

**Pavement Dowel Bars Retrofit, Item 416.0622.S.**

A. Description. Retrofit Dowel Bars consists of restoring load transfer in existing concrete pavement by installing epoxy coated dowel bars across transverse joints or cracks. The work shall conform to the plan details for retrofit dowel bar installation and as follows.

**B. Materials**

1. Dowel bars shall be epoxy coated and shall conform to the requirements prescribed in Subsection 505.2.6 of the Standard Specifications except that the surface treatment, capable of preventing bond between the bar and the concrete, on the epoxy-coated bars shall be manufacturer applied.

Dowel bars shall have tight fitting end caps made of a non-metallic material that allow for 1/4 inch (6 mm) movement of the bar at each end. The contractor shall submit a sample end cap to the engineer for approval prior to use.

2. Foam core board shall be 1/4 inch (6 mm) thick, constructed of closed cell foam, and faced with poster board material on each side.

3. Patching material shall be Patchroc 10-60, Five Star Highway Patch, or equal approved by the engineer. Patching material shall be extended at a 1 to 1 ratio, by weight, with a clean natural aggregate. Aggregate extender shall conform to the requirements prescribed in Subsection 501.2.5 of the Standard Specifications except that the size requirements are as follows:

Minimum of 95% passing the 3/8 (9.5 mm) sieve

Maximum of 25% passing the No. 4 (4.75 mm) sieve

4. Dowel bar chairs shall be made of non-metallic material. Chairs shall be designed to fit snugly in the saw cut and hold the bar in the lateral center of the slot. The contractor shall submit sample chairs to the engineer for approval prior to use.

C. **Construction Methods.** The contractor shall install the dowel bars in the existing concrete pavement as shown in the plan details and according to the following specifications:

1. Slots shall be cut in the pavement with a gang saw capable of simultaneously cutting a minimum of three slots, or by an alternate method approved by the engineer.

The saw cuts for all required slots at each transverse joint or crack shall be made such that the longitudinal centerline of each individual dowel bar is placed within the following tolerances:

- At the nominal mid-depth of the lower slab  $\pm 1/2$  inch (12 mm).
- Parallel to the top of the pavement  $\pm 1/8$  inch (3 mm) in 18 inches (450 mm) .
- Parallel to other bars in the same joint or crack  $\pm 1/8$  inch (3 mm) in 18 inches (450 mm).
- Parallel to the roadway centerline  $\pm 1/4$  inch (6 mm) in 18 inches (450 mm).

Traffic may run on sawed slots for a maximum of two weeks.

2. Concrete shall be removed from the slot area with a jackhammer no larger than the 30 pound (14 kg) class. The contractor shall use a lighter hammer if the pavement is damaged with the 30 pound (14 kg) hammer.

All exposed surfaces and cracks in the slot shall be sand blasted and cleaned of saw slurry and loose material before installing the dowel. All loose material shall be disposed of off the highway right-of-way.

3. Foam core board shall be placed to maintain the continuity of the existing transverse joint or crack.

Foam core board should be sized to fit the skew angle of the joint or crack and extend to, or beyond, the top surface of the lower slab. Foam core board shall fit tightly around the dowel bar and to the bottom and sides of the slot.

Existing transverse joints or cracks shall be caulked with a silicone sealant at the bottom and sides of the slot as shown in the plan details to provide a tight fit for the foam core board and to prevent any of the patch mix from entering the joint or crack.

Foam core board shall be installed such that it remains in position and tight to all edges during placement of the patching material. Tabs may be used to hold the foam core board in place. Existing joint sealant may be cut or removed to accommodate tabs. If the foam core board shifts during the placement of the patch mix, the work shall be rejected and replaced at the contractor's expense.

4. Dowel bars shall be placed, as a completed assembly with chairs and foam core board attached, across the transverse joint or crack as shown in the plan details. Chairs shall hold the dowel bar securely in place during the placement of the patch mix. If the dowel bar shifts during the placement of the patch mix, the work shall be rejected and replaced at the contractor's expense.

5. Existing concrete surfaces in the slot shall be moistened immediately prior to placing the patch mix, or prepared as recommended by the manufacturer. All excess water in the slot shall be removed before the patching material is placed.

6. Patching material shall be mixed according to the manufacturer's recommendations for mixing with a portable or mobile mixer.

Patching material shall be placed into the slot and vibrated to ensure that the dowel bar is completely encased. The diameter of the vibrator head shall not exceed 1 1/4 inches (32 mm).

Placement when the ambient temperature is below 50 degrees (10°C) Fahrenheit will require prior approval by the engineer.

7. The surface of the filled area shall be struck off flush with the adjacent concrete. Patching material shall be cured by the impervious coating method as prescribed in Subsection 415.3.12.2 of the Standard Specifications for a minimum of two hours before placing any vehicle load on the retrofitted transverse joint or crack. Covering may be needed to prevent excess thermal stress in the patch material during this two hour initial curing period.

When the ambient temperature is below 50 degrees Fahrenheit (10°C), the engineer may postpone opening to vehicular loads or require covering during the initial curing period, or both.

8. Joints shall be restored with a saw cut at least 1/4 inch (6 mm) wide and deep enough to remove all patching material from the joint. The joint shall be sawed within 24 hours after placement of patching material. The joint or crack shall be thoroughly cleaned after sawing to remove loose compressibles.

9. Any damage to the pavement due to the contractor's operation shall be repaired by the contractor at no cost to the department.

**D. Method of Measurement.** Pavement Dowel Bars Retrofit will be measured by each dowel bar installed and accepted.

**E. Basis of Payment.** Pavement Dowel Bars Retrofit, measured as provided above, will be paid at the contract unit price each, which shall be full compensation for furnishing all materials, including epoxy coated dowel bars; for sawing slots; for removing concrete; for installing dowel bars; for furnishing and installing patching material; for furnishing and applying water; and for all labor, tools, equipment and incidentals required to complete the work as specified.

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