ITEM 04502.8008 M - RETROFIT DOWEL BARS IN CRACKED PORTLAND CEMENT CONCRETE (PCC) PAVEMENT

This Specification has been Disapproved AND REPLACED BY ITEM 04502.8025

DESCRIPTION Furnish and install new dowels, load transfer devices (LTDs), in transverse cracks as shown in the contract plans and/or as directed by the Engineer. This item includes sawing channels into which the dowels will be placed, removing existing PCC to form the channels, sand blast cleaning all channel faces, caulking the crack, aligning and placing the dowels, and backfilling with a well bonded patching material around the dowel.

MATERIALS

Retrofit LTDs. The retrofit LTDs must be supplied by a supplier appearing on the Approved List for Transverse Joint Supports. The retrofit LTDs must conform to the configurations, dimensions, and spacings shown in the contract documents. Each retrofit LTD consists of one dowel, two expansion caps with each cap providing 6 mm of expansion room, a joint forming medium, and two epoxy coated or non-metallic supporting chairs.

The dowel element of the LTD, including epoxy coating and bond breaker, must meet the requirements for dowel bars detailed in §705-15, Transverse Joint Supports. The "Tests" and "Basis of Acceptance" portions of §705-15 shall not apply. However, the Contractor must provide the Engineer (1) certification from the supplier that the dowel elements meet the "Tests" requirements of §705-15 and (2) certification from the rolling mill as to the type and grade of steel used.

The joint forming medium must be:

- watertight,
- compressible, yet rigid enough to maintain it's shape during all operations detailed in this specification,
- treated with a release agent that prevents bond to the backfill material,
- deep enough to extend from the channel bottom to 3 - 6 mm below the pavement surface,
- equal to the crack width (+ 6/ - 0 mm), and
- capable of being routed to the depth indicated in sealing specifications contained in the contract documents.

Submit detailed shop drawings to the Director, Materials Bureau, for approval before work begins. The drawings must detail:

- the expansion cap,
- the type and positioning of chairs used to support and align the devices,
- the material used as a joint forming medium,
- the name of the bond breaker and the name and address of the manufacturer,
- the type of corrosion protection coating and the name and address of the manufacturer,
- the name and address of the corrosion protection coating applicator .

Different widths of joint forming material will be required for varying crack widths.

Backfill Material. Use HD-50, Patchroc 10-60, or L & M Durapatch HiWay, as a backfill material.

The contractor may submit an alternate prepackaged portland cement based patching material provided it meets the following requirements:

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Property	Extension	Minimum	Maximum
3 Hour Compressive Strength	Neat	24 MPA	-
24 Hour Compressive Strength	Neat	35 MPA	-
Contraction	Neat	-	0.05 %
Freeze - Thaw Loss	60 %	-	1.0 %
Bond to SSD PCC	60 %	2.8 MPA	-
Bond to Dry PCC	60 %	2.1 MPA	-
Work Time	60 %	15 Minutes	-
Chloride Content		-	0.0 %
Magnesium Phosphate Content		-	0.0 %

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Extend the prepackaged material with clean, surface dry crushed stone or crushed gravel meeting the requirements of §703-02, Coarse Aggregate, and having a 1A gradation. Use an extension rate of 50 - 60 % by weight of the prepackaged material. Do not use crushed slag aggregate. Follow the manufacturer's mixing instructions.

Non-proprietary portland cement mixes may also be submitted to the Director, Materials Bureau for approval. Any alternate material must be submitted to the Director, Materials Bureau a minimum of 30 days before any channels are constructed.

CONSTRUCTION DETAILS

Channel Construction - Make saw cuts with a diamond blade concrete saw equipped with a minimum of three saw blades of the same diameter. Space the blades on the saw arbor such that the outside blades are 65 mm apart. The purpose of the cut(s) made by the interior blade(s) is to facilitate concrete removal between the outer cuts to form the desired channel width and depth. Make the saw cuts parallel to the pavement longitudinal joint and to each other, with nearly equal lengths on either side of the crack. Make the saw cuts sufficiently deep such that (1) the longitudinal axes of the bars are at mid-slab when they are placed and aligned as discussed below in retrofit bar installation and (2) 13 to 19 mm of backfill material will completely surround the bars and expansion caps.

Remove concrete between the outer saw cuts with a light, pneumatic chipping hammer weighing no more than 13.6 kg, including muffler and bit. Remove concrete burrs such that the bars will sit level when positioned and the backfill material will completely encase the bar. Schedule operations such that the concrete between saw cuts is removed to form the desired channels of the proper dimensions as close to bar installation as possible. Do not allow traffic on the channels after the concrete has been removed.

Once the concrete is removed, thoroughly sand blast all faces of the channel such that any residue is removed and the surface is uniformly roughened. Immediately thereafter, air blast the channel to remove any remaining debris. The Engineer shall approve all concrete removal, blast cleaning, and air blasting equipment prior to the commencement of all the above operations. At the conclusion of these operations the channels shall be rough, dry and free of dirt, oil, and dust as determined by the Engineer. The Engineer will check for dust by wiping the channel faces with a dark cloth or glove.

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The Contractor may propose an alternate method(s) to form the channels. The alternate method is subject to the Engineer's approval and is not cause for a time extension.

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Retrofit Bar Installation - Before placing any dowels, (1) apply a masonry caulk approved by the Engineer to all crack faces within the channel such that no backfill material enters the crack and (2) coat the walls and bottom of the channels with a primer if recommended by the manufacturer's instructions. Do not place primer or backfill material on a wet surface or when the concrete substrate is outside the temperature range of 7°C to 38°C.

Place and support the dowels in accordance with the approved shop drawings such that:

- the longitudinal axis of each dowel is at the mid-depth of the pavement slab ± 6 mm,
- the longitudinal midpoint of each dowel is within 25 mm of the crack, and
- the longitudinal axis of each dowel is aligned parallel with the pavement centerline and pavement surface such that the maximum misalignment of one dowel end relative to the other is 4 mm.

Backfill Placement - Immediately after the dowel is positioned, slightly overfill the entire channel with backfill material. Follow manufacturer's instructions regarding placement time limits. Thoroughly consolidate the material using narrow (less than 25 mm), hand-held spud vibrators. Do not touch the bar with the vibrator.

Fill whole channels with each batch of material. Discard the remaining portion of a mixed batch if it will not completely fill a channel, if placement time limits are exceeded, or if the material is too stiff in the Engineer's opinion.

Finish the surface of the backfill material with as little hand finishing as possible. If the retrofit patches will not be diamond ground, the finished surface must be at the same elevation and cross-slope as the adjacent concrete. If the retrofit patches are to be diamond ground, leave the patch surface approximately 3 mm higher than the surrounding pavement surface.

Cure the backfill material in accordance with the manufacturer's instructions.

METHOD OF MEASUREMENT

The number of each retrofit bar placed in accordance with this specification.

BASIS OF PAYMENT

The unit price bid per bar shall include the cost of all labor, equipment and material necessary to complete the work in accordance with this specification.