

M A S S I N T E R C H A N G E

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LOOKING GOOD ONE YEAR LATER

Wood Street shows no signs of damage after its first New England winter



Demonstration of FDR with cement in Hopkinton, MA

In October 2003, full depth recycling of asphalt pavement with portland cement was used for the first time in Massachusetts. A 1000-foot long stretch of Hopkinton's Wood Street was recycled with cement as a stabilizer. One year later the road is in excellent condition and shows no signs of damage from its first cold winter.

This process, full depth recycling (FDR) with cement, rebuilds worn out asphalt pavements by recycling the existing roadway. The old asphalt and base materials are pulverized, mixed with cement and water, and compacted to produce a stronger, durable base. An asphalt surface or chip seal is applied over the new base and the road is ready for traffic.

Wood Street was plagued by rutting and alligator cracking (fatigue cracking) before rebuilding it with FDR. As in many other roads with a thin layer of asphalt over an old base, increased traffic and weather had taken their toll. In May 2003, Carolina Carbo, NECSA Pavement Recycling Specialist, met J. T. Gaucher, Director of the Department of Public Works for the Town of Hopkinton, MA, at the Norfolk-Bristol-Middlesex Highway Association Equipment Show. She introduced him to the idea of using cement in FDR to improve the strength of the base and prevent rutting. Mr. Gaucher recognized the potential of this process for this particular road and suggested a demonstration project.

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LTAP Local Technical Assistance Program

(413) 545-2604 http://www.ecs.umass.edu/baystate_roads



Chris Ahmadjian and Baystate Roads advisory board members congratulate F. Thom Donahue on his achievement in January.

#9 Crosses the Line...

A New Master Baystate Roads Scholar

Baystate Roads is pleased to announce our newest Master Roads Scholar. F. Thom Donahue has been attending the highway technology training workshops since 1989 while working at the Department of Public Works in Somerville, MA. A Stoneham native and 3rd generation public official, he has engineered public works projects for the state as well as municipal DPWs in Swampscott, Nahant, Lowell and Somerville. Although he recently accepted the City of Somerville's early retirement incentive, he has continued to work part time for Somerville, first as interim city engineer, then as acting superintendent of the newly merged water and sewer enterprise, and now as a senior advisor. A retrospective of his forty-six years in the engineering and construction industry specifically with respect to highways, roads and bridges includes:

- * Consultant engineer/surveyor for flood control projects in eastern Massachusetts
- * Preliminary, layout, inspection, and final surveys on MHD interstate highways and bridges
- * Preliminary, layout, inspection, and final surveys on MHD state routes and arterials
- * Design, bid, and construction management of rehab, reclamation & reconstruction for local roads
- * Snow and ice management for three municipalities
- * Fiscal management for local, bond, c.90, federal/state, and developer mitigation fund sources
- * Implementation of a computerized pavement management information system
- * Member of a Mayor's Transportation Cabinet.

Thom Donahue has been providing executive engineering support as a management consultant to the City of Somerville for the last two years. Prior to this position he was director of engineering at the Somerville DPW where he was in charge of \$70 mil in capital public works designs, bids and supervision of contracts. Thom founded Donahue Associates, a high tech land surveying practice and more recently Executive Engineering Support which provides project management services to DPWs, contractors, architects, engineers and land surveyors.

Mr. Donahue's commitment to further his education has continued with attendance at over 26 LTAP workshops. He holds a MBA in finance from Anna Maria College and a BS in environmental engineering from SUNY as well as an AA from Harvard University in economics.

Thom is affiliated with these professional organizations:

American Public Works Association
 American Water Works Association
 MassHighway Association
 Water Environment Federation
 Mass Municipal Engineers Association
 N.E. Floodplain & Stormwater Managers Assn.

