

Evaluation of Recycled Plastic Products in Terms of Suitability for Stabilization of Earth Slopes



COMPLETE!

**Recycled
Materials
Resource
Center**



University of New Hampshire



Federal Highway Administration

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The final report for Project 24 is available on-line at:

<http://www.rmrc.unh.edu/Research/Rprojects/Project24/P24finalreport.asp>

Project Description

Soil nailing has become a popular technique for stabilizing earth embankments. In general, steel pins



Recycled Plastic Pins are driven into a slope with the percussion hammer from a Davey-Kent Model 100B, track-mounted drilling rig.

(nails) are driven deep into the soil and then are connected to an outer layer such as shotcrete over a wire mesh. The nails reinforce the soil, supporting tensile loads and creating a stronger soil mass overall. Soil nailing is a fast, effective method for stabilizing new cuts or strengthening older slopes.

Missouri DOT (MoDOT) and the University of

Missouri-Columbia (UMC) are in Phase II of a three-phase project to evaluate plastic pins made from recycled plastics as a replacement for steel pins. Phase I of the project demonstrated that plastic pins successfully stabilized a slope near Emma, MO.

Phase II is expanding the demonstration to an additional four to six sites. However, MoDOT has encountered a problem in that there are dozens of manufacturers that produce plastic pins using different material formulations and processing techniques.

This results in significant variability in the engineer-

ing properties of different pins. Furthermore, there are no common specifications for quantifying and reporting pin performance, so that different manufacturers characterize their pins using different tests. To solve this problem, MoDOT and UMC will conduct uniform laboratory and field tests on different pins so that their properties can be directly compared. In the laboratory, uniaxial compression, 4-point bending and accelerated creep tests will be used to characterize the mechanical behavior of the material (i.e., strength, stiffness, creep, etc.). These tests will be followed by field tests to evaluate the key issue of "drivability," or how well the nails can be inserted into the soil. Once the research is complete, a new phase will begin that will focus on collecting the data and field experiences into standards and guidance documents.



4-point bending tests are performed in the lab.

Project Partners

University of Missouri-Columbia

End Products

- Plastic soil pin guidance specification for MoDOT
- Recommendation to AASHTO for a provisional plastic soil pin specification

Further Information

The Recycled Materials Resource Center (RMRC), a cooperative agreement between the University of New Hampshire and the Federal Highway Administration, is a national center that promotes the appropriate use of recycled materials in the highway environment. Its focus is on the long-term performance and environmental implications of using recycled materials.