WCPA Member Technical Briefing
December 11, 2019

Moving forward with concrete results

2020 WisDOT Standard Specification Changes
and
ASP-6 Revisions of December 2019
Section 102
Bidding Requirements and Conditions

102.5(1)

102.5 Examining Contract Documents and Work Site

Revise 102.5(1) to require prospective bidders to notify the department if discovering an error or omission.

- The bidder cannot take advantage of an error or omission in the contract. Carefully examine the contract documents and notify the department immediately upon discovering errors or omissions. Also perform a reasonable site investigation before submitting a proposal. Submitting a proposal is an affirmative statement that the bidder has examined the contract documents, investigated the site, and is satisfied as to the character, quality, quantities, and the conditions the bidder will encounter in performing the work that the bidder could determine by walking the project site. A reasonable site investigation also includes investigating borrow sites, hauling routes, and all other locations related to the performance of the work.
Section 106
Control of Materials

106.3.4.2.2.1

106.3.4.2.2 Department-Approved Aggregate Sources
106.3.4.2.2.1 General

Revise 106.3.4.2.2.1 to specify source approval dates and, for aggregate used in concrete, lightweight pieces testing.

(1) Coordinate with the department to collect sample aggregates. The department and contractor will jointly obtain and split samples with the department taking immediate possession of the department’s samples. Ensure that samplers are HTCP certified to sample aggregates. Costs associated with the required aggregate quality sampling and testing are incidental to the work.

(2) Test coarse aggregate sources a minimum of every 5 years for pits and a minimum of every 3 years for quarries. Source approval begins January 1 of the sampling year. If a source is sampled after October 15 and is not incorporated into a project the same year, source approval begins January 1 of the following year. Marginal sources; those with LA wear loss within 4.0 percent, sodium sulfate loss within 3.0 percent, or freeze-thaw soundness loss within 3.0 percent of a specification limit, may require annual testing. The department and contractor will jointly obtain and split samples to test marginal sources. The department maintains a list of current approved aggregate sources at:
106.3.4.2.2.1

1. Perform testing on the split of the sample conforming to the following:
   - LA Wear (100 & 500 revolutions) AASHTO T96
   - Sodium sulfate soundness (R-4, 5 cycles) ASTM D5521 as modified in CMM 8-60
   - Fracture AASHTO T104
   - Liquid limit AASHTO T99
   - Plasticity AASHTO T90
   - Coarse aggregate specific gravity and absorption AASHTO T85
   - Lightweight Pieces in aggregate AASHTO T113
   - Prepare samples according to AASHTO R74, Method A for the P-4 fracture.

106.3.4.2.2.2 Freeze-Thaw Soundness

1. Perform freeze-thaw soundness testing according to AASHTO T103 procedure B, 16 cycles, with methyl alcohol. Provide freeze/thaw soundness test results based on the fraction retained on the No. 4 sieve as follows:
   1. Using virgin crushed stone aggregates produced from limestone/dolomite sources in one or more of the following counties or from out of state:
      - Brown
      - Columbia
      - Crawford
      - Dane
      - Dodge
      - Fond du Lac
      - Grant
      - Green
      - Green Lake
      - Iowa
      - Jefferson
      - Lafayette
      - Marinette
      - Oconto
      - Outagamie
      - Rock
      - Shavano
      - Walworth
      - Winnebago
      - Using gravel aggregates produced from pit sources in one or more of the following counties or from out of state:
      - Dodge
      - Washington
      - Waukesha

   2. Using virgin crushed stone aggregates produced from limestone/dolomite sources in one or more of the following counties or from out of state:
      - Brown
      - Columbia
      - Crawford
      - Dane
      - Dodge
      - Fond du Lac
      - Grant
      - Green
      - Green Lake
      - Iowa
      - Jefferson
      - Lafayette
      - Marinette
      - Oconto
      - Outagamie
      - Rock
      - Shavano
      - Walworth
      - Winnebago
CMM 8-60.2-7

Add 8-60.2.7 to describe WisDOT modifications to standard AASHTO T103 freeze-thaw soundness testing requirements.

8-60.2.7 WisDOT Modified AASHTO T103 Freeze-thaw Soundness Testing

Follow AASHTO T103 Standard Method of Test for Soundness of Aggregates by Freezing and Thawing.

Procedure B, with the following modifications:

3.1.6 Temperature measuring equipment shall consist of thermometers, resistance thermometers, or thermocouples, capable of measuring the temperature at various points within the testing chamber and at the centers of each sample container. The thermometers, resistance thermometers, or thermocouples shall have an approximate range from -26 to 50°C (-15 to 120°F), readable and accurate to 0.5°C. Data storage devices shall be capable of sampling temperature measurements every ten minutes for the duration of the test.

