NCPP Pavement Preservation Partnerships Skill Share Webinar

Concrete Joint Sealing Practices

Presented By:

Jeffrey Mann, PE

Principal Pavement and Materials Engineer

WSP USA Inc.

Albuquerque, NM

wsp

New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

Presentation Outline

- We Will Discuss…
  - NMDOT's (Historical) Position on Seal vs No-Seal
  - Specifications, Standards, Materials
  - Average Unit Bid (AUB) Costs
  - Photos of In-Service Sealed Joints
  - Pavement Management db

wsp

New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

NMDOT (Historical) Position on Seal vs No-Seal Concrete Pavements

- NMDOT ~300 Lane Miles of Concrete Pavement
  - Majority JPCP, typical 15x12 foot spacing
  - 1 CRCP Project (Border w Mexico) – NM 136
  - Dowel/Tie Bars typical
  - Typical subbase – untreated base (A-1-a)
    - 4 to 6 inches typical depending on trucks, budget
  - NMDOT ***requires*** sealing of concrete pavement joints both in JPCP and CRCP

wsp

New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

NMDOT (Historical) Position on Seal vs No-Seal Concrete Pavements

- Reduce risk of pumping (UTBC)
- Considering Incompressibles (yes, narrow joint widths lower the risk)
- New Mexico in an arid, freeze/non-freeze environment
- Average wind speed – 10 MPH (weather.gov)
  - Spring 25-30 MPH
- Monsoons – short duration, high intensity

wsp

New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

NMDOT (Historical) Position on Seal vs No-Seal Concrete Pavements

Joint Sealant Specification

- Section 452 – Sealing and Resealing Concrete Pavement Joints
- Type NS or SL single component *silicone*
  - ASTM D5893
  - Low Modulus Polyurethane (ASTM C920)
- No Personal Experience w low modulus

SECTION 452: SEALING AND RESEALING CONCRETE PAVEMENT JOINTS

452.1 DESCRIPTION

This Work consists of cleaning, priming, and sealing concrete pavement joints. This Work also consists of removing joint sealant, sawing, cleaning, priming, and resealing joints.

The Contractor shall seal only joints between adjacent portland cement concrete surfaces. The Contractor shall seal joints between PCCP and asphalt pavement in accordance with Section 411, "Hot-Poured Crack Sealant," unless otherwise shown on the Plans.

wsp

New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

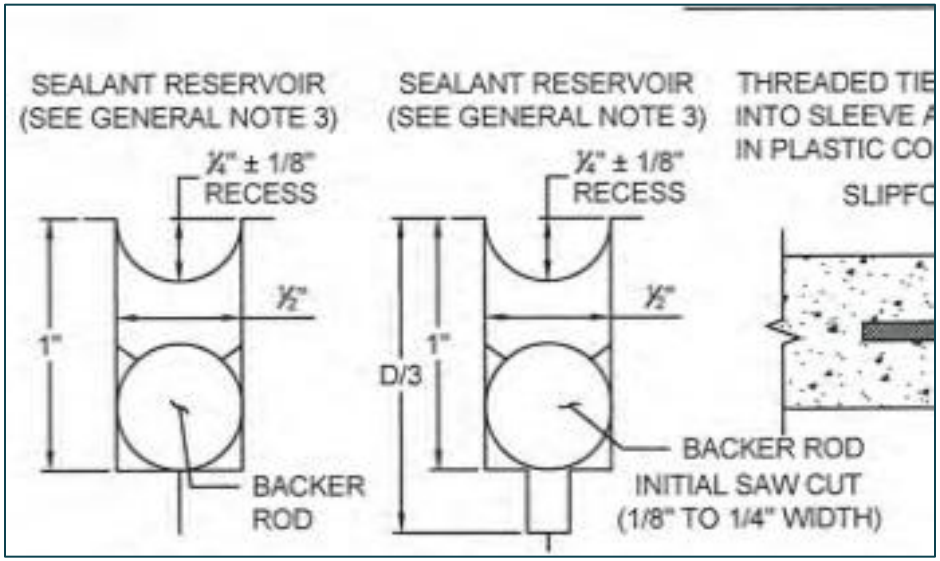
Joint Sealant Specification

- Certification – Reference to Approved Products List (APL)
- References manufacture guidelines
- Temp. Limitation/Requirements
- Unit is Linear Foot
- Work Included In Payment:
  - Cleaning, Sealing
  - Providing Sealant, Labor, Equipment

