

CAPE SEAL PAVEMENT PRESERVATION

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Cape seal is a pavement preservation process that may extend the service life of a roadway by an average of six to 10 years without the cost of mill and overlay and associated traffic disruption. The process is best suited for roads with moderate cracks and in areas where the appearance of a paved road is important. Pavement that is displaying structural distress such as major cracking, surface loss, deformation, or active shoving or rutting would require an alternate method of restoration and would not be a good candidate for a cape seal.

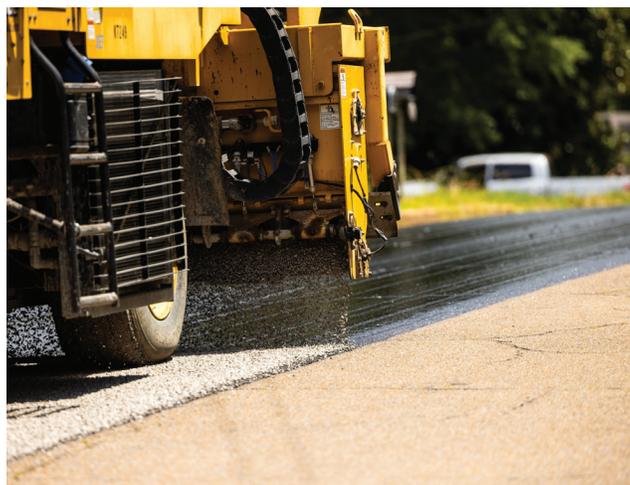
The benefits of a cape seal include:

- the sealing of moderate cracks
- protection of the pavement structure from continued oxidation and moisture intrusion
- an increase in skid resistance
- an improved color contrast for pavement markings
- a minimal effect on curb reveal, and
- improvement of overall surface longevity, rideability, and community acceptance.

This process has been well received in residential areas, as it provides the appearance of a newly paved road.



This is a good candidate for cape seal. It has cracks, but the road does not have base damage. The larger cracks were crack sealed prior to bituminous seal coat installation. Photo: Lower Salford Township, Montgomery County.



Chips are being placed on top of the emulsion in this photograph. This is the first step of the cape seal operation. Note the minor cracks which will be sealed by this operation. Photo: Ergon Inc.

PennDOT specifies material and installation parameters in both Publication 447, *Approved Products for Lower Volume Local Roads*, Sections MS-0340-0010 “*Cape Seal*” and MS 0340-0005 “*Bituminous Seal Coat for Lower Volume Local Roads*”, and Publication 408, *PennDOT Construction Specifications*, Sections 482, “*Slurry Seal*” Section 470 “*Asphalt Seal Coat*” and Section 483, “*Polymer-Modified Emulsified Asphalt Paving System (Micro Surfacing)*”. To be successful, a detailed evaluation of the



chosen roadway, consideration of performance and longevity goals, and available budget will ultimately fine-tune the specific cape seal method to be used.

A cape seal is a two-step process. A layer of chip seal is applied followed by a slurry or micro surface layer. There are a variety of options with each phase of the process. All the options must be selected per the specific PennDOT Publications 408 or 447 standards for each.

To promote success of a cape seal operation, suitable conditions must be adhered to, including:

1. Bituminous Seal Coat

- a. Air and surface temperatures generally above 60 degrees F and rising for emulsified asphalts and 70 degrees F and rising for asphalt cement.
- b. Humidity < 50%.
- c. Little to no wind.
- d. No rain in the forecast.

2. Slurry Seal/Micro Surfacing

- a. Air and pavement temperatures generally are 45 degrees F and rising.

Conversely, unsuitable conditions that could inhibit cape seal success may include:

1. Cool nights that could prevent good cure for chip seals to gain adequate strength.
2. Strong wind that could distort the fan pattern of asphalt being sprayed, leading to streaking or uneven distribution of material.
3. High humidity leading to long cure times for emulsified asphalts.
4. For micro surfacing, temperatures below 50 degrees F and falling or freezing temperatures within 24 hours of material application.

As with any successful pavement preservation operation, diligent inspection throughout by the municipality is important to ensure the best possible outcome. Areas of interest and documentation should include:

1. Emergency vehicle, police, school bus, and property owner notifications.
2. Traffic control during work operations to keep vehicular traffic off uncured material.
3. Existing pavement surface preparation.
4. Weather forecasting for required time duration for all component operations.
5. Material qualities confirmed through sampling and testing, especially bonding of aggregates with various types of emulsions. A clear understanding of emulsion



A micro surface — the second step in the cape seal process — is being placed over a chip seal. The right side shows the micro surface being placed. Photo: PennDOT.

“break” (i.e. curing) times is critical for ideal asphalt and aggregate placement.

6. Verification of acceptable mix designs.
7. Use of proper, well-functioning equipment with verification of acceptable calibration for material placement.
8. Acceptable application rates of material.
9. Quality workmanship to ensure neat lines, uniformity of material application, and material consistency.
10. Coordination of temporary or permanent pavement marking application.

Communication is Key

The experienced contractor, municipality, and/or construction inspector must be in complete communication throughout the entire cape seal process — especially, prior to the start of any field work. Discussions regarding community and resident awareness, traffic control, attention for school buses and emergency vehicles through the work zone, weather awareness (air and surface temperatures, wind, and humidity), and protection of the work from vehicular traffic prior to adequate cure time are of equal importance to equipment operation and efficient installation of the approved materials. Recognition of installation performance standards from the start is critical in order to make any required adjustments to equipment operation or Job Mix Formulas. Cape seal is a proven pavement preservation option if executed with clear goals and performance standards understood by all.

Resources

[PennDOT Publication 408, Construction Specifications](#)
[PennDOT Publication 447, Approved Products for Lower Volume Local Roads](#)