An Experimental Study on Effect of Use of Sugarcane Baggase Ash on Strength of Concrete – A Review

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Abstract- *Various possible alternatives to OPC is being considered along with their benefits that may occur from these alternatives in order to mitigate the problems mentioned above especially in developed countries. In the development of shelter and other infrastructural facilities the construction industry depends a lot on cement for its working. It then becomes extremely difficult for majority of the people to own their own houses. Thus minimising the global temperature & various pollution, cost of concrete hence successful implementation under such raw materials plays a very important role and improves concrete.*

The silica (SiO2) existing above raw material operates the free lime & CSH is formed. Factors are responsible for the different properties of the Sugarcane Baggase Ash . The utilization of industrial and agricultural waste produced by industrial process has been focus to waste reduction

Keywords- Sugarcane baggase ash , Cement.

I. INTRODUCTION

1.1 General

The researchers are finding a substitute for cement by different cement replacing materials because of the increasing demand of cement in construction and also due to improper waste management. The maximum height of the crop found out to be eight to twenty feet tall and in thickness measures 2 centimeters. Among the 200 sugarcane cultivable countries brazil is found to be the highest production all over the world. India ranks two in producing sugarcane. The total number of sugarcane mills In India are around 571 producing a large amount of sugar. Sugar production, Falernum, molasses , rum ,soda, cachaca and ethanol for fuel are some of the advantages of sugarcane. As there is production of vast amount of sugarcane and hence huge amount of sugarcane baggase ash is being expelled and which is waste product coming out of sugarcane industries.

The affordable housing is not possible for the average citizen of the country because of the high cost of the building materials. The eventual cost of the finished ordinary

Portland cement product is usually very high when other factors such as logistics and high demand are added to the afore-mentioned. The technique of some local wastes as alternative to conventional material in the construction industry has led.

For identifying optimal level of replacement, SCBA is evaluated for concrete property. Sugarcane baggase ash is a by-product of sugar factories and it is produced by burning sugarcane baggase where it is formed by the extracting all sugar from sugarcane.

The properties like compressive strength and water tightness of concrete and mortar was found to be increased in some percentage of replacement and fineness.

Higher silica content is one of the important factor responsible for this. The silica content may vary considering the ash content and which depends on the burning condition of sugarcane baggase. Though SCBA is a worth-less by-product of agricultural industries due to some of the ingredients which can be worked to alter cement. The different reactions formed, firstly the hydration reaction which takes place after addition of water in cement to form CH & CSH and after this second reaction is pozzolanic reaction which takes place between CH from hydration reaction and SiO2 a pozzolan from SCBA and produced second phase of CSH which increase the compressive strength. For making the environment good the actions are taken all over the world to control and to manage the agricultural waste. Thus there is necessity of burning the waste material. Variation in burning temperature and duration of burning, size of particle, chemical composition has been examined. Aim of the study evaluation of potential application of SCBA substituting cement. More viscous and plastic binary paste is formed when SCBA is present as compared to absence of SCBA. When concentration of SCBA resulted an increased in yield stress linearly. The use of 20% of SCBA was beneficial. SCBA is easily available and

cheap waste material of sugar industries. The waste material released from industry is of large amount. Around quarterly SCBA is been produced by effective burning of One Ton of sugarcane. SCBA defining good so it can be used in place of cement as a mortar. Near-about 5 to 8% of global CO2 emission is caused due to manufacturing of Portland cement this environmental problem will most likely to be increased due to growing demand of Portland cement. Several research group are investigating to produce green building material .There are many studies related to use of SCBA. Having low compressive strength SCBA cannot be effectively utilised in alkali activated system to produce geo polymer. SCBA produced by burning the sugarcane residual as a by-product and it mainly constitutes silica. The burning process is performed in uncontrolled condition. Thus the black particles present in the ash are of carbon and crystalline silica.

