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Effect of Fly Ash Content on Compressive Strength of Geopolymer-Based Flowable Fill

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ABSTRACT

Geopolymer binders have been widely used as cementitious materials due to their sustainability and long-term durability. The objective of this study is to investigate the effect of fly ash content on the strength characteristics of geopolymer-based flowable fill. The flowable fill mixtures consist of fly ash, silica sand, water, and an alkaline solution. Various proportions of fly ash and sand are used to prepare different geopolymer-based flowable fill specimens. The specimens are cured in a controlled chamber at a temperature of 40 ºC and subjected to unconfined compression tests after 7 and 28 days of curing. The results show that the compressive strength of the specimens varies with the fly ash content. The specimen with the fly ash content of 22 % exhibits the highest compressive strength due to sufficient alkaline solution in the mixture to form a stronger geopolymer gel. Thus, optimizing the mixed design of geopolymer-based flowable fill can significantly enhance its strength performance.

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