

Non-Traditional Stabilizers for Road Base Materials

Ryan van der Heijden, Dr. Ghazanfari, Dr. Dewoolkar, Department of Civil and Environmental Engineering at the University of Vermont

Abstract

Treatment with additives is a commonly used technique for increasing strength and stabilization of soil for use in engineering applications. In roadway subbase applications, biopolymers are being explored as environmentally friendly alternatives to traditional stabilizers such as cement, calcium chloride, or asphalt emulsion. This study investigated the effect of the biopolymer Xanthan Gum on the strength, stiffness, and surface gas permeability of roadway subbase material. Two subbase materials were used in the study: a lab-created material and a reclaimed asphalt base material from an active roadway rehabilitation project. Scanning electron microscope imagery indicates that the Xanthan Gum coats soil particles and creates connections between them. Specimens were treated with different amounts of Xanthan Gum and subjected to different curing times. The results indicate that treatment of roadway subbase with Xanthan Gum substantially increases both the unconfined compressive strength and the elastic modulus after at least 14 days of curing. Surface gas permeability of the specimens was found to generally decrease with increased Xanthan Gum content. A strong relationship between the moisture content at time of testing and the unconfined compressive strength was observed. In general, the results of this study suggest that Xanthan Gum could be a suitable non-traditional stabilizer for roadway subbase materials.

Acknowledgements: The research is financially sponsored by TIDC.