Iowa Department of Transportation

**MINUTES**
**OF**
**IOWA D.O.T. SPECIFICATION COMMITTEE MEETING**

**October 14, 2010**

| | | |
|---|---|---|
| **Members Present:** | Jim Berger | Office of Materials |
| | Roger Bierbaum | Office of Contracts |
| | Donna Buchwald | Office of Local Systems |
| | Eric Johnsen, Secretary | Specifications Section |
| | Bruce Kuehl | District 6 - Construction |
| | Deanna Maifield | Office of Design |
| | Doug McDonald | District 1 - Marshalltown RCE |
| | Gary Novey | Office of Bridges & Structures |
| | Dan Redmond | District 4 - Materials |
| | Tom Reis, Chair | Specifications Section |
| | John Smythe | Office of Construction |
| **Members Not Present:** | John Adam | Statewide Operations Bureau |
| | Troy Jerman | Office of Traffic & Safety |
| **Advisory Members Present:** | Lisa Rold | FHWA |
| **Others Present:** | Maria Hobbs | Office of Contracts |
| | Wayne Sunday | Office of Construction |
| | Max Grogg | FHWA |
| | Kim Anderson | FHWA |

Tom Reis, Specifications Engineer, opened the meeting. The following items were discussed in accordance with the agenda dated October 7, 2010:

**1. Article 1109.05, Partial Payments.**

The Office of Construction requested changes to clarify prompt payment to subcontractor requirements and enforcement.

**2. Article 2115.03, B, 4, Placing and Compacting Modified Subbase.**

The Office of Construction requested changes to add placement tolerances for Modified Subbase.

**3. Section 2413, Bridge Deck Surfacing, Repair, and Overlay.**

The Office of Construction requested changes related to Class HPC-O PCC deck overlays.

**4. Article 2502.05, Basis of Payment (Subdrains).**

The Office of Construction requested changes to add information that is no longer found in Article 2503.05 because Section 2503 Storm Sewers was replaced with SUDAS specification in the 2009 book.

**5. Section 2527, Pavement Marking.**

The Office of Design requested changes to update pavement marking requirements.

**6. Article 2528.03, G, 1, Lighting Devices.**

The Office of Design requested changes to eliminate specifying barricade warning light type in the

contract documents.

**7.** **Article 2529.02, B, 8, Transit Mix Concrete (Full Depth Finish Patches)**.
The Office of Materials requested changes to clarify use of retarder in concrete for patches.

**8.** **Article 2529.03, A, 1 (Full Depth Finish Patches).**
The Office of Design requested changes to eliminate a reference to HMA patch details.

**9.** **Article 2529.04, Method of Measurement (Full Depth Finish Patches).**
**Article 2529.05, Basis of Payment (Full Depth Finish Patches).**
The Office of Design requested changes to add a bid item for subdrains for patches.

**10.** **Article 2530.02, B, 4, h, Transit Mix Concrete (Partial Depth Finish Patches).**
The Office of Materials requested changes to clarify use of retarder in concrete for patches.

**11.** **Article 2533.05, Basis of Payment (Mobilization).**
The Office of Construction requested changes clarifying when the initial partial payment for mobilization is due and that each project on a contract be handled separately.

**12.** **Article 4133.04, Granular Backfill Material.**
**Appendix, Aggregate Gradation Table (English).**
**Appendix, Aggregate Gradation Table (Metric).**
The Office of Materials requested changes to clarify acceptable materials for granular backfill and delete an obsolete note for flooded backfill material.

**13.** **Article 4112.02, A, Intermediate Aggregate.**
The Office of Materials requested changes to allow greater tolerance for intermediate aggregate.

**14.** **Article 4163.02, Species of Wood**.
The Office of Materials requested changes to clarify acceptable species of wood.

**15.** **DS-09XXX, Compaction with Moisture and Density Control.**
The Office of Construction requested approval of Developmental Specifications for Compaction with Moisture and Density Control.

**16.** **DS-09XXX, PCC Paving 3-D Machine Control.**
The Office of Construction requested approval of Developmental Specifications for PCC Paving 3-D Machine Control.

**SPECIFICATION REVISION SUBMITTAL FORM**

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| **Submitted by:** John Smythe | **Office:** Construction | **Item 1** |
| **Submittal Date:** October 1, 2010 | **Proposed Effective Date:** April 2011 | |
| **Article No.:** 1109.05<br>**Title:** Partial Payments | **Other:** | |

**Specification Committee Action:** Approved with changes.

| **Deferred:** | **Not Approved:** | **Approved Date:** 10/14/2010 | **Effective Date:** 4/19/2011 |
|---|---|---|---|

**Specification Committee Approved Text:**

**1109.05, A, 1.**

**Replace** the first sentence:

For work extending over a period of more than one month, the Contractor will receive monthly progress estimate payments based on the amount of work completed ~~in an acceptable manner~~.

**1109.05, B, Prompt Payment to Subcontractors.**

**Renumber** Article 2 and **Add** new Articles:

**2.** The Contractor may withhold up to 5% of each progress estimate on work performed by subcontractors.

**3.** Retained funds due a subcontractor shall be payable by the Contractor within 30 calendar days after satisfactory completion of the work by the subcontractor. Subcontractor's work is satisfactorily completed when all tasks called for in the subcontract have been accomplished and required documentation provided by subcontractor. Non-bonded subcontractors may be required to submit proof of payment for all material bills and wages to the Contractor before the Contractor is required to pay the retainage.

~~2~~ **4.** The use of joint checks for payment to subcontractors for their materials is acceptable under the following conditions:

**a.** The request for a joint check from the prime contractor is made by the materials supplier.

**b.** The joint check issued by the prime contractor is for an amount not to exceed the cost of unpaid invoice(s) from the materials supplier to a subcontractor on that contract.

**c.** The joint check is given to the subcontractor and the subcontractor must release the joint check to the material supplier.

**d.** The use of a joint check by the prime contractor is applicable to all their subcontractors.

**1109.05, C, 1.**

**Add** to the end of the Article:

This retainage is held exclusively for claims filed in accordance with Chapter 573 of the Code of Iowa, and shall not be considered as an encumbrance on work performed by a subcontractor.

**1109.05, C, 2.**

**Delete** the Article:

~~**2.** The Contractor may withhold up to 5% of each progress estimate on work performed by subcontractors. All retained funds due a subcontractor shall be payable by the Contractor within 30 calendar days after completion of the work completed by the subcontractor. Non-bonded subcontractors may be required to submit proof of payment for all material bills and wages to the Contractor before the Contractor is required to pay the retainage.~~

**1109.05, E, Required Records.**

**Replace** the Article:

The Contractor shall maintain a system for tracking the status of subcontractor work and payments. The Contractor shall retain records that document the date of field completion, date of satisfactory completion of the ~~field~~ work ~~of each subcontractor~~ and the date of final payment (including ~~retained~~ funds retained in accordance with Article 1109.05, B, 2) to each subcontractor. Copies of the records to verify compliance with Article 1109.05, B shall be provided to the Contracting Authority, if requested.

Prior to receiving final payment, the Contractor shall provide to the Engineer the "Certification of Subcontractor Payments" (Form 518002). This form shall include the names of each approved

subcontractor, the date of field completion, the date of satisfactory completion of the work, the date of final payment, the number of days between satisfactory completion and final payment, and the date of payment by the Contracting Authority. ~~e~~Explanations for any final payments made after the 30 calendar day period following field completion shall be included with Form 518002.

Failure to comply with Article 1109.05, B may result in price adjustment credits, loss of Annual Good Faith Effort points, or suspension of bidding qualification in accord with Article 1102.03, A, 2.

**Comments:** These changes were prompted by an FHWA review.

The Office of Local Systems requested replacing "documented" with "required documentation submitted by subcontractor" in the second sentence of Article 1109.05, B, 3.

The Office of Construction requested Article 1109.05, E, be shown as three paragraphs as in the original submittal.

The Office of Contracts requested adding "the date of payment by the Contracting Authority" to the second sentence of the second paragraph of Article 1109.05, E.

The last sentence of the second paragraph of Article 1109.05, E, should read "field completion" as originally submitted.

The Office of Construction requested that Form 518002 make reference to Article 1109.05, B, 2, for the source of the retainage, so that the prime contractor is clear that this retainage is not associated with the retainage that the Contracting Authority is holding.

The Office of Contracts is concerned that retainage only be used for the intended purpose, specifically for claims filed in accordance with Chapter 573 of the Code of Iowa. The FHWA shares this concern.

The Office of Construction will add some additional guidance on retainage to the Construction Manual at the next revision.

The Office of Local Systems has been discussing the retainage issue with local entities at recent meetings.

**Specification Section Recommended Text:**

**1109.05, A, 1.**

**Replace** the first sentence:

For work extending over a period of more than one month, the Contractor will receive monthly progress estimate payments based on the amount of work completed ~~in an acceptable manner~~.

**1109.05, B, Prompt Payment to Subcontractors.**

**Renumber** Article 2 and **Add** new Articles:

**2.** The Contractor may withhold up to 5% of each progress estimate on work performed by subcontractors.

**3.** Retained funds due a subcontractor shall be payable by the Contractor within 30 calendar days after satisfactory completion of the work by the subcontractor. Subcontractor's work is satisfactory completed when all tasks called for in the subcontract have been accomplished and documented. Non-bonded subcontractors may be required to submit proof of payment for all material bills and wages to the Contractor before the Contractor is required to pay the retainage.

~~**2**~~ **4.** The use of joint checks for payment to subcontractors for their materials is acceptable under the following conditions:

**a.** The request for a joint check from the prime contractor is made by the materials supplier.

**b.** The joint check issued by the prime contractor is for an amount not to exceed the cost of unpaid invoice(s) from the materials supplier to a subcontractor on that contract.

**c.** The joint check is given to the subcontractor and the subcontractor must release the joint check to the material supplier.

**d.** The use of a joint check by the prime contractor is applicable to all their subcontractors.

**1109.05, C, 1.**

**Add** to the end of the Article:

This retainage is held exclusively for claims filed in accordance with Chapter 573 of the Code of Iowa, and shall not be considered as an encumbrance on work performed by a subcontractor.

