M A S S

INTERCHANGE

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Don't Shrug Shoulder Repair

In the rush to complete maintenance projects before winter, some agencies defer road shoulder work until spring. Putting it off can result in shoulders not serving all their purposes, which are:

1. To provide side support to the pavement
2. To drain water away from the pavement and into ditches
3. To provide a safe area for motorists during emergencies.

To fulfill these purposes, the shoulder and pavement edges must be level and the shoulder slope steeper than the pavement slopes. These characteristics are necessary to drain snow melt as well as rainfall.

With non-level, rutted or inadequately sloped shoulders, snowpack and ice accumulate at the edge of the pavement. Snow and ice melt faster next to the pavement and create a mini-ditch.

Water will seek the easiest path which often is underneath the pavement. Freeze-thaw cycles crack the pavement and loosen the base material beneath it. In a matter of days water penetrates further into the roadway, and freeze-thaw cycles cause additional damage, including alligator cracking several feet wide.

Shoulders with steep or eroded slopes lead to more erosion which weakens the edge of the pavement. Eroded materials travel into ditches and eventually into lakes and streams.

WHEN REPAIR IS REQUIRED

Highway departments should do shoulder repairs in the fall to slow roadway deterioration, save money and reduce environmental damage. Dirt or gravel shoulders should be repaired that show one or more of the following conditions:

1. The shoulder surface shows ruts and corrugations over one-inch deep.
2. The slope is too flat to provide good drainage.
3. The shoulder has eroded into cuts and gullies causing cracks in the edge of the pavement and material being carried into ditches.
4. More than a two-inch drop-off has developed from the pavement to the shoulder.

Asphalt shoulders need repair if they are cracked or a gap has formed along the pavement edge.

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Announcing Our Second Master Roads Scholar

Congratulations to David T. Frye, superintendent of Highways, Parks and Sewers, Town of Orange, who has recently completed the required twenty-two courses. David has been a regular attendee at workshops held in Northampton for over six years. He now supervises the highway operations in the Town of Orange where his family has lived for more than five generations. Orange has a population of over 7,500 with 90 miles roadways, 35 miles of sewers, and 8 parks, where fiscal expenditures are always carefully scrutinized by town officials. In order to accomplish his goals of fiscal management and labor efficiency, Mr. Frye has assembled a talented, productive workforce of six full-time and ten part-time employees through attention to working harmoniously.

David is an active member of the Franklin Regional Council of Governments Transportation Subcommittee through which grants have been obtained and has worked extensively with Mass Highway on Chapter 90 projects as well as other State funded activities. He also works closely with the town administrator, select board, conservation committee, police and fire departments, building inspector, and finance and capital committees. During his tenure, equipment, facilities and morale have improved dramatically as well as his ability to focus on advance planning instead of reacting to each crisis situation.

Mr. Frye has been recognized by his senator, representative, town and Baystate Roads Program for this achievement. The photos illustrate presentation of the engraved brass plaque for display at his office and a WearGuard jacket for those crisp New England winters. The advisory board also welcomes David's input and suggestions on how Baystate might improve technology transfer through the Massachusetts Local Technical Assistance Program (LTAP).

David Frye on his way to another Baystate Roads workshop

Chris Ahmadjian, LTAP program manager, presents a Master Roads Scholar jacket to David Frye at Winter Blitz 2001 Workshop in Northampton

Surfing the Web for OneDOT Information

Publications aren't just available on bookshelves, there is a wealth of transportation-related puiblications available online. Whether you're searching for an FHWA, U.S. DOT, or State DOT publication, chances are the information is available on one of the Web sites listed below. These are only a few of the user-friendly electronic databases that are available at everyone's fingertips. You can also check FHWA's main Web site:

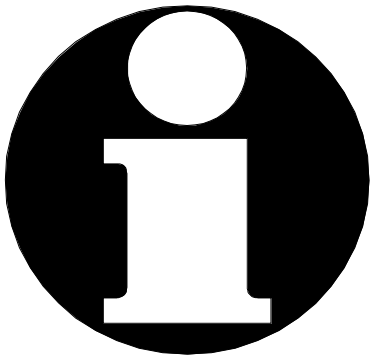
www.fhwa.dot.gov

and FHWA's research, development, and technology Web site:

www.tfhrc.gov

http://ntl.bts.gov/tris

--The Transportation Research Information Service (TRIS) database now has 500,000 records of published and on-going transportation research. It is (TRIS Online, Version 1.5) available to the public through the Bureau of Transportation Statistics National Transportation Library's Web site, and has abstracts of the research and some links to full-text documents.



