

Development of Construction Materials Using Sulfite-Rich Scrubber Sludge and Fly-Ash

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ABSTRACT

This paper presents the results of cooperative research and development studies conducted to develop construction materials using sulfite-rich scrubber sludge and fly-ash. The developed construction materials may have characteristics suitable for a variety of applications such as low-grade concrete, road subbase, structural fills, cattle feedlots and other similar applications. The new approach attempted in this study is the development of a soil-like mix that can be prepared at the power plant, transported to the deployment site and compacted using conventional road building equipment without the need for forms during construction process. For a cattle feedlot the cost should be about 25% to 30% of the cost of developing a conventional concrete feedlot.

Mixes have been designed with the goals of: (i) maximizing sulfite-rich scrubber sludge use, (ii) minimizing the use of FBC fly ash to maximize its use for other applications, (iii) maintaining swelling potential below 5%, (iv) maximizing strength, (v) meeting environmental standards, and, (vi) minimizing the use of binders to maintain low cost.

Mixes containing 95% coal utilization byproducts (CUBs) have been engineered to provide an early strength of 850-1,000 psi after 7-days. After 14-days curing, unconfined compressive strengths of 1,000-1,200 psi have been achieved. The porosity and permeability of the developed mixes is low and the water quality impacts have been found to be minimal.

A large scale field demonstration of the mixes for a 1-acre cattle feedlot application is in progress. The results of this demonstration will also be included in the paper.

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