



**Minnesota Department of Transportation**

**MEMO**

Office of Materials  
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**DATE:** June 4, 2008 Revision 6/27/2008 to Item F.

**TO:** Distribution 57, 612, 618, 650

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**SUBJECT:** 2008 Concrete Issues Advisory Memorandum

**Implementation**

Guidelines A – M are informational or procedural in nature.

Guidelines N – U should be included in the Special Provisions or by Supplemental Agreement or Change Order.

**Purpose**

The purpose of this memo is to address various concrete issues involving both general concrete work and concrete paving. Some of these are an update of issues that have been addressed previously in earlier Technical Memorandums. A summary of the issues follows:

**A. Mn/DOT Concrete Engineering Unit Web Site and Email Address**

The Concrete Engineering Unit website has recently changed addresses. The new address is [www.dot.state.mn.us/materials/concrete.html](http://www.dot.state.mn.us/materials/concrete.html). In addition, the Concrete Engineering Unit will accept mix design requests through email as well as faxing or mailing. The E-mail address is [concreteoffice@dot.state.mn.us](mailto:concreteoffice@dot.state.mn.us).

**B. Weekly Concrete Report Submittals**

In lieu of a hard (paper) copy of the Weekly Concrete Report, the Engineer may electronically submit the form to the Concrete Unit provided it is sent directly from the Project Engineer/Supervisor E-mail. The E-mail address is [weeklyconcretereport@dot.state.mn.us](mailto:weeklyconcretereport@dot.state.mn.us). Paper or faxed copies continue to be acceptable but they must be signed. **For project documentation, the Weekly Concrete Report must still be printed out and signed.**

**C. 2461.4D7 Certified Ready-Mix Requirements Changes**

The Ready-Mix Producer will keep all plant diaries, gradation and moisture documentation on file at the plant site for five calendar years.

A Mn/DOT Plant 1 Certified Technician representing the Producer shall review and sign the first Certificate of Compliance for each mix type, each day.

**D. Curb and Gutter and Sidewalk Low w/c Pilot Projects**

Because of poor durability experiences with some concrete sidewalk and curb & gutter projects, pilot project will continue into the 2008 construction season for the purpose of improving the quality of these construction items. If your Contract includes these Special Provisions, please contact the Concrete Engineering Unit before this work commences so a representative can monitor construction of these items.

**E. 2301 Concrete Pavement Pay Items**

The Concrete Engineering Unit is currently in the process of revising some of the methods of measurement and concrete pay items for concrete paving. Contact the Concrete Engineering Unit early in the design process to ensure you are designing concrete pavements according to the correct standards.

**F. Joint Sealing New Concrete Pavements**

Mn/DOT is currently reviewing the requirements for sealing concrete pavement joints. Contact the Mn/DOT Concrete Engineering Unit for discussions about joint sealing alternatives other than the current requirements for C4A-D joints (silicone).

This joint designation should have been C4E-D, not C4A-D.

**G. Joint Sealing on Concrete Pavement Rehabilitation (CPR) Projects**

When designing a CPR project refer to Specification 2301.3N for the appropriate joint sealant selection. Table 2301-N defines the correct longitudinal joint sealant type based on the selected transverse joint sealant type.

**H. Curb and Gutter Joint Spacing for Concrete Pavements**

The joint spacing for concrete mainline adjacent to concrete curb and gutter shall match the concrete mainline joint spacing (typically 15') per Mn/DOT Specification 2531.

**I. International Roughness Index (IRI) Ride Measurement for Concrete Pavements**

All new concrete pavements and concrete pavement rehabilitation projects that utilize diamond grinding will use IRI as the method of measurement for smoothness. IRI replaces Profile Index measurements and eliminates profilographs as an acceptable ride measurement device.

**J. Storage and Handling of Steel Reinforcement**

As a reminder, Mn/DOT Specification 2472 discusses repair, fabrication, handling and storage requirements for steel and epoxy coated steel reinforcement.

**K. Dowel Bar Coatings**

Mn/DOT Specification 2301.3E3 requires that epoxy coated dowel bars be coated with a thin uniform coating of an approved form coating material, meeting Specification 3902, within 1 hour of covering of concrete during paving operations. As an alternative to this practice, the dowel bar assemblies may be pre-coated with Tectyl 506 at the fabrication site. Since this material is tacky, it will pick up dirt if it is not protected from the environment; therefore, a thorough inspection of the dowel bar assemblies is warranted. Tectyl 506 coating may also be used for retrofit dowel bar projects.

**L. Basis of Payment for Concrete Pavement Rehabilitation (CPR) Projects**

Payment for repair types listed under Concrete Pavement Rehabilitation (CPR) standards shall be based on the surface area marked for removal by the Engineer. The Engineer shall measure and document the marked (painted) areas for payment. This

includes the chipped-back taper areas of partial depth repairs that are required when a saw-cut is used to delineate the removal area. The same taper area is automatically formed when the repair is milled. The Contractor shall not be compensated for any additional areas removed at their convenience. This issue should be discussed with the Contractor at the pre-construction conference.

**M. 2008 Schedule of Materials Control Changes for Concrete Items**

**1. Sampling for Concrete**

All samples shall be taken in a random manner using an appropriate random number generator.

**2. Gradation Requirements – Certified Ready-Mix**

The Producer shall complete the initial aggregate gradations prior to the start of concrete production each day. The Producer may perform testing on representative material at the end of the most recent day of production. **The Producer must have a passing gradation each day prior to beginning production.**

The Agency is required to pick up all QA (QC companion) samples.

**3. Moisture Testing Rates – Certified Ready-Mix**

Coarse and Fine: 1 per 200 m<sup>3</sup> (yd<sup>3</sup>) or completed every four hours, whichever results in the highest sampling rate.