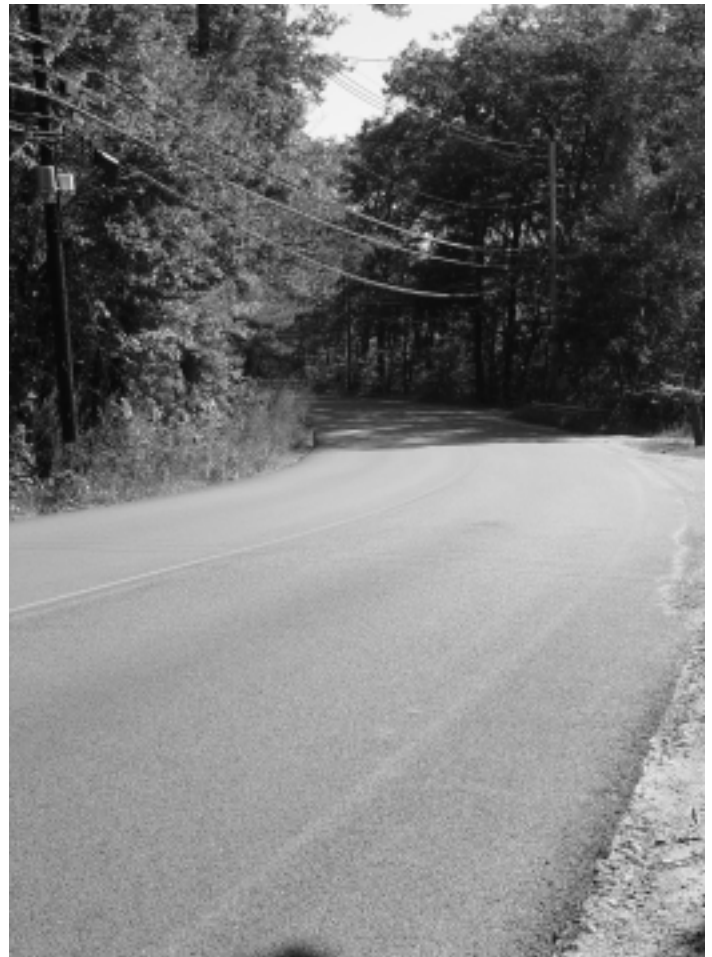
Congratulations to Thom Donahue on this achievement. He shared valuable suggestions for next year's workshops at the winter meeting of the Baystate Roads Advisory Board.



Initial condition

On October 7, 2003 town highway superintendents, directors of public works, and MassHighway engineers were invited to the jobsite to see the recycling process first hand. The existing asphalt road had been pulverized the previous day. During the demonstration, the attendees had the opportunity to watch the cement spreading process and then how all the materials were blended with a second pass of the reclaimer. After all the materials were mixed, a grader shaped the road and a roller was used for final compaction. A water truck then spread water over the new stabilized base to promote curing. The following day, the base was ready to be paved. The paving contractor placed a new, smooth-riding asphalt wearing course. As in any other FDR project, the entire project was done under traffic.

Wood Street has been rebuilt with an improved foundation. The pavement base provides the thickness and stiffness necessary to carry traffic loadings. FDR with cement is a more efficient and durable way to maintain and upgrade town roads, while promoting the recycling of precious natural resources. Do not forget the importance of drainage; FDR work provides the perfect opportunity to improve it. Regardless of the type of road structure, improving the drainage system will enhance the life of your roads.



Pavement after one year

PROJECT DESCRIPTION

Location: Portion of Wood Street from Whisper Way (just west of Rt. 495) easterly to #157 Wood Street, Hopkinton, MA

Length: 1,000 ft. -- **Width:** 29 ft.

Thickness of existing asphalt: 2 inches

Base: Poorly graded sand with silt & gravel

Thickness of reclamation: 8 inches of gravel, and cement mixed reclamation

Cement rate: 5% (dry weight)

A total of 8 inches was pulverized and stabilized with cement: 2 inches of binder course & 2 inches of surface course. The newly applied asphalt surface is 4 inches thick. Surface & binder courses follow specifications found in MA State Ref. Section M3.1 I.00

For more information contact Carolina Carbo, C.E., Pavement Recycling Specialist, Northeast Cement Shippers Assn. at (857) 998-0119 or ccarbo@necementshippers.com

DO YOU DIG SAFE?

Both Federal and State laws require excavators to notify appropriate utility companies before excavating to promote public safety and avoid costly damage to underground facilities. Notifying member utilities individually would be time consuming, but calling "DIG SAFE" simplifies the process.

Dig Safe is a system, required by these laws and funded by member companies, which allows excavators to notify the appropriate utilities with one telephone call or one Web form found on <http://www.digsafe.com> before digging, trenching, blasting, demolishing, boring, back-filling, grading, landscaping or other earth moving operations.



Massachusetts Highway Association provided this quiz for your refreshment of the current requirements. Answers can be found on page 5.

1. What is DigSafe?

- A. Locating company
- B. Government agency
- C. One-call center

2. What is the On-Target?

- A. Locating company
- B. Government agency
- C. One-call center

3. Who is required to call DigSafe?

- A. Home owner
- B. Contractor
- C. Excavator
- D. Anyone digging

4. When I call DigSafe all utilities in the area are notified?

- A. True
- B. False

5. Someone will mark ALL the lines in my yard when I call DigSafe.

- A. True
- B. False

6. What is the main purpose of DigSafe?

- A. To make me wait before digging
- B. To protect underground facilities
- C. To let all member utilities know where I am digging with one phone call
- D. Answers B & C

7. Once I call DigSafe. I can start digging anytime.

- A. True
- B. False

8. In MA, I need to wait ____ days before digging not including ____ and ____.

9. When does my DigSafe ticket expire? (check all)

- A. If work does not commence within 30 days
- B. If an emergency DigSafe occurs and the emergency is over
- C. 30 days from when I call in for a ticket
- D. Never expires if work continues

