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EFFECT OF AIR COOLED BLAST FURNACE SLAG AND POLYPROPYLENE FIBRE ON MECHANICAL PROPERTIES OF CONCRETE

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ABSTRACT

In India, annual production of pig iron is 70-80 million tons and Air Cooled Blast Furnace Slag (ACBFS) production is 21-24 million tonnes. This has created a new challenge for industry for disposal of ACBFS. In order to solve this problem, innovations are required so that we can use ACBFS in construction industry. Further, in India, natural sources for aggregates are very lacking, it is necessary that new aggregates should be sought. The property of blast furnace slag is similar to natural aggregates, the price is cheap and the output is large. Therefore it could be regarded as the substitute of the natural aggregates. The combined effect of ACBFS as replacement for coarse aggregates and fly ash as a partial replacement of cement along with polypropylene as additive on the compressive and flexural strength of concrete has been investigated. Eighteen mixes were prepared at different replacement levels of ACBFS (0% to 100% @20% increment) with coarse aggregate and fly ash was at 10% constant in all mixes. The polypropylene fiber was used with dosage varying of 0.25% - 0.75%@0.25 increment. The compressive strength of concrete and flexural strength was tested after 3, 7 and 28 days of curing. Results indicate that the compressive and flexural strength are in phase with each other. The replacement of ACBFS with coarse aggregates up to 40% increases the compressive and flexural strength of concrete and at 60% marginal decrease in both parameters. On further replacement up to 80% and 100% strength severely reduces the compressive and flexural strength of concrete mix. It is highly recommended that up to 40% of ACBFS can be used as coarse aggregate in concrete along with addition of 0.50% polypropylene.

KEYWORDS: Air Cooled Blast Furnace Slag (ACBFS), Compressive Strength, Flexural Strength, Fly Ash, Polypropylene Fiber