

SECTION 12 – UNDERSEALING WITH ASPHALT MATERIAL

12.1 GENERAL *(Rev. 01-21-14)*

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 the underside. Underseal 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 *(Rev. 09-28-09)*

Well in advance of the undersealing operation the PE/S will mark the pavement with the locations where holes are to be drilled, at the same time recording the station number and lane, right or left, in a field book for the Final Construction Record documentation. The location and spacing of the drill holes is a task requiring particular consideration and forethought. In the absence of previous experience this should be reviewed in detail with the AE.

Cracks and joints which are “pumping” are more easily discernible during the spring. However, during the summer season their detection becomes increasingly difficult. Immediately following a heavy rain, or as soon thereafter as the pavement becomes dry, is an ideal time to observe any tendencies toward slab movement, indicated by water and fine soil particles being pumped back 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 through the joints and edge.

12.3 PREPARATION FOR UNDERSEALING *(Rev. 09-28-09)*

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 to the elevation of the pavement’s edge. All shoulder areas adjacent to the 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 it is seldom that any two jobs are identical, and the satisfactory spacing of the hole or holes is most often a case of trial and error until a pattern giving 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 that the drill bit is not allowed to penetrate into the subgrade as this may open a new path for the asphalt material into the underlying subgrade.

12.4 ASPHALT PUMPING *(Rev. 01-21-14)*

The asphalt pumping operation should be performed at the minimum pressure that will accomplish the desired results. An excessive pressure will contribute to the waste of asphalt by movement into the shoulder and opposite lane, jacking of the slabs, and or increase the hazard of “blowouts” in the shoulder, at the pavement edge, and along the joint or crack. The PE/S should be certain that all personnel on the work are properly instructed concerning the dangers associated with hot asphalt being applied under pressure, cautioning them to be ever alert to blowouts and broken delivery lines. Unnecessary personnel should remain outside the immediate area of the operation at the time 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:

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

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 can not 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 time outlined above unless extrusion occurs.

After pumping is complete, a wood plug must initially be driven into the hole. Then, 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 current Standard Specifications and Special Provisions in both size and manner of installation.

12.5 SAFETY *(Rev. 09-28-09)*

Safety measures with respect to the undersealing operation cannot be overemphasized. Bear in mind that the asphalt material is being placed under pressure and at an unusually high temperature. 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 unnecessary personnel to stay clear of the operation. Those personnel inspecting the operation should stay clear of possible points of danger and if possible on the windward side of the operation. The PE/S should see that all state personnel assigned to the contract dress appropriately for the work and observe proper precautions.

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