**1109.05, C, 2.**

**Delete** the Article:

~~**2.** The Contractor may withhold up to 5% of each progress estimate on work performed by subcontractors. All retained funds due a subcontractor shall be payable by the Contractor within 30~~

~~calendar days after completion of the work completed by the subcontractor. Non-bonded subcontractors may be required to submit proof of payment for all material bills and wages to the Contractor before the Contractor is required to pay the retainage.~~

**1109.05, E, Required Records.**

**Replace** the Article:

The Contractor shall maintain a system for tracking the status of subcontractor work and payments. The Contractor shall retain records that document the date of field completion, date of satisfactory completion of the ~~field~~ work ~~of each subcontractor~~ and the date of final payment (including ~~retained~~ funds retained in accordance with Article 1109.05, B, 2) to each subcontractor. Copies of the records to verify compliance with Article 1109.05, B shall be provided to the Contracting Authority, if requested. Prior to receiving final payment, the Contractor shall provide to the Engineer the "Certification of Subcontractor Payments" (Form 518002). This form shall include the names of each approved subcontractor, the date of field completion, the date of satisfactory completion of the work, the date of final payment, and the number of days between satisfactory completion and final payment~~,~~. ~~and e~~Explanations for any final payments made after the 30 calendar day period following ~~field~~ satisfactory completion shall be included with Form 518002. Failure to comply with Article 1109.05, B may result in price adjustment credits, loss of Annual Good Faith Effort points, or suspension of bidding qualification in accord with Article 1102.03, A, 2.

**Comments:** Please note the proposed change in the second to last sentence of Article 1109.05, E.

**Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**

**1109.05 PARTIAL PAYMENTS.**

**A. Progress Payments.**

**1.** For work extending over a period of more than 1 month, the Contractor will receive monthly progress estimate payments based on the amount of work completed. ~~in an acceptable manner.~~ For Primary and Secondary projects in which the Contracting Authority is the Department or a county Board of Supervisors, these progress payments will be bi-weekly if requested by the Contractor. For late payment, the Contracting Authority will pay a penalty of 1.0% per month (or part of a month), or a minimum of $250, whichever is the greater amount, on any work completed but not processed for payment within 14 calendar days after completion of the work. Completion of the work includes physical completion of the work and submittal of all paperwork required by the contract.

**2.** On contracts for which the contract sum is $10,000 or more, payments may be allowed based on value of processed or fabricated materials or rolled steel products which have been delivered on the work or 90% of the value of processed or fabricated material, or rolled steel products, reserved for the project and stored elsewhere within Iowa or in other locations where there is routine inspection by Departmental personnel, provided the materials are of acceptable quality and the manner of storage is satisfactory to the Engineer.

**3.** Should a reasonable doubt arise as to the integrity of any part of the completed work, the payment for that portion will not be allowed until the cause for such doubt has been removed. The Engineer's estimates of work completed will result in partial payments on the contract sum, and the allowance of a progress payment by the Contracting Authority does not constitute final acceptance of the work upon which the payments are based.

**4.** The Contractor shall sign the final voucher certifying the quantities are just and unpaid.

**B. Prompt Payment to Subcontractors.**

**1.** The Contractor shall promptly pay each subcontractor. Any delay or postponement of payment among the parties may take place only for good cause, with written notification to the subcontractor. A payment, excluding retainage, to a subcontractor for satisfactory performance of the subcontractor's work shall be made by the Contractor no later than one of the following, as applicable:

**a.** 7 calendar days after the Contractor receives payment for the subcontractor's work.

**b.** 7 calendar days after the Contractor could have received payment for the subcontractor's work, if the reason for nonpayment is not the subcontractor's fault.

**2.** The Contractor may withhold up to 5% of each progress estimate on work performed by subcontractors.

**3.** All retained funds due a subcontractor shall be payable by the Contractor within 30 calendar days after satisfactory completion of the work ~~completed~~ by the subcontractor. A subcontractor's work is satisfactory completed when all the tasks called for in the subcontract have been accomplished and documented. Non-bonded subcontractors may be required to submit proof of payment for all material bills and wages to the Contractor before the Contractor is required to pay the retainage.

**4.~~2~~.** The use of joint checks for payment to subcontractors for their materials is acceptable under the following conditions:

**a.** The request for a joint check from the prime contractor is made by the materials supplier.

**b.** The joint check issued by the prime contractor is for an amount not to exceed the cost of unpaid invoice(s) from the materials supplier to a subcontractor on that contract.

**c.** The joint check is given to the subcontractor and the subcontractor must release the joint check to the material supplier.

**d.** The use of a joint check by the prime contractor is applicable to all their subcontractors.

**C. Retainage.**

**1.** Three percent of each progress estimate will be deducted and held as retainage on the first $1,000,000 paid on a contract. Additional retainage will be withheld to a maximum of $30,000 following retainage release if subsequent work is performed. This retainage is held exclusively for claims filed in accordance with Chapter 573 of the Code of Iowa, and shall not be considered as an encumbrance on work performed by a subcontractor.

~~**2.** The Contractor may withhold up to 5% of each progress estimate on work performed by subcontractors. All retained funds due a subcontractor shall be payable by the Contractor within 30 calendar days after completion of the work completed by the subcontractor. Non-bonded subcontractors may be required to submit proof of payment for all material bills and wages to the Contractor before the Contractor is required to pay the retainage.~~

**3.** The retained funds held by the Contracting Authority for the contract will not be due and payable prior to 30 calendar days after the date of final acceptance of the entire contract or following the release or adjudication of claims that may have been filed, or until the Contractor has filed the signed final voucher with the Contracting Authority.

**D. Complaints.**

**1.** Compliance with prompt payment is the responsibility of both the Contracting Authority and Contractor.

**2.** If the Contractor feels the Contracting Authority has not complied with the prompt payment provisions, the initial attempt to resolve the issue shall be with the Project Engineer, stating the project number, items of work, quantities, unit prices, dates work was performed, total amount owed, and signature of a representative of the Contractor.

**3.** If a subcontractor feels the Contractor has not complied with the prompt payment provisions, the initial attempt to resolve the issue shall occur with the Contractor. The attempt to resolve the issue shall include at least one written request to the Contractor, stating the project number, items of work, quantities, unit prices, dates work was performed, total amount owed, and signature of a representative of the subcontractor.

**4.** If the initial attempt to resolve the issue does not result in satisfactory payment for completed work, the Contractor or subcontractor shall submit a written complaint to the Office of Contracts. The written complaint shall include copies of the correspondence with the Project Engineer or Contractor that provides the details stated above. The Department will investigate and provide written response to the complainant within 15 business days of receipt of the complaint.

**E. Required Records.**

The Contractor shall maintain a system for tracking the status of subcontractor work and payments. The Contractor shall retain records that document the date of field completion, date of satisfactory completion of the ~~field~~ work, ~~ of each subcontractor~~ and the date of final payment ~~(including retained funds),~~ (including funds retained in accordance with 1109.05 B. 2,) to each subcontractor. Copies of the records to verify compliance with 1109.05 B shall be provided to the Contracting Authority, if requested.

Prior to receiving final payment, the Contractor shall provide to the Engineer the "Certification of Subcontractor Payments" (Form 518002). This form shall include the names of each approved subcontractor, the date of field completion, the date of satisfactory completion of the work, the date of final payment, and the number of days between satisfactory completion and final payment.~~, and e~~Explanations for any final payments made after the 30 calendar day period following field completion shall be included with Form 518002.

Failure to comply with 1109.05B may result in price adjustment credits, loss of Annual Good Faith Effort points, or suspension of bidding qualification in accord with 1102.03 A. 2.

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| **Reason for Revision:** Clarification of prompt payment to subcontractor requirements and enforcement. | | | | | |
| **County or City Input Needed (X one)** | | | **Yes** X | **No** | |
| **Comments:** | | | | | |
| **Industry Input Needed (X one)** | | | **Yes** X | **No** | |
| **Industry Notified:** | **Yes** X | **No** | **Industry Concurrence:** | **Yes** | **No** |
| **Comments:** | | | | | |

**SPECIFICATION REVISION SUBMITTAL FORM**

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|---|---|---|
| **Submitted by:** John Smythe / Kevin Merryman | **Office:** Construction | **Item 2** |
| **Submittal Date:** September 27, 2010 | **Proposed Effective Date:** April 2011 | |
| **Article No.:** 2115.03, B, 4<br>**Title:** Placing and Compacting Modified Subbase | **Other:** | |

**Specification Committee Action:** Approved with changes.

| | | | |
|---|---|---|---|
| **Deferred:** | **Not Approved:** | **Approved Date:** 10/14/2010 | **Effective Date:** 4/19/2011 |

**Specification Committee Approved Text:**

**2115.03, B, 4, Placing and Compacting Modified Subbase.**

**Add** new Article:

**d.** Profile and cross section tolerances for modified subbase are +0 to -0.05 feet (+0 mm to -15 mm).

**Comments:** The Office of Construction pointed out an error in their submittal. The revision should refer to "modified subbase".

**Specification Section Recommended Text:**

**2115.03, B, 4, Placing and Compacting Modified Subbase.**

**Add** new Article:

**d.** Profile and cross section tolerances for granular subbase are +0 to -0.05 feet (+0 mm to -15 mm).

**Comments:**

**Member's Requested Change (Redline/Strikeout):**

**2115.03 CONSTRUCTION.**

**B. Modified Subbase Construction.**

**4. Placing and Compacting Modified Subbase.**

**a.** Ensure modified subbase material is uniformly moist prior to and during compaction.

**b.** Place modified subbase in uniform lifts no more than 6 inches (150 mm) thick.

**c.** Compact modified subbase with a minimum of six roller passes.

**d.** Profile and cross section tolerances for granular subbase are +0 to -0.05 foot (+0 mm to -15 mm).

**Reason for Revision:** Adds placement tolerances for Modified Subbase construction. Tolerances are the same as for Granular Subbase.

