Joint and Crack Filling
NYSDOT Comprehensive Pavement Design Manual

⇒ Chapter 10 Preventative Maintenance

⇒ Section 10.3.3
Preventative Maintenance

Definition:

⇒ Any planned activity performed in advance of a critical repair. The activity may correct minor defects as a secondary benefit.

⇒ PM extends the service life, without significantly improving the structural capacity.

⇒ PM is meant to delay the development of distress
Crack Filling

- Crack filling needs to be the first preventative maintenance tool utilized.
- Crack filling is one of the most cost effective strategies for extending pavement service life.
- Minimizes intrusion of surface water.
- Reduces the formation of future cracks.
- Expected service life of 2 years.
  (Revisit the road after 2 years.)
PAVEMENT PERFORMANCE HISTOGRAPH

Asphalt Flexibility (Low temperature ductility 60°F)

Pavement Condition (Percentage)

Asphalt Condition (Kandahl Curve)

Pavement Serviceability

Maintenance

Critical Asphalt Cement Properties

Pavement OK

Loss of Fines

Raveling

Cracking Initiation

Extensive Cracking

Pavement Failure Begins

Unmaintained Road
PAVEMENT CONDITION INDEX

AGE OF PAVEMENT

Excellent
Good
Fair
Poor
Very

40% drop in quality

75% of life

$1.00 for PM Here

40% drop in quality

Will Cost $6.00 to $8.00 Here

12% of life

Failed
Scheduled Procedure

- Crack sealing should be scheduled for application, upon the completion of an overlay or treatment, within two years!
- Do not schedule crack sealing within 1 year of an HMA or within 1 month of a quick set slurry or micro-surfacing overlay.
Joint/ Crack Seal Work
Categories

1. Resealing Transverse & Longitudinal Joints in JPCP Pavement
2. Filling PCC-HMA Shoulder Joints
3. Routing & Sealing Cracks in HMA Pavements
4. Cleaning & Sealing Cracks in HMA Pavement
Crack repairs

- **Sealing**
  - *Working* cracks
  - Prevents the intrusion of water and *debris* into the crack

- **Filling**
  - *Nonworking* cracks
  - Prevents infiltration of water and to reinforce the adjacent pavement

Flush-Fill  |  Traditional Overband Struck-off flush  |  Reservoir
Sealant Types

- ASTM D-6690 Type II (D3405)
  - concentrated polymer in asphalt mixture
    - longitudinal cracks in JPCP
    - longitudinal PCC/HMA joints
    - HMA pavements
Equipment & Accessories

- Crack Filling Unit
  - large unit
  - small unit
- Router - if required
- Hot air lance
- “V” squeegee
Candidate Selection
Description

- Clean and seal only primary cracks, or where directed by the Engineer, along their entire length. Do not treat secondary radial cracks. The Engineer will determine which cracks are to be cleaned and sealed. In this specification, the word crack also means joint.
Proper vs. Improper Applications

Can you tell the difference?
Sealing Joints between PCC pavement & HMA shoulder

- D6690 type II (D3405)
- Sealant 3 mm high & 50 mm wide over joint
- Expected life 5 years
Rout & Fill Transverse Cracks in HMA Pavements

- > 6 m (20 ft) between cracks
- <25% of length of crack has secondary cracking
- Apply D6690 II (D3405)
  - < 50 mm wide
  - < 1 mm thick
- Expected life - 5 years
Clean & Seal Cracks in HMA Pavement

- No surrounding distress
- Schedule well before HMA, Surface Treatment, Micro, Slurry or PPST overlay
- Apply PG 64-22 & fiber or ASTM D6690 I or II
  - < 50 mm wide
  - < 1 mm thick
- Expected life - 2 years (revisit in 2 years)
Crack Treatment Design

- Crack Sealing (SHRP Research)
  - Seals out water & non-compressible materials

- Crack Filling (SHRP Research)
  - Seals out water & preserves adjacent pavement
Working Vs. Nonworking Cracks
(SHRP Definitions)

- **Working cracks**
  - Move 25mm 1/4” or more
    (Transverse)

- **Non-working cracks**
  - move less than 1/4”
    (Longitudinal)
Expected Failure

- Bond failure between the sealant and the pavement
- Degradation of the HMA at or near the interface with the sealant
Potential Problems

- Too much over banding
- Product is too cold
  - (review manufactures recommended application temperatures)
- Crack is cold and or wet (<40°F)
- Over application
Questions

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