EFFECT OF BAGASSES ASH ON THE PROPERTIES OF HIGH STRENGTH S.C.C. – A REVIEW

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ABSTRACT:-
The various research shows that every one ton of cement production releases half ton of carbon dioxide. For sustainable development, immediate need to control the usage of cement. Self compacting concrete is innovative concrete but it contain more powder content compare to conventional concrete. The consumption of cement can be substantially reduced in SCC, if cement partially replaced with materials such as Sugar Cane Bagasse Ash (SCBA). A waste such as Sugar Cane Bagasse Ash is difficult to dispose which in return is environmental Hazard. Various researcher have carried out study on bagasse ash and has been chemically and physically characterized, and partially replaced in the ratio of 0%, 5%, 10%, 15% and 20% by weight of cement in concrete. Fresh concrete test like compaction factor test was undertaken as well as hardened concrete test like compressive strength at the age of 7 days, 14 days and 28 days was obtained and also durability aspect of bagasse concrete for sulphate attack was studied. The Bagasse ash imparts high early strength to concrete and also reduce the permeability of concrete. The Silica present in the Bagasse ash reacts with components of cement during hydration and imparts additional properties such as chloride resistance, corrosion resistance etc. Therefore the use of Bagasse ash in concrete not only reduces the environmental pollution but also enhances the properties of concrete and also reduces the cost.

KEY WORDS:- Sugar Cane Bagasse Ash (SCBA), Sulphate Attack On Concrete Cubes, self-compacting concrete, Compressive Strength, Fresh property

I. INTRODUCTION

Cement production gives rise to CO2 emissions generated by the calcinations of CaCO3 and by the combustion of fossil fuels, being responsible for about 5% of the global CO2 emissions in the world. This can be substantially reduced if cement replacement materials such as Sugar Cane Bagasse Ash (SCBA) are used. Concrete is the most common construction material in the world because it combines very good mechanical and durability properties, workability and relative low cost. However, cement production emits greenhouse gases, mainly CO2, being responsible for about 5% of global anthropogenic CO2 emissions in the world [1-5].

Since 1 kg of cement produces approximately 1 kg of CO2, the use of low emission pozzolans as cement replacement is one of the possibilities to reduce greenhouse gases emissions. Even though the planet warming is an issue that may be regarded from a global perspective, the use of pozzolans as cement is an important by-product of the sugar cane industry and most of it is used to produce steam and electr replacement is a problem that would have local solutions since transport is one of the main cost components for cementitious materials. The bagasse in a co-generation plant at the ethanol plant. After the bagasse combustion, a new by–product is the Sugar Cane Bagasse Ash (SCBA). It consists mainly of silica (SiO2), which indicates its potential as mineral admixture for use in concrete. The results of this research program indicated that SCBA can be used as a pozzolan and substitute cement. Since durability is a very important issue for implementing new construction materials, in this Thesis, the results of tests of sulphate attack on concrete cubes made with SCBA. These tests indicated that SCBA improves the durability of a reference concrete..

Global production of sugarcane bagasse ash in 2014

The purpose of this research is to utilize the sugarcane bagasse ash (SCBA) as partial replacement of cement in concrete to reduce the environmental impacts of disposing this waste material. For this purpose, concrete specimens with 5, 10, 15, 20, and 25% SCBA were manufactured for three types of concretes including ordinary, lightweight, and self-compacting. Thereafter, the mechanical properties of specimens including compressive and tensile strength, ultrasonic pulse velocity (UPV), impact resistance and water absorption coefficient were evaluated through an extensive experimental program.

II. REVIEW OF LITERATURE

Juliana Petermann Moretti et. al. **[1]** has studied Self-compacting concrete incorporating sugarcane bagasse ash. In this paper current investigation is to survey the attainability of consolidating sugarcane bagasse fiery debris (SBA) from the sugar and ethanol industry as a filler material in the generation of self-compacting concrete (SCC). For this reason, glue creation was composed in the primary phase of this examination by leading an exploratory arrangement at the mortar level. Amid the second stage, SCC blend properties were assessed by considering the glue blend extents characterized in the main stage. The examination at the mortar level was led dependent on a measurable factorial outline approach, which offers a substantial reason for creating observational models that permit assurance of ideal settings of the plan factors to fulfill all execution prerequisites. At the solid level, the effect of three improved glue blends on SCC properties was surveyed. Crisp state, mechanical and sturdiness properties were assessed. Mortar and solid test outcomes uncovered that SBA can be utilized effectively in powder-type SCC as a filler material, and it displays great self-compacting capacity and quality levels, which are sufficient for some current structural designing applications.

