

# Special Specification 3039

## Dowel Bar Retrofit



### 1. DESCRIPTION

Furnish and install dowel bars in an existing concrete pavement including the bar supports where required, cutting and preparation of slots for the dowel bar placement, and furnishing and placing the concrete repair material to complete the dowel bar retrofit.

### 2. MATERIALS

2.1. **Repair Material.** Furnish repair materials meeting the requirements of DMS 4655 "Concrete Repair Materials" Type A. Follow the manufacturer's recommendations when using these materials. When necessary, use aggregates having a maximum size passing the 3/8 in. sieve to extend these repair materials.

2.2. **Dowel Bars.** Provide smooth, epoxy coated, steel dowel bars 18 in. in length, free from burrs and conforming to Item 440, "Reinforcement for Concrete." Support the dowel bars with non-metallic supports chairs in the slots so that the bar centerline coincides with the pavement mid-slab depth and is parallel to the pavement centerline.

Dowel bars made of alternate materials may be used when approved by the Engineer: Provide data showing equivalent load transfer efficiency performance when requesting to use dowels of alternate material.

2.3. **Joint Sealant and Filler.** Provide Class 5 or 8 joint sealant and fillers of the size, shape, and type as shown on the plans.

### 3. CONSTRUCTION

Perform dowel bar retrofit work after under sealing and slab jacking operations are completed, when necessary.

Place dowels at the locations and spacing shown on the plans.

3.1. **Test Section.** Provide a test section consisting of complete dowel bar retrofit at a site directed by the Engineer at least three days prior to startup of major operations as follows:

- Install 24 retrofit dowels in the test section.
- The Engineer will identify and mark three locations for coring.
- Take three – 4 in diameter full depth cores at least 4 hours after completion of the test section.

If the Engineer determines the retrofitting operations can continue,

- The Engineer will notify the Contractor to begin production operations.
- The Engineer's continued acceptance is based on satisfactory placement and performance.
- Completely remove and replace the dowel installation where the core samples were taken.

If approval of the retrofitting operation is not given, remove, at no additional cost to the department, the first test section dowel bar retrofits and reconstruct the test section for review by the Engineer.

- 3.2. **Slot Formation.** Provide saw cutting equipment capable of making multiple simultaneous saw cuts with diamond impregnated saw blades. Cut the slots to the dimensions shown on the plans and within the tolerances shown in Table 1. Remove concrete from the slots with lightweight jackhammers (30 lb. or less) or hand tools. When jackhammers are used, operate them at a 45° angle or less. Replace, at the contractor's expense, any slab, not broken at the joint prior to slot formation, but broken, by the contractor, full depth through the slab at the slot or the formation of cracks propagating into the slab from the slot.

**Table1**  
**Slot Tolerances**

Dimension	Tolerance
Width of Slot	-1/8, +1/2"
Length of Slot bottom, min.	Length of dowel bar assembly + 2"
Bottom of Slot Parallel to top of Pavement	±1/4" per 18"
Parallel to Other Slots	±1/8" per 18"
Parallel to Centerline of Road	±1/2" per 18"

- 3.3. **Preparation for Dowel Placement.** After removing the concrete from the slots, sand blast the walls of the slots, and clean and dry with high pressure air. Seal the joint/crack openings at the slot with caulking prior to placing the dowel in the slot.
- 3.4. **Dowel Placement.** Apply a thin film of grease, wax, silicone, or other approved de-bonding material to the epoxy coated bar for half the length plus 2 in. to prevent bond. Support the dowel chairs so that the dowel rests parallel to the centerline of the pavement at the mid-depth of the slab. Place joint filler material, Styrofoam material, or styrene board, at mid-length of the dowel to maintain the joint/crack and prevent the repair material from entering the joint or crack.
- 3.5. **Repair Material Placement.** Mix, place, and cure the repair material in accordance with the manufacturer's recommendations. Take care not to dislodge or move the dowel bar out of position, while ensuring the repair material fills the space under the bar. Finish the repair material level with the existing slab surfaces.
- 3.6. **Opening to Traffic.** Do not open the roadway to traffic, until the repair material has reached a compressive strength of 2000 psi. Prior to performing repair, perform trial batch testing to determine the time the repair material achieves the required compressive strength. If installation of all dowel bars at a joint cannot be completed prior to opening to traffic then do not install dowel bars in those joints.

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#### 4. MEASUREMENT

Dowel bar retrofit will be measured as each dowel bar complete in place.

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#### 5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Dowel Bar Retrofit". This price is full compensation for all materials, tools, labor, equipment and incidentals necessary to complete the work.