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(57) Abstract :
The present invention discloses the optimal addition and the effects of Ground Granulated Blast Furnace Slag (GGBS) in water prior to mixing it with the other components of mortar. In the investigation, there were two different mixing types employed. First, the typical technique of mixing, in which the GGBS was combined with the cement and sand. Second, a new mixing technique that involved dissolving GGBS in water first before adding it to cement and sand. With varying percentages of GGBS as cement replacement (0%, 2.5%, 5%, 10%, 20%), five dissolution times (0, 1, 3, and 12 h) were examined. In comparison to the traditional mixing method, the new mixing method has produced materials with higher compressive strengths. The maximum compressive strength measured was obtained at 2.5% and 5.0% GGBS during a one-hour immersion in water at a standing temperature. The hydrolysis of GGBS in water caused the higher compressive strength of mortar cubes, which was determined by the mobility of the ions Ca and Si. Compressive strength increased as the Ca/Si ratio decreased, and was more noticeable while the portlandite Ca(OH)2 was in an active state. The compressive strength was created in an earlier stage due to the pozzolanic activity and ion mobility.

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