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| **County or City Input Needed (X one)** | **Yes** | **No** X |
| **Comments:** | | |

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| **Industry Input Needed (X one)** | | | **Yes** | **No** X | |
| **Industry Notified:** | **Yes** | **No** X | **Industry Concurrence:** | **Yes** | **No** |
| **Comments:** | | | | | |

**SPECIFICATION REVISION SUBMITTAL FORM**

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|---|---|---|
| **Submitted by:** John Smythe / Wayne Sunday | **Office:** Construction | **Item 3** |
| **Submittal Date:** September 16, 2010 | **Proposed Effective Date:** April 2011 | |
| **Article No.:** 2413<br>**Title:** Bridge Deck Surfacing, Repair, and Overlay | **Other:** | |

**Specification Committee Action:** Approved with changes.

| **Deferred:** | **Not Approved:** | **Approved Date:** 10/14/2010 | **Effective Date:** 4/19/2011 |
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**Specification Committee Approved Text:**

**2413.02, D, 2, CLASS HPC-O HIGH PERFORMANCE CONCRETE.**

**Renumber** Articles c, d, and e and **Add** new Articles:

**c.** Increase moisture testing of coarse and fine aggregate to ensure batch-to-batch consistency and reduce water addition at job site. Perform moisture testing of coarse and fine aggregate prior to batching when batch weights are determined and then again half-way through the placement.

~~**c**~~ **d.** Air content is to be the same as required for Class O PCC.

~~**d**~~ **e.** Use Type IS or Type IP cement. If Type I/II is used, 25% replacement with GGBFS is required.

~~**e**~~ **f.** Limit fly ash substitution to ~~15~~ 20% replacement by weight.

**g.** For projects with deck overlay quantities greater than 1800 square yards (1500 $m^2$), make a trial batch of the mix (minimum 3 cubic yards) at the anticipated concrete temperature during delivery. Initially test the slump and air content. Let the mixer run for the time anticipated, including batching, delivery to the project, estimated waiting time for discharge of the load, and the time to discharge the load. Test the slump and air content again. If the slump at the discharge time is 2 inches (50 mm) or less, the proposed mix is not suitable and an additional trial batch will be required. The intent is to ensure the admixture or combination of admixtures will maintain the desired slump without additional water at the discharge site. If unacceptable slump loss occurs during the project placement so that the slump is 2 inches (50 mm) or less, one or all of the following steps will be required:

**1.** Change the dosage rate of admixture(s).

**2.** Change the brand of admixture(s).

**3.** Change the location of mixing admixture(s). For example: incorporate admixture(s) in the ready mix truck on the project site instead of at the ready mix plant.

**4.** Reduce the concrete temperature. For example: use ice or chilled water.

**2413.03, A, 4, c, 1, Class O Portland Cement Concrete.**

**Add** new article:

**h)** Have internal vibration equipment for consolidation at the edges of the placement.

**2413.03, A, 4, c, 2, CLASS HPC-O HIGH PERFORMANCE CONCRETE.**

**Add new article:**

**c)** Be equipped to provide vibration at the finishing drum.

**2413.03, A, 4, d.**

**Replace** the Article:

~~For Class O PCC, internal vibration equipment is required for consolidation at the edges of the placement.~~ Provide supplemental vibration for the concrete between the curb and the end of the drum finisher and along the construction joint adjacent to the current or future placement. Vibration with a standard stinger, whether point vibrating or dragging through the concrete, is not an acceptable method of supplemental vibration.

**2413.03, C, 3, c.**

**Add** the following to the end of the Article:

Provide a method of removal at the bottom of the bridge deck that will prevent feather edging of the concrete.

**2413.03, E, 1, b, 9.**

**Replace** the Article:

~~Allow the partial placement to cure for 72 hours.~~ Wet cure the partial placement for 96 hours.

**2413.03, E, 2, i.**

**Add** the following to the end of the Article:

For Class HPC-O PCC, use supplemental surface vibration for consolidation at the curb side, and along the longitudinal joint adjacent to the current or future placement.

**2413.03, F, 2, a.**

**Replace** Articles 1 and 2:

**1)** Allow the surface to cure for at least 72 hours. When Class HPC-O is used on projects with a deck overlay quantity greater than 1800 square yards (1500 $m^2$), allow the surface to cure for 168 hours.

**2)** ~~For the first 24 hours, k~~ Keep the burlap continuously wet by means of an automatic sprinkling or wetting system throughout the required curing period. ~~After 24 hours, the Contractor may cover the wet burlap with a layer of 4 mil (100 µm) polyethylene film for a minimum of 48 hours in lieu of using the sprinkling or wetting system.~~

**2413.03, F, 2, c.**

**Delete** the Article:

~~**c.** At the Contractor's option, partial depth concrete for Class B repair may be cured with white pigmented curing compound only. When this curing is completed, sandblast the surface and allow to dry. Sandblast the existing concrete in vicinity of Class B repair prior to placement of the overlay course.~~

**2413.03, H, 9.**

**Replace** the third sentence of the Article:

If this work is started before the end of the 72 hour curing period or 168 hour curing period for Class HPC-O projects with greater than 1800 square yards (1500 $m^2$), the work will be restricted as follows:

**2413.03, H, 10.**

**Replace** the first sentence of the Article:

Do not allow traffic on a finished surface course until 72 hours after placement or 168 hours for Class HPC-O projects with greater than 1800 square yards (1500 $m^2$).

**Comments:** Proposed Article 2413.02, F, should fall under Article 2413.02, D, 2, because it applies only to Class HPC-O High Performance Concrete.

The Committee decided that the trial batch needs only to be a minimum of 3 cubic yards.

The 1800 square yard (1500 $m^2$) limit will only apply to bridges over approximately 400 feet (122 m) long (assuming a 40 foot (12.2 m) width).

The option of using polyethylene film over wet burlap for curing was eliminated. This option was typically used for late season deck overlays which are not allowed by specification. If the Engineer allows a late season overlay, the Engineer will have to address the curing method.

The option of curing Class B repair with white pigmented curing compound was eliminated. Even with sandblasting, the potential to cause a poor bond between the repair and the overlay was still there. Class B repair shall be wet cured.

The AGC Structures Committee has reviewed the proposed revisions and had no comments.

**Specification Section Recommended Text:**

**2413.02, D, 2, CLASS HPC-O HIGH PERFORMANCE CONCRETE.**

**Renumber** Articles c, d, and e and **Add** new article:

**c.** Increase moisture testing of coarse and fine aggregate to ensure batch-to-batch consistency and reduce water addition at job site. Perform moisture testing of coarse and fine aggregate prior to batching when batch weights are determined and then again half-way through the placement.

~~**c**~~ **d.** Air content is to be the same as required for Class O PCC.

~~**d**~~ **e.** Use Type IS or Type IP cement. If Type I/II is used, 25% replacement with GGBFS is required.

~~**e**~~ **f.** Limit fly ash substitution to ~~15~~ 20% replacement by weight.

**2413.02, MATERIALS.**

**Add** new Article:

**F.** For projects with deck overlay quantities greater than 1800 square yards (1500 $m^2$) make a trial batch of the mix in the batch quantity proposed and at the anticipated concrete temperature during delivery. Initially test the slump and air content. Let the mixer run for the time anticipated, including batching, delivery to the project, estimated waiting time for discharge of the load, and the time to discharge the load. Test the slump and air content again. If the slump at the discharge time is 2 inches (50 mm) or less, the proposed mix is not suitable and an additional trial batch will be required. The intent is to ensure the admixture or combination of admixtures will maintain the desired slump without additional water at the discharge site. If unacceptable slump loss occurs during the project placement so that the slump is 2 inches (50 mm) or less, one or all of the following steps will be required:

**1.** Change the dosage rate of admixture(s).

**2.** Change the brand of admixture(s).

**3.** Change the location of mixing admixture(s). For example: incorporate admixture(s) in the ready mix truck on the project site instead of at the ready mix plant.

**4.** Reduce the concrete temperature. For example: use ice or chilled water.

**2413.03, A, 4, c, 1, Class O Portland Cement Concrete.**

**Add** new article:

**h)** Have internal vibration equipment for consolidation at the edges of the placement.

**2413.03, A, 4, c, 2,.**

**Add new article:**

**c)** Be equipped to provide vibration at the finishing drum.

**2413.03, A, 4, d.**

**Replace** the Article:

~~For Class O PCC, internal vibration equipment is required for consolidation at the edges of the placement.~~ Provide supplemental vibration for the concrete between the curb and the end of the drum finisher and along the construction joint adjacent to the current or future placement. Vibration with a standard stinger, whether point vibrating or dragging through the concrete, is not an acceptable method of supplemental vibration.

**2413.03, C, 3, c.**

**Add** the following to the end of the Article:

Provide a method of removal at the bottom of the bridge deck that will prevent feather edging of the concrete.

**2413.03, E, 1, b, 9.**

**Replace** the Article:

~~Allow the partial placement to cure for 72 hours.~~ Wet cure the partial placement for 96 hours.

**2413.03, E, 2, i.**

**Add** the following to the end of the Article:

For Class HPC-O PCC, use supplemental surface vibration for consolidation at the curb side, and along

the longitudinal joint adjacent to the current or future placement.

**2413.03, F, 2, a.**

**Replace** Articles 1 and 2:

**1)** Allow the surface to cure for at least 72 hours. When Class HPC-O is used on projects with a deck overlay quantity greater than 1800 square yards (1500 $m^2$), allow the surface to cure for 168 hours.

**2)** ~~For the first 24 hours, k~~ Keep the burlap continuously wet by means of an automatic sprinkling or wetting system throughout the required curing period. ~~After 24 hours, the Contractor may cover the wet burlap with a layer of 4 mil (100 µm) polyethylene film for a minimum of 48 hours in lieu of using the sprinkling or wetting system.~~

**2413.03, F, 2, c.**

**Delete** the Article:

~~**c.** At the Contractor's option, partial depth concrete for Class B repair may be cured with white pigmented curing compound only. When this curing is completed, sandblast the surface and allow to dry. Sandblast the existing concrete in vicinity of Class B repair prior to placement of the overlay course.~~

**2413.03, H, 9.**

**Replace** the third sentence of the Article:

If this work is started before the end of the 72 hour curing period or 168 hour curing period for Class HPC-O projects with greater than 1800 square yards (1500 $m^2$), the work will be restricted as follows:

**2413.03, H, 10.**

**Replace** the first sentence of the Article:

Do not allow traffic on a finished surface course until 72 hours after placement or 168 hours for Class HPC-O projects with greater than 1800 square yards (1500 $m^2$).

**Comments:**

**Member's Requested Change:** **(Do not use 'Track Changes', or 'Mark-Up'.Use ~~Strikeout~~ and Highlight.**

**2413.01 DESCRIPTION.**

**A. Deck Surfacing.**
Place a wearing course on the prepared surface of a new bridge deck. Perform other necessary work shown in the contract documents.