4.2 Coarse aggregate for the test shall consist of plus 4.75 mm (No.4) sieve size material. For WisDOT source approval, sample stockpiles with 100 percent passing the 1-1/2 inch sieve.

6 Use Procedure B with methyl alcohol.

6.1.2 Each sample fraction container shall be placed in the freeze apparatus. Samples shall be covered and placed a minimum of 6 inches above the base of the apparatus and shall have a minimum of 1 inch clear space around the entire sample (sample shall not include). The sample shall be cooled until the temperature at the center of the sample reaches -23 ± 3°C (0 ± 5°F). A minimum of one temperature probe per freeze shall be placed in the center of a sample while freezing. A minimum of one temperature probe per freeze shall be placed in the center of the sample while thawing. A minimum of one temperature probe per freeze shall be placed in the center of the sample while thawing.

6.2.1 In this procedure, the samples shall be placed in a vacuum chamber and saturated by subjecting them to an air pressure of not more than 3.4 kPa (25.4 mm of mercury) and breaking the vacuum with a sufficient amount of 0.5 percent (by mass) solution of methyl alcohol in water to completely cover the samples. The samples shall be left in the solution for 15 minutes.

7.1 Alternate freezing and thawing shall be repeated until the required number of cycles is obtained. One test cycle consists of one freeze cycle and one thaw cycle. Repeat the procedure of alternate freezing and thawing for 16 cycles. One complete cycle shall not exceed 24 hours. If the test is interrupted, the sample shall remain covered in a thawed state until testing is resumed. The sample shall remain partially immersed during the test.

Section 107
Legal Relations and Responsibility to the Public
107.14 Contractor’s Responsibility for Work

Revised 107.14 to clarify contractor responsible for damage done by public traffic and to relieve the contractor of responsibility for damage from bridge hits. This change was implemented in ASP 6 effective with the June 2019 letting.

1. Within 107.14, the term “work” is redefined to mean “the work product that is completed in its final position and is incorporated in the project.”

2. The contractor shall maintain charge and care of the work until the engineer accepts the work as specified in 105.11. Protect the work against injury or damage caused by public traffic, the action of the elements, or from other causes, whether arising from the execution or non-execution of the work. Rebuild, repair, restore, and make good injuries or damages to work caused by the above at no additional cost to the department.

3. The department will assume responsibility for the work as follows:
   1. Costs the department assumes under 104.6.
   2. Costs to repair bridge damage attributed to public traffic, if the engineer determines that damage was beyond the control of and without the fault of the contractor.

4. The contractor shall not bear the expense for damage to the work caused by abnormal and unforeseeable occurrences beyond the control of, and without the fault or negligence of, the contractor. These abnormal and unforeseeable occurrences include but are not limited to the following:
   1. Cataclysmic phenomena of nature.

Section 109 Measurement and Payment
### Section 109 Measurement and Payment

**109.1.4 Weight**

Revise 109.1.4(1) to specify daily weigh tickets for each load as work is completed.

#### 109.1.4.1 General

1. If weighing materials in the hauling vehicle, check gross weights and determine the vehicle tare weight whenever the engineer directs.
2. If the contract allows, the engineer may measure the volume of material and convert to weight for payment. The engineer will determine the volume to weight conversion factors. The engineer and contractor must agree on the conversion factor before the engineer converts a pay quantity.

#### 109.1.4.2 Load Tickets

1. For weighed aggregates, submit a ticket for each load of material. Submit tickets daily as work is completed. Ensure that each ticket includes a unique ticket number, the project ID, material description, date & time measured, gross, tare & net weights, and truck ID.
2. For asphaltic mixtures, submit tickets as specified in 450.3.1.1.4.
3. For ready-mixed concrete, submit tickets as specified in 501.3.5.4.
501.3.5.4

• No changes

With each load of ready-mixed concrete, provide a computer-printed batch ticket which includes load and truck identification, the actual batch weights of all materials in that load, the mixing time for central plant-mixed concrete or the start of the batch life as specified in 501.3.5.2(3) for transit-mixed concrete, and other pertinent data. Give batch tickets to the inspector upon arrival at the work site. The department will only accept loads that arrive in satisfactory condition and have a batch ticket. The engineer will only accept hand written batch tickets in remote locations where no computerized plant is available within deliverable distance of the work site.

Instead of requiring a batch ticket for each load, the engineer may accept central-mixed concrete used in pavement and associated bid items based on daily production records from a computer-controlled plant erected specifically for work under the contract. Submit a complete load-by-load written record that lists the truck IDs to the batch quantities and batch times for each day’s production to the engineer at the end of each day’s production. During concrete production, operate under a plan acceptable to the engineer that lists the truck ID to the batch quantities and batch time for each load. In that plan describe how that information will be made available to the engineer immediately upon request. The engineer may also require batch tickets to address short-term operational difficulties.

