Pulverize for longer pavement life

Costs for pulverization, cracking, and leveling courses vary with the contract bid, Blazek says. On three recent contracts, milling cost $9.60, $8.35, and $8.12 per ton. Cracking and seating cost $4.1, $1.15, and $3.35 per square yard. Binder courses with MV mix type asphalt cost $26.75, $29.85 and $27.75 per ton.

All contracts pay separately on a unit price basis for hauling away pulverized material. “That way, if we estimate amounts wrong on one street we pay only for the amount the contractor hauls out,” says Blazek. Streets department staff use historical records, observe curb height, and sometimes take cores to help them make tonnage estimates.

Rather than trying to reuse or salvage their own pulverized material, Racine’s bid specs allow using recycled asphalt mix for either course. “The contractor’s logistics aren’t such that they can pick up and re-mix and lay the same material,” says Blazek. “They stockpile it, then bring us virgin or recycled material that is not necessarily ours.”

Pulverizing in urban areas has its challenges, Blazek, says, and may cost a little more, but is worth it. “We’ve been doing it at least 10 years and have found it to be very effective. We get 30% to 50% longer life out of the pavement,” he says.

For more information on pulverization, contact John Edelbeck, Waupaca, at 715-258-4420, email: jarewaup@yahoo.com, or James Blazek, Racine, at 262-636-9191, email: jblazek@cityofracine.org.

With construction season just around the corner, it’s time to review a valuable tool for resurfacing asphalt roads—pulverization. Whether the pulverized material goes into the base course or gets recycled and relaid, the process eliminates reflective cracking and extends road life. Pulverizing equipment works effectively within curb and gutter, over old concrete and even brick pavements, and on rural roads.

“It’s like starting over with a new pavement,” says John Edelbeck, Director of Public Works in Waupaca. “You’ve eliminated the existing cracks that will put pressure on the new overlay.” Waupaca, a city of 5,000, uses pulverization on all types of streets and roads. Since many of its roads are thin asphalt layers over sandy soil, pulverizing’s main benefit is conserving the existing pavement to increase road strength, according to Edelbeck. Waupaca’s contractors pulverize the old asphalt surface to a depth of 6-8 inches and mix it in place with the stone base course. Often, about half the material is hauled away to keep the final surface even with existing curb and gutter and to help maintain proper crown. The city stockpiles the excess material and uses it for shoulders and as utility backfill.

After pulverizing, a grader comes in and grades and compacts the surface. A 1½ inch binder course and a 1½ inch surface course of asphalt follow. With the residual asphalt in the pulverized pavement, the graded and compacted surface is “passable,” Edelbeck says. This allows the road to be opened to traffic quickly which is good when there’s a delay before the paver comes in.

“We’ve been doing it for three years now and hope to continue pulverizing streets where we can,” says Edelbeck. Even with removing half the surface material, the process tends to raise the road’s crown height, so older, wider streets with a flat crown are good candidates for pulverizing, he says. Streets with subbase failures are not good candidates he says. Pulverizing costs 45 cents per square yard.

Pulverizing over concrete and brick

On its many streets that are asphalt over concrete, the City of Racine first grids off the asphalt then breaks up and re-seats the underlying concrete. The contractor breaks the concrete pavement into pieces 3-4 feet square then rolls it with a vibratory roller. “This helps considerably with reflective cracking,” says City Engineer Jim Blazek. “The pieces all mesh together and you don’t have the heavy cracking coming through.”

Reflective cracking is a particular problem on streets with asphalt over concrete. They are more prone to developing potholes because water seeps in between the two layers causing deterioration from the inside. The freeze thaw cycle accelerates the process. So do very hot or cold temperatures because the materials expand and contract at different rates.

Old brick streets don’t cause reflective cracking but often they will have deep depressions in the tire tracks. After pulverizing off the asphalt surface, the contractor fills in low areas before laying the binder course. Leveler courses are also used to meet higher gutter levels and to even out the surface around old concrete patches that are elevated above the surrounding brick layer.
PASER and PASERWARE—Clarifying the facts

The T.I.C. gets many calls about PASER, PASERWARE, and the new state requirement that local governments rate their roads. We hope the following helps clarify the situation.

PASER is a state-approved pavement surface rating system that is used to rate the condition of streets and roads, on a scale of 1 to 10 for paved surfaces and 1 to 5 for unpaved ones. T.I.C. has PASER manuals for asphalt, concrete, and gravel roads that show how to do the ratings using pictures and simple text. T.I.C. also has a videotape that explains how to rate asphalt surfaced roads using PASER.