wsp

New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

Joint Sealant Standards



3. SEALANT RESERVOIR, JOINT SHAPE FACTOR, BACKER ROD, AND NON-EXTRUDING FILLER SHALL BE PLACED IN ACCORDANCE WITH SECTION 452 - SEALING AND RESEALING CONCRETE PAVING JOINTS. WHEN USING SILICONE SEALANT, A MINIMUM SHAPE FACTOR (RATIO OF SEALANT DEPTH TO WIDTH) OF 1:2 IS RECOMMENDED. THE MAXIMUM SHAPE FACTOR SHALL NOT EXCEED 1:1. THE MINIMUM WIDTH OF SEALANT SHALL BE 3/8". THE SURFACE OF SEALANT SHALL BE RECESSED 1/4" ± 1/8" BELOW THE PAVEMENT SURFACE. BACKER ROD SHALL BE A CLOSED-CELL POLYURETHANE FOAM ROD HAVING A DIAMETER APPROXIMATELY 25% GREATER THAN THE WIDTH OF THE JOINT.

wsp

New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

Joint Sealant Materials

Product Information
Silicone
Sealants

DOW CORNING

Dow Corning® 890-SL Silicone Joint Sealant

FEATURES & BENEFITS

- Self-leveling, no tooling required.
- Can be extruded from -20 to 120°F.
- Flows into irregular joint widths and does not require tooling.

Self-leveling silicone sealant for concrete and concrete to asphalt pavement joints.

APPLICATIONS

- *Dow Corning*® 890-SL Silicone Joint Sealant can be used for concrete to concrete and concrete to asphalt pavement joints.

Product Submittal

NMDOT APL

452.2.1	Product Name	Manufacturer Name	Restrictions	Approval Date	Expiration Date
Sealing and Resealing Concrete Pavement Joints (Sealant)					
	Sikasil-728 SL	Sika		5/24/2023	5/24/2028
	300SL	Pecora Corporation		9/22/2021	9/22/2026
	301NS	Pecora Corporation		9/22/2021	9/22/2026
	DOWSIL 890-SL Silicone Joint Sealant	The Dow Chemical Company (Formerly Dow Corning)		6/30/2021	6/30/2026
	DOWSIL 888 Silicone Joint Sealant	The Dow Chemical Company (Formerly Dow Corning)		6/30/2021	6/30/2026

wsp

New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

Joint Sealant – Average Unit Bid (AUB) Costs

Year	Cost/Linear Foot	Linear Foot
2021	$4.41	1,085
2022	$8.85	41,600
2023	$13.50	974
2024	$12.00	5796

Joint Sealant – Photos

Joint Sealant – Photos

wsp

New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

Pavement Management db

Table 13 - Rigid Pavement Treatments and Repair Categories

Rigid Pavement Repair Category	Treatment
0 - Monitor	0 - Monitor
R1 – Joint and Crack Seal	R1 – Joint and Crack Seal
R2 - Patch	R2 - Patch
R3 - Preservation (Minor)	R3A - Diamond Grinding R3B - Diamond Grooving
R4 - Preservation (Major)	R4A - Patch (Full Depth isolated areas) R4B - Slab Replacement < 5% R4C - Dowel Retrofit
R5 - Rehabilitation (Minor)	R5A - Slab Stabilization (isolated joint faulting) R5B - HMA Overlay (2.5" to 4") R5C- Bonded Overlays (2.5" to 5")
R6 - Rehabilitation (Major)	R6A - Slab Stabilization R6B - Slab Replacement 5 to 15% R6C - Unbonded Concrete Overlay (4" - 11") - (50% of Crack/Seat) R6D - Crack and Seating with 6" HMA Overlay
R7 - Reconstruction	R7A- Rubblizing R7B - Reconstruction

Table 17 - Rigid Pavement Treatment Exclusion Years

Rigid Pavement Repair Category	Exclusion Years
R1 – Joint and Crack Seal	10 years
R2 - Patch	10 years
R3 - Preservation (Minor)	10 years
R4 - Preservation (Major)	20 years
R5 - Rehabilitation (Minor)	25 years
R6 - Rehabilitation (Major)	28 years
R7 - Reconstruction	50 years

Table 18 - Rigid Pavement Budget Groups

Rigid Pavement Repair Category	Budget Group
R1 - Crack Seal	Maintenance Budget
R2 - Patch	
R3 - Preservation (Minor)	Preservation Budget
R4 - Preservation (Major)	
R5 - Rehabilitation (Minor)	Rehabilitation Budget
R6 - Rehabilitation (Major)	
R7 - Reconstruction	Reconstruction

wsp

New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE

NCPP Pavement Preservation Partnerships Skill Share Webinar

Concrete Joint Sealing Practices

Presented By:

Jeffrey Mann, PE

jeffrey.s.mann@wsp.com

wsp

New Mexico DEPARTMENT OF TRANSPORTATION
MOBILITY FOR EVERYONE