

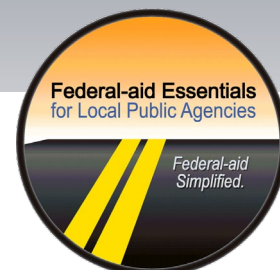
Check out  
the video

## Federal-aid Program Overview

### Asphalt Pavement Preservation

[www.fhwa.dot.gov/federal-aidessentials](http://www.fhwa.dot.gov/federal-aidessentials)

*Preservation techniques to extend asphalt pavement life.*



Today, most agencies recognize the role of preventive maintenance treatments in slowing deterioration, extending the life of pavement, and reducing the need for costly repairs.



Historically, agencies react to poor conditions by either patching potholes or removing or replacing the top layers of asphalt to restore the pavement surface. A reactionary approach often results in conditions fluctuating from good to poor over time and is less cost effective. However, much like doing regular oil and air filter changes for your car, pavement preservation treatments—such as crack sealing and slurry seals—work well when done in a timely manner before the structure is damaged.

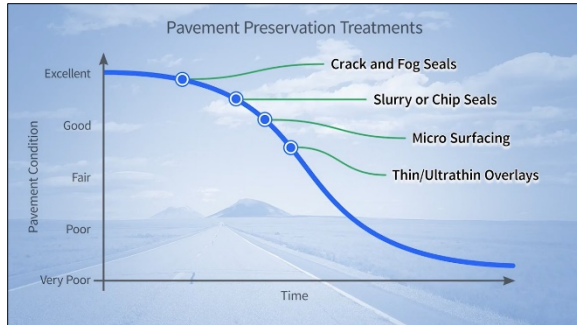
Agencies expect their asphalt pavements to last at least 20 years. To maintain that lifespan, what is the most cost-effective preventive maintenance treatment?



That depends largely on the condition of the pavement and local conditions, such as traffic and weather patterns, pavement materials, and community expectations of a smooth ride. For example, is the pavement condition:

- Excellent, or very smooth
- Good, mostly smooth with minor cracking;
- Fair with wheel path cracking; or
- Poor or very poor with frequent alligator cracking, rutting, and potholes?

**Let's review commonly used pavement preservation treatments and see how one local agency re-evaluated its preventive maintenance regime to lower pavement life-cycle costs.**



Crack and fog seals are most appropriate for pavements in excellent to good condition and can extend the life of pavement by 1 to 4 years.

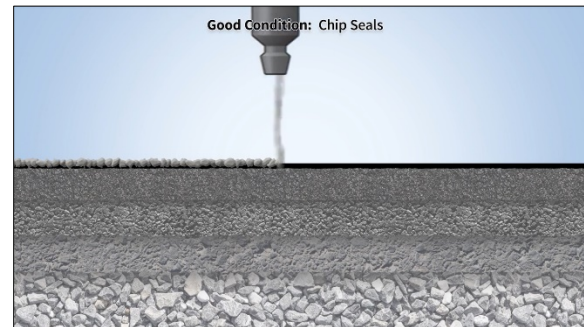
Routine infiltration of water and debris deteriorates pavement and weakens its foundation. Fog Seals — an application of a specially formulated asphalt emulsion — seals narrow cracks, restores lost flexibility to the pavement surface due to asphalt oxidation, and protects pavement structure.

In addition to cracks being vulnerable to water intrusion, pavement can develop minor rutting and other defects that create poor surface friction characteristics.



When existing pavements develop these conditions but are still in good condition, some agencies are able to extend the useful life of pavements by 3 to 7 years by sealing the surface with a more robust combination of asphalt and aggregate.

Chip seals consist of an application of an asphalt emulsion covered immediately with crushed rock which combine to form a single layer, whereas, slurry seals include a single layer of a paving mixture composed of asphalt emulsion, aggregate - or very small crushed rocks- and water.



If the pavement is still in good condition but shows minor signs of rutting in addition to water intrusion and surface defects, micro surfacing can be a good option.

When applying micro surfacing to the surface of asphalt, crews use a paving mixture composed of asphalt emulsion, aggregate, water, and chemical additives. Micro surfacing mixtures are durable and cure quickly, a priority when quick traffic return is important.



Once pavement conditions become fair or poor, thin and ultrathin overlays can extend their useful life by 5 to 12 years.

Thin overlay materials consist of a dense-graded mix of asphalt and aggregate prepared in a plant. Following cold milling to remove surface

defects, crews apply a less than 2-inch layer of materials.