PASERWARE is pavement management software that local officials can use to inventory local roads, recording physical characteristics (such as length and width), PASER condition ratings, and maintenance and repair actions. PASERWARE provides an initial inventory of local roads because it translates the state database of local roads. It also projects into the future to help local officials evaluate the consequences of alternative maintenance strategies and budgets. It creates graphs and tables to help local officials communicate the consequences of alternatives.

Two new versions of PASERWARE will be available this spring, PASERWARE 1.1, an updated MS-DOS version, and PASERWARE 2.0, a Windows-based version written in Access 97 using the current 1.0 version of PASERWARE. The MS-DOS version is being continued for local agency users whose computers don’t have the speed and memory to process the Windows version.

Earlier versions of PASERWARE were named ROADWARE. The name of the software was changed to PASERWARE to avoid confusion with a Canadian company that makes pavement testing equipment. ROADWARE 6.0 and PASERWARE 1.0 are essentially the same. Both new versions of PASERWARE (1.1 and 2.0) will read road data files from RW 6.0 and PW 1.0. Agencies with road data in earlier versions of ROADWARE (5.12, 4.0, 3.0) may not be able to transfer their road data files to the new versions without special assistance. In some cases, it may be better to start over.

By December 2001, condition ratings of local roads are to be reported to Wisconsin DOT. This will give local governments time to rate their roads using any state-approved condition rating system. DOT will review condition rating systems and provide a way to submit condition ratings closer to the date when they are due.

If you want to learn how to rate your roads using PASER and how you can benefit by using PASERWARE, consider attending a workshop in April or May. See the Calendar on page 5 for dates and locations.

Windshield treatment improves vision in rain

A WinDOT reader sent a recommendation for rain repellent glass treatments. “I just love using the products because they improve vision greatly and almost totally eliminate the need for wipers at high speeds,” says Mark Paulat. “They would definitely help highway crews as well.”

The products penetrate the microscopic pores of glass creating a supercritical, invisible barrier. They are wiped on and polished off like a wax. “Rain-X” and a similar product from STP cost under $5 a bottle at auto parts and discount stores. They require two applications 5-7 days apart and last about a month. “Aquapel” from PPG Industries, is a service treatment costing $29.95 for a passenger vehicle. It is supposed to last six months to a year.

Although they are not a substitute for windshield wipers, they are effective against slush, rain, snow, frost, ice, mud, and bugs, as well as salt. They seem to work better when the vehicle is traveling at 35 m.p.h. or faster. In fact, they are commonly used on airplane windshields.

Do’s and you should avoid using these products on streets/highway maintenance vehicles? Please call, email or write to tell us how well they work. (To reach us see page 7.)
New standards for crashworthy work zone devices

New tests show that several types of work zone devices can make fixed object crashes more severe. Many barricades and most portable sign supports with signs made from rigid materials are uncrashworthy under NCHRP 350 standards adopted by the Federal Highway Administration. "Minivans, pickup trucks, and 4WD vehicles are becoming more common, and crash tests show problems. Some work zone devices are penetrating the windshields or getting sent into a work area in a crash," says Tom Notbohm, Traffic Operations Engineer of the WisDOT Bureau of Highway Operations. Improving work zone devices is part of the FHWA's Congressional mandate under the 1991 STEA to make all roadway hardware devices more crashworthy.

Local street and highway agencies, road contractors, and utilities should start phasing out uncrashworthy items now and begin spacing and ordering devices that meet the standards. All new category 2 devices bought after October 1, 2000 meet the National Highway System must be crashworthy. This category includes barricades, portable sign supports, and drums with lights. Since the guidelines allow agencies to use up current stocks, full compliance dates in Wisconsin are two to five years hence, depending on the type of device and whether it is used on national or state highway system roads.

Tentative Wisconsin sunset dates are:

- Barricades—January 1, 2002 for state-let contracts on National Highway System (NHS) routes; January 1, 2004 on all state routes and contracts.
- Portable signs supports—January 1, 2003 for state-let contracts on NHS routes; January 1, 2005 on all state routes and contracts.
- Maintenance and utility work on state highways—dates are not firm yet, but will be similar.

The requirement does not apply at the local level unless the agency is doing work on a National Highway System or state route. However, FHWA strongly recommends following these standards on other routes for both safety and liability reasons. "Liability may be an issue if an agency has a different standard on some roads than others," Notbohm says.

