



## Seal coats renew aging pavements

Summer is seal coat season. The warm, dry days help cure these thin coats of asphalt and aggregate. When properly done, a seal coat can give worn asphalt pavements 5-8 more years of service.

Also called a surface treatment, this economical maintenance procedure will provide dust free, skid resistant, smooth-riding roads at half or less the cost of a thin asphalt overlay. Seal coating is also quick, so traffic is usually back on the road by the end of the day.



"They're being used at almost all levels of government—town, county, state—with excellent performance. Almost every jurisdiction has done it and likes it," says Tom Nelson, Prof. of Civil and Environmental Engineering, UW Platteville. Nelson teaches the T.I.C.'s Roadway Maintenance workshops every March.

After several years, when the sealed surface shows wear again, you can apply another seal coat, as long as the underlying pavement is still structurally sound. You can also do a double seal coat which can further extend the life of the pavement surface.

"The key consideration is to go with a company that understands the products," says Nelson. "The success of the seal coat depends on careful workmanship and on using the right stone and binder. Any incompatibility of the two materials can cause failure."

### Tips for successful seal coats

**Choosing the road** Select asphalt roads with pavements that are a 5 or 6 on the PASER rating scale. Any residential street, town road, or county road in good structural condition is a good candidate. Rutting, alligator cracking or distress in the wheel path indicates the need to strengthen or rebuild. Roads or sections with these conditions are not good candidates for seal coating.

**Preparation** Repair potholes and fill depressions. Fill cracks wider than 1/4". "Consider using a stiffer crack filling material under a seal coat because it is less flexible and won't reflect up through the chip seal," says Nelson. The surface must be dry, clean, and dust free—power-swept on the day the seal coat will be applied.

**Materials** Aggregate for seal coats must be clean, dust free, and of uniform size. Both pea gravel and crushed stone work, although crushed, angular aggregate that has a relatively cubical shape is best. A common size is 3/8", but various sizes may be used depending on traffic loads.

Both asphalt emulsions and cutbacks perform well. Use of cutback asphalt during the seal coating season is limited in Wisconsin to cutbacks with less than 5% (by weight) petroleum solvents.

**Application** Air and pavement temperatures should be at least 50° F and rising. Pavement should be dry with no rain in the forecast. For good results you need warm weather for a few weeks after the seal coat is applied, so avoid late season applications. June, July and August are the best months to seal coat. May and September may have periods of warm dry weather acceptable for seal coating.

Asphalt must be applied uniformly, but the rate will vary depending on the pavement condition and aggregate size. Spread aggregate uniformly, just one stone thick, covering the asphalt within 30-60 seconds. A good sealcoat will imbed about two-thirds of the thickness of the stone into the asphalt.

"A common mistake is over-graveling," says Nelson. "Any stone more than one stone thick is going to whip off."

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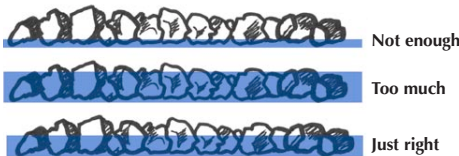
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Roll with rubber tired rollers to seat the aggregate into the asphalt. As soon as possible after the asphalt hardens, follow with a vacuum or sweeper to remove any loose stone. "You may also ask contractors to come back in 3-5 days to check for additional loose gravel," says Nelson. "It's easy for the contractor to do and to their mutual advantage." Drivers and neighbors are not annoyed by the loose stone and the contractor can use the aggregate on another part of the job.

"If jurisdictions are concerned about the non-black look, they can apply a fog seal on top," says Nelson. "It holds the stone in better and gives a look of hot-mix asphalt pavement." Pre-coating the aggregate with 1% asphalt also works.



Properly applied asphalt covers two-thirds of aggregate.

**Traffic control** Keep traffic off freshly seal coated surfaces until the initial asphalt set has occurred. When the new surface is opened, try to keep traffic speeds at 25 mph or lower. Also, don't let hauling equipment drive or make turning maneuvers on the freshly placed surface.

**Costs** The price for a seal coat is very dependant on the contractor: where else they are working, how many other jobs they have in the area, and the source and hauling cost of aggregate. The national average cost ranges from \$.80–\$.90/sq. yd.

"Two key things to remember are: 1) seal coats do not add structural strength, and 2) rely on a contractor who has done it in your area since they will know the materials they are using," Nelson advises. Seal coating is a simple, economical way to extend the life of your asphalt pavements, if it is done right.

