

# **IMPLEMENTATION OF TECHNOLOGY FOR CONTROLLED LOW-STRENGTH MATERIALS USING ILLINOIS COAL COMBUSTION PRODUCTS**

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## **ABSTRACT**

Over 90% of 5.5 million tons per year of coal ash produced from burning Illinois coal is currently disposed in landfills. The focus of this project was to develop a high-volume Illinois coal ash content controlled low-strength material (CLSM) (a.k.a. flowable slurry). The CLSM slurry manufactured as a part of this project consisted of very low amounts of cement, high-volumes of Illinois coal ash, and water to produce flowable slurry for many construction applications. Use of CLSM as a construction material would consume large amounts of Illinois coal ash providing economic as well as ecological benefits. Illinois Department of Transportation (IDOT) and other currently available construction specifications from Illinois were used for manufacturing CLSM in Rockford and Peoria at ready-mixed concrete/CLSM manufacturing plants.

Two series of CLSM were batched in the laboratory, Series 1 CLSM mixtures were composed of a fine crushed sand, Illinois coal ash, and cement. The second series (Series 2) was composed of a combination of typical concrete sand, Illinois coal ash, and cement. Mixtures for both series varied the coal ash and sand content from 0% Illinois coal ash, and 100% sand or fine crushed sand, to 100% coal ash without sand. Laboratory mixtures were evaluated for fresh CLSM properties as well as compressive strength and water permeability. The laboratory mixtures were then used as the basis for mixture proportions used for field manufacturing. Series 1 field mixtures were manufactured at the facilities of Meyer Material Co. and Rockford Sand and Gravel, Inc., Rockford, IL; while Series 2 field mixtures were manufactured at the facilities of the United Ready-Mix, Inc., Peoria, IL. The CLSM test mixtures manufactured generated the necessary experimental and production data to optimize CLSM mixture proportions for commercial production. Two construction demonstration/technology transfer workshops were held in Illinois. One field demonstration was held in Rockford, IL, in cooperation with the Rockford Blacktop Construction Co., and a second demonstration and technology transfer workshop was held in Peoria, IL with cooperation from the United Ready-Mix, Inc.