**B. Deck Repair.**

**1. Class A Deck Repair.**
Remove deck concrete below the level described for Deck Overlay, but less than full depth. Replace the excavated volume with concrete to a level bounding the Deck Overlay classification.

**2. Class B Deck Repair.**
Remove deck concrete below the level described for Deck Overlay for the full depth of the floor. Replace the excavated volume with concrete to a level bounding the Deck Overlay classification.

**C. Deck Overlay.**
Remove deck concrete to a depth 1/4 inch (5 mm) below the existing finished surface, and overlay with a concrete course of a depth designated. Unless specified otherwise in the contract documents, overlay is to accomplish a raise of the existing roadway surface and cover the entire concrete deck surface, including those areas to be repaired.

**2413.02 MATERIALS.**

**A.** Use materials meeting the requirements for the respective items in Division 41. When structural repairs are included in the project, Class C concrete may be mixed using equipment meeting requirements of Article 2413.03, A, 3. The concrete mixture used for the overlay may be used for the repair. Use the water and consistency specified in Article 2403.02, B, 2.

**B.** Use a single source of cement during an individual placement.

**C.** Apply Sections 4110 and 4115 to the aggregates. Use only those coarse aggregates specifically allowed by Article 4115.05 for this work.

**D.** Use one of the following mixes:

**1. Class O Portland Cement Concrete.**

**a.** Use Class O PCC meeting the requirements of Materials I.M. 529 and the following requirements:

**1)** The slump, measured according to Materials I.M. 317, shall be 3/4 inch (20 mm) with a maximum of 1 inch (25 mm) and no minimum requirement. Commence testing for concrete slump from a continuous mixer within 2 to 4 minutes after the concrete is discharged.

**2)** The intended air entrainment of the finished concrete is 6%. Ensure the air content of fresh, unvibrated concrete at the time of placement, as determined by Materials I.M. 318 is 6.5%, with a maximum variation of plus 2.0% and minus 1.0%.

**b.** Fly ash substitution is not permitted for Class O PCC.

**2. Class HPC-O High Performance Concrete.**

Meet the requirements of Materials I.M. 529 and the following:

**a.** A slump of 1 inch (25 mm) to ~~3~~ 4 inches (~~75~~ 100 mm), measured according to Materials I.M. 317, with a maximum of ~~4~~ 5 inches (~~100~~ 125 mm). Commence testing for concrete slump from a continuous mixer within 2 to 4 minutes after the concrete is discharged. Before placing ready mix concrete, test the slump.

**b.** Use a mid-range water reducing admixture meeting the requirements of Materials I.M. 403, Appendix C and a retarder listed in Materials I.M. 403 Appendix G. When the expected haul time is less than 30 minutes or the maximum air temperature expected is less than 75°F (24°C), addition of a retarder is not required. The intent of the mid-range water reducer is to achieve a workable, dense, and low w/c ratio concrete. The Engineer may approve other admixtures or combinations of admixtures and dosages to achieve a workable low w/c ratio mix.

**c.** Increase moisture testing of coarse and fine aggregate to ensure batch-to-batch consistency and reduce water addition at the job site. Moisture testing of the coarse and fine aggregate shall be performed prior to batching when batch weights are determined and then again half-way through the placement.

**d.~~c.~~** Air content is to be the same as required for Class O PCC.

**e.~~d.~~** Use Type IS or Type IP cement. If Type I/II is used, 25% replacement with GGBFS is required.

**f.~~e.~~** Limit fly ash substitution to ~~15~~ 20% replacement by weight.

**E.** To bond new concrete to previously placed concrete, use a grout consisting of a mixture of about 5 to 6 gallons of water to each 94 pound bag (0.45 to 0.50 L/kg) of cement. Mix to a consistency such that the slurry can be applied with a stiff brush or broom to the previously placed concrete in a thin, even coating that will not run or puddle in low spots. An equivalent grout of Portland cement and water, applied by pressure spray may be substituted with approval of the Engineer. For sealing vertical joints between adjacent lanes and at the curbs, thin this grout to paint consistency.

F. For projects with deck overlay quantities greater than 1800 square yards make a trial batch of the mix in the batch quantity proposed and at the anticipated concrete temperature during delivery. Initially test the slump and air content. Let the mixer run for the time anticipated, including batching, delivery to the project, estimated waiting time for discharge of the load, and the time to discharge the load. Test the slump and air content again. If the slump at the discharge time is 2 inches or less, the proposed mix is not suitable and an additional trial batch will be required. The intent is to ensure the admixture or combination of admixtures will maintain the desired slump without additional water at the discharge site. If unacceptable slump loss occurs during the project placement so that the slump is 2 inches or less, one or all of the following steps will be required:

1. Change the dosage rate of admixture(s).
2. Change the brand of admixture(s).
3. Change the location of mixing admixture(s). For example: Incorporate admixture(s) in the ready mix truck on the project site instead of at the ready mix plant.
4. Reduce the concrete temperature. For example: Use ice or chilled water.

**2413.03 CONSTRUCTION.**

**A. Equipment.**

Use equipment approved by the Engineer and complying with the following:

**1. General.**

**a.** Ensure the overall combination of labor and equipment for proportioning, mixing, placing, and finishing the new surface is of such minimum capability as to meet the requirements of Table

2413.03-1, except when noted otherwise in the contract documents.

**Table 2413.03-1: Minimum Capacity and Labor Requirements**

| Total Surface Area per Bridge, sq. yd. ($m^2$) | Minimum Requirement, cu. yd. per hour ($m^3$ per hour) |
|---|---|
| 0-328 (0-274) | 1.0 (0.8) |
| 329-492 (274.1-410) | 1.5 (1.2) |
| 493-656 (410.1-550) | 2.0 (1.6) |
| over 656 (over 550.1) | 2.5 (2.0) |

**b.** Use a finishing machine designed so the elapsed time between depositing the mixture on the floor and final screeding does not exceed 10 minutes when the mixture is being mixed and placed at the specified minimum rate under normal operating conditions.

**2. Preparation Equipment.**

Use the following types of preparation equipment:

**a. Sawing Equipment.**
Use sawing equipment capable of sawing concrete to the specified depth.

**b. Sandblasting or Shot Blasting Equipment.**
Use sandblasting or shot blasting equipment capable of removing rust, oil, and concrete laitance from the existing surface of the bridge deck and exposed uncoated reinforcing bars.

**c. Power Driven Hand Tools.**
Power driven hand tools will be permitted with the following restrictions:

**1.** Do not use jack hammers heavier than nominal 30 pound class (14 kg)

**2.** Do not operate jack hammers or mechanical chipping tools at an angle exceeding 45 degrees measured from the surface of the deck.

**3.** Do not use chipping hammers heavier than a nominal 15 pound (7 kg) class.

**d. Hand Tools.**
Provide hand tools, such as hammers and chisels, for removal of final particles of unsound concrete or to achieve the required depth.

**e. High Pressure Water Blasting Equipment.**
Use high pressure water blasting equipment capable of removing rust, oil, concrete laitance, and unsound concrete from the existing surface of the bridge floor and exposed uncoated reinforcing bars.

**3. Proportioning and Mixing Equipment.**

**a.** Use proportioning and mixing equipment for Class O PCC or Class HPC-O that meets requirements of Articles 2001.20, E, and 2001.21, D. Use equipment capable of proportioning water accurately to within 1.0%. Use a rotating paddle type concrete mixer (construction or stationary). A continuous mixer used in conjunction with volumetric proportioning, described above, is acceptable.

**b.** Provide sufficient mixing capacity so the intended quantity can be placed without interruption.

**c.** The cement, fly ash, and GGBFS for Class HPC-O shall be pre-blended by the producer or by using equipment capable of thoroughly mixing the materials to the tolerances in ASTM C 685 when concrete is produced using a volumetric mixer.

**d.** For Class HPC-O, ready mixed concrete equipment meeting the requirements of Articles 2001.20 and 2001.21 is acceptable. For ready mixed concrete, the cement, fly ash, and GGBFS are not required to be pre-blended.

**4. Placing and Finishing Equipment for Deck Surfacing and Deck Overlay.**

**a.** Include adequate hand tools for placing the mixture and working it down to approximately the correct level for striking off with the screed. A self propelled finishing machine is required for all surfacing and overlays. Use a machine that operates on supporting rails which:

- Are adequately secured to the previously placed surface and are adjustable to the correct profile without shimming,
- Do not deflect under the load of the machine, and
- May be removed without damage to the edge of the new surface that remains in place.

**b.** When placing the mixture in a lane abutting a previously completed lane, equip the side of the finishing machine adjacent to the completed lane to travel on the completed lane. The Engineer will inspect the finishing machine. The Engineer's approval of the finishing machine is required before starting work on each project.

**c.** Use a finishing machine meeting the requirements of Article 2412.03, D. This machine shall be

self propelled, capable of forward and reverse movement under positive control, and provide for raising all screeds to clear the screeded surface for traveling in reverse. The machine shall meet the following additional requirements for the type of mixture to be placed.

**1) Class O Portland Cement Concrete.**

The machine shall:

**a)** Have a mechanical strike off to provide a uniform thickness of mixture in front of the screed designed to consolidate the mixture by vibration, as specified.

**b)** Have a front screed designed to consolidate the mixture to be placed to 100% of the rodded density.

**c)** Have the bottom face for each screed at least 5 inches (125 mm) wide with a turned up or rounded leading edge to minimize tearing of the surface of the plastic concrete.

**d)** Have an effective weight (mass) for each screed at least 75 pounds for each square foot (365 kg/m$^2$) of bottom face area.

**e)** Have positive control of the vertical position, the angle of tilt, and the shape of the crown for each screed provided.

**f)** Be designed so that, together with appurtenant equipment, obtains positive machine screeding of the plastic concrete within 1 inch (25 mm) of the face of the existing curbs.

**g)** Have a screed long enough to:

- Extend at least 6 inches (150 mm) beyond the line where a saw cut is intended to form the edge of a subsequent placement section, and
- Overlap the sawed edge of a previously placed course at least 6 inches (150 mm).

Internal vibration equipment is required for consolidation at the edges of the placement.

