



## Recycled Materials Resource Center



University of New Hampshire



Federal Highway Administration

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## Research Project 28

# Evaluation of Cement-Stabilized Full-Depth Recycled Base Materials for Frost and Early Traffic Conditions

### Project Objectives

The overall objective of this project will be to develop procedures for designing and evaluating cement-stabilized FDR bases with regard to performance in frost areas and under early traffic. The scope of this project has been purposely limited to evaluate only one stabilizing agent (cement). To expand the scope to include other agents would reduce the ability to explore in detail the specific questions in this project related to the impact of frost and early traffic.

### Project Description

In general terms, full depth reclamation (FDR) is a technique for recycling pavement materials where the surface and base courses are crushed and stabilized with a binding agent to form a new base layer. FDR can provide cost savings through the reuse of pavement materials and also by providing a strong base layer, which allows for thinner and less expensive asphalt layers. While interest in FDR is growing, many issues still remain unsolved. This project seeks to develop procedures for designing and evaluating cement stabilized FDR bases with regard to performance in frost areas and under early traffic. The scope of this project has been purposely limited to evaluate only one stabilizing agent (cement). To expand the scope to include other agents would reduce the ability to explore in detail the specific questions in this project related to the impact of frost and early traffic. The need for such a project can be seen by considering that many states currently use specifications for early traffic loads that are especially conservative (such as requiring no traffic for seven days after construction). This can delay construction and encourage the use of other materials (such as new crushed stone) that reduces the use of recycled materials. The Portland Cement Association currently recommends that traffic be allowed on a newly constructed cement stabilized base when it is "sufficiently stable to withstand marring or permanent deformation." However, there are currently no guidelines, other than the experience of the engineer, to determine when this condition will be met.

Dr. Miller has completed a comprehensive review of current FDR practices and is distributing a survey to state DOTs to learn more about their respective experiences with FDR. Though originally limited to DOTs from the Northeast, the scope of the survey has been expanded to include all fifty states because issues such as early traffic loads must be considered by all DOTs. Samples have been collected from an FDR project in



Undergraduate research assistant, Justin Yaitanes, standing by some of the aggregate and recycled pavement from the project.

Rhode Island, and Dr. Miller hopes to obtain samples from Massachusetts and New Hampshire soon. These samples are being tested in the laboratory to determine the mechanical properties of the

mixtures. Work continues on finding an appropriate test site for a field demonstration of FDR. Monitoring of the field conditions will verify the laboratory results.

### Project Partners

Brigham Young University, Portland Cement Association, NH DOT, RI DOT, MassHighway

### End Products

Sample specifications will be developed which can be modified and adopted by transportation agencies or other organizations. These sample specifications will also be submitted to the appropriate committees in organizations that develop standards, such as ASTM, AASHTO, and ACI.

### 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.

For detailed quarterly progress reports for Project 28, as well as all RMRC-funded research projects, please see: <http://www.rmrc.unh.edu/Research/researchlevel2.asp>.