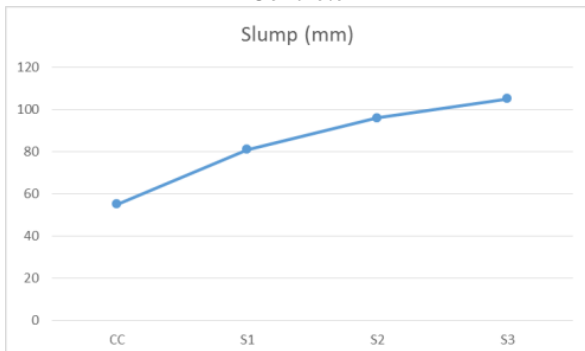


Fig. 4: Graph 4: Workability of Sugarcane Bagasse Ash Concrete

IV. CONCLUSION

Form the current study we concluded that sugarcane bagasse ash can be used as a partial replacement of cement in concrete. from the study it has been observed that only S1 mix is matching the standard of the grade of the concrete and it is also observed that with the increase in the percentage of sugarcane bagasse ash in concrete compressive strength of the concrete is decreased. Workability of the sugarcane bagasse ash concrete in the form of slump (mm) and it has been observed that sugarcane bagasse ash increases the workability (slump) of the concrete with the increase in the percentage of sugarcane bagasse ash.

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