**2) Class HPC-O High Performance Concrete.**

The machine shall:

**a)** Be capable of finishing the surface to within 1 foot (0.3 m) of the edges of the area being placed.

**b)** Have positive control of the vertical position of the screeds.

**c)** Be equipped to provide vibration at the finishing drum.

~~For Class O PCC, internal vibration equipment is required for consolidation at the edges of the placement.~~ Provide supplemental vibration for the concrete between the curb and the end of the drum finisher and along the construction joint adjacent to the current or future placement. Vibration with a standard stinger, whether point vibrating or dragging through the concrete, is not an acceptable method of supplemental vibration.

**B. Preparation of Surface for Deck Surfacing and Deck Overlays.**

**1.** Remove material for test wells (for Class O PCC density testing) and all loose, disintegrated, or unsound concrete from the bridge deck, as designated by the Engineer. Test wells for nuclear density checks shall have nominal dimensions of 1 1/2 inches x 10 inches x 10 inches (40 mm x 250 mm x 250 mm). On bridge deck overlays, Class A bridge deck repair removal areas may be used as test wells provided they meet the nominal dimensions and are located in the testing frequency areas. Nuclear density testing of Class O PCC will be according to Materials I.M. 358.

**2.** For bridge deck overlays, uniformly scarify or prepare the entire existing concrete floor area to a depth of 1/4 inch (5 mm), except over areas of Class A and Class B repair where the 1/4 inch (5 mm) removal may be coincidental with operations for repair removal. Removal to a greater depth will be required at drains and elsewhere as noted in the contract documents. Measure the thickness of the concrete overlay from a level 1/4 inch (5 mm) below the original surface to a final raised surface as shown. Use a minimum thickness of abutting overlay of 3/4 inch (20 mm) and taper to the full designated thickness where removal to a level lower than 1/4 inch (5 mm) below the original surface is necessary because of surface fixtures.

**3.** Place all new concrete above the prepared surface for bridge deck surfacing at the thickness specified in the contract documents. The thickness of concrete above the prepared surface (for bridge deck surfacing) and above the prepared surface or reinforcing steel (for bridge deck overlay) is to be at least 1 3/4 inches (45 mm), and greater if specified in the contract documents. Check the thickness and clearance in the following manner before concrete is placed:

**a.** To the bottom of the screed, attach a filler block having a thickness 1/4 inch (5 mm) less than the overlay thickness. With screed guides in place, pass the screed over the area to be concreted. An alternate to passing the finishing machine is passing an approved template, supported by the screed guides, over the area to be concreted. Where the intended clearance does not allow use of this method, use a string line or other means as approved by the Engineer. If the filler block or other method used to check does not clear the area to be concreted, adjust the profile of the new

surface to the Engineer's satisfaction.

**b.** Prepare the surface for placement of new concrete by sandblasting or shot blasting, followed by an air blast. Ensure this cleaning removes all dirt, oil, and other foreign material. Ensure it removes all unsound concrete, laitance, or loose material from the surface and edges against which the surface mixture is to be placed. The cleaning should roughen the surface in order to provide satisfactory bond with the surfacing mixture. Protect metal floor drains and areas of the curb or railing above the proposed surface from the cleaning.

**c.** Keep areas from which concrete has been removed free of slurry produced by wet sawing of concrete joints. Remove all slurry from prepared areas before placing new concrete.

**d.** Use hand tools to remove final particles of concrete or to achieve the required depth. Sandblast or shot blast the entire surface against which new concrete is to be placed, including curbs and exposed reinforcement. Remove all dirt, oil, and other foreign material, as well as any unsound concrete. Clean epoxy coated reinforcing with hand tools that will not damage the epoxy coating. Clean the surface with an air blast immediately before applying grout in preparation for placement of concrete.

**e.** Do not presaturate existing concrete prepared for repair, surfacing, or overlay with water before placing grout and new concrete. Allow the prepared surface to dry to allow some absorption of the grout.

**f.** At the time of placement of either Class O PCC or Class HPC-O, ensure the area is clean and all exposed reinforcement free of rust. Rust forming overnight because of dew on clean reinforcement will not be considered objectionable, but reinforcement with a greater amount of rust must be recleaned before the concrete is placed. Clean the area by air blast before the concrete is placed.

**C. Preparation of Surface for Deck Repair.**

Remove concrete from each area (either designated in the contract documents or by the Engineer) to a depth and in a manner consistent with the classification for that area. Areas as shown in the contract documents are based on the best information available. The Engineer will determine actual areas.

**1. General.**

**a.** Keep areas from which concrete has been removed free of slurry produced by wet sawing concrete joints. Remove all slurry from prepared areas before concrete is placed.

**b.** Use hand tools to remove final particles of concrete or to achieve the required depth. Sandblast or shot blast all surfaces against which new concrete is to be placed, including curbs and exposed reinforcement. Remove all dirt, oil, and other foreign material, as well as any unsound concrete. Clean the surface with an air blast immediately before applying grout in preparation for placement of new concrete.

**c.** Thoroughly clean all reinforcing bars and newly exposed concrete by sandblasting or shot blasting. Clean epoxy coated reinforcing with hand tools that will not damage the epoxy coating. Where bond between existing concrete and reinforcing steel has been destroyed, remove the concrete adjacent to the bar to a depth that will permit new concrete to bond to the entire periphery of the exposed bar. A minimum of 3/4 inch (20 mm) clearance is required around the bar. Exercise care to prevent cutting, stretching, or damaging any exposed reinforcing steel. The Engineer may require enlarging a designated area should inspection indicate deterioration of concrete or corrosion of reinforcing beyond the limits previously designated.

**d.** Do not presaturate existing concrete prepared for surfacing before grout and new concrete is placed. Allow the prepared surface to dry to allow some absorption of the grout.

**e.** At the time of placement of either Class O PCC or Class HPC-O, ensure the area is clean and the reinforcement free of rust. Rust forming overnight because of dew on clean reinforcement will not be considered objectionable; however, reinforcement with a greater amount of rust shall be recleaned before placing the concrete. Clean the area with an air blast before the concrete is placed.

**2. Class A Deck Repair.**

**a.** Class A repair removal is considered to start 1/4 inch (5 mm) below the existing surface. This does not preclude removal coincidental with preparation for overlay. Removal for Class A repair extends at least to the level of the top reinforcing bars, and deeper, as determined by the Engineer, to remove unsound concrete.

**b.** Concrete may be removed by chipping, shot blasting, hydro blasting, or by a combination of these. Complete the final cleanup using hand tools.

**c.** For Class A repair and in preparation for bridge deck overlay, the deck surface may also be prepared or partially prepared using a high pressure water system, at the Contractor's option.

Use the equipment manufacturer's recommended procedures, subject to the Engineer's approval, and within such limitations as may be imposed.

**d.** Additional removal may be required to provide for test wells.

**3. Class B Deck Repair.**

**a.** Class B repair removal is considered to start 1/4 inch (5 mm) below the existing surface. This does not preclude removal coincidental with preparation for overlay. Remove all concrete within all areas designated for Class B repair, and in all areas designated for Class A repair in which the depth of the remaining sound concrete is less than 50% of the original depth of the bridge deck.

**b.** Designated Class A repair areas will be measured as Class B Deck Repair when full depth removal is required. At the Engineer's direction, limited areas of removal greater than 50% of the floor thickness (such as beneath reinforcing) may be allowed. These limited areas of excess depth will be measured as Class A Deck Repair.

**c.** Remove concrete using a jack hammer or chipping hammer, or by using a combination of a scarifyier and chipping hammer. Accomplish the final removal at the periphery of Class B repair using a 15 pound (7 kg) jack hammer, chipping hammer, or hand tools. Provide a method of removal at the bottom of the bridge deck that will prevent feather edging of the concrete.

**d.** Provide forms to enable placement of new concrete in the full depth opening. Use forms that, preferably, are suspended from existing reinforcing bars by wire ties. In the case of large area openings, forms may be supported by blocking from the beam flanges. Support all forms by elements of the existing superstructure unless specifically noted or shown otherwise in the contract documents.

**D. Proportioning and Mixing.**

**1. General.**

**a.** Proportion and mix Class O PCC at the project site. Ready mixed concrete will not be approved.

**b.** For Class HPC-O, ready mixed concrete or portioned and mixed concrete at the project site will be allowed.

**c.** Mix the water reducing admixture for improved workability of Class O PCC or HPC-O into the concrete according to the manufacturer's recommendations and the Engineer's instructions.

**2. Stationary Mixer.**

When a construction or stationary mixer is used, proportion and mix according to applicable provisions of Article 2403.02, D.

**3. Continuous Mixing Equipment.**

When continuous mixing equipment is used, apply the following:

**a.** Use mobile continuous mixers that accurately proportion all materials for the specified mixture.

**b.** Calibrate the proportioning equipment for each material in the presence of the inspector. The Engineer may accept a previous calibration and require satisfactory verification checks only, at the settings indicated by the previous calibration.

**c.** Operate the proportioning equipment at the speed recommended by the manufacturer during calibration, checks, or normal operation.

**d.** Recharge continuous mixers at the site.

**e.** The Contractor may make yield checks or other checks and the inspector will cooperate in such checking.

**f.** Mix the materials in an approved mixer within 1 mile (2 km) of the site of placement. Mix the materials according to the specified requirements for the equipment used. Ensure the mixture, as discharged from the mixer, is uniform in composition and consistency.

**E. Placing and Finishing.**

**1. Repairs.**

Apply the following to repair work:

**a.** Although repair classes are considered to begin 1/4 inch (5 mm) below the original concrete surface, place repair concrete monolithically with the overlay course, except as described for larger areas of Class B repair. Internally vibrate fresh concrete 3 inches (75 mm) or more in thickness.

**b.** For Class B repair areas 2 square yards (2 $m^2$) or greater:

**1)** Use floor forms supported by beams or stringers.

**2)** Bring the individual concrete replacement to the lower boundary for the superimposed overlay.

**3)** Use Class C structural concrete meeting the requirements of Sections 2403 and 2412 for

Class B repair.

**4)** Leave the surfaces of individual placements rough.

**5)** Complete placements for each construction stage before starting the overlay course.

**6)** If a full depth repair is staged, provide a beveled keyway not less than 1 1/2 inch by 3 inches (35 mm by 75 mm) at the vertical joint.

**7)** Ensure concrete placement and reinforcing support comply with applicable portions of these specifications except as modified by the contract documents.

**8)** Deck repair concrete, described in Article 2413.02, or Class C structural concrete, meeting requirements of Sections 2403 and 2412, may be used when individual placements are placed to the lower boundary for the superimposed overlay.