**4. 3U18 Pre-Bagged Mixes for Concrete Pavement Repair:**

When Bagged Portland Cement Concrete Patching Mix Grade 3U18 is supplied (any size bags) to the project, the dry blended mixture shall be sampled from the Contractor's field batching apparatus. The minimum sampling rate shall be 1 sample per shipment.

The samples shall be submitted to the Central Laboratory for testing. To determine the cement content and the aggregate gradation, the samples shall be wet-washed through the 75µm (#200) sieve to remove the portland cement and the aggregate retained on the 75µm (#200) sieve shall be dried prior to performing gradation testing to verify compliance with Specification 3105.2B. For cement content determination, assume all material passing the 75µm (#200) sieve is cement.

**5. Dowel Bar Retrofit Material Testing Rates:**

During the test operations:

1 set of 3 cylinders tested at 3 hours

1 set of 3 cylinders tested at 1 day

Testing may need to be repeated if any problems with the dowel bar retrofit material are encountered.

First day of production:

1 set of 3 cylinders tested at 3 hours

1 set of 3 cylinders tested at 1 day

After the first day of production:

1 cylinder per day during production tested at rate determined by Engineer.

**6. Controlled Low Strength Material (CLSM) – Cellular Concrete Testing Rates:**

1 set of 4 cylinders per day  
Minimum of 1 set of 4 per project

4 x 8 cylinders shall be filled in two equal lifts, do not rod the concrete, lightly tap the sides, cover and move to area with minimal or no vibration. Do not disturb for 24 hours.

**7. Cementitious Materials**

The Producer obtains and stores the sample in a sealed container provided by the Agency, and includes the supplier's bill-of-lading from which the sample is obtained.

Sample once per project or once every 3 months whichever is less. Take additional samples as Concrete Engineer directs.

**8. Curing Compounds**

Refer to the approved products list of curing compounds for pre-tested lots or call (651) 366-5556 before applying.

**N. Mn/DOT Specification 2461 is modified to add w/c specs for Grade 3A Concrete Mixes:**

The cement-voids ratio shown shall control the cementitious contents of all concrete mixes with the following exceptions:

- (a) When the cement content is fixed by the minimum values provided for in 2461.3C.
- (b) As otherwise authorized herein.
- (c) For bridge deck concrete, the ratio of the mass (weight) of water to the mass (weight) of cementitious shall not exceed 0.44.
- (d) For concrete pavement, including approach panels and concrete pavement rehabilitation, the ratio of the mass (weight) of water to the mass (weight) of cementitious shall not exceed 0.40 for machine placement and 0.45 for manual placement.
- (e) For Type 3, Grade A concrete, not defined as concrete pavement, the ratio of the mass (weight) of water to the mass (weight) of cementitious shall not exceed 0.45.

**O. High-Early Mixes – Mn/DOT Designed**

Cement substitutions will not be permitted when producing High-Early Concrete except by permission of the Engineer or as otherwise required or permitted in the Specifications applying to the item of work in which the concrete is to be used.

**P. Transition Detail from Ramp to Mainline**

To reduce the risk of random cracking where the pavement thickness changes as ramps transition into the concrete mainline, a design detail is being developed to transition this thickness change over the length of 2 ramp panels. Until this Design is incorporated into the Standard Plans, construct transitions over 2 panels as described above.

**Q. Modified Dowel Basket Configuration and Dowel Basket Locations (Edge Offset)**

Due to the concern that baskets are being clipped by concrete paving equipment on concrete with 12' wide lanes, the Concrete Engineering Unit recommends modifying Standard Plate 1103 to place the outside dowel 12" from the pavement edge instead of

6". This requires reducing the number of dowels in the dowel bar basket assembly by one and shortening its length by one foot. This change applies to all concrete lane widths resulting in 11-foot wide dowel bar baskets.

**R. Requirements for sawing and sealing longitudinal joints between concrete mainline and curb and gutter or median:**

Longitudinal construction joints between a concrete median or gutter section and a concrete pavement no longer need to be sawed or sealed.

**S. Vibration Requirements for Concrete Paving**

A vibration maximum limit for full-width vibrators has been increased from 6000 VPM to 7000 VPM in concrete. The Contractor may be allowed to increase the speed with approval of the Engineer. Additional air content testing may be required at no expense to the Agency.

**T. Slurry Removal Requirements when Diamond Grinding Concrete Pavements**

Additional language has been added to contracts for new concrete pavements and concrete pavement rehabilitation projects regarding the handling of slurry removal during the diamond grinding process. See Special Provisions or contact the Concrete Engineering Unit for additional information.

**U. Concrete Curing Boiler Plate**

Beginning in Spring 2007, all Contracts containing concrete construction items will include the following Boiler Plate. The intent of this Boiler Plate is to require the Contractor to provide a uniform "white" coating of membrane cure when this form of concrete curing is required.

Mn/DOT Standard Specifications: 2301.3M2, 2401.3G, 2404.3C3, 2521.3C3b, 2531.3G2 are hereby modified to include the following provision:

The Contractor shall place all types of membrane cure material homogeneously to provide a uniform solid white opaque coverage on all exposed concrete surfaces (equal to a white sheet of typing paper). The membrane cure shall be placed within ½ hour of concrete placement or once the free water has disappeared unless otherwise directed by the Engineer. Failure to comply with these provisions will result in a price reduction for the concrete item involved in accordance with Mn/DOT Specification 1503.

**Exception: Specific Mn/DOT approved alpha methyl styrene curing membranes may have a base color (i.e. yellow) that cannot comply with the above requirement. In this case, the color shall be of a uniform solid opaque consistency meeting the intent of the above requirement.**

**Questions**

For information on the contents of this advisory memorandum, please contact **Doug Schwartz (651) 366-5576**.