RMS QA on Concrete Pavement Joint Sealing

George Vorobieff
Principal Road Pavement & Geotechnical Engineer
Engineering Technology Services Branch
Network Management Division
Roads & Maritime Services

Construction Quality Technical Direction

Quality Alert xx — Concrete Pavement Joint Sealing
This alert has been issued to minimise the risk from incorrectly installed concrete pavement joint sealants.

Background
A number of reports are coming in of pavement joint sealants losing adhesion within the first 5 years of service and eventually coming away from the joints. This is preceded by the sealant "dropping down" in the joint at the wheel path as shown in Figure 1 and progressively deteriorating to the point of being removed from the joint.

Joints are required to be sealed to prevent the ingress of debris and water. The early distress of the sealants is of serious concern as the repair task requires lane closures and associated serious disruption to traffic, along with significant costs.

Figure 1 View of silicone sealant adhesion failure (left) and sealant 'dropping down' in the transverse contraction joint (right).

An investigation into the possible causes of the early sealant distress by RMS and the Australian Society of Concrete Pavements (ASCP) has indicated that the most likely cause is in the preparation of the joint prior to application of the sealant. In addition, the increase in this distress mechanism in recent years may also be related to the wider use of early-entry sawing.

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Example of silicone sealant distress
Possible causes of early distress of sealant
R83 specified requirements
QA – interim approach
Feedback
Silicone sealant distress
Silicone sealant
Possible causes of early distress

Most appear to be adhesion failure
- concrete to damp at sealant application
- dust on side faces of joint
- curing compound on side faces of joint
The cleanliness of joints after sawing and prior to sealing is a two stage process, with a preliminary seal installed between the two stages.
Clause A4.5.3.2 The sawcut must be cleaned of all debris soon after sawing and before the residue dries. The cleaning method used must not damage the sawcut or arrises nor leave any substance deleterious to the concrete or to the adhesion of the joint sealants to be used.

The method must incorporate a liquid or liquid/air oil-free jet at a sufficiently high pressure to ensure that the faces are dust-free upon drying. Gravity fed liquid from tanks will not be acceptable. Grit blasting must not be used.
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Clause A4.5.3.5 Immediately prior to introducing the silicone sealant into the groove, any foreign or disturbed material such as dust must be cleaned from the joint and from the top of the backer rod by a dry, oil-free air jet.

Grit blasting must not be used.

The joint faces must be fully surface dry at the time of installation and the joint must then be primed in accordance with the recommendations of the sealant manufacturer.
1. Remove the residue powder when using early-entry saws
2. High pressure water or water and air should be used to clean all joints. (no curing compound on sides of joint)
3. Install preliminary sealant
1. Remove the residue powder when using early-entry saws
2. High pressure water or water and air should be used to clean all joints.
3. Install preliminary sealant
4. Conduct second sawcut (if required)
5. Clean and dry the joint using high air pressure
6. Cleanliness of the sawcut is to be undertaken using a piece of 100% cotton black cloth
Use of primers

Not commonly used

To be introduced in ‘high risk areas’
  - sag curves
  - areas protected from direct sunlight for long periods of the day
  - areas under bridge overpasses

Applied according to manufacturer’s recommendations
Joint to be cleaned after every sawing operation
Joint to be cleaned & tested prior to the application of the sealant
Use a suitable primer in high risk areas.
Use a verification checklist
Apply a standard field adhesion hand pull tests

RMS welcomes feedback on draft QA by COB 12 Sept 2012
Please send to George.Vorobieff@rms.nsw.gov.au
Questions