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 all projects with concrete pavement.

Section 412 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 412.13 (b) 2. and replace it with the following:

*Transverse Weakened Plane*. *Joints*. When dowel bars are specified in the Contract, they shall be installed within the tolerances and of the size, grade, and spacing specified. Dowel bars shall be furnished in a rigid welded assembly or placed by a dowel bar insertion (DBI) machine. The center of the dowel assembly or the insertion location shall be marked on both sides of the pavement slab for reference in sawing the joint.

When a DBI is used, the Contractor shall submit details and specifications of the proposed slip-form paver and DBI to the Engineer a minimum of 14 calendar days prior to the Concrete Pavement Pre-Paving Conference. The Contractor shall detail his methodology for ensuring correct marking of dowel bar insertion points and correct sawing of the joints. The Contractor shall ensure that the slip-form paver is compatible with the DBI.

When a rigid assembly (dowel basket) is used, the rigid assembly shall be fabricated from number 1/0 wire or heavier with vertical support wires every 1 foot. The rigid assembly shall be securely fastened to the subbase and constructed to firmly hold all the dowel bars at T/2 depth, parallel to each other and to the pavement grade and alignment. Horizontal support wires or shipping braces shall be non- deformed bars or wires with a diameter less than or equal to 0.307 inches (gauge 0 wire). The number of horizontal support wires or shipping braces shall be limited to five per rigid assembly. Shipping braces shall not be cut.

The Contractor shall perform a pull test after dowel baskets are staked. The minimum staking method will be determined using the pullout test. The pullout test shall be performed on all dowel baskets placed in a test section and one dowel basket per day thereafter when the minimum staking method is used. The test section for determining staking method shall be the first 10 joints with dowel baskets for each base type. Each dowel basket in the test section shall withstand a minimum of 25 pounds of force when pulled vertically at three equally spaced locations along the length of the dowel basket frame using a fish scale, or approved equivalent. If any dowel basket moves more than 0.5 inches, a new staking method and test section will be required.

The use of the MIT Scan-2 will be used for joint acceptance. Joint acceptance or rejection will be based on the Joint Map generated by the MIT Scan software. Should the joint map show missing or misaligned bars the Contractor will have the choice of either performing additional testing using a method approved by the Engineer or perform corrective measures. Colorado Procedure 79 in the CDOT Field Materials Manual will be used to determine if dowel bars are misaligned or missing. Dowels in rigid assemblies will be inspected by the Engineer prior to concrete placement for misalignment and dowel bar depth. If misalignments and/or dowel bar depths exceeding the rejection tolerances are found, the rigid assembly shall be reset and re-inspected. The MIT Scan-2 shall be used for determining the depth of dowel bars placed by a DBI.

See Standard Plan M-412-1 for schematic describing the measurement of each tolerance.

Joint Rejection Criteria:

* 1. Any joint that does not have at least three acceptable dowel bars in each wheel path.
  2. Rotational Alignment:

Bars with a misalignment greater than 1.5 in.

* 1. Longitudinal (side) shift:

Bars that are not embedded at least 6 inches on each side of the joint (saw-cut).

* 1. Depth:

Bars within the top 3 inches of the pavement or at a depth less than the saw-cut depth. Bars within the bottom 3 inches of the pavement.

Corrective Measures: The following corrective measures will be allowed for the bars or joints that are rejected.

1. Rotational misalignment.

Saw-cut the misaligned bars. Joints with less than three un-cut bars in each wheel path will require the addition of dowel bars using an approved dowel bar retrofit method.

1. Longitudinal (side) Shift and missing bars.

Addition of dowel bars using an approved dowel bar retrofit method.

1. Depth.

Inadequate cover above the bar—saw-cut the bar and install a replacement bar using an approved dowel bar retrofit method*.*

Inadequate cover below the bar— Addition of dowel bars using an approved dowel bar retrofit method*.*

Retrofitted dowel bars shall not exceed the dowel bar rejection criteria.

In addition to the above procedures, the Contractor may propose removal and replacement of the affected slabs. The Contractor shall submit his method of repair to the Engineer for approval.

The Contractor shall demonstrate his ability to place dowel bars in conformance with the specifications by placement of a test section. The test section shall be a minimum of 300 feet in length. Upon completion of the test section, the Contractor shall shut down paving operations. During the shutdown period, the Contractor shall evaluate all joints in the test section using the MIT-Scan-2 and CP-79 and submit the results to the Engineer. Paving operations shall not be restarted until the Engineer approves the test section results. The test section will be found acceptable if 100% of the joints are found to be acceptable. All unacceptable joints must be addressed using the above corrective measures. The Contractor may continue paving at his own risk before the test section evaluation is complete.

If the Project has less than 500 linear feet of pavement, the test section will not be required. If a Project does not have sections of continuous pavement greater than 45 linear feet, the test section will not be required.

Upon completion of the test section(s) and for each week of production, the Contractor shall prepare an electronic report generated using MagnoProof software and submit it to the Engineer at the start of each working week during production, for the previous week’s work. The reports shall show the joint map generated by the MIT-Scan-2 and the joint pass/fail rating according to CP-79

When the test section is found to be unacceptable, the Contractor shall perform corrective actions and place a second test section. If the second test section is found to be unacceptable, the Contractor shall pave no more than 500 feet per day until an acceptable test section has been achieved.

Once a test section is successfully completed, Dowel Bar Placement testing frequency shall be a minimum of one location per 1,250 linear feet of each continuous lane including climbing lanes, passing lanes, acceleration and deceleration lanes and ramps. Sections greater than 45 linear feet and less than 1,250 linear feet require a minimum one of test location. Testing locations shall be determined by a random procedure so that each area has a randomly selected transverse joint location. At each location, five consecutive joints shall be tested.

Sections of continuous pavement constructed by the project less than 45 linear feet will not require Dowel Bar Placement Testing.

When any joint exceeds the rejection criteria, joints shall be tested in each direction from the rejected joint, until two consecutive joints in each direction are found to be acceptable.

All delays or costs associated with equipment being rejected for use by the Engineer will not be paid for by the Department, and will be considered a Non-excusable Delay in accordance with subsection 108.08 (c) 2.

When concrete shoulders or widenings are constructed subsequent to the driving lanes, transverse weakened plane joints shall immediately be formed in the plastic concrete of these widenings to create an extension of the existing transverse joint. This tooled joint shall be formed in such a manner that it controls the cracking and shall be sawed and sealed in accordance with the above requirements.