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TITLE OF PROJECT: Integrating Bamboo Ash in Geopolymer Concrete

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ABSTRACT (150-300 words):

Taking look at carbon footprint from the industries cement is one of the largest contributors for CO₂ emission. In order to overcome the use of cement in concreting various industrial waste products are integrated with cement in concrete as admixture. Further geopolymer concrete minimizes the cement content to suitably low values by using fly ash and ground granulated blast furnace slag or silica fume. Fly ash being a waste product from coal combustion having considerably high aluminosilicate content being suitable for replacing cement to an extent, we also face certain drawbacks with the use of fly ash. Using fly ash delays the setting time for the concrete, reduced the early strength gain in concrete, and presence of alkali content in some cases can affect the durability and strength of the concrete. This paper shows experimental research done to replace fly ash with bamboo ash partially and completely in geopolymer concrete preparation. Further, to add on pozzolanic reactivity and strength factors, various mineral admixtures like silica fume or micro-silica, ground granulated blast furnace slag or metakaolin are also experimented to make the geopolymer concrete. Study on the comparison between using fly ash and bamboo ash, suitable properties required for replacing fly ash with bamboo ash, strength gain after replacement, maximum quantity of replacement, and need for any further addition of admixture to develop the properties of the geopolymer concrete is done in this paper. In conclusion, bamboo ash is considerably a good replacement for fly ash due to its high silica and calcium content. Also, it can help in increasing the strength and durability of the concrete when mixed in correct proportions. Working towards the sustainable and environmental conscious material for construction bamboo ash is a suitable substitution for fly ash in geopolymer concrete.

KEYWORDS: Bamboo Ash, Geopolymer concrete, Fly Ash, Admixtures, Binders

CATEGORY: Concrete Technology and Building Materials