**9)** ~~Allow the partial placement to cure for 72 hours.~~ Wet cure the partial placement for 96 hours.

~~8~~ **10)** After the cure, surface dry, sandblast or shot blast, and clean individual placements before applying overlay course or grout.

**c.** For Class A repair areas~~:~~,

~~**1)** U~~use Class O or Class HPC-O concrete when repair concrete is placed monolithically with the overlay.

~~**2)** Deck repair concrete, described in Article 2413.02, or Class C structural concrete, meeting requirements of Sections 2403 and 2412, may be used when individual placements are placed to the lower boundary for the superimposed overlay.~~

~~**3)** Allow the partial placement to cure for 72 hours.~~

~~**4)** After the cure, surface dry, sandblast or shot blast and clean individual placements before applying the overlay course or grout.~~

**2. Deck Surfacing and Deck Overlay.**

**a.** Use an approved finishing machine as specified in Article 2413.03, A, 4.

**b.** Place the support rails upon which the finishing machine travels outside the area to be surfaced. Make provisions for anchorage of supporting rails that provide for horizontal and vertical stability. The Engineer may require positive anchorage. Do not use a hold down device shot into concrete unless the concrete shall be subsequently surfaced. Hold down devices of other types leaving holes in exposed areas will be approved provided the holes remaining are grouted full. Submit support rail anchoring plans and the mixture placing procedure to the Engineer for approval.

**c.** The locations of longitudinal joints may be shown in the contract documents. If not shown, locate longitudinal joints as approved by the Engineer. The approval will be based on avoiding joints in the wheel paths as much as practical.

**d.** In order to assure a junction with properly consolidated concrete, saw the surface course previously placed to a straight and vertical edge at longitudinal and transverse joints and remove before adjacent concrete is placed. The Engineer will determine the extent of such removal.

**e.** Take every reasonable precaution to secure a smooth riding bridge deck. Prior to placement operations, review the equipment, procedures, personnel, and previous results with the Engineer. The Engineer will review inspection procedures to assure coordination. Include the following precautions:

**1)** Assurance that concrete can be produced and placed within the specified limits, continuously and with uniformity.

**2)** After finishing, check the surface with a 10 foot (3 m) straightedge. Eliminate causes for irregularities exceeding 1/8 inch (3 mm) and make corrections, if practical.

**3)** The Engineer will check each placement according to Section 2428 the day following placement or before another section is placed.

**f.** After cleaning the surface and immediately before placing Class O PCC or Class HPC-O, scrub a thin coating of bonding grout into the dry, prepared surface. At the Contractor's option, the grout may be sprayed onto the surface in a manner subject the Engineer's approval. Exercise care to assure that all parts receive a thorough even coating, and that no excess grout is permitted to collect in pockets. Limit the rate of progress for applying grout so that the grout does not become dry before it is covered with new concrete. If the grout becomes dry, remove it by sandblasting and apply new grout.

**g.** Place concrete in a continuous operation. For Class O PCC, manipulate the new concrete and mechanically strike it off slightly above final grade. Then mechanically consolidate it to 100% of the rodded density, with a minus tolerance of 2%. Screed the new concrete to final grade. The Engineer will determine rodded density according to Materials I.M. 358.

**h.** The rodded density measurement is not required for Class HPC-O.

**i.** For Class O PCC, use internal vibration for consolidation at the curb side, and along the longitudinal construction joint adjacent to a previously constructed lane. For Class HPC-O PCC, use supplemental surface vibration for consolidation at the curb side, and along the longitudinal

joint adjacent to the current or future placement.

**j.** Ensure concrete temperature and theoretical evaporation rate comply with Article 2412.03, C.

**k.** Apply Section 2428 to smoothness of the completed bridge deck surfacing and bridge deck overlay for Interstate and Primary projects and when specifically required for other projects.

**3. Placement of Grooving.**

**a. Interstate and Primary Projects.**

**1)** Transverse grooving or tining in plastic concrete of bridge deck surfacing or bridge deck overlay (and bridge approach overlay when included in a bridge deck overlay project) will not be allowed.

**2)** Perform longitudinal grooving according to Article 2412.03, D.

**b. Other Projects.**

**1)** After achieving a tight, uniform surface, apply a suitable grooving, by hand methods, similar to that described in Article 2301.03, H, 3, with the following exceptions:

- Grooving is to be transverse to the centerline of roadway.
- Transverse grooving is to be randomly spaced from 3/4 inch to 1 5/8 inches (20 mm by 40 mm) with no more than 50% of the spacings exceeding 1 1/4 inches (30 mm) with a minimum of four different spacings in a 2 foot (0.6 m) width.

**2)** Perform this operation at a time and in a manner to achieve the desired texture while minimizing displacement of the larger aggregate particles. The texture should not extend into the areas within approximately 2 feet (0.5 m) of curbs. As soon as finishing has been completed, seal all vertical joints with adjacent concrete by painting with thinned grout.

**F. Curing.**

**1.** Place the first layer of prewetted burlap on the concrete as follows:

**a. Interstate and Primary Projects.**
Place within 10 minutes after finishing. If Class O PCC is revibrated because of failure to meet density requirements with initial vibration, place the prewetted burlap within 10 minutes after finishing of the revibrated area.

**b. Other Projects.**
Immediately after final finishing, cover the area finished with white pigmented curing compound meeting the requirements of Article 4105.05, applied at a rate of no more than 135 square feet per gallon (3.3 square meters per liter). Place the first layer of prewetted burlap on the concrete within 30 minutes after the concrete has been deposited on the deck. If Class O PCC is revibrated because of failure to meet density requirements with initial vibration, this time limit will be extended by 15 minutes.

**2.** Cure the concrete as follows:

**a.** For Class O PCC or Class HPC-O:

**1)** Allow the surface to cure for at least 72 hours. When Class HPC-O is used on projects with a deck overlay quantity greater than 1800 square yards, allow the surface to cure for 168 hours.

**2)** ~~For the first 24 hours, k~~ Keep the burlap continuously wet by means of an automatic sprinkling or wetting system throughout the required curing period. ~~After 24 hours, the Contractor may cover the wet burlap with a layer of 4 mil (100 µm) polyethylene film for a minimum of 48 hours in lieu of using the sprinkling or wetting system.~~

**3)** Failure to apply wet burlap within the required time is cause for rejecting the affected work. Remove the surface concrete in the rejected area and replace at no additional cost to the Contracting Authority.

**b.** Prewet the burlap with sufficient water, prior to placement, to prevent absorption of moisture from the concrete surface.

~~**c.** At the Contractor's option, partial depth concrete for Class B repair may be cured with white pigmented curing compound only. When this curing is completed, sandblast the surface and allow to dry. Sandblast the existing concrete in vicinity of Class B repair prior to placement of the overlay course.~~

**G. Sealing for Deck Overlay.**

Seal the tops and traffic sides of curbs, retrofit barrier rails, and concrete barrier rails according to Article 2403.03, P, 3. In addition, for Class O PCC overlay or Class HPC-O overlay, apply the sealer along each gutter line, extending 1 foot (0.3 m) onto the roadway. The Engineer or the contract documents may designate other areas requiring concrete sealer.

**H. Limitations of Operations.**

**1.** Do not commence work on the surface until the lower course meets the requirements of Article 2403.03, N, 2.

**2.** If traffic shall be maintained during the construction period of this contract, it will be noted in the contract documents. Provide traffic controls required by the contract documents.

**3.** Night work will be permitted. Furnish adequate lights for nighttime work at the direction of the Engineer at no additional cost to the Contracting Authority. Provide the Engineer with advanced notice.

**4.** If there is a major delay in the placement operation, place a construction dam or bulkhead. During minor delays of 1 hour or less, the end of the placement may be protected from drying with several layers of wet burlap.

**5.** Protect freshly placed concrete from sudden or unexpected rain. The Engineer may order removal of concrete damaged by rainfall.

**6.** Screed rails may be removed at any time after the concrete has taken initial set. Protect the edge of the new surface from damage during screed removal.

**7.** Do not place concrete adjacent to a surface course less than 36 hours old (this restriction does not apply to a continuation of placement in a lane or strip beyond a joint in the same lane or strip).

**8.** If concrete placement is stopped or delayed for a period of 90 minutes or more, discontinue further placement. Resume only after a period of no less than 12 hours. This restriction does not prohibit continuation of placement provided a gap is left in the lane or strip. Ensure the gap is sufficiently long for the finishing machine to clear previously placed concrete.

**9.** Preparation work will not be allowed in a lane or strip until the lane is closed to traffic. In areas where there is no traffic, preparation of the area may be started in a lane or strip adjacent to newly placed surface the day following its placement. If this work is started before the end of the 72 hour curing period or 168 hour curing period for Class HPC-O projects with greater than 1800 square yards, the work will be restricted as follows:

- **a.** Limit the interference sawing, or other operations, has on curing to the minimum time practical, and to the immediate area only. Resume curing promptly.
- **b.** Do not use chipping hammers heavier than a nominal 15 pound (with a mass greater than 7 kg) class.
- **c.** Operate air compressors on the deck only directly over the piers.
- **d.** Do not allow loads, other than construction equipment, on any portion of the bridge deck that has undergone preparation in advance of new concrete placement and curing.

**10.** Do not allow traffic on a finished surface course until 72 hours after placement or 168 hours for Class HPC-O projects with greater than 1800 square yards. At temperatures below 55°F (13°C), the Engineer may require a longer waiting time.

**11.** Do not place PCC when the air or floor temperature is below 40°F (4°C).

**12.** Do not place concrete mixture after October 1 and before April 1 without the Engineer's written approval.

**2413.04 METHOD OF MEASUREMENT.**

Measurement will be as follows:

**A.** Deck Surfacing (Class O PCC), Deck Surfacing (Class HPC-O), Class A Deck Repair, Class B Deck Repair, Deck Overlay (Class O PCC), and Deck Overlay (Class HPC-O): square yards (square meters) computed from measurements of the areas surfaced, repaired, or overlaid. For deck surfacing, the Engineer may require concrete removal for Class O PCC test wells. This removal will not be measured for payment.

**B.** Sealing (as required in Article 2413.03, G): not measured separately for payment.

**C.** Longitudinal Grooving in Concrete: according to Article 2412.04.

**2413.05 BASIS OF PAYMENT.**
Payment will be as described below. The profile may be improved by raising the finished overlay surfaces up to 1/2 inch (15 mm) above that shown in the contract documents, with no additional compensation to the Contractor. Locations where the raise exceeds 1/2 inch (15 mm), payment will be made as extra work for the materials which represent the volume in excess of the 1/2 inch (15 mm) raise.