See *T.I.C. Bulletin No. 10, Seal Coating and Other Asphalt Surface Treatments*, and videos available from the T.I.C. lending library. Details are in Resources.

## Resources

The following publications are available free from the T.I.C. while supplies last.

**Evaluation of Near-Transportation Sector Asset Management Practices** (Proj. 01-02), Midwest Regional University Transportation Center (MRUTC), UW-Madison. A research study of techniques for managing facilities used by private industry. Includes lessons learned that may apply to governmental agencies interested in improving their asset management program. Request a summary of the report, 12 pp. from T.I.C. Order the full report from MRUTC at [www.mrutc.org](http://www.mrutc.org) (see research, completed projects).

**Evaluation of Transportation Organization Outsourcing** (Project 01-03), MRUTC. A research study that looks at the benefits and challenges to using private companies to provide services for a public agency. Provides good information on key steps and challenges to successful contracting for public services. Request a summary, 8 pp., from T.I.C. or full report, 86 pp., from MRUTC at [www.mrutc.org](http://www.mrutc.org) (see research, completed projects).

**Managing Utility Cuts, No. 17**, T.I.C. 8 pp. Provides guidelines to help governmental units manage utility cuts. Includes sample permits and specifications.

**SAFER Manual**, T.I.C., 40 pp. A guide to field review of roadway safety.

**Seal Coating and Other Asphalt Surface Treatments, No. 10**, T.I.C., 4 pp. Overview of seal coating materials and construction procedures.

**Signing for Local Roads, No. 7**, T.I.C. 12 pp. Basics of signing for local agencies.

**Utility ordinance and permit samples.** Copies of ordinances and permit forms from Madison, Milwaukee, WCHA, and two towns.

**Work Zone Safety: Guidelines for Construction, Maintenance, and Utility Operations**, T.I.C. 2003. Pocket-sized guide, 58 pp. Handy reference for setting up work zone signing. Includes flagging procedures summary.

### Websites

**Summary Report, 2002-03 Local Roads Improvement Program** Available only on the WisDOT Website. Defines the program and reviews the 1,198 projects programmed during the 2002-2003 LRIP cycle. Includes program statistics overview, management issues, and compliance review results. <http://www.dot.wisconsin.gov/localgov/highways/lrip.htm>

### WisDOT Product Acceptability List (PAL)

Lists erosion and sediment control products approved for use on State of Wisconsin structures and highways. Gives guidance in installation and proper use. <http://www.dot.wisconsin.gov/business/engrserv/pal.htm>

**Minnesota Seal Coat Handbook** Useful information on seal coat materials, equipment, design, and construction. Download at: [http://www.mrr.dot.state.mn.us/research/MnRoad\\_Project/restools/sealcoat.asp](http://www.mrr.dot.state.mn.us/research/MnRoad_Project/restools/sealcoat.asp)

**Roundabout Summit Proceedings** The FHWA and ITE jointly organized a summit to discuss Americans with Disabilities Act-related issues at roundabouts, especially how to improve mobility for visually impaired pedestrians. <http://safety.fhwa.dot.gov/roundaboutsummit/index.htm>

### Videos

Videos are loaned free through county extension offices. The T.I.C. Video Lending Library catalog is available online at <http://tic.engr.wisc.edu/>

**Seal Coat Introduction**, T.I.C. 75 min. #17162. An excellent presentation for proper selection and application of materials for seal coating.

**Sealcoating: A Matter of Science and Skill** MinnDOT, 16 min. #17608. Provides maintenance workers with information on how to perform a high quality chip seal.

**Asphalt Chip Seals**, FHWA, 22 min. #16656. Discusses equipment operation and application of materials in detail. Stresses completing each task properly to gain long term benefits. Also discusses various types of materials and aggregates and their proper use for various circumstances.

**Chip Seal Application**, LTAP, 40 min. #17820 (3 parts). 1) Preliminary concerns, materials, equipment, surface preparation, weather requirements, application rates. 2) Chip seal procedures, binder application, chip spreading and roller application, joint construction, brooming, opening to traffic. 3) Problems and Pitfalls. Recommended for maintenance superintendents, pavement engineers, public works directors, inspection foremen, and elected officials.

**Flagging Operations and Procedures**, North Carolina State Institute for Transportation Research and Education, 24 min. #18610. Demonstrates proper equipment and procedures in the *Wisconsin Flaggers Handbook* for single flagger, two flagger, pilot car, night flagging, one-direction flagging, and emergency flagging operations. It is recommended for flaggers and their supervisors.