

PERFORMANCE AND LEACHING ASSESSMENT OF FLOWABLE SLURRY

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ABSTRACT

This project was conducted to evaluate the performance and leaching of Controlled Low Strength Materials (CLSM) incorporating fly ash and foundry sand. Two different CLSM (a.k.a. flowable slurry) reference mixtures (equivalent to available production CLSM mixtures) were proportioned for unconfined compressive strength level in the range of 0.3 to 0.7 MPa (50 to 100 psi), at 28 days, using two sources of ASTM Class F fly ash. For each reference mixture, other mixtures were proportioned using two sources of foundry sand (molten metal-casting mold sand) as a replacement of fly ash in the range of 30 to 85%.

The ingredients of the slurry mixtures fly ash, clean foundry sand, and used foundry sand were tested for their physical and chemical properties, and leachate characteristics. Portland cement used as the primary binder was also tested for its properties. All CLSM mixtures made with and without foundry sand were evaluated for settlement, setting and hardening characteristics, compressive strength, permeability, and leachate characteristics. The leachate results of these CLSM-making materials were below the Enforcement Standards (ES) of the Wisconsin Department of Natural Resources (WDNR) Groundwater Quality Standards (GWQS). They also met practically all the parameters of the Drinking Water Standards. A number of CLSM mixtures incorporating fly ash and foundry sand are recommended for construction applications.