**A.** Deck Surfacing (Class O PCC) or Deck Surfacing (Class HPC-O):

**1.** Contract unit price per square yard (square meter).

**2.** Payment is full compensation for furnishing all material, equipment, forms, and labor necessary to complete this work according to the contract documents.

**B.** Class A Deck Repair, Class B Deck Repair, Deck Overlay (Class O PCC), and Deck Overlay (Class HPC-O):

**1.** Contract unit price per square yard (square meters).

**2.** Payment is full compensation for removal of excess concrete from the project and it becoming the property of the Contractor, for furnishing all material, equipment, forms, and labor necessary to complete the work according to the contract documents.

**3.** When there is no item for Class B Deck Repair, but such work is required, payment for each square yard for 5 square yards (square meter for 4 $m^2$) or less will be at three times the contract unit price per square yard (square meter) for Class A Deck Repair. Should the quantity exceed 5 square yards (4 $m^2$), payment will be made as extra work.

**C.** Sealing as required in Article 2413.03, G: included in the contract unit price for Deck Overlay (Class O PCC) or Deck Overlay (Class HPC-O).

**D.** Longitudinal Grooving in Concrete: according to Article 2412.05.

**E.** When Section 2428 applies, payment may be modified as specified therein.

**Reason for Revision:** Several revisions were made related to Class HPC-O PCC deck overlay to improve the concrete mix, placement of the concrete including machine and supplemental vibration of the concrete, and extend the curing period on large projects to increase the concrete strength gain and permeability reduction. Also included a revision regarding Class B concrete repairs to require the contractor to provide a method of concrete removal at the bottom of the bridge deck to prevent feather edging of the concrete.

| | | | | | |
|---|---|---|---|---|---|
| **County or City Input Needed (X one)** | | | **Yes** | **No** X | |
| **Comments:** | | | | | |
| **Industry Input Needed (X one)** | | | **Yes** X | **No** | |
| **Industry Notified:** | **Yes** X | **No** | **Industry Concurrence:** | **Yes** X | **No** |
| **Comments:** | | | | | |

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** John Smythe / Melissa Serio | **Office:** Construction | **Item 4** |
| **Submittal Date:** 8/31/10 | **Proposed Effective Date:** April 2011 | |
| **Article No.:** 2502.05<br>**Title:** Basis of Payment (Subdrains) | **Other:** | |

**Specification Committee Action:** Approved as recommended.

| | | | |
|---|---|---|---|
| **Deferred:** | **Not Approved:** | **Approved Date:** 10/14/2010 | **Effective Date:** 4/19/2011 |

**Specification Committee Approved Text:** See Specification Section Recommended Text.

**Comments:** The Specifications Section wondered if similar language for overdepth excavation needs to be added to the specifications for Storm Sewer, Sanitary Sewer, and Water Main. The Specifications Section will discuss this issue with Paul Wiegand of SUDAS.

The Marshalltown Construction Office wondered if the methodology for determining the price paid for overdepth excavation could be simplified. The Office of Construction will review.

**Specification Section Recommended Text:**

**2502.05, A, 4.**

**Replace** the Article:

When the contract documents do not indicate the depth of excavation, the first 6 feet (1.8 m) of excavation will be included in the contract unit price. Payment will be made for overdepth excavation ~~according to Article 2503.05.~~ as follows:

125% of the delivered cost of pipe per foot (meter) shall be deducted from the original contract unit price per foot (meter) of pipe. The remainder will be considered the contract unit price for excavation and laying of pipe for subdrain of 6 feet (1.8 m) in depth. The contract unit price for excavation and laying of pipe, determined as provided above, will be divided by 6 and this quotient considered the basic excavation and laying price per foot (meter) of pipe, per foot (0.3 m) of depth.

For overdepth excavation required for the placement of subdrain to elevations greater than 6 feet (1.8 m), measured to the nearest foot (0.3 m) below the original ground profile over the trench, the rate of payment will be as shown in the following table:

| Overdepth Excavation* | Percentage of Basic Excavation and Laying Price |
|---|---|
| 1st foot (0.3 m) | 100% |
| 2nd foot (0.3 m) | 120% |
| 3rd foot (0.3 m) | 140% |
| 4th foot (0.3 m) | 160% |
| 5th foot (0.3 m) | 180% |
| 6th foot (0.3 m) | 200% |

*For depths of excavation greater than 12 feet (3.6 m) below original ground profile, payment will be made as extra work, as provided in Article 1109.03, B.

**Comments:**

**Member's Requested Change:** **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**

## 2502.05, Basis of Payment

**4.** When the contract documents do not indicate the depth of excavation, the first 6 feet (1.8 m) of excavation will be included in the contract unit price. Payment will be made for overdepth excavation as follows: ~~according to Article 2503.05.~~

125% of the delivered cost of pipe per foot (meter) shall be deducted from the original contract unit price per foot (meter) of pipe. The remainder will be considered the contract unit price for excavation and laying of pipe for subdrain of 6 feet (1.8 m) in depth. The contract unit price for excavation and laying of pipe, determined as provided above, will be divided by 6 and this quotient considered the basic excavation and laying price per foot (meter) of pipe, per foot (0.3 m) of depth.

For overdepth excavation required for the placement of subdrain to elevations greater than 6 feet (1.8 m), measured to the nearest foot (0.3 m) below the original ground profile over the trench, the rate of payment will be as shown in the following table:

| **Overdepth Excavation*** | **Percentage of Basic Excavation and Laying Price** |
|---|---|
| 1st foot (0.3 m)<br>2nd foot (0.3 m)<br>3rd foot (0.3 m)<br>4th foot (0.3 m)<br>5th foot (0.3 m)<br>6th foot (0.3 m) | 100%<br>120%<br>140%<br>160%<br>180%<br>200% |
| *For depths of excavation greater than 12 feet (3.6 m) below original ground profile, payment will be made as extra work, as provided in Article 1109.03, B. | |

**Reason for Revision:** Information is no longer found in Article 2503.05 because Section 2503 Storm Sewers was replaced with SUDAS spec in the 2009 spec book.

| | | | | | |
|---|---|---|---|---|---|
| **County or City Input Needed (X one)** | | | **Yes** | **No** X | |
| **Comments:** None | | | | | |
| **Industry Input Needed (X one)** | | | **Yes** | **No** X | |
| **Industry Notified:** | **Yes** | **No** | **Industry Concurrence:** | **Yes** | **No** |
| **Comments:** None | | | | | |

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** Deanna Maifield | **Office:** Design | **Item 5** |
| **Submittal Date:** 09/29/10 | **Proposed Effective Date:** 04/19/11 | |
| **Article No.:** Table 2527.02-1, Table 2527.02-2, 2527.03-A-5, 2527.03-D, 2527.03-F-4, 2527.04-B<br>**Title:** Pavement Marking | **Other:** | |

**Specification Committee Action:** Approved as recommended.

| | | | |
|---|---|---|---|
| **Deferred:** | **Not Approved:** | **Approved Date:** 10/14/2010 | **Effective Date:** 4/19/2011 |

**Specification Committee Approved Text:** See Specification Section Recommended Text.

**Comments:** The plan detail that shows pavement marking details is being made into a Road Standard.

**Specification Section Recommended Text:**

**2527.02, D, 2, b, 2, Table 2527.02-1: Waterborne Paint.**

**Delete** the first row of the Table:

| | | | |
|---|---|---|---|
| ~~4 1/2"~~<br>~~(115 mm)~~ | ~~14 mils~~<br>~~(0.35 mm)~~ | ~~305.5 ft. of solid line per gallon of paint.~~<br>~~(24.60 m of solid line per liter of paint.)~~ | ~~9.0 lb./gal.~~<br>~~(1.08 kg/L)~~ |

**2527.02, D, 2, b, 2, Table 2527.02-2: Solvent-Based Paint.**

**Delete** the first row of the Table:

| | | | |
|---|---|---|---|
| ~~4 1/2"~~<br>~~(115 mm)~~ | ~~16 mils~~<br>~~(0.41 mm)~~ | ~~267.4 ft. of solid line per gallon of paint.~~<br>~~(21.53 m of solid line per liter of paint.)~~ | ~~9.0 lb./gal.~~<br>~~(1.08 kg/L)~~ |

**2527.03, A, 5.**

**Replace** the Article:

Ensure the following for all painted and taped pavement markings:

- Uniform thickness,
- Uniform distribution of glass beads throughout the line width,
- Line widths as specified, with a tolerance of ± 1/4 inch for 4 inch (± 6 mm for 100 mm) lines and ± 1/2 inch (13 mm) for wider lines, ~~and~~
- Symbols and Legends are visually proportional to contract documents with an out-to-out tolerance of ± 6 inches (150 mm), and
- Markings have sharp edges and cutoffs at the ends

**2527.03, D, Pavement Marking Requirements.**

**Delete** the Article:

~~**D. Pavement Marking Requirements.**~~

~~Apply the following marking material placement requirements for permanent and temporary standard pavement markings:~~

~~**1. Edge Lines.**~~

~~Solid white lines (solid yellow line for the inside edge line for a multi-lane divided highway, including ramps and crossovers). Place approximately 3 inches (75 mm) from the edge of the pavement.~~

~~**2. Center Lines for Two Lane, Two Way Highways.**~~

~~Single, dashed yellow lines 10 feet (3 m) long with 30 foot (9 m) gaps between dashes.~~

~~**3. Center Lines for Multi-lane, Undivided Highways.**~~

~~Solid yellow lines spaced 10 1/2 inches (270 mm) apart between the inside edges of the lines.~~

~~**4. Lane Lines for Multi-lane Highways (Divided and Undivided).**~~

~~Single, dashed white lines 10 feet (3 m) long with 30 foot (9 m) gaps between dashes.~~

~~**5. No Passing Zone Lines.**~~

~~**a.** Solid yellow lines. For PCC surfaces, place 3 inches (75 mm) outside a 4 1/2 inch (115 mm) center line or 3 1/4 inches (85 mm) outside a 4 inch (100 m) center line. For asphalt surfaces, place 10 1/2 inches (270 mm) from the adjacent center line or no passing zone line.~~