http://ntl.bts.gov

--The National Transportation Library (NTL) has over 5,300 full-text documents and a search engine that indexes 110,000 documents from 14 transportation agencies. The NTL document collection includes U.S. DOT reports, transportation planning documents, and material from more than 30 State DOT's and university Web sites.

www.ntis.gov

--Even though the National Technical Information Service (NTIS) collection is large and varied, with nearly 3 million titles, you can easily browse through the collection for government-produced information from around the world. You can customize your searches to specific needs, and most items are available for purchase directly from NTIS. NTIS can also be reached at (703) 605-6000 or toll-free number (800) 553-NTIS (6847) from 8 a.m. to 8 p.m. EST, Mon-Fri.

http://isweb.tasc.dot.gov/Library/library.htm

--Through Research Information Databases and Electronic Resources (RIDER), the DOT Library offers hundreds of technical, scientific, legal, and business databases to DOT employees at their desktops. The system consists of three components: the DOT Online Catalog, Research and Reference Databases, and the Digital Special Collection.

www.state.ma.us

--Through the Massachusetts site, you are linked to transportation information resources, consumer assistance, providers and state agency sources.

Removing Washboard Corrugations

by *Don Beard, Public Works Director, Laramie County, Wyoming*

Washboard corrugations on gravel roads create a major safety problem for the traveling public and increase roadway maintenance costs.

Washboard corrugations create a number of problems:

1. Loss of vehicle control
2. Increased vehicle breaking distance
3. Vehicle damage
4. Increased road maintenance cost
5. Increased dust and air pollution

Removal of the washboard corrugations and relaying the gravel material can only be effectively accomplished during the spring and fall when soil moisture conditions are adequate. Without proper moisture conditions, washboarding will rapidly reappear, increasing the cost of maintenance. Washboard corrugations can be a serious problem both during the summer and winter months. Use of water trucks to aid in relaying the material is time-consuming and cost prohibitive. Chemical road stabilization products, while effective in certain situations in reducing washboarding, can also be cost prohibitive.

Prior practice has found that by cutting the washboards off and removing the loose aggregate material, a safe and smooth road can be maintained, even during the summer and winter. Removal of road base aggregate does not adversely affect the strength of the road because the road surface has its greatest strength during those times of the year. During the winter, the surface and subbase are frozen, providing a solid uniform section. Moisture is not present to lubricate the aggregate or create soft spots in the road during the summer months. The removal of one to two inches (25.4 to 50.8 mm) of road surface is not a detriment.

It is extremely important not to break the surface crust when removing the washboards and equally important, to remove all the loose aggregate. The most effective means of removing the washboard corrugations and loose material is to use a normal straight cutting edge on a motor grader and to "sweep" the loose aggregate off with the blade. The use of carbide tip points on the blade tends to break up the aggregate and leaves loose material. The removal of loose material is important. If it is not removed, the road surface crust may break loose and washboard corrugations will reform. Loose material on the road will enhance the dust problem and the binder material will be lost.

The removal of the washboard corrugations and loose aggregate is effective as long as the surface material has at least 9% fines (minus 200 sieve, 75 um). The fines work as a binder for the crust and facilitate a smooth road surface. Past experience has demonstrated that hard vehicle braking on the road where the washboards have been removed has resulted in black tire skid marks on the road surface.

When the loose aggregate material is removed, blade the aggregate onto the in-slope of the roadway. Do not leave the material windrowed. For safety reasons, spread the material out over the shoulder. When soil moisture conditions are adequate, the material should be retrieved with a motor grader and reapplied to the road surface to reestablish the proper cross section.

The removal of washboards is not a save-all procedure, but an intricate piece to the total maintenance program.

(Adapted from the FHWA Region 8 "You Show Us How" contest with permission from the Wyoming T2/LTAP Center)

Descriptive Terms for Gravel Roads

New TV Ads Available

The U.S. Department of Transportation (DOT) and U.S. Environmental Protection Agency(EPA) State and local stakeholders have identified an acute need to: 1) strengthen the public's understanding of the connection between their travel choices, congestion, and air pollution; and 2) through information exchange, media campaigns, and networking, educate the public about opportunities to have mobility and clean air.