Section 301
Base, Subbase and Subgrade Aggregate
301.2.4.5 Aggregate Base Physical Properties

Revised 301.2.4.5(6) to add a freeze-thaw testing requirement for recycled concrete from outside of project limits.

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>CRUSHED STONE</th>
<th>CRUSHED GRAVEL</th>
<th>CRUSHED CONCRETE</th>
<th>RECLAIMED ASPHALT</th>
<th>REPROCESSED MATERIAL</th>
<th>BLENDED MATERIAL</th>
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<tbody>
<tr>
<td>Gradation AASHTO T27</td>
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<td></td>
<td></td>
<td>note(1)</td>
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<td>not allowed</td>
<td>not allowed</td>
<td>not allowed</td>
<td>not allowed</td>
</tr>
</tbody>
</table>

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301.2.4.5

- ASP-6 December 2019

(1) No requirement for material taken from within the project limits. For material supplied from a source outside the project limits:
- LA wear maximum of 50 percent loss, by weight.
- Freeze-thaw maximum of 42 percent loss, by weight.
301.2.4.5

301.2.4.5

Dense-Graded Base

Section 305
Dense-Graded Base
305.2.1

General

1. Provide aggregate conforming to 301.2 for crushed stone, crushed gravel, crushed concrete, reclaimed asphalt, reprocessed material, or blended material. Provide QMP for dense-graded base as specified in 730.

2. Where the contract specifies or allows 1 1/4-inch base, do not place reclaimed asphalt, reprocessed material, or blended materials below virgin aggregate materials unless the contract specifies or the engineer allows in writing. The department will allow virgin aggregate above reclaimed asphalt, reprocessed material, or blended materials in shoulder areas adjacent to concrete pavement.

Recycled Asphalt Base

FDM 14-5-1 Figure 1.3

MATCH DEPTH OF BASE AGG 3/4-INCH TO DEPTH OF PAVED SHOULDER

BASE AGG DENSE 3/4-INCH OR BASE AGG DENSE 1 1/4-INCH *

* DESIGNERS SHOULD INCLUDE THIS QUANTITY IN THE BID ITEM OF BASE AGG DENSE 3/4-INCH

Should this be virgin or RAP?
Section 415
Concrete Pavement

415.3.16.3

415.3.16.3 Locating Test Plates

Revise 415.3.16.3(1) to specify clearance from steel embedments when locating thickness test plates.

Locate department-furnished test plates at two random locations, within each pavement unit, according to CMM 8-70 4.7.2. Do not place plates within 3 feet of steel or an object containing steel.
Plates may not be required for special units where the engineer employs alternate methods.
Section 420
Diamond Grinding

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420.3.2 Equipment

Revise 420.3.2 to define effective wheelbase under the contract and allow shorter grinders for urban work. This change was implemented in ASP 6 effective with the December 2018 letting.

420.3.2.1 General

1. Use self-propelled grinding machines with depth, grade, and slope controls designed for grinding and texturing concrete. Equip grinding machines with diamond blades and a vacuuming system capable of removing liquid and solid residue from the ground surface. Shroud the machine to prevent discharging loosened material into adjacent work areas or live traffic lanes. Provide the specified effective wheelbase, defined as the center of the front to center of the rear main support wheels.
2. Do not use equipment that causes raveling, aggregate fractures, joint deflection, or other damage to material remaining in place.
3. Maintain equipment in proper working order. Ensure that the match and depth control wheels are round. Stop grinding and immediately replace out-of-round wheels.

420.3.2.2 Continuous Grinding

1. Under the Continuous Diamond Grinding Concrete Pavement bid item, ensure that the grinding machine, including the grinding head, weighs 35,000 pounds or more, will grind a strip at least 4 feet wide, and has an effective wheel base of 25 feet or more. For pavements with a design speed less than 40 miles per hour and areas difficult to access, the contractor may use equipment with an effective wheel base of 12 feet or more.
Section 501
Concrete

501.3.8.2.1

501.3.8.2.1 General

(a) The contractor is responsible for the quality of the concrete placed in hot weather. For concrete placed under the bid items enumerated in 501.3.8.2.1(2), submit a written temperature control plan at or before the pre-pour meeting. In that plan, outline the actions the contractor will take to control concrete temperature if the concrete temperature at the point of placement exceeds 90°F. Do not place concrete under these bid items without the engineer’s written acceptance of that temperature control plan. Perform the work as outlined in the temperature control plan.