G. Nithin Kumar Reddy et. al. **[2],** has studied Partial Replacement of Cement in Concrete with Sugarcane Bagasse Ash and its Behavior in Aggressive Environments. This says that investigates has demonstrated that each one ton of concrete fabricate discharges half ton of carbon dioxide, so there is a quick need to control the utilization of bond. On the hand materials squanders, for example, Sugar Cane Bagasse Ash is hard to arrange which consequently is ecological Hazard. The Bagasse fiery remains confers high early quality to concrete and furthermore decrease the porousness of cement. The Silica present in the Bagasse fiery debris responds with parts of concrete amid hydration and bestows extra properties, for example, chloride opposition, consumption obstruction and so forth. Hence the utilization of Bagasse fiery debris in cement decreases the ecological contamination as well as improves the properties of cement and furthermore diminishes the expense. This task for the most part manages the supplanting of bond with Bagasse slag in settled extents and breaking down the impact of magnesium sulfate on SCBA mixed cement. The solid blend composed by shifting the extents of Bagasse powder for 0%, 5%, 10%, 15%, 20%, 25% the blocks are been threw and restored in typical water and 5% magnesium sulfate answer for a very long time of 7, 28 and 60 days, the properties like droop cone test and compaction factor test for new concrete and compressive quality for solidified cement are checked and results are broke down.

Gritsada Sua-iam, Natt Makul **[3], [3]** has studied the Use of increasing amounts of bagasse ash waste to produce self- compacting concrete by adding limestone powder waste. Study said that Bagasse slag is a copiously accessible burning side-effect in the sugarcane business. We inspected the impact of adding limestone powder to self-compacting solid blends in which a lot of bagasse fiery remains were utilized as a fine total substitution. A Type 1 Portland bond substance of 550 kg/m3 was kept up in the majority of the blends. The fine total was supplanted with 10, 20, 40, 60, 80, or 100% bagasse slag and limestone powder by volume. Blends were intended to yield a droop stream measurement of 70 _ 2.5 cm. The functionality (droop stream, T50cm droop stream time, V-channel stream time, and Jring stream) and solidified properties (ultrasonic heartbeat speed and compressive quality) of every blend were estimated, and blocking appraisals were performed. The volumetric rate substitution of 20% limestone powder in fine total consolidating 20% bagasse fiery remains successfully upgraded the usefulness and solidified properties of self-compacting concrete.

Seyed Alireza Zareei **[4]** has studied Microstructure, strength and durability of eco-friendly concretes containing sugarcane bagasse ash. This paper shows a broad exploratory examination to research the likelihood of utilizing sugarcane bagasse fiery debris (SCBA) as an incomplete substitution of bond in customary, lightweight, and self-compacting concretes. For this reason, examples containing 5, 10, 15, 20, and 25% SCBA not with standing a control example were readied. To assess the mechanical properties of solid examples, compressive quality, elasticity, affect opposition, usefulness, water ingestion, and ultrasonic heartbeat speed (UPV) tests were performed. The outcomes demonstrated that changes in quality and effect opposition in lightweight cement are seen as contrasted and the control test when bond was supplanted with bagasse fiery debris at 5%. It was likewise discovered joining of BA enhanced solidness and nature of SCC.

Lavanya, Sugumaran, Pradeep **[5]** has conducted study on An Experimental study on the compressive strength of concrete by partial replacement of cement with sugarcane bagasse ash. Activities are rising worldwide to strike a harmony between the improvements in foundation and anticipation of the earth from pollution by reusing the mechanical

squanders. The plausibility of utilizing sugarcane Bagasse Ash (SBA), a finelyground squander item from the sugarcane business, as incomplete swap for bond in ordinary cement is analyzed. The tests were led according to Bureau of Indian Standards (BIS) codes to assess the reasonableness of SBA for incomplete substitutions up to 30% of concrete with changing water bond (w/c) proportion .The physical properties of SBA were examined. Compressive qualities (7, 14 and 28 days) were resolved. The outcomes demonstrated that the expansion of sugarcane bagasse fiery remains enhances the qualities in all cases. The most extreme quality increment occurs at 15% with 0.35 w/c proportion.

Piyaut Muangtong et. al. **[6]** has studied Effects of Fine Bagasse Ash on the Workability and Compressive Strength of Mortars. There are different sorts of agrarian waste slag all through the modern procedures in Thailand, for example, sugar stick bagasse fiery debris (SCBA), rice husk cinder, oil palm powder and so forth. They are right now abused as pozzolanic materials and enhancements to enhance the compressive quality as far as microstructures of bond by somewhat supplanting of concrete with them. One of their favorable circumstances is to diminish CO2 gas outflow from diminishing utilization of bond in either mortar or solid generation. Fitting proportion of supplanting clinker by fine (<45 micron) SCBA and w/c proportion and also impacts of SCBA on properties of concrete are being examined in this exploration. At first, clinker and SCBA extent were planned by supplanting clinker with the measure of SCBA at 0, 20 and 40%, individually, while gypsum was consistent included. Examples were gave a role as concrete mortars and glues and, at last, broke down for compressive quality, stream capacity, synthetic sythesis and microstructure as per relieving ages of 3, 7 and 28 days. Their properties were completed and contrasted and the consequences of business compose I Portland concrete. These test outcomes demonstrated that supplanting clinker with 20% SCBA was proper for creation in research center scale and w/c proportion of 0.735 is reasonable on usefulness of the resultant concrete.