As a result, the agencies developed "It All Adds Up to Cleaner Air," a comprehensive public education and partnership building program to support regional, State, and community efforts to reduce traffic congestion and air pollution. The goal of the program is to expand the public's knowledge and understanding of the effects that their individual, daily transportation choices have on air quality and traffic congestion. The program has provided communities with guidance and technical assistance for developing a successful outreach campaign, a set of broadcast and print promotional materials, and limited funds to support program implementation. "It All Adds Up to Cleaner Air" delivers consistent, national themes that can be easily adapted and tailored to meet information needs in communities where traffic congestion, air pollution, and public health are concerns for area residents.

The "It All Adds Up to Cleaner Air" initiative has three main elements: community partnerships; high-quality marketing materials and resource toolkit; and a national coalition, the Alliance for Clean Air and Transportation (ACAT). As a result of ACAT collaboration, DOT and EPA have been able to work with the Ad Council to develop two television ads that promote environmentally sound transportation use (vehicle maintenance and tire inflation). The ads began airing nationally in September 2001 and may be requested for local customization. At the end of the public service announcements, the Ad Council will include the ACAT logo and the "It All Ads Up to Cleaner Air" artwork and voice-over. This work will provide our State and local partners with two new, high-quality TV ads produced by the Ads Council, which will assist them in placing the ads on their community television stations at no cost. For more information visit the Web site: www.epa.gov/otag/trag/trag-pedo/italladd, contact Joann Jackson-Stephens at: jackson-stephens.joann@epa.gov, OR contact:

Kathy Daniel
(202)366-6276
kathy.daniel@fhwa.dot.gov

ALLIANCE
FOR CLEAN AIR & TRANSPORTATION

Congratulations to the newest Baystate Roads Scholar on your achievement. Keep saving those certificates and you, too, could be listed here.

Edward J. Cauley
Southampton DPW

Bridge Study Analyzes Accuracy of Visual Inspections

For all the sophisticated technology employed in bridge design and construction today, the maintenance and preservation of bridges still depends largely on regular visual inspection of the structures. The visual inspection method, in fact, is the predominant nondestructive evaluation technique used for bridge inspections in the United States. Beginning in 1998, the Federal Highway Administration's (FHWA) Nondestructive Evaluation Validation Center undertook a comprehensive study to examine the reliability of this method for highway bridges. The study was designed to measure the accuracy and reliability of both routine and indepth inspections, study the influence of key factors that might affect bridge inspector performance, and examine differences in State inspection procedures and reporting styles. The results have shown that the methods used and data collected in routine inspections can vary considerably from State to State.

The study consisted of a review of existing literature on the topic, a survey of bridge inspection agencies, and a series of performance trials involving 49 State department of transportation bridge inspectors. The performance trials were conducted on bridges in Northern Virginia and south central Pennsylvania. Researchers collected data on the results of the inspections, the characteristics of the inspectors, and the inspection environment. The primary data used to evaluate the routine inspections were the National Bridge Inspections Standards Condition Ratings assigned by the inspectors to the primary bridge components (deck, superstructure, and substructure). The condition ratings, which range from 0 to 9, describe both the degree of bridge deterioration and the extent to which it is distributed throughout the structures components. The primary data used to evaluate the indepth inspections were the inspectors' field notes, which summarized specific deficiencies identified in the bridge.

The study showed that routine inspections are completed with significant variability, particularly with respect to the assignment of condition ratings. During the performance trials, on average four or five different condition rating values were assigned to the bridges' primary components. The frequency with which field notes were taken also varied considerably from State to State. Inadequacies with the indepth inspections were noted as well--specifically, most of the inspectors did not make note of the types of defects, such as weld cracks, that this type of inspection is designed to identify. Factors that may affect indepth inspection results include the structure's complexity and accessibility, the inspector's comfort with the working height and access equipment used, and the inspectors' visual acuity.

Recommendations made by the study for improving the accuracy of visual inspections include:

* Revising the condition rating system to increase accuracy and reliability;
* Increasing the training of inspectors with regard to frequently reoccurring types of defects that they are likely to encounter and methods that would allow them to easily identify these faults;
* Examining further the types and sizes of specific defects that are likely; to be identified during an indepth inspection;
* Placing greater emphasis during the design phase of bridges on building a structure that is accessible and can be more easily inspected; and
* Performing more research to determine if setting minimum vision standards for inspectors would benefit the inspection process.