(b) If the concrete temperature at the point of placement exceeds 90°F, do not place concrete under the following structure and concrete barrier bid items:

- Concrete Masonry Bridges
- Concrete Masonry Bridges HES
- Concrete Masonry Culverts
- Concrete Masonry Culverts HES
- Concrete Barrier Single-Faced 32-Inch
- Concrete Barrier Double-Faced 32-Inch
- Concrete Barrier Transition Section 32-Inch
- Concrete Masonry Retaining Walls
- Concrete Masonry Retaining Walls HES
- Concrete Masonry Endwalls
- Concrete Masonry Overlay Decks
- Concrete Barrier (type)
- Concrete Barrier Fixed Object Protection (type)
- Concrete Barrier Transition (type)
501.3.8.2.1

- Sidebar Discussion
- Paying for Ice
- Created for bridge work
- Nothing prevents expanded use on other concrete
- We all agree that ice is not an option
- Alternatives

Alternatives to Ice

- Ice
- Liquid Nitrogen
- Super Cooler

- NITROcrete
- Add on to any concrete plant
Paying for Reducing Temperature

- $0.75 per pound historical
- WisDOT assumes:
  - Over 90 degrees is bad
  - Add ice to lower temp
  - To what?
- Liquid Nitrogen and Super Cooled Water
  - Effectiveness?
  - Equivalency to ice?
  - Payment for use?

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505.2.6

505.2.2 Bar Steel Reinforcement
Replace paragraph one with the following effective with the December 2019 letting:
(m) Conform to AASHTO M31, type S or type W.

505.2.3 High-Strength Bar Steel Reinforcement
Replace paragraph one with the following effective with the December 2019 letting:
(m) Conform to AASHTO M31, grade 60, type S or type W.

505.2.4.1 General
Replace paragraph one with the following effective with the December 2019 letting:
(m) Conform to AASHTO M31, grade 60, type S or type W. Ensure that the coating is applied in a CRSI certified epoxy coating plant. Bend bars that require bending before coating, unless the fabricator can bend the bar without damaging the coating.
505.2.6 General
Replace paragraph one with the following effective with the December 2019 letting:
(1) For dowel bars and straight tie bars, there is no requirement for bend tests. Ensure that the bars are the specified diameter and length the plans show.

505.2.6.2 Solid Dowel Bars
Replace paragraph one with the following effective with the December 2019 letting:
(1) Furnish coated bars conforming to AASHTO M31 grade 40 or 60. Alternatively, the contractor may furnish dowel bars conforming to AASHTO M227 grade 70-80. Coat in a plant certified by the Concrete Reinforcing Steel Institute with a thermosetting epoxy conforming to AASHTO M254, type B.

Section 603
Concrete Barrier
603.2 Materials

Revise 603.2 to specify class I barrier concrete for cast-in-place concrete barrier allow ACI 355.4 adhesive.


603.3.1.1

Revise 603.3.1.1(3) to include hot weather placement provisions for permanent concrete barrier bid items. This change was implemented in ASP 6 effective with the April 2019 letting.

(1) Cast permanent barrier and transitions in place. Use construction methods conforming to 502 and conform to the hot weather placement requirements of 501.3.8.2. Use forms or engineer-approved slip form methods for barrier. Use forms for transitions. Construct barrier on horizontal curves as a series of 12-foot or shorter chords.
Section 701
General QMP Requirements

ASP-6 December 2019 - 701.3.1
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ASP-6 December 2019 - 701.3.1

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Method</th>
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<tbody>
<tr>
<td>Air content of fresh concrete</td>
<td>AASHTO T152[2]</td>
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<tr>
<td>Air void system of fresh</td>
<td>AASHTO TP118[7]</td>
</tr>
<tr>
<td>Concrete slump</td>
<td>AASHTO T119[2]</td>
</tr>
<tr>
<td>Concrete temperature</td>
<td>ASTM C1064</td>
</tr>
</tbody>
</table>

PCCTEC-1
ACT-PCC

Plants personnel may operate equipment.
Consolidate tests by rodding only.

Section 715
QMP Concrete Pavement and Structures
715.1.1.2 Small Quantities

Revise 715.1.1.2(1) to define small quantities of barrier concrete per contract instead of per bid item.

- The department defines small quantities of class I concrete, subject to the reduced requirements under 710.2, as follows:
  - Less than 150 cubic yards of structure concrete placed under a single bid item.
  - Less than 150 cubic yards of barrier concrete placed under the contract.
  - Less than 2500 cubic yards of slip-formed pavement placed using a single mix design.
  - Less than 1000 cubic yards of non-slip-formed pavement placed using a single mix design.

ASP-6 December 2019 – 715.2.1

715.2.1 General

Replace paragraph five with the following effective with the December 2019 letting:

For new lab-qualified mixes, test the air void system of the proposed concrete mix conforming to AASHTO provisional standard TP 118. Include the SAM number as a part of the mix design submittal.
715.2.3.1

715.2.3 Class I Concrete Mixes

Revise 715.2.3.1(1) to base barrier concrete on pavement mixes with strength based on structures concrete.