Sign trailers currently used by counties and others don't meet the crash test requirements. "We recognize that the trailers have safety benefits for the work crews," says Notbohm. "We want to continue allowing the use of existing trailers for several more years, but we are recom-

Resources

Materials listed are available from the Wis.T.I.C. unless otherwise noted. To get your copy call 608-264-4721 or visit the T.I.C.’s Web site at www.dot.state.wi.us/T.I.C. unless otherwise noted. To get your copy call 608-264-4721 or visit the T.I.C.’s Web site at www.dot.state.wi.us/T.I.C. unless otherwise noted.

PROPOSED AMENDMENTS to the Manual on Uniform Traffic Control Devices (MUTCD), Part 5, Traffic Control Devices for Low Volume Rural Roads, Federal Highway Administration Register and FHWA, December 1999, 22 pages. The Federal Highway Administration is proposing to add a new Part 5 for low volume rural roads. The intent of new Part 5 is to provide in one location in the MUTCD the standards and guidance that are unique to low volume rural roads. Proposed Part 5 defines low volume roads as both paved and unpaved roads outside of corporate limits that carry traffic volumes with an annual average of less than 200 vehicles per day. The proposal includes Standards and Guidance for sign sizes and placement, regulatory signs, warning signs, pavement markings, traffic control for highway-railroad grade crossings, and temporary traffic control. It also includes options for low volume roads in the sections concerning sign placement, stop and yield sign warrants, and centerline pavement markings. FHWA is accepting comments until June 30, 2000.

Roadway Drainage The materials below were distributed at T.I.C.'s fall Roadway and Roadside Workshops. They offer valuable advice and information on how to identify the causes of common roadway drainage problems and some practical solutions to solve them. Available in limited quantity for those not able to attend. Roadway and Roadside Drainage by David P. Orr, E.I., Cornell Local Roads Program, ch. 1, 1999-92. 88 pp.

The Excavator's Guide to Diggers by David P. Orr. This book is a complete guide for how to select an excavator to excavate in the public right-of-way. Covers notification procedures, phone numbers, excavator responsibilities, and state law on excavation notification. Municipal Roadway Projects Near Wetlands and Navigable Streams by Bob Meier, Wis. DNR, Nov. 1999, 3 pp. Helpful facts about the causes of common roadway drainage problems and some practical solutions to solve them. Available in limited quantity for those not able to attend.

Spray patchers speed repairs

Spring is bustin' out all over, especially in the potholes on your roads. To combat them, some Wisconsin municipalities are using new spray injection patching equipment, and they find it makes better patches quickly and safely in all kinds of weather.

"It is so much better than a cold patch because it stays pliable where the road and moves with the road," says Richard Kinzer, Beloit streets supervisor. "We have had just three pothole failures since we bought the patcher in 1997 and last year we repaired more than 10,000 potholes."

Beloit's trailer-mounted Patchmobile put 200 tons of chipped limestone and 7,000 gallons of emulsion into fixing potholes, blending in raised manholes, ramping up to bridge decks, and other maintenance chores.

Patches stick tight

Blowing a blend of emulsion and stone into the pothole under high pressure (about 50 mph) makes the patches stay in place. Thefill material is fully compacted in thin layers from the bottom up. A jet of compressed air cleans the hole of debris and standing water, helping ensure a good bond with the pavement.

Spray patches also seem to be as good or better than hot mix patches, and they can be done in any weather. "You can use it year round and the patch stays in the hole for the first time. You're not going back to the same hole five or ten times," says Kinzer. "And a great advantage is you can use it in wet weather if you have a bad hole that needs to be fixed right away. You can build a little dam around the hole to keep the water out."

Belot has even used their Patchmobile in temperatures as low as -10°F, but they keep trips short because valves tend to stick and freeze in very cold weather.

The machines are especially good for fixing shallow holes. "It's very good on viaducts," says Daryl Solczek, City of Milwaukee Street Repair District Manager. "You tend to get a lot of spalling on bridges because of the amount of reflector on the surface. When holes do form they are shallow. Normal asphalt doesn't last in those types of holes."

The City of Milwaukee just bought its second self-propelled Roadpatcher.

Milwaukee crews are out most days of the year. Each machine goes through approximately 100 gallons of CRS-2 emulsion and three tons of 1/4-inch washed stone every day.