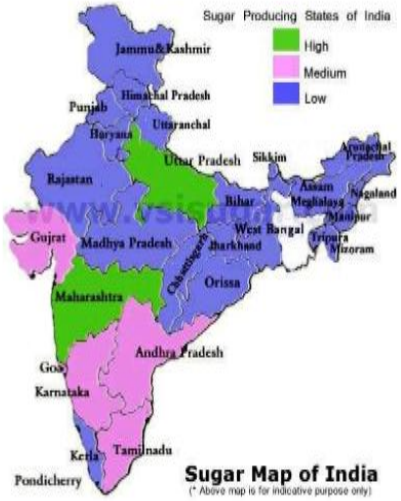

Fig.1.1: Sugar Map of India

II. LITERATURE REVIEW

Nuntachai C et. al (2009) (1)

Explained the importance of bagasse ash for development in concrete. Portland cement occupies many places in building construction due to its strength. Concrete production cost can be effectively reduced with the use of similar material without varying the properties. Un-ground BA is kept in place of PPC. The American standard Codes of practice was used for determining the physical nature water permeability & heat evolution test. It was found that concrete with bagasse ash in grounded state had 113% more strong than conventional mix.

Srinivasan R et. al (2010) (2)

In this study the researcher worked on utilisation of the waste by product on inline sugarcane industry and baggase biomass fuel in the electric generation industry. The investigations are performed the total 180 cubes are prepared of different dimensions and mix design used was M20 grade. In which the sugarcane baggase ash is replaced with the varying percentage of cement replacement and the properties are identified like strength and elastic modulus for different time duration. Thus plasticizer's use is arrested and lighter material is produced in the society.

Fairbairn E et.al (2010) (3)

Examined that co2 emission found to be less when catalysed by the Sugar cane bagasse ash. The study in this topic the material SCBA was collected from southern region of brazil. The CDM analysis for the global increase in temperature was checked of city. The ash was used instead of cement in varying proportions identifying strength and liable characteristics. Near-about 5 to 8% of global CO2 emission is caused due to manufacturing of Portland cement this environmental problem will most likely to be increased due to growing demand of Portland cement. Several research group are investigating to produce green building material. The green-house effect of the city was studied against co2 emission .The literature admires the engineering properties of concrete can be improved if sugarcane baggase ash is properly blended with the OPC as it provides a good bond.

Modani P et.al (2012) (4)

Optimized the workability and flow ability in which the baggase ash is partially replaced by different percentages of fine aggregate. In this subject sugarcane baggase ash is analysed chemically by XRF Scan test and test results was found out. Material shows good nature under chemical test and radicals are found worthy. With the effective replacement of baggase ash by fine aggregate is replaced by 10% to 20% an experimental investigation is carried out . All tests were done in accordance with Indian standard.

Kawade U et.al (2013) (5)

Examined the effect of use of SCBA modifying cement in different ratios by weight of SCBA for compressive strength. With the use of similar raw material of same composition by weight of cement without affecting the quality the cost can be reduced. The maximum percentage of the cement could be effectively replaced with SCBA is not more than 15%. The concrete without SCBA is having lower strength.

Somna R et.al (2013) (6)

Studied the utilization of ability and behaviour of pozzolanic nature. Limestone in the mix proportion of conventional concrete was replaced GBA is compared with conventional concrete, the mixture containing conventional concrete gives more value. Researchers clarify the strength parameter and elastic range for both mixes. All test were done in accordance with American standard.

Sivakumar M et.al (2015) (7)

Analysed SCBA, 20% cement replacement by the Bagasse ash gave higher compressive strength. In this paper sugarcane baggase ash is determined chemically. The sugarcane baggase ash is analysed chemically by XRF scan test and the test results are find out. The compressive strength of the different agro industrial waste material in place of concrete is examined with varying mix designs and duration of curing. The final results found out to be cost reduction occurs when the waste material is utilised forming a cheaper cost of 12%. Also the problem regarding the waste disposal is also solved.

III. CONCLUSION

As we studied the research earlier Sugar- cane bagasse ash concrete performed better when compared to ordinary concrete with replacement of SCBA. At less amount of substitution the SCBA concrete performed better than ordinary concrete. Hence bagasse ash is a by-product material, its use as a cement replacing material reduces the levels of CO2 emission by the cement industry. In addition its use minimizes disposal problems related with it in the sugar industries.

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