715.2.3.1 Pavements and Cast-in-Place Barrier

(i) Use at least 5 pairs of cylinders to demonstrate the compressive strength of a mix design. Use either laboratory strength data for new mixes or field strength data for established mixes. Demonstrate that the 28-day compressive strength of the proposed mix will equal or exceed the following:
- For pavement: the 85 percent within limits criterion specified in 715.5.2
- For barrier: the 90 percent within limits criterion specified in 715.5.3.

715.3.1.1

715.3 Testing and Acceptance
715.3.1 Class I Concrete Testing
715.3.1.1 General

(i) Provide slump, air content, concrete temperature and compressive strength test results as specified in 710.5. Provide a battery of QC tests, consisting of results for each specified property, using a single sample randomly located within each subplot. If a subplot random test location falls within a mainline pavement gap, relocate the test to a different location within the subplot. Cast three cylinders for strength evaluation.

Revise 715.3.1.1(2) to extend field SAM testing for all class I concrete including structures and concrete barrier.

(ii) Test the air void system conforming to AASHTO provisional standard TP118 at least once per lot and enter the SAM number in the MRS for information only. SAM testing is not required for the following:
- For lots with less than 4 sublots.
- High early strength (HES) concrete.
- Special high early strength (SHES) concrete.
- Concrete placed under the following bid items:
  - Concrete Pavement Approach Slab
  - Concrete Masonry Culverts
  - Concrete Masonry Retaining Walls
  - Steel Grid Floor Concrete Filled
  - Crash Cushions Permanent
  - Crash Cushions Permanent Low Maintenance
  - Crash Cushions Temporary
**ASP-6 December 2019 – 715.3.1.1**

**715.3.1.1 General**

Replace paragraph two with the following effective with the December 2019 lettings:

1. Test the air void system at least once per lot and enter the SAM number in the MRS for information only. SAM testing is not required for the following:
   - For lots with less than 4 sublots.
   - High early strength (HES) concrete.
   - Special high early strength (SHES) concrete.
   - Concrete placed under the following bid items:
     - Concrete Pavement Approach Slab
     - Concrete Masonry Culverts
     - Concrete Masonry Retaining Walls
     - Steel Grid Floor Concrete Filled
     - Crash Cushions Permanent
     - Crash Cushions Permanent Low Maintenance
     - Crash Cushions Temporary

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**715.3.1.2.3**

**715.3.1.2.3 Lots by Cubic Yard**

Revise 715.3.1.2.3(1) to specify subplot and lot sizes for cast-in-place concrete barrier.

1. Define standard lots and sublots conforming to the following:
   - Do not designate more than one subplot per truckload of concrete.

   - Lots for structures are a maximum of 500 cubic yards divided into approximately equal 50-cubic-yard or smaller sublots.
   - Lots for barrier are a maximum of 1000 cubic yards divided into approximately equal 100-cubic-yard or smaller sublots.
   - Lots for pavement are a maximum of 2000 cubic yards divided into approximately equal 250-cubic-yard or smaller sublots.
715.5.1

715.5.1 General
Revise 715.5.1 to add an incentive bid item and a disincentive administrative item for concrete barrier strength.

1. The department will pay incentive for compressive strength under the following bid items:

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<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
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<tbody>
<tr>
<td>715.0415</td>
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<tr>
<td>715.0502</td>
<td>Incentive Strength Concrete Structures</td>
<td>DOL</td>
</tr>
<tr>
<td>715.0603</td>
<td>Incentive Strength Concrete Barrier</td>
<td>DOL</td>
</tr>
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</table>

2. Incentive payment may be more or less than the amount the schedule of items shows.

3. The department will administer disincentives for compressive strength under the Disincentive Strength Concrete Pavement, Disincentive Strength Concrete Structures, and Disincentive Strength Concrete Barrier administrative items.

4. The department will adjust pay for each lot using PWL of the 28-day sublot average strengths for that lot. The department will measure PWL relative to the lower specification limit of 3700 psi for pavements and 4000 psi for structures and barrier. The department will not pay a strength incentive for concrete that is nonconforming in another specified property, for ancillary concrete accepted based on tests of class I concrete, or for high early strength concrete unless placed in pavement gaps as allowed under 715.3.1.2.1.

