

BEST PRACTICES IN AIRFIELD ASPHALT PAVEMENT MAINTENANCE

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SWIFT CONFERENCE BANFF, ALBERTA CANADA SEPTEMBER 18, 2012







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Crack Movements

Horizontal – temperature changes - up to 1 inch +

Vertical – Traffic loadings - greater deflection after cracking

Crack Growth

- Cracks widen as they age
- Crack face deterioration, raveling
- AC mixture shrinkage
- Incompressible intrusion
- Widening of approx 10% of annual movement per year

SHRP H-106 Project

- SHRP -1993, LTPP through 1999
- 5 test sites in different climates, 15 materials, 8 installation configurations
- Monitored for 7 years
- Determined service life and cost comparisons





SHRP H-106 Findings

- Differences at sites influenced resultsclimate, crack type, spacing, traffic
- High elongation, low strength materials had best performance in working cracks
- Reservoir installations provided longest life in working cracks





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Process Selection

- Determine crack type and movements
- Working >1/8 inch movement,
 - Typically transverse at over 15-20 ft.
 - -Use Crack Seal Process
- Non-Working < 1/8 inch movement,
 - Typically longitudinal, transverse or other at less than 15-20 ft.
 - Use Crack Fill Process



Crack Fill Process

- Stiffer sealants that can withstand annual temperature extremes and remain flexible
- Installed in cleaned existing cracks, or in routed reservoirs for improved life
- Typically installed in a fill with overband configuration







Sealant Selection Historically in Canada

- ASTM 6690 Type 1 (Thin and Thick)
- ASTM 6690 Type 2
- ASTM 6690 Type 4
- ASTM 6690 Type 4 modified

Sealant Selection Historically in Canada

- ASTM 6690 Type 1 (Thin circle)
- ASTM 6690 Type 2
- ASTM 6690 Type 4

ASTM 6690 Type 4 modified

Sealant Selection

- Low Temperature
 - Crack Seal -- Pass bond extension test at the determined low
 - temperature 50-200% extension Experience
 - Crack Fill -- pass a mandrel bend test at the determined low temperature -10% extension Experience







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Reservoir Size- Crack Seal		
Width based on temperature range and crack spacing to limit extension		
Temp Range	Width	Depth
<80C	1⁄2 in	³ /4 in
86C	³⁄₄ in	3⁄4 in
92C	1 1/8 in	1/2 in
96C+	1 ½ in	1⁄2 in
For spacing size	over 50 ft	, consider wider



Installation Configuration- Non Working Cracks

- Fill existing cleaned crack, and/or
- Use overband, 1/16 in max by 4 in wide, or
- Can also use reservoir for longer life, typically 1/2 in by ³/₄ in.





















Failure Modes & Causes

- Adhesion Loss- cleaning, moisture, cold weather, install temperatures, weak mix, sealant properties, geometry
- Cohesive Fracture- sealant properties, overheating, geometry
- Pullouts/Tracking- sealant properties, cleaning, moisture, excess application, early traffic