Jord Paya et.al **[7]** has studied Bagasse ash. Research says that Sugarcane is the biggest harvest by creation amount on the planet. A lot of wet bagasse is yielded and the administration of this buildup is of incredible significance from an ecological perspective. The burning of this bagasse is a standout amongst the most widely recognized works on, bringing about the creation of an extra buildup, the sugarcane bagasse cinder (SCBA). Synthetic and mineralogical arrangement of SCBA makes it a potential strengthening material in Portland concrete mixes and furthermore in geopolymeric fasteners. Fineness, crystallinity, and the nearness of unburned particles are urgent for the improvement of pozzolanic reactivity and for having great mechanical execution. Sturdiness of SCBA-based mortar and cement is fitting, and as a rule 20% substitution of concrete can be done without noteworthy execution misfortune. Additionally, SCBA and sugarcane straw fiery debris are great possibility for getting ready geopolymeric paired frameworks. A decrease of CO2 emanations has been proposed with the utilization of these buildups.

Behnam Vakhshouri **[8]** has studied Mix design of light-weight self-compacting concrete. In late decades, the use of mineral and concoction admixtures in cement innovation has prompted changes in the detailing and blend outline which has, thusly, made the solid more grounded and more strong. Light weight concrete (LWC) is a brilliant arrangement as far as diminishing the dead heap of the structure, while self-compacting concrete (SCC) facilitates the pouring and expels development issues. Joining the focal points of LWC and SCC is another field of research. Considering its light weight of structure and simplicity of situation, Light-weight self-compacting concrete (LWSCC) might be the response to the expanding development prerequisites of slim and all the more intensely fortified auxiliary components. Twenty one research center exploratory examinations on the blend extent, thickness and mechanical properties of LWSCC have been distributed in the most recent 12 years and these are examined in this examination. The gathered data is utilized to research the blend extents including the substance and mineral admixtures, light weight and ordinary weight totals, fillers, bond and water. Dissected outcomes are displayed as far as factual articulations. It is extremely useful for future research to pick the best possible segments with various

proportions and restoring conditions to achieve the coveted solid review as per the arranged application.

S.anvesh, P.Chamanthi et. al. **[9]** has studied the Study On Behavior of Partial Replacement of Cement with Sugarcane Bagasse Ash for High Strength Concrete Mix. In which Concrete generation offers ascend to CO2 outflows created by the calcinations of CaCO3 and by the ignition of petroleum products, being in charge of around 5% of the worldwide CO2 emanations on the planet. This can be generously decreased if bond substitution materials such as Sugar Cane Bagasse Ash (SCBA) are utilized. Inside the system of an exhaustive research concerning this leftover of the sugar and ethanol agro – ventures, examined some strength attributes of cements made with SCBA. In this task report the consequences of the tests conveyed out on sulfate assault on solid shapes in water restoring alongside MgSO4 arrangement. Additionally, pointing the utilization of SCBA as concrete substitution. The present exploratory examination were carried on bagasse powder and has been synthetically and physically portrayed, and somewhat supplanted in the proportion of 0%, 5%, 10%, 15%, and 20% by weight of bond in cement. New solid test like compaction factor test was embraced and also solidified solid test like compressive quality at 7 years old days, 28 days, 60 days, 90 days, 180 days was gotten and furthermore sturdiness part of bagasse concrete for sulfates assault was tried. The outcome shows that the SCBA enhances concrete toughness.

CONCLUSION

From the above investigations the tests of concrete were conducted for the trail mix grade with different percentages i.e. 0%, 4%, 8%, 12%, 16%, 20% at the selected age i.e.7 and 28 days. There was also significant improvement in Flexural strength of the Concrete with rice husk ash content of 4% & 8% both at the age of 7 and 28 days. The following investigation reveals that all tests like compression strength, flexural strength, split tensile strength are high strength in 4% at 28 days for M50 grade of cement. It is observed that with the inclusion of pulp ash the workability of concrete decreases. The results showed that, the concrete with 4% of SCBA once twenty eight days of action had higher strength once compared to concrete with alternative replacement percentages. The results show that the reduction in compressive strength is least for 8% replacement once compared to alternative replacement percentages.

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