715.5.3

715.5.3 Structures and Cast-in-Place Barrier

1. The department will adjust pay for each lot using equation “QMP 2.01” as follows:

<table>
<thead>
<tr>
<th>Percent within Limits (PWL)</th>
<th>Pay Adjustment (dollars per cubic yard)</th>
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<tbody>
<tr>
<td>&gt;= 99 to 100</td>
<td>10</td>
</tr>
<tr>
<td>&gt;= 90 to &lt; 99</td>
<td>0</td>
</tr>
<tr>
<td>&gt;= 50 to &lt; 90</td>
<td>(7/8 x PWL) - 78.75</td>
</tr>
<tr>
<td>&lt; 50</td>
<td>-35</td>
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</table>

2. The department will not pay incentive if the lot standard deviation is greater than 350 psi.

3. For lots with less than 4 sublots, there is no incentive but the department will assess a disincentive based on the individual sublot average strengths. The department will reduce pay for sublots with an average strength below 4000 psi by $35 per cubic yard.
WisDOT Standard Detail
Drawing Revisions

ADA and Curb Ramps
SSD08D5g

GENERAL NOTES

Detectable warning fields that are installed at a curb ramp shall be from the same manufacturer. Place all detectable warning field systems in accordance to the manufacturer’s recommendation. Field cuts at intermediate joints within the radial detectable warning field are prohibited.

Determine final radial warning field configuration and its individual plate locations. Perform pre-layout prior to placement in plastic concrete. Follow manufacturer’s product list and installation recommendations.

For radial detectable warning field applications where standard radial plates are not available at an intersection curb radius, a combination of square or rectangular plates and radial plates may be used to form radial configuration. Radial wedge plates in combination with square plates are also acceptable. Follow manufacturer’s recommendations.

Refer to contract and standard specifications for field cutting requirements.

Do not embed in concrete any field cut plates with cut edges shorter than 6 inches. Consult with manufacturer for re-drilling and anchoring requirements of field cut plates.

Field saw cuts along radial detectable warning plates will be necessary to match each curb ramp edge. Avoid cutting through domes whenever possible. Make field cuts true to line and within 2° deviation. Smooth edges of field cut plates.

SDD13B02a&b
Concrete Pavement Approach Slab

GENERAL NOTES

The contractor may splice no. 4 bars in the approach slab for skewed structures only. Stagger splices with a maximum of one splice per bar. The length of lap is 20 inches.

Tack yield dowel bars to the baskets on alternate ends.

The contractor may use no. 4 bars spaced at 2’ - 0” C - C in both the longitudinal and transverse directions for top reinforcement as an alternative to the welded wire fabric.

The contractor may omit the bars between reinforced slabs where slab reinforcement bars extend across the centerline or reference line.

Do not construct an expansion joint or install dowel bars when abutting an HMA pavement.

Use a joint sealant meeting the requirements of ASTM D6880.

Place expansion cap on the end of the dowel that is not tack welded to the basket. Do not force dowel bar past the dowel stop.

Extend expansion joint through any adjacent tied concrete.

Standard contraction joint normal to C or R.

Standard longitudinal joint with tie bars.

1 1/2” expansion joint with dowel bars normal to C or R.
SDD13C18g added

HTCP Updates for 2020

Jackie Spoor

Wisconsin Concrete Pavement Association

Moving forward with concrete results
Optimized Aggregates and Optimized Mixtures

- 2019 work
- Issue identification
- Mix Design Spreadsheet
- Should WCPA work with WisDOT to move this to the standard specifications?
Mix Design Spreadsheet Issues

MIT Scan Device for Thickness

• 2019 Issues?
• Experience is showing this device measures very accurately
• WCPA experience
• Documentation of location of plates seems to be the main issue.
MIT Scan Device Issues

PROPOSED WISDOT CHANGES TO DISCUSS
Concrete Aggregates

- Aggregate Production or Concrete Production
- WisDOT Emphasis is on testing during concrete production
- Testing during aggregate production or stockpiling to be limited

Gradation Testing During Aggregate Production or Stockpiling
Gradation Testing During Aggregate Production or Stockpiling

715.1.1.2 Small Quantities

Revised 715.1.1.2(f) to define small quantities of barrier concrete per contract instead of per bid item.

(i) The department defines small quantities of class I concrete, subject to the reduced requirements under 710.2, as follows:
- Less than 150 cubic yards of structure concrete placed under a single bid item.
- Less than 150 cubic yards of barrier concrete placed under the contract.
- Less than 2500 cubic yards of slip-formed pavement placed using a single mix design.
- Less than 1000 cubic yards of non-slip-formed pavement placed using a single mix design.

Gradation Testing During Aggregate Production or Stockpiling

Revised 716.2.1(f) to allow aggregate gradation testing for ancillary concrete. ASP 8 Dec 2019 Ist.

Replace paragraph four with the following:

(k) Test aggregate gradations, including P200, as specified in 710.5.6 at the frequency listed below which results in the least number of tests:
- A maximum of one test per site.
- A minimum of one test per 400 cubic yards of cumulative concrete placed.

