

The Effects of Fly Ash and Portland Cement on Long Term Excavatability of Flowable Fill

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ABSTRACT

Specifying agencies low confidence in the excavatability of flowable fill has restricted the growth of this market for coal-combustion byproducts. The Ready Mixed Concrete Associations of Kentucky and Tennessee sponsored a preliminary study at Tennessee Technological University (TTU) to increase confidence in excavatable flowable fill (EFF). Further, the associations and TTU applied for and received Combustion Byproducts Recycling Consortium (CBRC) funding to conduct a two-year field study of EFF. The results of the preliminary study are presented as well as the plan for CBRC two-year field study.

The preliminary study was conducted in the laboratory using nine EFF mixtures. The impact of paste components on engineering properties of EFF was evaluated using Type I Portland cement contents of 30, 45, and 60 lbs/yd³ and Class F fly ash contents of 300, 370, and 440 lbs/yd³. Engineering properties evaluated included flow (ASTM D 6103), compressive strength (ASTM D 4832), and bleed time. The results of the study indicate a very strong correlation ($R^2 = 0.914$) between rates of EFF strength gain and the product of Portland cement content and Class F fly ash content.

The CBRC study will make use of twenty-four 3x3x16 foot trenches and 4x8 inch cylinders to determine the relationship between compressive strength and excavatability. The product of the study will be a CD-ROM containing project results and a model specification for EFF containing coal combustion byproducts. The CD will be provided to municipal officials and engineers at four free seminars at the conclusion of the project.