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Section 12:

Undersealing with Asphalt Material

SECTION 12 – UNDERSEALING WITH ASPHALT MATERIAL

12.1 GENERAL

Undersealing consists of drilling holes and pumping hot asphalt beneath faulted and "pumping" pavement slabs. The fundamental purpose is to provide a uniform bearing for the pavement by filling any cavities and voids that exist between the slab and subgrade. This operation will also seal the cracks and joints from underneath the pavement. Undersealing should not be used in areas where the subgrade is providing satisfactory support for the slab or to re-adjust adjacent slabs into vertical alignment.

12.2 LOCATING AREAS FOR UNDERSEAL

Well in advance of the undersealing operation, the PEMS must mark the locations on the pavement where holes are to be drilled. At the same time, record the station number and lane, right or left, for contract payment documentation. The location and spacing of the drill holes requires consideration and forethought. In the absence of previous experience, this aspect should be reviewed in detail with the AE.

Cracks and joints which are "pumping" are more easily discernible during the wetter months of spring. Their detection becomes more difficult during dryer summer months. Immediately following a heavy rain, or as soon thereafter, as the pavement becomes dry, is an ideal time to observe any tendencies toward slab pumping movement. Pumping pavement is identified by water and fine soil particles being pushed through the joints or from beneath the slab at the pavement edges. Another indication of slab movement is discoloration or evidence of soil staining at the joints and edge of pavement caused by the pumping action.

12.3 PREPARATION FOR UNDERSEALING

Prior to the start of the undersealing operation, the Contractor is required to fill or repair all holes, low areas, and displaced areas in the shoulders immediately adjacent to the pavement to be undersealed. These repairs should be made with appropriate materials and to the elevation of the pavement's edge. All shoulder areas adjacent to areas to be undersealed shall be compacted prior to the start of the underseal operation.

Holes no larger than 1 1/2 in. in diameter should be drilled in the center of the traffic lane and from 30 to 36 in. from any transverse crack or joint. This distance will vary according to the condition of the crack or joint. At well-interlocked cracks one hole placed relatively close may prove sufficient, while an open joint may require a drill hole on both sides as much as 36 in. in each direction from the joint. Establishing typical patterns is impractical because no two jobs are identical, and the satisfactory spacing of holes is often a case of trial and error until a pattern providing the desired results is established.

The same is true for the transverse location of the hole. Begin by placing the hole in the center of the lane and make note of which side of that lane the material creeps out of first, the edge of the pavement or longitudinal joint. If material is consistently creeping out of one side first, the location of the holes should be moved away from that side to ensure complete filling of the void across the lane width. This will require experimenting with a number of holes at the beginning of

the operation. Care should be taken to not allow the drill bit to penetrate into the subgrade. This may open a new path for the asphalt material to flow into the underlying subgrade.

12.4 ASPHALT PUMPING

The asphalt pumping operation should be performed at the minimum pressure that will accomplish the desired results. An excessive pressure will contribute to waste of asphalt by movement of the material into the shoulder and opposite lane, and excessive jacking of slabs. It can also increase the potential for "blowouts" in the shoulder, at the pavement edge, and along a joint or crack. The PEMS should be certain that all personnel on the operation are properly instructed concerning the dangers associated with hot asphalt being applied under pressure, cautioning them to be alert to blowouts and broken delivery lines. Non-essential personnel should remain outside the immediate area of the operation during times when the material is being pumped. Long sleeves, face protection and gloves should be worn by those required to be within the immediate area of the pumping operation.

The undersealing measuring device or gauge should be used to monitor the movement of the slab at each hole. Depending on the type of pavement being undersealed, pumping should cease when one of the following conditions are met:

	Conditions		
Type of Pavement	Slab Lift	Pumping Time	Leak/Blowout
Jointed Concrete	1/4 in.	15 seconds	Leak/Blowout
Continuous Reinforced	1/8 in.	12 seconds	Leak/Blowout

The gauge must be placed on an adjacent area and perpendicular to the centerline of the pavement being undersealed. The gauge must be monitored during the pumping operation to detect slab movement. Each hole may require a different amount of underseal material and must be monitored as outlined above for the applicable treatment.

This gauge cannot be used on the center lane of a three-lane roadway due to the requirements for placing the gauge. The center lane should be undersealed first and usually for the pumping time indicated above unless extrusion occurs.

After pumping is complete, a wood plug must initially be driven into the hole. When the pumped material has hardened, the initial plug is removed and a hardwood plug is driven flush with the surface of the pavement. This installation of the hardwood plug should be in accordance with the SS and contract documents in both size and manner of installation.

12.5 SAFETY

Safety measures for the undersealing operation cannot be overemphasized. Keep in mind that hot asphalt material is being pushed under the pavement at high pressure. Flexible lines and connections are subject to mechanical failure. In addition, "blowouts" at surface cracks, pavement joints and edges, and in the shoulders are common occurrences. In view of all these facts, it is advisable for all non-essential personnel to stay clear of the operation. Those personnel

inspecting the operation should stay clear of potential hazardous locations and stay up-wind of the operation to lessen the potential for exposure to hot asphalt material that might be blown during removal of the nozzle from the core hole. The PEMS should see that all Department assigned personnel dress appropriately for the operation and observe proper precautions.