The department will accept gradation test results for multiple projects if placement on a project does not begin within 12 calendar days after the date the sample was obtained from the stockpile, retest the stockpile. Alternatively, the estimator may accept aggregate based on documented previous testing.
Gradation Testing During Aggregate Production or Stockpiling

- This has been a compromise process
- Initial was 10% proposal by WisDOT
- WCPA Member examples
Partial Sublots

716.3.1.2.2 Lots by Lane-Feet
Replace paragraph one with the following:

1. The contractor may designate slip-formed pavement lots and sublots conforming to the following:
   - Lots and sublots are one paving pass wide and may include one or more travel lanes, integrally placed shoulders, integrally placed ancillary concrete, and pavement gaps regardless of mix design and placement method used in the gaps.
   - Sublots are 1000 feet long for single-lane and 500 feet long for two-lane paving. Align sublot limits with ride segment limits defined in 716.3.2. Adjust terminal sublot lengths to match the project length or, for staged construction, the stage length. Ensure that sublot limits match for adjacent paving passes. Pavement gaps do not affect the location of sublot limits. The contractor may include a sublot with a length less than or equal to 40 percent of the standard length in the previous sublot.
   - Create lots by grouping 4 to 5 adjacent sublots matching lots created for adjacent paving passes.

Partial Sublots

715.3.1.2.3 Lots by Cubic Yard
Replace paragraph one with the following:

1. Define standard lots and sublots conforming to the following:
   - Do not designate more than one sublot per truckload of concrete. The contractor may include a sublot with a volume less than or equal to 40 percent of the that volume in the previous sublot.
   - Lots for structures are a maximum of 500 cubic yards divided into approximately equal 50-cubic-yard or smaller sublots.
   - Lots for barriers are a maximum of 1000 cubic yards divided into approximately equal 100-cubic-yard or smaller sublots.
   - Lots for pavement are a maximum of 2000 cubic yards divided into approximately equal 250-cubic-yard or smaller sublots.
QMP General

- Trial Batches
- IRI Ride
- Ancillary
  - Start Up
  - Compressive strength

---

Trial Batches

(C3) Concrete - 715

Replace paragraph one with the following:

715.2.3.1 Pavements and Cast-in-Place Barrier

Replace paragraph one with the following:

Use at least 5 pairs of cylinders from 5 separate trial batches to demonstrate the compressive strength of a mix design. Use either laboratory strength data for new mixes or field strength data for established mixes. Demonstrate that the 28-day compressive strength of the proposed mix will equal or exceed the following:

- For pavement: the 85 percent within limits criterion specified in 715.5.2
- For barrier: the 90 percent within limits criterion specified in 715.5.3

==============================================
IRI Sublot

Revise 740.3.2 to decouple ride segments from concrete sublots. ASP 6 Dec 2019 let.

740.3.2 Contractor QC Testing
Replace paragraph three with the following:
(a) Field-locate the beginning and ending points for each profile run. Measure the profiles of each standard and partial segment. Define primary segments starting at a project terminus and running contiguously along the mainline to the other project terminus. When applicable, align segment limits with the sublot limits used for testing under 716. Define segments one wheel path wide and distinguished by length as follows:
1. Standard segments are 500 feet long.
2. Partial segments are less than 500 feet long.

Ancillary Start Up

Revise 716.2.1(2) to allow startup acceptance testing for small quantities of ancillary concrete. ASP 6 Dec 2019 let.

716.2.1 Class II Concrete
Replace paragraph two with the following:
(a) Perform random QC testing at the following frequencies:
1. Test air content and slump a minimum of once per 100 cubic yards for each mix grade and placement method.
2. Cast one set of 2 cylinders per 200 cubic yards for each mix grade and placement method. Cast a minimum of one set of 2 cylinders per contract for each mix grade and placement method. Random 28-day compressive strength cylinders are not required for HES or SHES concrete.
3. For deck overlays, perform tests and cast cylinders once per 50 cubic yards of grade E concrete placed.
4. For concrete base, one set of tests and one set of cylinders per 250 cubic yards.

The department will allow startup test results for quantities under 50 cubic yards. Cast one set of 2 cylinders if using startup testing for acceptance.
Ancillary Strength

AIR SPECIFICATIONS

- Current – 7% +/- 1.5%
- Shadow spec on SAM meter has collected a lot of data
- WHRP Research project is done and waiting for final report
- PROPOSAL - Minimum 4% air with a SAM Number of 0.2 or less.
- Hard part is developing entire specification and nonconforming air penalties
TRANSPORT PROPERTIES
(the next priority with WisDOT?)

Transport Properties (Permeability)

- All deterioration mechanisms involve fluid movement
- Keep water out = longer life
- Measurement has been difficult

- Prequalification
- QC
- Acceptance
Electric Resistivity

- Durability measurement
- Correlates very well with Rapid Chloride Permeability.
- RPC 28-day test
- This can be used on any cylinder or concrete.