Economical and safer

Although the initial equipment cost is more than for conventional patching methods, in the long run it is more cost efficient. "The log cost saving is you reduce your crew from two to one. Also, you can stay out year round and the pothaces stays in," says Solczek. Milwaukee paid $12,000 for their newest truck-mounted Wildcat Road-patcher. Belot's Patchmobile trailer cost $34,000 for a two-yard trailer, plus $3000 for the emulsion tanks.

Using the trailer is much safer for the crews, Solczek points out. "In the past we had people walking behind a truck exposed to heavy traffic on major arterials," he says. Now the operator stays safely inside the cab. A large arm board on the back and strobe lights make the patcher very visible and vehicles do move over, he notes. Also, since the patches set up immediately, the operator is exposed to traffic for less time.

Techniques

Patches need good well-trained operators Kinzer and Solczek agree. The operator needs to be attentive when operating the valves and filling the emulsion tanks. And it takes a while to learn how to manage the emulsion-stone mix for different conditions.

"You have to crown the patch about a quarter-inch to compensate for the settling," says Kinzer. A thin coat can help hold an alligating road together until it can be repaired permanently. Belot has also used it to fix sunken curb and gutter. One problem Milwaukee found is that in very hot weather the patches had a tendency to track. They resolved it by increasing their cover aggregate.

They also found 1/4 inch washed stone is best, otherwise fines tend to clog the conveyor. The stone also needs to be fairly dry. Belot uses limestone chip aggregate from a local quarry, gradiented from 1/8 inch down into the fines.

Positive public response is also an advantage. "Citizens like the looks of the patches, because they come out white and look like concrete roadway," Solczek says. They appreciate the smoothed out road with patches that stay in place.

For more information about patcher operations, contact Richard Kinzer, Beloit, 608-364-2929 or Daryl Solczek, Milwaukee, 414-286-5333.
Good drainage lengths road life
Improving roadway drainage can make your roads last longer. Last fall’s Roadway Drainage workshops highlighted ways to identify the cause of drainage problems and how to follow up with effective improvements. The workshop instructor was David Orr, Technical Assistance Engineer with the Cornell Local Roads Program in New York. A former county highway engineer, Orr shared his experience with a very enthusiastic audience in this Wisconsin T.I.C. workshop series. For those who could not attend, here are several key points.

Good quality base course
It is very important to insist on (and test) good quality aggregate for all roadway base and surfacing materials. One common sense step is limiting the fines in base course aggregate to less than 8%. It is not easy to tell the fine content of a graded aggregate just by looking, as a classroom demonstration showed. In the workshop, most participants could not identify the best quality material from among three base course samples, even after touching them. This shows that running a simple gradation test on your aggregate is an essential, economical way to improve local roadway performance.

Pavement crown
Orr reviewed the value of good pavement and shoulder crowns for getting water off the road and into the ditch. He stressed the importance of the shoulder crown slope being slightly steeper than the pavement crown to improve drainage away from the pavement. Shoulders should be maintained regularly to remove grass and debris that builds up along the edge and traps water.

Under drains
Installing under drains can cut localized road failures from sub-surface water. These systems should be installed to drain the base course thoroughly to its bottom. It is important for the long term performance of the drains to keep fine materials out of them. Unfortunately, many fiber-wrapped pipes could not identify the best quality material from among three base course samples, even after touching them. This shows that running a simple gradation test on your aggregate is an essential, economical way to improve local roadway performance.

Under drains must be maintained. Design them to discharge into a ditch and cover the outlets with a rodent screen. Locate the outlet 6-12 inches above the ditch’s flow line. This avoids back flow and clogging when silt and debris fill the ditch. Inspect the outlets periodically and clean as necessary.

Geotextiles have also proven effective in preventing road failures where there are poor subsoils and a high water table. The geotextile separates the base course from the fine-grained soils and water below. Non-woven geotextiles resist puncture well and give excellent long-term performance.

Installing culverts
Most culvert installations are replacing existing sediment-laden culvert pipes. Orr cautioned participants to review the culvert’s effectiveness before simply replacing it with the same size and type. Consult local residents and long time maintenance personnel about which pipes can adequately handle heavy storm flows.

A check on the sizes of upstream and downstream culverts can also be revealing. A simple way to spot undersized culverts is to compare the square footage of their openings. Changes in land development upstream from the culvert can also significantly impact pipe adequacy. Consider not only existing conditions but also improvements planned for the next few years.

