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Executive Summary: Review of Texas Transportation Institute Report 3929-1

ROADBOND EN1 RECEIVES HIGH MARKS IN TEXAS TRANSPORTATION INSTITUTE STUDY ENTITLED "REDUCTION OF SULFATE SWELL IN EXPANSIVE CLAY SUBGRADES IN THE DALLAS DISTRICT."

Texas Transportation Report 3929-1: THE TWO MAIN OBJECTIVES OF THIS RECENTLY COMPLETED TEXAS TRANSPORTATION INSTITUTE STUDY WERE (1) to determine effective means of identifying high sulfate soils and (2) to identify alternative non-calcium based soil stabilizers that could be effectively substituted for lime. It has been well documented that lime does not perform well as a stabilizer in high sulfate soils due to excessive swell problems. The study evaluated several techniques for identifying high clay soils and five non-calcium products were selected for comparison to lime as soil stabilizers at two high sulfate test sites. The selection criteria specified that the non-calcium stabilizer must be readily available and inexpensive. The products selected were Roadbond EN1, EMC Squared (EMC^2), Claypack, potassium hydroxide, and ammonium chloride.

This study was well planned and the report was exceedingly detailed. The report contained 159 pages of tables, graphs, and technical commentary. Regarding objective number one, the study determined that simple instrumental tests designed to measure electrical conductivity and dielectric constant can effectively be used to identify high sulfate soils. The study results showed that the non-calcium commercial stabilizers Roadbond EN1 and EMC^2 were superior to lime in strength, stiffness, swell resistance and permeability. Furthermore, these two proprietary products appeared to stabilize the soil, making it more impervious, increasing its strength and stiffness, and reducing the swell-shrink problems created by the expansive lime-sulfate reaction. At the State Highway (SH) 161 site Roadbond EN1 applied @ 1:500 (one part product by weight to 500 parts water by volume) achieved the best results while EMC^2 @1:220 achieved the best results at Interstate Highway (IH) 635. With respect to strength at failure and stiffness, both Roadbond EN1 and EMC^2 outperformed lime at both study sites. With respect to the swell test, Roadbond EN1 achieved the best results at both sites at application rates of 1:500 and 1:300 respectively. Of all the samples, the maximum swell occurred with the lime treated samples from both sites.

Finally, the study established the superiority of the commercial stabilizers Roadbond EN1 and EMC^2 to lime in strength, stiffness, swell resistance, and permeability. The study further substantiated that since these commercial products produce stabilized soils with lower permeability and a lower suction than the soils beneath it; the stabilized soils shed rain better and did not soak up water from the soils beneath them. The report concluded that the non-calcium commercial stabilizers when applied at the appropriate rates were more effective at stabilizing high sulfate expansive soils than lime. The report recommends that the product manufacturers be consulted regarding optimum application procedures and application rates. While the study made no effort to determine structural permanence of soils stabilized with non-calcium treatments, the study does show that both Roadbond EN1 and EMC^2 are superior to Lime at reducing swell in high sulfate expansive soils. Although the report indicates that both Roadbond EN1 and EMC^2 were effective as well as economical no detailed cost comparisons are provided and the authors were careful not to endorse a particular product. For more detail the full report should be consulted.