February 3, 2011

REVISION OF SECTION 412

PORTLAND CEMENT CONCRETE PAVEMENT

CONSOLIDATING AND FINISHING

**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 for 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 which 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 having portland cement concrete pavement.

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

In subsection 412.07(b) delete the second paragraph and replace with the following:

The full width and depth of concrete requiring a finishing machine shall be consolidated by a single pass of an approved internal vibrator. Internal vibrators shall be operated within a frequency range of 4,000 to 8,000 vibrations per minute (VPM). Vibrators shall not be operated in a manner to cause a separation of the mix ingredients, either a downward displacement of large aggregate particles or an accumulation or laitance on the surface of the concrete. Avoidance of separation of the mix may require reduction in the vibrator frequency when forward motion of the paver is reduced. Paving machine operations shall stop if any vibrator fails to operate within specifications. Vibration shall be stopped whenever forward motion of the paver is stopped.

The use of surface vibrators shall be approved by the Engineer prior to use. Surface vibrators shall be operated within a frequency range of 3,500 to 6,000 VPM.

Delete subsection 412.12 and replace with the following:

**412.12 Finishing.** The sequence of operations shall be strike-off and consolidation, floating, and final surface finish.

Water shall not be added to the surface of the concrete to assist in finishing operations. The surface shall be finished to a uniform texture, true to grade and cross section, and free from porous areas. When the finishing machine, either form or slip form, or hand finishing method, leaves a surface that is not acceptable, the operation shall stop and corrective action shall be taken. Inability of the fin­ish machine to provide an acceptable surface finish, after corrective action, will be cause for requiring replacement of the finish machine.

Wastewater generated from concrete finishing operations shall be contained and disposed of in accordance with subsection 107.25.

1. *Hand Finishing*. Hand finishing should be minimized wherever possible. The Engineer shall be notified prior to hand finishing work and the proposed hand finished work shall be addressed in the Quality Control Plan for concrete finishing. Unless otherwise specified, hand finishing methods will be permitted only under the following conditions. Hand finished concrete shall be struck off and screeded with a portable screed that is at least 2 feet longer than the maximum width of the slab to be struck off. It shall be sufficiently rigid to retain its shape. Concrete shall be thoroughly consolidated by hand vibrators. Hand finishing shall not be allowed after concrete has been in-place for more than 30 minutes or when initial set has begun unless otherwise approved by the Engineer. Finishing tools made of aluminum shall not be used.

The Contractor shall provide a Quality Control Plan (QCP) to ensure that proper hand finishing is accomplished in accordance with current Industry standards in the concrete pavement placement. It shall also identify the Contractor’s method for ensuring that the provisions of the QCP are met. The QCP shall be submitted to the Engineer at the Preconstruction Conference. Paving operations shall not begin until the Engineer has approved the QCP. The QCP shall identify and address issues affecting the quality of finished concrete pavement including but not limited to:

1. Timing of hand finishing operations
2. Methodology to place and transport concrete
3. Equipment and tools to be utilized
4. Qualifications and training of finishers and supervisors

When the Engineer determines that any element of the approved QCP is not being implemented or that hand finished concrete is unacceptable, work shall be suspended. The Contractor shall supply a written plan to address improperly placed material and how to remedy future hand finishing failures and bring the work into compliance with the QCP. The Engineer will review the plan for acceptability prior to authorizing the resumption of operations.

1. *Floating.* Hand floating will be permitted only as specified in paragraph (a) above. The Contractor shall not use floats *made* of aluminum.
2. *Final Finish.* For the final finish a strip of plastic turf shall be dragged longitudinally over the full width of pavement after a strip of burlap or other approved fabric has been dragged longitudinally over the full width of pavement to produce a uniform surface of gritty texture.

The plastic turf drag shall be made of material at least 3 feet wide and be maintained in such a condition that the resultant surface finish is of uniform appearance and reasonably free from grooves over 1/16 inches in depth. Where more than one layer of burlap drag is used, the bottom layer shall be approximately 6 inches wider than the layer above. Drags shall be maintained clean and free from encrusted mortar. Drags that cannot be cleaned shall be discarded and new drags installed.

1. *Tining and Stationing.* Where posted speeds are 40 mph or higher, the surface shall be given a longitudinal metal tine *finish* immediately following turf drag. Tining is not required where posted speeds are less than 40 mph. Tining shall produce grooves of 1/8 inch by 1/8 inch spaced 3/4 inch apart and parallel to the longitudinal joint. Longitudinal tining shall stop at the edge of travel lanes. Tining devices shall be maintained clean and free from encrusted mortar and debris to ensure uniform groove dimensions. The tining finish shall not be performed too early whereby the grooves may close up.

Before paving the Contractor shall provide in writing a tining plan showing tining locations and describing methods that will be used for hand tining. Paving shall not commence until the Engineer has approved the tining plan in writing.

The tining grooves shall be neat in appearance, parallel with the longitudinal joint, uniform in depth and in accordance with what is shown in the plans and these specifications. Any time that the tining grooves do not meet these requirements, the concrete paving operation shall be immediately stopped and will not resume until the problem has been resolved.

Stationing shall be stamped into the outside edge of the pavement, as shown on the plans.