Careful attention to backfilling around pipes is the most important step in avoiding damaged or collapsed culverts. It is good practice to place the backfill in 6 to 8 inch layers and compact each layer. Orr also cautioned against the false economies of using a culvert pipe that is too short. Pipes should be aligned with the stream’s natural flow, not just placed perpendicular to the road. They need to be long enough to provide good protection at the end of the pipe and to avoid erosion and undercutting during heavy flow. It is always cheaper to buy an adequate length of pipe than to try to fix erosion and stream flow problems afterwards.

Diggers Hotline
Orr reminded everyone to call Diggers Hotline at least three days before doing any excavation and to use its services. When you are planning an excavation, Diggers Hotline locates underground utilities and advises on safe working clearance for overhead lines. Orr also uses the Hotline to track other projects scheduled in his right-of-ways.

Protecting the environment
Transportation liaison staff from Wisconsin DNR regional offices spoke at each workshop. They reviewed state regulations on erosion control and constructing and maintaining local roads near wetland and navigable streams. DNR staff welcome questions about the regulations and will help local officials meet state requirements. They urged participants to contact them when planning work near navigable streams and wetlands or projects that will uncover more than five acres of soil. A list of DNR transportation contacts for each county and a summary of the regulations were distributed and are available from the T.I.C.

Maintenance
Roadside ditches must be maintained. Ideally the culvert bottom should be at least one foot below the bottom of the base course. Its slope may need to be different from the roadway’s slope to maintain flow and avoid erosion. Ditch slopes between 1% and 3% are most desirable.

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Good drainage makes your roads last longer. It requires regular maintenance and special attention when making pavement improvements.

T.I.C. workshops
Several workshops and demonstrations are in the announces mailed to all Crossroads subscribers. For additional copies, or more information, call the T.I.C. at 800/442-4615.

Maintaining Gravel Roads
How to build and better maintain gravel roads taught by Ken Koshorek, Field Operations Manager of the South Dakota Transportation Technology Transfer Service. Workshops cover routine grader operations, fixing rutts and washboards, and proper maintenance techniques/materials.

Mar 13 Rhinelander Mar 15 Eau Claire
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Periodic cleaning is normally required to remove the build up of silt and debris. You can minimize ditch erosion if cleaning minimizes the area disturbed. Orr recommended to remove silt only from the ditch bottom and to avoid scraping soil from the slope on the sides. Exposed ditch soil should be seeded immediately by hand sowing the seed and walking it in. On steep ditch slopes that are subject to erosion, Orr recommended using erosion control blankets. These control blankets also eliminated the need for periodic culvert inspection and cleaning. A handy, short inspection form was included in the workshop handouts.

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Roads with poor crown and no shoulder or ditch will suffer pavement failure.

Under drains Installing under drains can cut localized road failures from sub-surface water. This system should be installed to drain the base course thoroughly to its bottom. It is essential, economical way to improve local road performance.

Pavement crown Orr reviewed the value of good pavement crowns for getting water off the road and into the ditch. The shoulder cross slope should be slightly steeper than the pavement crown to improve drainage away from the pavement. Shoulders should be maintained regularly to remove grass and debris that builds up along the edge and traps water.

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Installing culverts Most culvert installations are replacing existing culvert pipes. Orr cautioned participants to review the culvert’s effectiveness before simply replacing it with the same size and type. Consult local residents and long time maintenance personnel about which pipes can adequately handle heavy storm flows. A check on the sizes of upstream and downstream culverts can also be revealing. A simple way to spot undersized culverts is to compare square footage of their openings. Changes in land development upstream from the culvert can also significantly impact pipe adequacy. Consider not only existing conditions but also improvements planned for the next few years.

Careful attention to backfilling around pipes is the most important step in avoiding damaged or collapsed culverts. It is good practice to place the backfill in 6 to 8 inch layers and compact each layer. Orr also cautioned about the false economics of using a culvert pipe that is too short. Pipes should be aligned with the stream’s natural flow, not just placed perpendicular to the road. They need to be long enough to provide good protection at the end of the pipe and to avoid erosion and undercutting during heavy flow. It is always cheaper to buy an adequate length of pipe than to try to fix erosion and stream flow problems downstream.

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Maintenance Roadside ditches must be maintained. Ideally the ditch bottom should be at least one foot below the bottom of the base course. Its slope may need to be different from the roadway’s slope to maintain flow and avoid erosion. ditch slopes between 1% and 3% are most desirable.

Periodic cleaning is normally required to remove the build up of silt and debris. You can minimize ditch erosion if cleaning minimizes the area disturbed. Orr recommended to remove silt only from the ditch bottom and to avoid scraping soil from the slope on the sides. Exposed ditch soil should be seeded immediately by hand sowing the seed and walking it in. On steep ditch slopes that are subject to erosion, Orr recommended using erosion control blankets.