Formation Factor

- Resistivity
  - Store a cylinder in a fixed salt solution
  - Pull out at desired age
  - Read and put back
  - Repeat
  - Calculate formation factor (x10)

\[ F = \text{Resistivity (bulk)} - \text{Resistivity (solution)} \]
Accuracy of Dowel Bar Placement

- WisDOT Owns New MIT Dowel Bar Scan Device

In 2019
- 2 Trierweiler Projects
- 3 Zignego Projects
- 1 Michels Project

Dowel Bar Tolerances

- Section 415.3.7.3 on tolerance
  - Within 1 inch of the planned transverse location and depth
  - Within 2 inches of the planned longitudinal location.
  - Parallel to the pavement surface and centerline within a tolerance of 1/2 inches in 18 inches.
- This tolerance allows for whole inch baskets to be used for half-inch pavement thicknesses (Example: 9-inch basket used in a 9.5 inch pavement)
Where is WisDOT Going With Dowel Bar Scan

- Revise specification
- Quality control
- Contractor QC application
- Spot check by WisDOT
- Not just for DBIs
- Baskets will be in the future as well
### WisDOT Specifications

<table>
<thead>
<tr>
<th>Current Needs</th>
<th>Allowable</th>
<th>Rejet Specifications</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transverse Direction (Horizontal Translation)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 2&quot; of planned transverse location</td>
<td>–</td>
<td>&gt;2&quot; from the edge of longitudinal joint</td>
<td>Cut Dowel(s)</td>
</tr>
<tr>
<td><strong>Longitudinal Direction (Side Shift)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 2&quot; of planned longitudinal location</td>
<td>–</td>
<td>&gt;2&quot; to 4&quot;</td>
<td>Cut Dowel(s)</td>
</tr>
<tr>
<td><strong>Vertical Direction (Depth)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 1&quot; of planned depth</td>
<td>0.5&quot; from top or bottom of dowel bar (not impacted by sawcut operations)</td>
<td>&gt;1.5&quot;</td>
<td>Cut Dowel</td>
</tr>
<tr>
<td><strong>Horizontal and Vertical Misalignment (Single Bar)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel to pavement surface and centerline within a tolerance of ±0.5&quot; in 18&quot;</td>
<td>–</td>
<td>&gt;0.5&quot; to 1.5&quot;</td>
<td>Apply dust blower</td>
</tr>
<tr>
<td><strong>Horizontal and Vertical Misalignment (Multiple Bars)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel to pavement surface and centerline within a tolerance of ±0.5&quot; in 18&quot;</td>
<td>–</td>
<td>&gt;1.5&quot;</td>
<td>Cut Dowel</td>
</tr>
</tbody>
</table>

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**Barrier Wall**

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Barrier Wall Update

• Very large update to the Standard Detail Drawings have been in for review and approval for 18 months.
• Administrators office and FHWA are delaying them

Barrier Wall Highlights

• Going back to a footing standard
• 5 ft or 6 ft wide footing
• Tie steel changes
• Forming of joints in the face
Barrier Wall Concept Change

- The following will apply to all of the single slope barrier (32, 36, 42 and 56")
- Barrier will be tool jointed/sawed 1" deep to match the exiting pavement joint (on the tied side) – Should we include a detail for this from other states?
- Footing under barrier should will be jointed/sawed to match the existing pavement joint (on the tied side)
- End Anchor Detail will remove the "construction joint" note so footnote 12 applies to daily construction joints.
- Median barrier footings will be tied to the adjacent pavement on one side only. The tied side controls the jointing of the barrier and footing. (Single median barrier case)
- Outside barrier will be tied to shoulder panel. This also applies to the cases when two separate barriers are run down the median.
- If median barriers are more than 10’ apart, they shall be treated as outside barriers, which will require a 1’ footing to provide support on the non-traffic side (see proposed SE region note 16)
- Longitudinal footing joint (parallel to the barrier) will be 30” from the foot of the barrier, to allow room for drainage structures. This joint will be considered optional if the shoulder from edge line to face of barrier is 10’ or less in its final configuration for outside shoulders. Longitudinal joint is required on median barriers.
- Footing can be paved integrally with the shoulder (contractor option), and will be the same thickness as the shoulder.
 Barrier Wall Details

• Other points of discussion (Needs future follow up).
• Pinning of barriers to footing, or using TL 5 or TL 3 in crash prone situations.
• Construction joints – remind people that they do not require end anchors – clean up detail.
• Barrier transitions – don’t use special cases. Use the details that have been drawn up by BPD. FDM and reminder follow up.
• End Treatments – can we create a bid item for them & detail them on the plan – BPD and WCPA to follow up.
Training

• Integrated Materials and Construction Practices for Concrete Pavements – December 17, 2019 at WisDOT lab
• 2020 Construction Inspection Training with WisDOT – February and March 2020
• Concrete Pavement Preservation Training?
• Municipal Concrete Pavement Design?
• Municipal Concrete Pavement Inspection?