As these recommendations are reviewed by State highway agencies, contractors, and others, "I think we will see some changes in bridge inspections in the next five years," says Brent Phares of FHWA's Nondestructive Evaluation Validation Center. "I think we will also see some major revisions to the National Bridge Inspection Standards."

For more information or to obtain a copy of the study, contact Brent Phares at 202-493-3121 (fax: 202-493-3126); email: brent.phares@fhwa.dot.gov).

Reprinted with permission from FOCUS, January 2001.

PROPER STOCKPILING PROCEDURES

A good road begins with good aggregate. But even if you spend money on good quality aggregate, it can deteriorate if not stored or transported properly.

PREPARE THE SITE

For a stockpile to be effective, its site must be carefully prepared. It cannot be placed in an area where it could easily be contaminated or intermingled with other aggregates. Therefore, the site must be cleaned beforehand of any material not intended to be in the stockpile, such as mud, debris and vegetation.

ASSURE GOOD DRAINAGE

Good drainage is an important factor in maintaining quality aggregate. Stockpiles in areas that receive runoff will be too wet and more susceptible to contamination by vegetation and any chemicals in the runoff. A well-drained stockpile should be placed on level ground or on top of a downhill slope rather than pushed against the side of a slope or in a valley.

LEAVE ENOUGH FREE SPACE

The stockpile area also must have enough space for other stockpiles as well as trucks and loaders that will add to or remove material from them. If your stockpiles contain different kinds of aggregates, it is especially important to keep the piles well separated.

USE CORRECT SHAPE

When building the stockpile it is important to shape it to avoid segregating the aggregate. The natural tendency of the stockpile is for larger aggregate particles to roll away from the main body of material and accumulate at the base. This often occurs when the stockpile is shaped like a cone. Instead the stockpile should have a rectangular base and triangular ends.

The stockpile should be built in layers less than a meter deep and set in a little from the layer underneath it. Or individual truckloads could be dumped in a single layer of adjoining piles.

If an existing stockpile has not been formed in the best manner, it's best for loaders to remove aggregate from the ends rather than sides to obtain a better cross section of aggregate.

OTHER CONSIDERATIONS

Proper equipment is of utmost importance in avoiding aggregate segregation. If a truck has poor suspension, segregation can occur when transporting aggregate from the stockpile to a road work site.

Grading skill also is key in getting the most out of good aggregate. When grading a road, operators who cut too deeply into the road surface will bring up subgrade materials that are undesirable for the wearing course of the road.

In conclusion, you can make the most of your aggregate by knowing the basic types and characteristics of stockpiles and the right and wrong ways of handling and working with aggregate once it's stockpiled.

Baystate Roads Calendar

Gravel Road Repair & Maintenance

MARCH 20 Sturbridge
MARCH 21 Falmouth
MARCH 26 Westford
MARCH 27 South Hadley
MARCH 28 Lee

Hot-Mix Asphalt

MAY 29-31 Worcester

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HOW TO MAKE REPAIRS

With a motor grader, crews can shape and smooth the shoulder slope. They should compact the shoulder, ensuring level shoulder and pavement edges. Next, they should add, spread and compact granular material.

Because shoulders must support vehicles, the materials used in them should be similar to the road base. Therefore, before reshaping or replenishing, it might be necessary to remove organic debris, clays, silts and other unsuitable substances.

Asphalt shoulder repairs are the same as those applied to the roadway. Sealing gaps between the shoulder and pavement are necessary to prevent freeze-thaw effects.

Highway departments also should consider reshaping ditches. This is especially important if poor ditch drainage will affect the repaired shoulder.

Reprinted with permission from Nevada Milepost, Winter 2001.

Highway Trivia

Be the first to guess the correct answer and win a prize. At a recent Baystate Roads Program Advisory Meeting, Neil Andres provided this teaser: *WHAT IS THE ONLY MOVIE ILLUSTRATING A CHIP SEAL APPLICATION?* Sorry, no Baystate advisory board members are eligible to win

Fax answer to Sue at 413-545-6471

in this issue...

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). FHWA is joined by the Massachusetts Highway Department, 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

To contact the Baystate Roads Program call (413) 545-2604 or FAX 413-545-6471.

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