October 4, 2019

REVISION OF SECTION 412

CONCRETE PAVEMENT DOWEL BAR RETROFIT

1. **NOTICE**

This is a standard special provision that revises or modifies CDOT’s *Standard Specifications for Road and Bridge Construction*. It has gone through a formal review and approval process and has been issued by CDOT’s Project Development Branch with formal instructions regarding its use on CDOT construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT construction projects, and do not use this special provision on CDOT projects in a manner other than that specified in the instructions unless such use is first approved by the Standards and Specifications Unit of the Project Development Branch. The instructions for use on CDOT construction projects appear below.

Other agencies that use the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision as appropriate and at their own risk.

**Instructions for use on CDOT construction projects:**

Use this standard special provision on projects with insertion of dowel bars in existing concrete pavement.

Section 412 of the Standard Specifications is hereby revised for this project to include the following:

**412.35 Dowel Bar Retrofit.** This work consists of placing epoxy coated smooth dowel bars in transverse joints as identified on the plans. This shall be done by cutting slots into the existing concrete pavement, installing dowel bars, and filling the slots at locations as shown on the plans. The surface shall be finished as approved by the Engineer. All work, including the concrete pavement slot preparation, inserting dowel bars, filling the slot with backfill material, and finishing the surface shall be performed in accordance with these specifications and the details shown on the plans.

**412.36 Materials.** Materials for dowel bars shall meet the requirements in subsection 709.03. Dowels shall be equipped with tight fitting, non-metallic end caps to allow 1/4 inch bar movement.

Concrete patching material to be used as backfill shall be a product on the CDOT Approved Products List. Concrete patching material shall attain an average compressive strength of at least 4,500 psi at 24 hours. Concrete patching material compressive strengths shall be tested according to ASTM C39 or ASTM C109. Concrete patching material shall provide a minimum bond strength of 1,000 psi at 24 hours, as tested by ASTM C882. Concrete patching material shall have a relative durability factor greater than 90 as tested by ASTM C666 method A. Concrete patching material shall have a maximum shrinkage of 0.13 percent at four days as tested by ASTM C157. The proposed material shall be submitted to the Engineer for approval at least five days in advance of the start of dowel bar placement. Installation of dowel bars shall not begin until approval has been received in writing from the Engineer.

**412.37 Construction Requirements.** Slots for dowel bars shall be cut perpendicular to the transverse joint as shown on the plans by using a slot cutting machine or walk-behind saw. Slots shall be of adequate length and width to accommodate the dowel bar, as shown on the plans or as directed. The concrete in the slot shall be removed by using a lightweight jackhammer weighing a maximum of 30 pounds, or hand tools, to half slab depth. All damage to the concrete slab outside of the slot shall be repaired or replaced at the Contractor’s expense. Slots shall be placed at locations shown on the plans.

Slots shall be removed of all debris and cleaned prior to placement of dowel bars by sandblasting or other procedure so that clean aggregate is exposed. Prior to placement of backfill material, each dowel bar shall be equipped with a 1/4 to 3/8-inch thick foam core board to provide a tight seal at the joint. Dowels shall be placed on chairs so that the bar is sitting a minimum of 1/2 inch above the bottom of slot and perpendicular to the transverse joint. The chairs shall be epoxy coated steel or plastic rigid enough to hold the dowel in place during grout placement. The existing transverse joints shall be sealed with an approved joint sealant along the bottom and sides of the slot to prevent backfill material from infiltrating the joint. The joint sealant material shall be on the CDOT Approved Products list and shall be approved by the Engineer prior to use.

Backfill material to be placed shall be mixed according to the manufacturer’s recommendations. Once in the slot, the material shall be vibrated thoroughly so that the entire bar is encased with the consolidated material. The slot shall be slightly overfilled, and the area shall be diamond ground once the material has cured to provide a smooth pavement surface. After grinding, transverse joints shall be sawed and sealed in accordance with subsection 412.18.

**412.38 Opening to Traffic.** The pavement shall not be opened to traffic until all dowel bars have been installed at a joint and the concrete has obtained a minimum compressive strength of 3,000 psi. Pavement shall be cleaned before opening to traffic.

**412.39 Method of Measurement.** Dowel bar retrofit in concrete pavement will be measured as the actual number of dowel bars placed and accepted.

**412.40 Basis of Payment.** The accepted quantities will be paid for at the contract unit price for the pay item listed below.

Payment will be made under:

# Pay Item Pay Unit

Concrete Pavement Dowel Bar Retrofit Each

The accepted quantity of dowel bar slots cut, filled with accepted patching material, and dowel bars will be paid for at the contract unit price per each bar installed. Payment for cutting slots, support chairs, joint sealant, patching, and all labor, materials, equipment, tools and incidentals necessary for completion of the work will not be measured and paid for separately, but shall be included in the work. Payment will not be made for extra work required to repair damage to the adjacent pavement that occurs during dowel bar retrofitting.