



U.S. Department of Transportation  
Federal Highway Administration

# ROAD BUSINESS



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*Above: From left to right - Ken Kyle, NHDOT District Engineer, and Bruce Knox, NHDOT Project Engineer, overlook recycling in Alton*

## On The Road In New Hampshire

*NHDOT demonstrates leading edge technology in Alton and New Durham by using a cold in-place recycling train*

It's a demonstration project, first of its type in New Hampshire. Located on Route 11, south of the Alton traffic circle the project is a 6 mile segment that looks like and rides like any of the many hot asphalt pavements constructed by NHDOT this year. The key difference in this demonstration segment is the equipment and materials used to

construct the 4 inch base course under the 24 foot wide driving lanes.

### Equipment

A new, more sophisticated cold in-place recycling equipment train was required to complete this work. It is designed to be self-propelled and to complete the construction process from milling to paving in one continuous operation along a 12' wide stretch of existing pavement. The equipment train mills the existing bituminous pavement, pulverizes the millings, adds emulsified asphalt, mixes and repaves the material in a continuous operation providing an ability to simultaneously reestablish or improve the existing line, grade and cross-slope.

The actual equipment train consists of four pieces of machinery:

- Cold Milling Planer - powers the first three units of the train. This piece of equipment also grinds and picks up the existing pavement then transfers the material to the second unit. This portion of the process results in about 80% of the milled pavement meeting the maximum required specification size.
- Screening/Crushing Unit - picks out the oversized material, runs it through a crusher and rescreening process, then transfers the graded material to the third unit.

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## Americans with Disabilities Act

### The Law is in Effect

Title I of the Americans with Disabilities Act (ADA) became effective in July 1992. The new Act prohibits discrimination in the workplace against qualified individuals with disabilities *because of the disabilities*. The law bars discrimination in any activity or service operated or funded by state or local government. The federal Equal Employment Opportunity Commission (EEOC) has issued regulations implementing employment provisions (29CFR Part 1630).

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## Requirements of Employers

It requires that employers with 25 or more employees provide reasonable accommodation for disabled workers unless there is demonstrated undue hardship. That hardship may include significant difficulty or expense to the employer.

## Definition of "disability"

The definition of "disability" comes from the definition of "handicap" which is contained in the amended 1973 Rehabilitation Act rules under section 504. The definition refers to individuals with "a physical or mental impairment that substantially limits one or more of the major life activities or "a record of such impairment."

Major life activities, according to Section 504, include functions such as caring for oneself, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning, and working.

"Impairment" does not include physical characteristics such as eye color, hair color, left-handedness, or height, weight or muscle tone that are within "normal" range, and are not the result of a physiological disorder. Advanced age, in itself, is not an impairment.

For example, under the regulations, someone with hearing loss would be defined as having a disability even if the condition were correctable with the use of a hearing aid.

ADA does not require that unqualified individuals be hired. Employers can judge what functions of a job are essential.

## Where to Get More Information

If you need information or technical assistance on the ADA, contact the Regional Disability and Business Technical Assistance Center at the Northeast DBTAC in Trenton, New Jersey, telephone 609-392-4004.

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# Reasons for "Chip Seal" Failures

by Peter Messmer, Lab Engineer,  
Cornell Local Roads Program

Oil and stone surface treatments (chip seals) are steak and potatoes fare on the platter of most town and county construction menus. This article discusses why many chip seals are doomed to an early end.

The good news is that to be forewarned is to be forearmed. To get the most for your "chip seal" dollar, be on the alert for things that can go wrong, such as:

- the aggregate and emulsion spread rates
- construction techniques
- weather
- surface preparation
- traffic control
- material problems

A recent phone survey has shown that chip sealing is a fairly widespread paving and maintenance procedure. Since the survey was not announced, most agencies were unprepared to give accurate cost estimates. However, agencies indicated a range of \$6,000 to \$8,500 per mile for a single chip seal. Clearly, there is the potential for great financial losses when chip seals fail before a reasonable life expectancy of five years or so.

## What constitutes failure?

The main reasons for chip sealing are:

- to provide an all-weather road surface (i.e., seal against entrance of water into base course and subgrade)
- improve skid-resistance
- rehabilitate an old, weathered asphalt surface
- provide demarcation of traffic lanes

If a chip seal ceases to perform these functions, it has failed. Failures occur in two primary forms:

- stripping (loss of cover stone)
- bleeding (excess asphalt on the road surface)

Both conditions ruin the ability of the chip seal to provide the stated functions.

## Debunking a Myth

A reason commonly offered for chip seal failures is that the emulsion and aggregate are not well suited to each other.

This idea comes from the difference between *anionic* and *cationic* emulsions. All emulsions are a mix of asphalt cement, water, and an emulsifier. Mixing asphalt with water requires an emulsifying agent, since they do not readily mix. As the three ingredients are blended, a suspension of asphalt droplets in water occurs. The emulsifier creates a surface tension between the asphalt particles and surrounding water that permits the asphalt droplets to remain in suspension until the water evaporates. Emulsifiers create an electrical charge on the surface of the asphalt particles that cause them to repel each other, helping them to stay in suspension. An *anionic* emulsifier is one that makes a negative charge on the asphalt droplets, while a *cationic* emulsifier creates a positive charge on the droplets.

Traditionally engineers agree that anionic emulsions work best with aggregates having mostly positive surface charges, such as limestone. On the other hand, usually a cationic emulsion works best with aggregates having mostly negative surface charges, such as sandstone. However, recent studies have begun to challenge these concepts.

Perhaps certain asphalt emulsions work better with certain aggregates. Seldom, if ever, is the degree of compatibility so poor that the asphalt will not coat the rocks. Furthermore, once the emulsion has broken, it behaves like an asphalt cement, and the charge on the asphalt film disappears. The fact is that

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