10. What is considered an "emergency"? (check all)

- A. Constructing a fence
- B. Gas leak
- C. Threats to life or health
- D. Water leak

11. An excavator may pre-mark an excavation area in the color of their choice.

- A. True
- B. False

12. What color is used to mark electric lines?

- A. Blue
- B. Orange
- C. Pink
- D. Red

13. How can I tell how deep utility lines are buried?

- A. They are always 3 to 4 feet deep
- B. Dig gently with backhoe until warning tape is found
- C. Hand dig until lines are exposed

14. When I hit a utility line with a backhoe, I should...?

- A. Keep working until the utility company arrives
- B. Rebury the line and call the utility company
- C. Stop work and call the utility company

15. Typically how deep is the yellow caution tape buried with gas lines? _____

16. Warning tape and sand will always be found before reaching underground utilities?

- A. True
- B. False

17. If a natural gas line is ruptured, gas is lighter than air.

- A. True
- B. False

18. The DigSafe toll free phone number is:

1-____ - ____ - _____

19. Once ALL UTILITIES are marked, who is responsible for maintaining the marks?

- A. Utility companies
- B. Homeowners
- C. Excavators

ANSWERS: 1 C; 2 A; 3 D; 4 B; 5 B; 6 B & C; 7 B; 8 3/weekends & holidays; 9 A,B,D; 10 B, C, D; 11 B; 12 D; 13 C; 14 C; 15 12"-24"; 16 B; 17 A; 18 888-DIG-SAFE; 19 C.

NEW VIDEOS

ST-204 MODERN DRIVING HAZARDS

American Training Resources 19 minutes

Covers modern day driving situations such as racing against other drivers, road rage, stressful driving situations and use of cell phones.

ST-205 THE ULTIMATE DRIVING CHALLENGE

American Training Resources 30 minutes

Hosted by well-known celebrities, a series of live demonstrations of difficult and dangerous driving situations and how to correctly handle each one safely.

ST-194 MAKING THE EFFORT WORKS: REDUCING UTILITY DELAYS DURING CONSTRUCTION

FHWA & AASHTO 19 minutes

Sets forth actions that can be taken to avoid construction delays and reduce or eliminate unnecessary project costs, and stresses the importance of working together to achieve common goals. Features extemporaneous comments from a variety of spokespersons from 7 states that have developed and implemented innovative practices for reducing utility-related delays, illustrated by action footage.

MO-253 SNOW REMOVAL TECH NIQUES – PLOWING TIPS FROM THE PROS

VISTA Training 25 minutes

Teaches snow plowing on city streets, country roads and interstates. After pre-trip inspections, it shows different types of snow plows/snow blowers in use on trucks, wheel loaders, motor graders, one-way plows, reversible plows, "V" plows, wing plows and special cutting edges for ice.

BOOSTING ROADWAY SAFETY WITH RUMBLE STRIPS



Approximately one-third of all traffic fatalities and serious injuries in the United States annually are due to run-off-road crashes. In 2,000, almost 16,000 deaths were attributed to these types of accidents. Such statistics have caused the transportation community in recent years to take steps aimed at keeping motorists on the road, rather than relying on clear roadsides and traffic barriers to minimize crash severities. [One answer: rumble strips.](#) Richard Powers of the Federal Highway Administration's (FHWA) Office of Safety Design says, "Our primary goal is to reduce single-vehicle crashes and fatalities, and rumble strips have proven to be a cost-effective way to keep motorists on the roadway."

Rumble strips are raised or grooved patterns constructed primarily along paved shoulders. When vehicle tires pass over the strips, they produce a sudden rumbling and vibration in the car. Both the sound and vibration alert fatigued or distracted drivers that they are beginning to drift off the road.

FHWA is spearheading a movement to increase nationwide use of rumble strips. A new technical advisory released by FHWA, [Roadway Shoulder Rumble Strips](#), contains the latest information on the state-of-practice design and installation of rumble strips, including recommendations for minimizing the adverse effects rumble strips may have on bicyclists using roadway shoulders. The advisory, which also includes an extensive list of

reference materials on rumble strip use and effectiveness, is posted on the Web at:

www.fhwa.dot.gov/legsregs/directives/techadv/t504035.htm.

Numerous States have performed studies on the effectiveness of rumble strips, with the resulting statistics revealing dramatic success rates. In 1985, the California Department of Transportation (DOT) performed a before-and-after study where it installed rumble strips along sections of Interstates 15 & 40 in San Bernardino County. The study revealed a 49 percent decrease in the number of run-off-road crashes in the areas with rumble strips. Recent follow-up evaluations of freeway segments where shoulder rumble strips have been in place for 3 or more years have shown a 33 percent average reduction in run-off-road accidents.

