

RMRC



Recycled  
Materials  
Resource  
Center



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of  
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Research Project 74

# Stabilization of FGD Byproduct Using Fly Ash

## Project Objectives

- Determine the effect of fly ash on dry unit weight flue gas desulfurization and filter cake
- Determine the impact fly ash has on the unconfined compression strength of flue gas desulfurization and filter cake

## Project Summary

In 2006, FGD scrubber systems at coal-fired power plants generated approximately 27.4 million metric tons (30.2 million tons) of material, or 24.2 percent of all coal combustion products. Due to an expected increase in scrubbing applications, the amount of FGD produced is expected to grow during the next few decades. Approximately 30 percent of the FGD material produced in 2006 was beneficially used. Fixated or stabilized calcium sulfite FGD scrubber material has been used as an embankment and road base material. FGD products have also been used in place of gypsum, as feed material to produce Portland cement. In addition, FGD material has been used in flowable fill in mine reclamation and in aerated concrete blocks. Oxidized FGD scrubber material (calcium sulfate high in gypsum content) is used in the manufacturing of wallboard. For use as wallboard gypsum, oxidized FGD scrubber material only requires drying to a specified solids content and does not require fixation or stabilization. Wallboard production represents the largest single market for FGD scrubber material.

Use of FGD material has increased over the past decade because FGD material is being used as a source of gypsum for wallboard and Portland cement production. There was a 5 percent increase in the utilization of FGD material between 2005 and 2006, representing an additional 453,000 metric tons (500,000 tons) of material.

Fixated or stabilized flue gas desulfurization (FGD) scrubber material can be used as a stabilized base or subbase material in the same manner as lime-fly ash or cement-stabilized base materials. Fixated FGD scrubber material may be used in an "as produced" condition, provided the material meets specifications, or the FGD scrubber material can be modified with additional reagents such as Portland cement, lime, fly ash, etc. to improve characteristics. In addition to adding fixation reagents, an aggregate material (sometimes coal bottom ash) can be blended with the fixated FGD scrubber material to improve material performance. Properly designed fixated FGD scrubber material has comparable strength development and durability characteristics to that of conventional stabilized base materials.

## Project Partners

American Coal Ash Association

## End Products

Fly ash have a obvious effect on the dry unit weight of FGD and filter cake. They increase gradually with the increase of fly ash content and reaching 13.8 kN/m<sup>3</sup> and 10.7 kN/m<sup>3</sup> , respectively. Unconfined compression strength of FGD and filter cake increases sharply with the increase of fly ash content. The maximum of UCS of FGD mixed with 60 percent fly ash reaches 1.3 Mpa. The maximum of UCS of filter cake mixed with 30 percent fly ash is slightly greater than 0.55 Mpa.

## Further Information

The Recycled Materials Resource Center (RMRC) is a national center that promotes the appropriate use of recycled materials in the highway environment. It focuses on the long-term performance and environmental implications of using recycled materials.