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PAVEMENT LIFE EXTENSION

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Preventative Maintenance: Crack Repair

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Cracksealing or filling can help extend the life of pavement if done properly.

Asphalt parking lots and roads need to be maintained. There is no question about that. And often, asphalt maintenance can be more cost effective than removing and replacing asphalt. And when done properly, maintenance can directly extend a pavement's life.

Cracksealing and crack filling are two of many pavement preservation strategies, and often they are used in conjunction with other strategies such as sealcoating or slurry seal. There are two types of cracks - working and non-working. Working cracks have a considerable amount of horizontal or vertical movement - greater than or equal to 3 mm - because of temperature change or amount of traffic, according to the *Materials and Procedures for Sealing and Filling Cracks in Asphalt-Surfaced Pavement - Manual of Practice*. Non-working cracks typically have "little movement between crack edges."

The Manual defines cracksealing as placing "specialized treatment materials above or into working cracks to prevent the intrusion of water." Crack filling is the "placement of ordinary treatment materials into non-working cracks to reduce infiltration of water and to reinforce the adjacent pavement."

But before property owners, property managers or contractors, crackseal or crack fill, they should understand why and how cracks occur.

Asphalt expands and contracts in different temperature environments. If not all of the asphalt is moving in a uniform way, it will become weak at the joints, says James B. Curtis, president of Chec Management Systems Inc. in Redding, CA. "Cracks are usually wider when it's cold and narrower in warmer temperatures," he says.

Left untreated, cracks in asphalt enable water to penetrate beneath the pavement surface, weakening the base and subbase, leading to raveling or failure of the pavement and to more extensive, costly repairs. So repairing cracks is a relatively inexpensive preventive maintenance technique that can help property managers extend the life of their parking lot.

Preparation is Key

"Good prep will give you the best performance for your crack filler or sealer," Curtis says. Before crack filling or sealing, be sure to properly clean and dry the crack. This can be done with wirebrushing, airblasting or sandblasting. Proper cleaning helps to minimize the potential for adhesion failures resulting from dirty or moist cracks.

Another option is hot airblasting done with a hot compressed-air lance or a heat lance. Contractors choosing this method need to be careful not to burn the asphalt and cause further damage. A heat lance can also allow a contractor to fill or seal cracks in colder or damp conditions because it will heat and dry the asphalt.

Another approach, recommended by various studies as the way to ensure the most successful crack repair, is to cut or route the crack prior to sealing or filling. Routing widens cracks to create a clean reservoir to better contain the sealer. Curtis suggests routing if a crack is at least 3/4 of an inch wide and has at least 1/2 to 3/4 inches of movement. Contractors need to be cautious so the cutting does not increase or create further damage to the asphalt.

Material Options Available

Curtis says installation of crack filler or sealer must be done right after cleaning the crack to ensure the crack stays dry and free of debris prior to material application and minimize the chance for failures. Contractors have an array of sealing and filling material options to choose from.

Emulsified crack filler contains both oil and water. If using emulsified filler, make sure it is fully cured before sealcoating over it. A deeper crack will take longer for the emulsion to cure. If the emulsion isn't fully cured the water in it will be kept in the asphalt, possibly causing the crack filler to fail and the asphalt to ravel, Curtis says. Depending on the material and job requirements, emulsions can be applied partially heated or unheated.

Another option for contractors is hot pour mastic crack filler, a bendable crack filler containing fine aggregate. "The fine aggregate gives the crack filler strength," Curtis says. If using mastic, consult with the manufacturer on how to apply it. The aggregate in the material might not flow through all application tools and might call for special application requirements.

Rubber- and fiber-modified asphalt materials are another option. These materials must be heated and mixed using indirect-heating equipment. Indirect heating can be safer and provide a more controlled and uniform heating. Like mastic material, fiber-modified asphalt materials also require specific equipment for application. Fiber-modified materials create a thicker consistency requiring the need for kettles with heavy-duty application pumps, large hoses, and full-sweep agitation equipment.

Other materials and methods of application some contractors prefer to use include applying a tack coat, filling the crack with cold asphalt material, and then tamping the asphalt into the crack. Some cracks can be repaired using partial depth mill and adding fabric to the crack. Although this won't solve a cracking issue 100%, the fabric will help make future cracks more manageable, Curtis says.

The *Manual of Practice* suggests four guidelines contractors should follow:

1. Apply the material with the nozzle in the crack channel, so that the channel is filled from the bottom up and air is not trapped beneath the material.
2. Apply the material in a continuous motion, being sure to fill the channel to the proper level for recessed configurations or provide a sufficient amount of material for flush, capped, or overbanded configurations
3. Reapply material to crack segments where material has sunk into the crack or an insufficient amount was furnished in the previous pass
4. Recirculate material through the wand into the melting vat during idle periods.

Sometimes a bond-breaker material, such as backer rod, is placed at the bottom of a crack prior to filling or sealing. The backer rod prevents the filling or sealing material from going down into the crack during application and prevents the material from forming a three-sided bond with the crack's reservoir perimeter. Often, a bond-breaker is only used if the crack is relatively straight with very little edge deterioration, the *Manual of Practice* says.

The final step in cracksealing or filling is to finish and shape. To ensure the best finish possible, keep the squeegee close behind the application equipment. Keep the application equipment and the finishing squeegee centered over the crack channel. Periodically remove any material buildup from the squeegee.

Some jobs may require a blotting material after the finish to prevent the uncured cracksealer or filler from tracking. Common materials used with rubber-modified asphalt materials include toilet paper, talcum powder, and limestone dust. Sand is often used with emulsion materials and should be applied in a thin layer. A variety of spray-on blotting materials are also available. These materials are applied immediately after finishing.

Repairing Filled Cracks Crack filler should bond to the pavement keeping water out of the crack. But some cracks might reopen or widen even after repair. If this is the case be prepared to do a little extra prep work. "New crack filler won't easily stick to old crack filler," Curtis says. The old crack filler will need to be reheated before applying new crack filler over the top of it.

Educating customers on how and why cracks occur is essential. "Even after crack filling or sealing, pavement still wants to relieve pressure and will probably crack in other places," Curtis says. Make sure a customer understands this. Let the customer know his or her options for repairing the asphalt. But don't oversell your product or service.

The advertisement is a vertical banner with a dark background and yellow accents. At the top, it reads "The One Source For All Your Paving Needs!". Below this is the company name "SURE-SEAL PAVEMENT MAINTENANCE INC." in large, bold, yellow letters. The phone number "1-888-PAVEMENT" is prominently displayed in a yellow box, with "PAVEMENT LIFE EXTENSION" written below it. A central slogan says "Discover How We Can..." followed by a list of benefits: "Save You Thousands", "Increase Your Property Value", "Protect Your Investment", and "Beautify Your Property". The website "www.1888PAVEMENT.ca" is listed at the bottom. The banner is flanked by vertical yellow bars containing the website "www.1888PAVEMENT.ca". Six small images illustrate different services: "CATCH BASIN REPAIRS", "HOT CRACK SEALING", "BEFORE SEAL COATING", "LINE PAINTING", "AFTER SEAL COATING", and "PAVEMENT REPAIRS".

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