

A Prospective Study on Alkali Activated Bottom Ash-GGBS Blend in Paver Blocks

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Abstract : This paper presents a study on use of alkali activated bottom ash (BA) and ground granulated blast furnace slag (GGBS) blend in paver blocks. A preliminary effort on alkali-activated bottom ash, blast furnace slag based geopolymer (BA-GGBS-GP) mortar with river sand was carried out to identify the suitable mix for paver block. Several mixes were proposed based on the combination of BA-GGBS. The percentage ratio of BA:GGBS was selected as 100:0, 75:25, 50:50, 25:75 and 0:100 for the source material. Sodium based alkaline activators were used for activation. The molarity of NaOH was considered as 8M. The molar ratio of SiO₂ to Na₂O was varied from 1 to 4. Two curing mode such as ambient and steam curing 60°C for 24 hours were selected. The properties of paver block such as compressive strength split tensile strength, flexural strength and water absorption were evaluated as per IS15658:2006. Based on the preliminary study on BA-GGBS-GP mortar, the combinations of 25% BA with 75% GGBS mix for M30 and 75% BA with 25% GGBS mix for M35 grade were identified for paver block. Test results shows that the combination of BA-GGBS geopolymer paver blocks attained remarkable compressive strength under steam curing as well as in ambient mode at 3 days. It is noteworthy to know BA-GGBS-GP has promising future in the construction industry.

Keywords : bottom ash, GGBS, alkali activation, paver block

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