

Research Project 17

Development of a Rational and Practical Mix Design System for Full Depth Reclamation (FDR)



COMPLETE!

Recycled
Materials
Resource
Center



University of New Hampshire



Federal Highway Administration

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The final report for Project 17 is available on-line at:

<http://www.rmrc.unh.edu/Research/Rprojects/Project17/P17finalreport.asp>

Project Objectives

- Develop mix design method using the Superpave Gyrotory Compactor (SGC)
 - (a) Develop guidelines for the use of SGC for preparation of samples for mix design
 - (b) Determine compactive effort in terms of gyration number for selection of optimum additive content.
- Determine proper curing procedure before compaction, and after compaction and before testing of mixes during laboratory mix design.
- To evaluate the in-place performance of four different types of additive used in FDR.
- To recommend proper structural numbers for full depth reclaimed base material

Project Progress

Full depth reclamation (FDR) is an asphalt pavement recycling technique in which the asphalt layer and part of the unbound sub-layer are processed in-place and then put down as a stabilized base course. FDR has the potential for widespread use across the country, but acceptance of the procedure is slow because of the lack of specifications and mix designs. For instance, contractors are not always willing to



Slotted mold designed for the project.

consider FDR because they do not want to assume the risk of producing a defective product until they have more experience and guidance. The goal of this project was to develop a rational and practical mix design system that would produce mixtures with consistently good performance, thereby enhancing confidence in the use of FDR and encouraging the increased use of recycled materials. The overall work plan consisted of obtaining asphalt and

unbound material samples from state FDR projects (see Project 16), analyzing the samples in the laboratory, developing a mix design method using the Superpave gyrotory compactor (SGC), constructing test sections using different mix designs and then refining the mix designs based on the performance of the test sections.



Filling the slotted mold with sample material for compacting.

One of the parameters used to evaluate a mix design was resistance to moisture damage. The results showed that the use of emulsion and lime, with cement in small quantities, provided the highest wet tensile strength and was recommended for FDR. Also, it was found that a minimum of 95% of density of in-place loose mix samples, compacted to 50 gyrations, should be achieved in a control strip in the field. This project was completed during the summer of 2002.

Project Partners

- Maine DOT
- National Center for Asphalt Technology

End Products

- Full depth reclamation mix design specification to AASHTO (via Maine DOT)
- Full depth Reclamation "Technology ready for Implementation" to AASHTO (via Maine DOT)

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. Please visit <http://www.rmrc.unh.edu>.