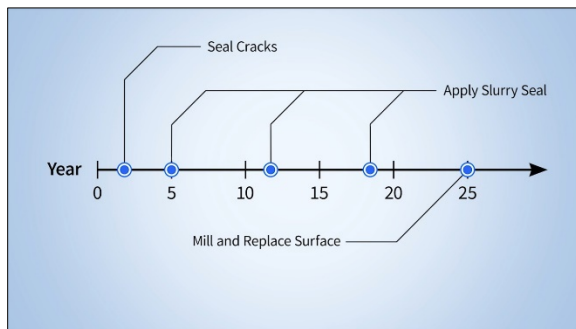


Ultrathin overlay materials consist of a designed asphalt and small stone mixture that is prepared in a plant and hauled to the site. Following the application of a thick layer of liquid asphalt tack coat, crews apply less than 1 inch of the ultrathin material mixture.

**Now let's see how one municipality reassessed its pavement preventive maintenance guidelines in an effort to extend pavement life.**

For residential streets designed to last 25 years or more, the municipality has followed these guidelines since the late 1990's:

- Year 2: Seal cracks.
- Years 5, 12, and 18: Apply a slurry seal.
- Year 25: Mill and replace the surface.



The city engineer reviewed the data in the pavement management information system focusing on the reported pavement condition and observed distresses. The municipality's emphasis on elapsed time between treatments

has produced large fluctuations in the annual street maintenance budgets due to major repairs being needed outside of the cycle; this, in turn has caused the delay of preventive maintenance activities which is leading to more streets in poor condition.

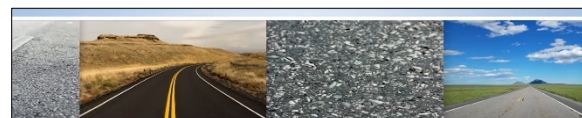
Based on the available annual budget, he concluded that the city's overall pavement condition could remain stable, and the overall life of the pavement network could be extended several years without substantial rehabilitation if the city:

- Prioritize maintenance based on pavement condition rather than elapsed time between treatments;
- Crack fill and seal pavements that are in good condition;
- Fog seal roadways to prevent loss of aggregate when raveling appears; and
- Micro Surface roads when they show signs of minor rutting.

As the example illustrates, agencies make better use of available funds when they analyze pavement life-cycle costs and re-evaluate their preventive maintenance guidelines.

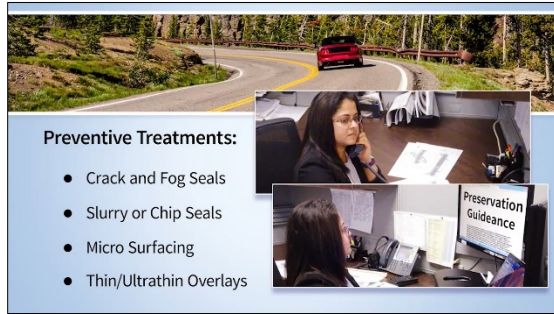
Preventive maintenance can:

- As with your car, extend the useful life of the pavement,
- Make effective use of available funding, and
- Reduce the frequency of costly and disruptive rehabilitation and reconstruction projects.



**Preventive Treatments:**

- Extend Life
- Effective Use of Funds
- Reduce Disruption



**Preventive Treatments:**

- Crack and Fog Seals
- Slurry or Chip Seals
- Micro Surfacing
- Thin/Ultrathin Overlays

If some of the techniques highlighted here are not in your agency's tool box, contact your local FHWA Division office or State DOT or ask other agencies how they have effectively used these treatments to manage their pavement network and incorporated these activities into Federal-aid projects.

## Additional Resources

The FHWA Policy Guidance Center page has technical information and guidance materials for Pavement Preservation.

<https://www.fhwa.dot.gov/pgc/index.cfm?ddisc=52&dsub=1014>

See this FHWA Center for Accelerating Innovation (CAI) webpage for details of preservation techniques.

[https://www.fhwa.dot.gov/innovation/everydaycounts/edc\\_4/pavement.cfm](https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/pavement.cfm)

This website of the Foundation for Pavement Preservation provides a toolbox with links to research reports and details for the wide variety of preservation techniques.

<http://fp2.org/preservation-toolbox/>

This pavement management guidance document provides the necessary tools, procedures and practices for network-level pavement condition data collection.

[https://www.fhwa.dot.gov/pavement/management/qm/data\\_qm\\_guide.pdf](https://www.fhwa.dot.gov/pavement/management/qm/data_qm_guide.pdf)

Promotional brochure from FHWA effort to clarify when, where, and how of pavement preservation that can be distributed to stakeholders and management.

[https://www.fhwa.dot.gov/innovation/everydaycounts/edc\\_4/factsheet/pavement\\_preservation.pdf](https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/factsheet/pavement_preservation.pdf)

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This Companion Resource is the script content for the video production of the same name.