These controls also highlighted the need for periodic culvert inspection and cleaning. A handy, short inspection form was included in the workshop handouts. This inspection form, the Roadway Drainage manual, the Diggers Hotline Guide, and the handouts from DNR are available from the T.I.C. (See Resources, page 6.)

Good drainage makes your roads last longer. It requires regular maintenance and special attention when making pavement improvements.
New standards for crashworthy work zone devices

New tests show that several types of work zone devices can make fixed object crashes more severe. Many barricades and most portable sign supports with signs made from rigid materials are uncrashworthy under NCHRP 350 standards adopted by the Federal Highway Administration. "Minivans, pickup trucks, and 4WD vehicles are becoming more common, and crash tests show problems. Some work zone devices are penetrating the windshields or getting sent into a work area in a crash," says Tom Notbohm, Traffic Operations Engineer of the WisDOT Bureau of Highway Operations.

Improving work zone devices is part of the FHWA’s Congressional mandate under the 1991 ISTEA act to make all roadway hardware devices more crashworthy.

Local street and highway agencies, road contractors, and utilities should start phasing out uncrashworthy items now and begin spacing and ordering devices that meet the standards. All new category 2 devices bought after January 1, 2000 for use on the National Highway System must be crashworthy. This category includes barricades, portable sign supports, and drums with lights. Since the guidelines allow agencies to use up current stocks, full compliance dates in Wisconsin are two to five years hence, depending on the type of device and whether it is used on national or state highway system roads. Tentative Wisconsin sunset dates are:

- Baricades—January 1, 2002 for state-let contracts on National Highway System (NHS) routes; January 1, 2004 on all state routes and contracts.
- Portable signs supports—January 1, 2003 for state-let contracts on NHS routes; January 1, 2005 on all state routes and contracts.
- Maintenance and utility work on state highways—dates are not firm yet, but will be similar.

The requirement does not apply at the local level unless the agency is doing work on a National Highway System or state route. However, FHWA strongly recommends following these standards on other routes for both safety and liability reasons. “Liability may be an issue if an agency has a different standard on some roads than others,” Notbohm says.

Sign trailers currently used by counties and others don’t meet the crash test requirements. “We recognize that the trailers have safety benefits for the work crews,” says Notbohm. “We want to continue allowing the use of existing trailers for several more years, but we are recom-

Spray patchers speed repairs

Spray bustin’ out all over, especially in the potholes on your roads. To combat them, some Wisconsin municipalities are using new spray injection patching equipment, and they find it makes better patches quickly and safely in all kinds of weather.

“It is so much better than a cold patch because it stays pliable—no edges to the road and moves with the road,” says Richard Kinzer, Beloit streets supervisor. “We have had just three pothole failures since we bought the patcher in 1997 and last year we repaired more than 10,000 potholes.”

Belot’s trailer-mounted Patchmobile put 200 tons of chipped limestone and 7,000 gallons of emulsion into fixing potholes, blending in raised manholes, ramping up to bridge decks, and other maintenance chores.

Patches stick tight

Blowing a blend of emulsion and stone into the pothole under high pressure (about 50 mph) makes the patches stay in place. The fill material is fully compacted in thin layers from the bottom jet of compressed air clears the hole of debris and standing water, helping ensure a good bond with the pavement.

Spray patches also seem to be as good or better than hot mix patches, and they can be done in any weather. “You can use it year round and the patch stays in the hole for the first time. You’re not going back to the same hole five or ten times,” says Kinzer. “And a great advantage is you can use it in wet weather if you have a bad hole that needs to be fixed right away. You can build a little dam around the hole to keep the water out. "Belot has even used their Patchmobile in temperatures as low as -10°F, but they keep trips short because valves tend to stick and freeze in very cold weather.

The machines are especially good for fixing shallow holes. “It’s very good on viaducts,” says Daryl Sobczak, Milwaukee crews are out most days of the year. Each machine goes through approximately 100 gallons of CRS-2 emulsion and three tons of 1/4-inch washed stone every day.

Economical and safer

Although the initial equipment cost is more than for conventional patching methods, in the long run it is more cost efficient. “The log cost saving is you reduce your crew from two to one. Also, you can stay out year round and the potholes stay in safer,” says Sobczak. Milwaukee paid $122,000 for their newest truck-mounted Wildcat Roadpatcher. Belot’s Patchmobile trailer cost $34,000 for a two-yard trailer, plus $5000 for the emulsion tanks.