The Delaware DOT's US Route 301 Centerline Rumble Strip Project provides some of the most compelling evidence concerning the success of rumble strips. After experiencing a high fatality rate from head-on collisions on Route 301, this DOT installed centerline rumble strips along the roadway. The result was a 90 percent decrease in the head-on collision rate and a zero fatality rate. These improvements were achieved despite a 30 percent increase in traffic. The project was awarded one of the 2001 National Highway Safety Awards by FHWA.

In addition to increased safety, rumble strips have been shown to cut costs. Several States have analyzed the benefit/cost ratio of shoulder strips, and the results are as dramatic as the accident reduction rates. New York Thruway data indicates a benefit/cost ratio ranging from 66:1 to a high of 182:1. A Maine DOT survey of 50 State DOTs identified a benefit/cost ration of 50:1 for milled rumble strips on rural interstates nationwide.

Looking at the future to build on current rumble strip successes, additional installations and evaluations of centerline rumble strips and shoulder rumble strips on two-lane rural roads are needed.

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REDUCING UTILITY-RELATED DELAYS: A Resource Guide

Highway construction projects are often delayed by problems with planning around and relocating utility lines. These delays are costly, time-consuming, and often unnecessary. A number of Federal Highway Administration (FHWA) resources provide guidance on reducing or avoiding these utility-related delays and the accompanying costs.

Avoiding Utility Relocations (FHWA publication DTFH61-01-C00024) looks at methods for "designing around" utilities to avoid delays. These design strategies include making geometric and alignment changes and changes to drainage systems, such as moving storm drains, narrowing ditch widths, and adjusting flow lines. To successfully "design around" utility lines, however, highway agencies must know where they are. Subsurface utility engineering (SUE) can help provide this vital information. SUE uses surface geophysical techniques to identify the presence and approximate position of underground utilities. The utility lines can then be exposed so that precise measurements can be taken and other data collected. A recent study found that SUE typically costs less than 0.5 percent of the total project construction cost, saves more than \$4 for every \$1 spent, and may reduce project delivery time by as much as 20 percent. More information about SUE can also be found in a FHWA fact sheet, *Subsurface Utility Engineering: Enhancing Construction Activities* (FHWA Publication No. FHWA-IF-01-011), or by visiting the SUE Web site at: www.fhwa.dot.gov/programadmin/sueindex.htm.



Early communication and cooperation allows highway planners to explore highway alignment alternatives prior to project design to avoid the need for major utility relocations

Avoiding Utility Relocations also looks at the importance of early communication and coordination among utilities and State highway agency staff. Early communication and cooperation allows highway planners to explore highway alignment alternatives prior to project design to avoid the need for major utility relocations. And when utility work cannot be avoided, the construction schedule for that work can be coordinated with the highway construction schedule, to reduce the disruptions to the public and prevent conflicts between contractors.

Strategies for greater communication, cooperation, and coordination (CCC) are explored in the FHWA video, *CCC: Making the Effort Works!* The video looks at the efforts of Georgia, Maryland, and Wisconsin to improve coordination among highway agencies and utility companies. A *Viewing and Discussion Guide* is also available for use with the video. This guide can be found on the Web at:

www.fhwa.dot.gov/programadmin/viewer.htm

For more information or to obtain copies of *Avoiding Utility Relocations*, the SUE fact sheet, or *CCC: Making the Effort Works!*, contact Rober McClellan at F H W A , 2 0 2 - 3 6 6 - 6 7 6 5 (e m a i l : roger.mcclellan@fhwa.dotgov).

Reprinted from July 2003 issue of FOCUS published by the Federal Highway Administration.

Congratulations to the newest Baystate Roads Scholars on their fine achievement. Keep saving those certificates and you, too, could be listed here!

Walter Castagna
Town of Shrewsbury

Jeffrey Colby
Town of Chatham

John Haines
Town of East Bridgewater

Thomas P. Temple
City of Marlborough

David Donahue
Town of Marblehead



Baystate Roads Scholar!

Thomas Hladick
Town of Natick

Michael Gifford
Town of Orange

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The Baystate Roads Program, which publishes *Mass Interchange* each quarter, is a Technology Transfer (T2) Center created under the Federal Highway Administration's (FHWA) Local Technical Assistance Program (LTAP). This newsletter is prepared in cooperation with MassHighway and the United States Department of Transportation Federal Highway Administration. FHWA is joined by Mass Highway, College of Engineering at the University of Massachusetts/Amherst, and local public works departments in an effort to share and apply the best in transportation technologies.

In addition to publishing *Mass Interchange*, the Baystate Roads Program facilitates information exchange by conducting workshops, providing reports and publications and videotapes on request, and offering one-to-one technical assistance on specific roadway issues. Because the program relies on input from many sources, inquiries, articles, and ideas are encouraged.

LTAP Local Technical Assistance Program

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