

Base Stabilization and Dust Control Using Calcium Chloride and Fly Ash

D. Saylak¹, C. K. Estakhri², S. Mishra³, D. Sinn⁴

¹Director, By-product Utilization and Recycling, Civil Engineering Department, Texas A&M University, College Station, Texas 77843

²Associate Research Engineer, Texas Transportation Institute, Texas A&M University, College Station, Texas 77843

³Manager, Business Development, TETRA Technologies, Inc. The Woodlands, Texas 77380

⁴Graduate Research Assistant, Civil Engineering Department, Texas A&M University, College Station, Texas 77843

Keywords: Calcium Chloride, Fly Ash, Stabilization, Dust Control

Abstract

Field trials were conducted at the TETRA Technologies, Inc. plant site in Lake Charles, Louisiana. A filter cake generated in the production of calcium chloride at this plant was investigated for its potential as a dust-controlling agent and for the stabilization of low-volume dirt roads. A laboratory study was initiated prior to the field trials to develop mix designs in which this filter cake could be blended with a crushed limestone base, obtained from the construction site located at the plant grounds. Two mix designs were developed in the laboratory for incorporating the filter cake into a series of field sections. One mixture was blended so as to contain a dry CaCl_2 content (i.e. percent of dry solids in the base) of 1.3 percent. A second mix was designed for a dry CaCl_2 content of 1.7 percent. A locally available ASTM designated Class C fly ash was added to both mixtures to control fines, porosity, and moisture-density characteristics. Five test sections were built as a part of the construction phase of the project. Along with a control section represented by the untreated, existing crushed limestone base and two sections containing filter cake, two other sections were built in which the base was treated with *Roadmaster*TM, a commercial 38 percent aqueous solution of CaCl_2 marketed by TETRA Technologies, Inc. of The Woodlands, Texas. Of the two sections containing *Roadmaster*, only one incorporated fly ash. Both *Roadmaster* treated sections were designed to have a 1.3 percent dry CaCl_2 content. Following construction, the five sections were subjected to traffic to qualitatively compare their ability to minimize dust erosion. All four treated sections performed extremely well, whereas the control section created considerable dust clouds at vehicle speeds typical of those anticipated at the plant. Limitations in the construction equipment used in this project had an adverse effect on the surface characteristics of the test sections containing filter cake and on their ability to provide a uniformly homogenized blend within the thickness of the base. Recommendations for dealing with these problems are presented for consideration in planning future projects utilizing this filter cake.