Using the spray is much safer for the crews, Sobczak points out. “In the past we had people walking behind a truck exposed to heavy traffic on major arterials,” he says. “Now the operator stays safely inside the cab. A large area on the board on the back and strobe lights make the patcher very visible and vehicles do move over, he notes. Also, since the patches set up immediately, the operator is exposed to traffic for less time.

Techniques

Patchers need good well-trained operators Kinzer and Sobczak agree. The operator needs to be attentive when operating the valves and filling the emulsion tanks. And it takes a while to learn how to manage the emulsion-stone mix for different conditions.

“you have to crown the patch about a quarter-inch to compensate for the settling,” says Kinzer. A thin coat can help hold an alligating road together until it can be repaved permanently. Belot has also used it to fix sunken curb and gutter. One problem Milwaukee found is that in very hot weather the patches had a tendency to track. They resolved it by increasing their cover aggregate. They also found 1/4 inch washed stone is best, otherwise fines tend to clog the conveyed. The stone also needs to be fairly dry. Belot uses limestone chip aggregate from a local quarry, graduated from 1/8 inch down to the fines.

Positive public response is also an advantage. “Citizens like the looks of the patches, because they come out white and look like concrete roadway,” Sobczak says. They appreciate the smoothed out road with patches that stay in place.

For more information about patcher operations, contact Rich Adam, Belot, 608/364-2929 or Daryl Sobczak, Milwaukee, 414/286-5533.
PASER and PASERWARE—Clarifying the facts

The T.I.C. gets many calls about PASER, PASERWARE, and the new state requirement that local governments rate their roads. We hope the following helps clarify the situation.

PASER is a state-approved pavement surface rating system that is used to rate the condition of streets and roads, on a scale of 1 to 10 for paved surfaces and 1 to 5 for unpaved ones. T.I.C. has PASER manuals for asphalt, concrete, and gravel roads that show how to do the ratings using pictures and simple text. T.I.C. also has a videotape that explains how to rate asphalt surfaced roads using PASER.

PASERWARE is pavement management software that local officials can use to inventory local roads, recording physical characteristics (such as length and width), PASER condition ratings, and maintenance and repair actions. PASERWARE provides an initial inventory of local roads because it translates the state database of local roads. It also projects into the future to help local officials evaluate the consequences of alternative maintenance strategies and budgets. It creates graphs and tables to help local officials communicate the consequences of alternatives.

Two new versions of PASERWARE will be available this spring. PASERWARE 1.1, an updated MS-DOS version, and PASERWARE 2.0, a Windows-based version written in Access 97 are the current 1.0 version of PASERWARE. The MS-DOS version is being continued for local agency users whose computers don’t have the speed and memory to process the Windows version.

Earlier versions of PASERWARE were named ROADWARE. The name of the software was changed to PASERWARE to avoid confusion with a Canadian company that makes pavement test equipment. ROADWARE 6.0 and PASERWARE 1.0 are essentially the same. Both new versions of PASERWARE (1.1 and 2.0) will read road data files from RW 6.0 and PW 1.0. Agencies with road data in earlier versions of ROADWARE (5.12, 4.0, 3.0) may not be able to transfer their road data files to the new versions without special assistance. In some cases, it may be better to start over.

By December 2001, condition ratings of local roads are to be reported to Wisconsin DOT. This will give local governments time to rate their roads using any state-approved condition rating system. DOT will review condition rating systems and provide a way to submit condition ratings closer to the date when they are due.

If you want to learn how to rate your roads using PASER and how you can benefit by using PASERWARE, consider attending a workshop in April or May. See the Calendar on page 5 for dates and locations.

Windshield treatment improves vision in rain

A WinDOT reader sent a recommendation for rain repellent glass treatments. “I just love using the products because they improve vision greatly and almost totally eliminate the need for wipers at high speeds,” says Mark Paulat. “They would definitely help highway crews as well.”

The products penetrate the microscopic pores of glass creating a superlubric, invisible barrier. They are wiped on and polished off like a wax. “Rain-X” and a similar product from STP cost under $5 a bottle at auto parts and discount stores. They require two applications 5-7 days apart and last about a month. “Aquapel” from PPG Industries, is a service treatment costing $29.95 for a passenger vehicle. It is supposed to last six months to a year.

Although they are not a substitute for windshield wipers, they are effective against slush, rain, snow, frost, ice, mud, and bugs, as well as salt. They seem to work better when the vehicle is traveling at 35 m.p.h. or faster. In fact, they are commonly used on airplane windshields.

