

Development of Flowable Backfill Material Using Waste Oyster Shell, Coal Ash, and Surplus Soil

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This study aimed to develop flowable backfill material using oyster shell, coal ash, and surplus soil. Evaluation system was established to obtain repeatable experimental data. The high temperature ($>800^{\circ}\text{C}$) reaction was required to convert CaCO_3 to CaO . The solid specimens formed by pozzlanic reaction between CaO and coal ash showed low unconfined compressive strength. The effect of kaolin and blast furnace slag was also examined. It was found that CaO and coal ash could not be utilized due to high cost and low performance. The use of oyster shell without calcination (CaCO_3) was evaluated. The specimens composing of oyster shell and cement showed the higher unconfined compressive strength than that composing of coal ash and cement. However, use of oyster shell is limited in mortar due to the presence of salt. Addition of soil into oyster shell-coal ash-cement mixture satisfied the specification of flowable backfill material by optimizing their ratio.