Industrial Wastes as a Substitute in Construction Industry

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Abstract— with increasing demand and consumption of cement, researchers and scientist are in search of developing Alternate binders that are ecofriendly and contribute towards waste management. The utilization of industrial and agricultural waste produced by industrial processes has been the focus on waste reduction. One of the agro waste sugar cane bagasse ash (SCBA) which is a fibrous waste product obtained from sugar mills as byproduct. Juice is extracted from sugar cane then ash produced by burning bagasse in uncontrolled condition and at very high temperature. The present paper deals with the effect on strength and mechanical properties of cement concrete by using fly ash. And bagasse ash comparatively. The utilization of fly-ash in concrete as partial replacement of cement is gaining immense importance today, mainly on account of the improvement in the long term durability of concrete combined with ecological benefits. Technological improvements in thermal power plant operations and fly-ash collection systems have resulted in improving the consistency of fly-ash.

Key words: CANMET, HVFA, SCM

I. INTRODUCTION

The present paper deals with the effect on strength and mechanical properties of cement concrete by using fly ash and bagasse ash.. The utilization of fly-ash in concrete as partial replacement of cement is gaining immense importance today, mainly on account of the improvement in the long term durability of concrete combined with ecological benefits. Technological improvements in thermal power plant operations and fly-ash collection systems have resulted in improving the consistency of fly-ash. Based on this study compressive strength v/s W/C curves have been plotted. Fly ash advantages and Constraints In Canada, much of the impetus for SCM development came from work by CANMET (now Natural Resources Canada), which has published extensively on this concept and whose work included the development of up to 65% replacement HVFA concrete. Advantages of using FA as an SCM in concrete are that it: · helps to slow hydration of today's relatively finely ground cements, giving improved longterm performance; · reduces heat in mass sections and therefore reduces the possibility of thermal cracking; · costs less than cement; · improves resistance to sulphate and other chemicals; · slightly reduces shrinkage; · improves workability/pumpability of the fresh concrete; · controls the disruptive alkali-silica reactions in local aggregates that have borderline reactivity characteristics; and · produces higher long-term strength.

II. LITERATURE REVIEW

Although it would appear that the use of FA should be more extensive, one main deterrent is that FA hydrates more slowly than cement and has correspondingly slower strength gain. This factor, which increases with increasing FA replacement dosages, presents a problem in today's concrete construction where rapid form stripping and turnaround are essential. Other constraints to FA replacement are: · FA as an SCM is permitted but not specifically mandated by Canadian building codes, nor is it mandatory in most engineering specifications. · Concrete strength acceptance in North America has historically been based on a 28 day test, which penalizes the long-term strength gain potential of HVFA mixes. There is little logic today in 28 day acceptance because concrete strength is needed either earlier or later depending on the structural element and construction schedule. To achieve maximum benefit from SCMs, extended curing is required.

Under most conditions, HVFA mixes set slower and have a richer texture, resulting in corresponding delayed finishing and the need for modified finishing techniques. · The Canadian construction industry bases its cost estimates on risk management concepts and innovations such as HVFA present risks, albeit small.

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III. BAGASSE ASH

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

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hydration and impartsadditional properties such as chloride resistance, corrosion resistanceetc. Therefore the use of Bagasse ash in concrete not only reduces the environmental pollution but also enhances the properties of concreteand also reduces the cost. It makes the concrete more durable The Bagasse ash imparts high early strength to concrete and also reduce the permeability of concrete. The Silica present in the Bagasseash reacts with components of cement during hydration and imparts additional properties such as chloride resistance, corrosion resistanceetc. Therefore the use of Bagasse ash in concrete not only reduces the environmental pollution but also enhances the properties of concreteand also reduces the cost. It makes the concrete more durable

IV. RECENT STUDIES

Mr. U.R. Kawade et al.,on StrengCharacterized and partial replaced in the ratio of 0%, 10%, 15%, 20%,25% and 30% by weight of cement in concrete. The results show thatthe SCBA concrete had significantly higher compressive strengthcompared to that of the concrete without SCBA. It is found that thecement could be advantageously replaced with SCBA up to maximumlimit of 15%. Although the optimal level of SCBA content wasachieved with 15% replacement. Partial replacement of cement bySCBA increases workability of fresh concrete, therefore use of SuperPlasticizer is not essential.Lourdes M. S. Souza et al., Hydration Study of SugarCane Bagasse [1]Ash and Calcium Hydroxide Pastes of Various InitialC/S Ratio tigated on the reactions between calciumhydroxide (CH) and sugar cane bagasse ash (SCBA). For this purpose,pastes of various initial CaO/SiO2 (C/S) molar ratios were produced.The formed products were analyzed by[2] thermal analyses, X-raydiffraction, scanning electron microscopy and energy dispersivespectrometer. The results show that the main product was found to beC-S-H of not specific morphology and that could not be related to thknown products C-S-H (I)/C-S-H (II). Calcium alumina silicatehydrates and [3] calcium aluminate hydrate, in the form of fine plates orneedles, were also produced. The main product formed in the pozzolanic reactions between SCBA and CH is C-S-H and it appearsas a[4] dense net of amorphous agglomerations. In addition, it cannot becorrelated with the C-S-H formed in the reaction of hydrous silica andCH. C2ASH8, C4AH13 and [5]C3ASH6 are also formed and they appear as thin places or needles deposited inside the pores of the C-S-H net.

V. CONCLUSION

Aim of this paper gives an attempt has been made to review a variety of literatures for the comparative study of the industrial wastes as the cement replacing materials in concrete .This discussion gives a detailed and clear overview of how to proceed in the systematic manner considering all the engineering aspects.

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