Texas A&M Transportation Institute

PROJECT SUMMARY

Texas Department of Transportation

5-6271-03: Using Small Sample Sizes in Full Depth Reclamation Laboratory Mix Designs

Background

Oftentimes, renewal of deteriorated pavements relies on stabilization to strengthen pavement materials. Typically, this process takes place with full depth recycling, where in-situ materials receive treatment and mixing with a stabilizing agent to result in a renewed and strengthened base or subbase material. A properly designed and constructed stabilized base or subbase mixture can significantly reduce the required total pavement thickness to meet pavement design requirements. Traditionally, these stabilized mixtures are designed in the laboratory based on unconfined compressive strength (UCS). However, given typical field material variability, different potential stabilizers, and different treatment levels, the laboratory mix design historically requires significant amounts of material and significant time to return results. This project focused on initial implementation of a small sample mix design approach using reduced sample sizes and indirect tensile strength.

What the Researchers Did

Researchers received samples from eight locations and performed 24 mix designs. Researchers evaluated the recommended stabilization level based on results from UCS-based mix designs and the small sample mix design procedure. Researchers also evaluated the attained specimen density in the small sample procedure as compared to the Tex-113-E maximum density.

Research Performed by:
Texas A&M Transportation Institute

Research Supervisor:
Tom Scullion, TTI

Researchers:
Stephen Sebesta, TTI
Ross Taylor, TTI

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What They Found

These results from the small sample mix design show:

- With cement treatment, reasonable agreement exists between the recommended stabilizer content from both large and small samples.
- With other stabilizers, such as emerging asphalt treatments, initial data suggest reasonable agreement also exists between large and small sample mix designs.
- On average, the small sample densities were 1.8 pcf below the Tex-113-E maximum.
- With the observed variability, this difference in density from the Tex-113-E maximum was not significantly different from zero.

What This Means

Figure 1 illustrates how, with the amount of material required for one UCS specimen, the small sample procedure can perform an entire mix design. This reduction in material quantity requirements offers a major advantage since many times four to eight different mixture designs may be under consideration. The small sample design procedure offers a quick method to determine viable stabilization options; if desired, the most promising treatments can then be cross-checked with UCS.

Figure 1. Contrast of Traditional (Left) and Small (Right) Samples.

For More Information

Project Manager:
Joe Adams, TxDOT, (512) 416-4748

Research Supervisor:
Tom Scullion, TTI, (979) 845-9913

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Research and Technology Implementation Office
Texas Department of Transportation
125 E. 11th Street
Austin, TX 78701-2483

www.txdot.gov
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