

# Nondestructive Testing to Improve Quality of Recycled Pavements



Recycled  
Materials  
Resource  
Center



University of New Hampshire



Federal Highway Administration

**Project Principal Investigator**

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## Project Objectives

The goals of this project are to determine the in-place modulus of stiffness of foamed asphalt, to develop a guideline for surveying existing field conditions before foamed asphalt and full depth reclamation occur, and to develop guidelines for quality control management of foamed asphalt and full depth reclamation construction.

## Project Progress

Maine DOT was awarded a Technical Problem Solving grant to assist them with their foamed asphalt trials. Foamed asphalt is a relatively new technology that uses a mixture of reclaimed granular base material, reclaimed asphalt, asphalt binder, water, and air to form “foam” that can be compacted into a stabilized base layer. The appeal of foamed asphalt technology is that it provides a method for full depth pavement recycling that result in a strong, stiff base course.



*Reclaimer pushing the asphalt tanker and introducing the foamed asphalt into the base.*

Strong sublayers allow for a thinner asphalt layer, which can result in significant cost savings. Since 2001, Maine DOT has conducted more than thirty foamed asphalt projects in low and medium volume

roads throughout the state. Currently, Maine DOT is using foamed asphalt for most of their base stabilization projects. Maine DOT has learned from previous foamed asphalt projects that there was a considerable lack of data regarding the in-place modulus of stiff-

ness of foamed asphalt, that the presence of large aggregate particles cause the modulus of stiffness and density of the foamed asphalt to be negatively affected, that excessive percentage of air voids (due to large aggregate particles) and excessive moisture content adversely influence the overall quality of foamed asphalt, and that there was a serious lack of quality control measures and tests during foamed asphalt construction. Five sections of roads in different parts of Maine, previously scheduled for reclamation with foamed asphalt, were selected for testing and detailed investigation. The research involves testing the seismic properties of the foamed asphalt to determine the seismic modulus of the foamed asphalt. Traditional falling weight deflectometer (FWD) studies are being conducted concurrently with ground penetrating radar (GPR) to establish the thickness and response of the pavement layers. In addition, a portable seismic property analyzer (PSPA) is being used for comparison. The field component consists of testing the reclaimed material behind the final roller and taking core samples from selected locations. Laboratory testing consists of observing moisture content and percentage of air voids of the collected core samples. The field and laboratory results are being synthesized to provide the information required for development of a standard procedure for a field survey, prior to conducting a full depth reclamation.

## Project Partners

- Worcester Polytechnic Institute
- University of Texas, El Paso
- Infrasense, Inc.

## End Products

- Accurate moduli of foamed asphalt layers;
- Step-by-step guide for use of non-destructive testing for pre-full depth reclamation survey;
- Step-by-step guide for quality control of foamed asphalt construction.

## 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 39, as well as all RMRC-funded research projects, please see: <http://www.rmrc.unh.edu/Research/researchlevel2.asp>.