Proper Crack Sealing Provides Extended Life for Asphalt Pavements

By Jim Chehovits

Crack sealing treatments are highly effective preventive maintenance procedures for extending life of asphalt pavements. Crack treatment processes consist of preparing cracks and applying sealant to restrict water entry into underlying pavement layers to reduce degradation. Treatment effectiveness is influenced by crack type, movement, density, climate, and traffic.

The treatment must perform over the range of temperatures and crack movements experienced. Many sealants with differing performance are available, and there are several installation methods. For lasting performance, sealant and installation method should be selected for project conditions.

Pavement evaluation and treatment selection

To determine the appropriate crack treatment, evaluate cracking type and density, which helps indicate expected crack movement. "Working cracks" have greater than 1/8 inch thermal movement (typically transverse with > 20 foot spacing), and "non-working cracks," have less than 1/8 inch movement (longitudinal, random, block, close transverse, etc.).

Crack sealing treatments for working cracks use routed widened reservoirs and highly extensible sealants to accommodate movement. Crack filling treatments for non-working cracks include crack cleaning (routing may or may not be used), and filling with flush or overband applications of flexible traffic resistant sealant. For example, the Michigan DOT rout and seal treatment for transverse cracks uses 3/4 by 3/4 inch widened reservoirs and low modulus hot applied sealant installed flush. The Michigan overband crack treatment procedure used for more extensive cracking consists of cleaning cracks with high pressure air and applying stiffer hot applied sealant in a neat overband. Crack filling and sealing can also be used as pretreatments prior to chipseals, microsurfacing, and overlays.

Sealant product selection

For both crack sealing and filling treatments, sealants must function over the range of temperatures experienced from summer to winter. Sealant types with differing performance ranges are available. Sealants should be stiff enough to resist traffic at high temperatures, and flexible enough to resist cracking or debonding in the winter. Temperature ranges that sealants will be exposed to can be determined following FHWA Application Note FHWA-RD-03-080, "Using LTPPBIND to Improve Crack Sealing in Asphalt Concrete Pavements."

Proper installation

Sealant manufacturer's installation and safety instructions and agency requirements must be followed for best performance. Important items include:

- Proper pavement surface temperature (generally 40 degrees F and rising)
- Dry pavement
- Effective crack cleaning and reservoir cutting
- Intact crack surfaces
- Sealant heated to required temperature following manufacturer's instructions
- Application equipment meets sealant manufacturer's requirements, is temperature calibrated, and in good working condition

Effective treatment of cracks will help keep water out of the underlying pavement layers.

- Specified sealant application configuration is achieved without excesses
- Traffic control procedures meet safety requirements and keep traffic off the treated pavement until sealant has cured to resist pickup.

When applying prior to overlays, to guard against bump formation, leave sealant approximately 3/8 inch low in the routed reservoir for sealing treatments, or tightly squeeged to flush with the pavement surface for filling treatments. When compacting overlays on crack sealed or filled pavements, use dual drive rollers at proper speeds, and follow industry recommended guidelines to reduce shoving.

For additional information on proper crack sealing and filling procedures refer to FHWA RD-99-147, *Materials and Procedures for Sealing and Filling Cracks in Asphalt Surfaced Pavements-Manual of Practice*, and *Crack Seal Application Pavement Preservation Checklist Series* available from the FHWA or the Foundation for Pavement Preservation at www.fp2.org. HMAT

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