

Effect of Freeze-Thaw Cycling on the Mechanical Properties of FGD By-Products

William E. Wolfe¹, Tarunjit S. Butalia¹

¹The Ohio State University, Department of Civil and Environmental Engineering and Geodetic Science, 470 Hitchcock Hall, 2070 Neil Avenue, Columbus, Ohio 43210

KEYWORDS: FGD, freeze-thaw, engineering properties, strength, permeability

ABSTRACT

In recent years, flue gas desulfurization (FGD) by-products have been proposed as substitutes for conventional materials in an increasing number of engineering applications. These proposals are based largely on laboratory test results and field observations that, compared with soil, properly placed FGD possesses high strength and low permeability. However, alternating cycles of freeze and thaw can have a detrimental impact on these engineering properties of FGD materials. Therefore the performance of engineered structures such as fills, embankments, pavement base courses and subgrades may be adversely affected by alternating cycles of freeze and thaw. This paper presents a review of the laboratory and field scale studies performed at The Ohio State University to identify the factors most significantly affected by alternating cycles of freeze and thaw and makes recommendations for testing and evaluation of FGD by-products. Recommendations for improving the resistance of structures constructed of FGD materials to the detrimental effects of freeze and thaw are given.