Does your municipality have experience using these products on streets/highway maintenance vehicles? Please call, email, or write to tell us how well they work. (To reach us see page 7.)

Crossroads

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Wisconsin Transportation Information Center, U.S. Highway Department of Engineering Professional Development, 420 N. Lake St., Madison, WI 53706
Phone: (608) 262-4615 Fax: (608) 263-3160 email: sauer@engr.wisc.edu

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Pulverize for longer pavement life

Costs for pulverization, cracking and seating, and leveler courses vary with the contract bid, Blazek says. On three recent contracts, milling cost $9.60, $8.35, and $8.32 per ton. Cracking and seating cost $4.11, $1.15, and $3.35 per square yard. Binder courses with MV mix type asphalt cost $26.75, $29.85 and $27.75 per ton.

All contracts pay separately on a unit price basis for hauling away pulverized material. "That way, if we estimate amounts wrong on one street we pay only for the amount the contractor hauls out," says Blazek. Streets department staff use historical records, observe curb height, and sometimes take cores to help them make tonnage estimates.

Rather than trying to reuse or salvage their own pulverized material, Racine's bid specs allow using recycled asphalt mix for either course. "The contractor's logistics aren't such that they can pick up and re-mix and lay the same material," says Blazek. "They stockpile it, then bring us virgin or recycled material that is not necessarily ours."

Pulverizing in urban areas has its challenges, Blazek, says, and may cost a little more, but is worth it. "We've been doing it at least 10 years and have found it to be very effective. We get 30% to 50% longer life out of the pavement," he says.

For more information on pulverization, contact John Edelbeck, Waupaca, at 715/258-4422, email: jaewaup@yahoo.com; or James Blazek, Racine, at 262/636-9191, email: jblazek@cityofracine.org

Pulverize for longer pavement life

With construction season just around the corner, it's time to review a valuable tool for resurfacing asphalt roads—pulverization. Whether the pulverized material goes into the base course or gets recycled and relaid, the process eliminates reflective cracking and extends road life. Pulverizing equipment works effectively within curb and gutter, over old concrete and even brick pavements, and on rural roads.

"It's like starting over with a new pavement," says John Edelbeck, Director of Public Works in Waupaca. "You've eliminated the existing cracks that will put pressure on the new overlay."

Waupaca, a city of 5,000, uses pulverization on all types of streets and roads. Since many of its roads are thin asphalt layers over sandy soil, pulverizing's main benefit is conserving the existing pavement to increase road strength, according to Edelbeck.

Waupaca’s contractors pulverize the old asphalt surface to a depth of 6-8 inches and mix it in place with the stone base course. Often, about half the material is hauled away to keep the final surface even with existing curb and gutter and to help maintain proper crown. The city stockpiles the excess material and uses it for shoulders and as utility backfill.

After pulverizing, a grader comes in and grading and compacts the surface. A 1½ inch binder course and a 1½ inch surface course of asphalt follow. With the residual asphalt in the pulverized pavement, the graded and compacted surface is “passable,” Edelbeck says. This allows the road to be opened to traffic quickly which is good when there’s a delay before the pave comes in.

“We've been doing it for three years now and hope to continue pulverizing streets where we can,” says Edelbeck. Even with removing half the surface material, the process tends to raise the road's crown height, so older, wider streets with a flat crown are good candidates for pulverizing, he says. Streets with subbase failures are not good candidates he says. Pulverizing costs 45 cents per square yard.

Pulverizing over concrete and brick

On its many streets that are asphalt over concrete, the City of Racine first grinds off the asphalt then breaks up and re-seats the underlying concrete. The contractor breaks the concrete pavement into pieces 3-4 feet square then rolls it with a vibratory roller. "This helps considerably with reflective cracking," says City Engineer Jim Blazek. "The pieces all mesh together and you don't have the heavy cracking coming through."

Reflective cracking is a particular problem on streets with asphalt over concrete. They are more prone to developing potholes because water seeps in between the two layers causing deterioration from the inside. The freeze thaw cycle accelerates the process. So do very hot or cold temperatures because the materials expand and contract at different rates.

Old brick streets don’t cause reflective cracking but often they will have deep depressions in the tire tracks. After pulverizing off the asphalt surface, the contractor fills in low areas before laying the binder course. Leveler courses are also used to meet higher gutter levels and to even out the surface around old concrete patches that are elevated above the surrounding brick layer.

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