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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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