~~**b.** Where there are two no passing zone lines, the center line is to be omitted, and the no passing zone lines are spaced 10 1/2 inches (270 mm) apart between the inside edges of the lines.~~

~~**c.** It is intended that only the two outside paint nozzles be used for painting center lines and no passing zone lines on asphalt surfaces. Painting equipment should be equipped to change from solid line to a dashed line on the two outside paint nozzles.~~

~~**6. Dotted Lines.**~~

~~Dotted lines are usually single, white dotted lines 2 feet (0.6 m) long with 4 foot (1.2 m) gaps between dots.~~

~~**7. Transverse Marking.**~~

~~Transverse marking will be shown in the contract documents.~~

~~**8. Symbols and Legends.**~~

~~Symbols and legends will be shown in the contract documents. Each of the following is a complete unit:~~

~~**a.** Each RxR marking for railroad and highway grade crossing.~~

~~**b.** Each SCHOOL legend (one lane or two lane).~~

~~**c.** Each STOP, X-ING, ONLY, BUS, LANE.~~

~~**d.** Each arrow (straight, left, right, combination, or ramp).~~

~~**9. Solid White Barrier Lines.**~~

~~Solid white barrier lines may also be required in the contract documents.~~

**2527.03, F, 4, Temporary Delineators.**

**Delete** the second sentence of the Article:

~~If not shown, space them at intervals described in Section 3D-5 of the MUTCD.~~

**2527.04, B.**

**Replace** the last sentence of the Article:

Measurement of lines wider than 4 ~~1/2~~ inches (~~115~~ 100 mm) will be adjusted by the quantity factor to a 4 inch (100 mm) line.

**Comments:**

**Member's Requested Change:** **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**

**Section 2527. Pavement Marking**

**2527.02-D-2-b-2 Table 2527.02-1**

**Table 2527.02-1: Waterborne Paint**

| Line Width | Wet-Film Thickness | Paint | Spheres |
|---|---|---|---|
| ~~4 1/2" (115 mm)~~ | ~~14 mils (0.35 mm)~~ | ~~305.5 ft. of solid line per gallon of paint. (24.60 m of solid line per liter of paint.)~~ | ~~9.0 lb./gal. ( 1.08 kg/L)~~ |
| 4" (100 mm) | 14 mils (0.35 mm) | 343.7 ft. of solid line per gallon of paint. (27.68 m of solid line per liter of paint.) | 9.0 lb./gal. (1.08 kg/L) |

**2527.02-D-2-b-2 Table 2527.02-2**

**Table 2527.02-2: Solvent-based Paint**

| Line Width | Wet-Film Thickness | Paint | Spheres |
|---|---|---|---|
| ~~4 1/2" (115 mm)~~ | ~~16 mils (0.41 mm)~~ | ~~267.4 ft. of solid line per gallon of paint. (21.53 m of solid line per liter of paint.)~~ | ~~9.0 lb./gal. (1.08 kg/L)~~ |
| 4" (100 mm) | 16 mils (0.41 mm) | 300.8 ft. of solid line per gallon of paint. (24.22 m of solid line per liter of paint.) | 9.0 lb./gal. (1.08 kg/L) |

**2527.03 Construction**

**A. General**

**5.** Ensure the following for all painted and taped pavement markings:

- Uniform thickness,
- Uniform distribution of glass beads throughout the line width,
- Line widths as specified, with a tolerance of ± 1/4 inch for 4 inch (± 6 mm for 100 mm) lines and ± 1/2 inch (13 mm) for wider lines, ~~and~~
- Symbols and Legends are visually proportional to contract documents with an out-to-out tolerance of ± 6 inches, and
- Markings have sharp edges and cutoffs at the ends

**2527.03 Construction**

~~**D. Pavement Marking Requirements.**~~

~~Apply the following marking material placement requirements for permanent and temporary standard pavement markings:~~

~~**1. Edge Lines.**~~

~~Solid white lines (solid yellow line for the inside edge line for a multi-lane divided highway, including ramps and crossovers). Place approximately 3 inches (75 mm) from the edge of the pavement.~~

~~**2. Center Lines for Two Lane, Two Way Highways.**~~

~~Single, dashed yellow lines 10 feet (3 m) long with 30 foot (9 m) gaps between dashes.~~

~~**3. Center Lines for Multi-lane, Undivided Highways.**~~

~~Solid yellow lines spaced 10 1/2 inches (270 mm) apart between the inside edges of the lines.~~

~~**4. Lane Lines for Multi-lane Highways (Divided and Undivided).**~~

~~Single, dashed white lines 10 feet (3 m) long with 30 foot (9 m) gaps between dashes.~~

~~**5. No Passing Zone Lines.**~~

~~**a.** Solid yellow lines. For PCC surfaces, place 3 inches (75 mm) outside a 4 1/2 inch (115 mm) center line or 3 1/4 inches (85 mm) outside a 4 inch (100 m) center line. For asphalt surfaces, place 10 1/2 inches (270 mm) from the adjacent center line or no passing zone line.~~

~~**b.** Where there are two no passing zone lines, the center line is to be omitted, and the no passing zone lines are spaced 10 1/2 inches (270 mm) apart between the inside edges of the lines.~~

~~**c.** It is intended that only the two outside paint nozzles be used for painting center lines and no passing zone lines on asphalt surfaces. Painting equipment should be equipped to change from solid line to a dashed line on the two outside paint nozzles.~~

~~**6. Dotted Lines.**~~

~~Dotted lines are usually single, white dotted lines 2 feet (0.6 m) long with 4 foot (1.2 m) gaps between dots.~~

~~**7. Transverse Marking.**~~

~~Transverse marking will be shown in the contract documents.~~

~~**8. Symbols and Legends.**~~

~~Symbols and legends will be shown in the contract documents. Each of the following is a complete unit:~~

~~**a.** Each RxR marking for railroad and highway grade crossing.~~

~~**b.** Each SCHOOL legend (one lane or two lane).~~

~~**c.** Each STOP, X-ING, ONLY, BUS, LANE.~~

~~**d.** Each arrow (straight, left, right, combination, or ramp).~~

~~**9. Solid White Barrier Lines.**~~

~~Solid white barrier lines may also be required in the contract documents.~~

**2527.03 Construction**

**F. Temporary Pavement Marking.**

The location of temporary pavement marking will be shown in the contract documents or as directed by the Engineer. Temporary pavement marking includes:

**4. Temporary Delineators.**

Erect temporary delineators (when required) as shown in the contract documents. ~~If not shown, space them at intervals described in Section 3D-5 of the MUTCD.~~ Temporary delineators will usually be single, white reflectors which are to be placed:

- 2 feet (0.6 m) beyond the outside edge of the shoulder, and
- 4 feet (1.2 m) above the edge of the pavement on delineator posts.

**2527.04 Method of Measurement**

**B.** The Engineer will measure the number of stations (meters), based on a single 4-inch (100 mm) width, of painted, taped, and/or removed line. The length of each type of markings will be determined using beginning and ending points, and adjusting for breaks at side roads, median crossings, station equations, or other locations shown in the contract documents. The measurement for dashed and dotted lines will be adjusted to exclude skips. Measurement of lines wider than 4 ~~1/2~~ inches (~~115~~ 100 mm) will be adjusted by the quantity factor to a 4 inch (100 mm) line.

**Reason for Revision:**

**Table 2527.02-1** and **Table 2527.02-2** both refer to 4 ½" line widths. Road Design Detail 9001 (Standard Types of Pavement Markings) no longer shows the 4 ½" line widths.

**2527.03-A-5** In order to correct various differences between Road Design Details and the 2009 MUTCD Standard Highway Signs release, adjustments to the Road Design Details showing the Symbols and Legends needed to be made. In order to allow older marking templates that still provide the same visual cues but are no longer exact in their dimensions, we felt the need to add another bullet allowing for such differences.

**2527.03-D** These line types are shown in the new Pavement Marking standards (04/19/11) and include updated dimensions and line types introduced in the new MUTCD.

**2527.03-F-4** To determine quantity and placement, the designer will have to determine the spacing interval and it will be shown in the contract documents. As a second note of interest, the MUTCD Section 3D-5 has become Section 3F.04 and the spacing intervals appear in Table 3F-1.

**2527.04-B** To adjust for the change away from 4 1/2" wide lines, the standard line is now 4" wide and all lines wider than that should be adjusted by the quantity factor to a 4" line.

| | | | | | |
|---|---|---|---|---|---|
| **County or City Input Needed (X one)** | | | **Yes** | **No** X | |
| **Comments:** | | | | | |
| **Industry Input Needed (X one)** | | | **Yes** | **No** X | |
| **Industry Notified:** | **Yes** | **No** X | **Industry Concurrence:** | **Yes** | **No** |
| **Comments:** | | | | | |

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** Deanna Maifield | **Office:** Design | **Item 6** |
| **Submittal Date:** 09/24/10 | **Proposed Effective Date:** 4/19/11 | |
| **Article No.:** 2528.03, G, 1<br>**Title:** Lighting Devices | **Other:** | |

**Specification Committee Action:** This revision was withdrawn by the Office of Design.

| | | | |
|---|---|---|---|
| **Deferred:** | **Not Approved:** X | **Approved Date:** | **Effective Date:** |

**Specification Committee Approved Text:**

**Comments:** The Offices of Construction and Traffic and Safety did not see this issue as causing any problems and preferred not to make a revision.

By including a road standard indicating one or the other, the contract documents will specify one or the other and the contractors will bid accordingly.

**Specification Section Recommended Text:**

**2528.03, G, 1, Lighting Devices.**

**Replace** the first sentence:

Furnish lighting devices as required ~~by the contract documents~~.

**Comments:**

**Member's Requested Change:** **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**

**2528.03, G, 1, Lighting Devices.**

**Replace** the first sentence:

Furnish lighting devices ~~as required by the contract documents~~.

**Reason for Revision:** Designers won't always know which type of barricade warning lights, Type A or Type B, a project will require.

| | | | | | |
|---|---|---|---|---|---|
| **County or City Input Needed (X one)** | | | **Yes** | **No** X | |
| **Comments:** | | | | | |
| **Industry Input Needed (X one)** | | | **Yes** | **No** X | |
| **Industry Notified:** | **Yes** | **No** X | **Industry Concurrence:** | **Yes** | **No** |
| **Comments:** | | | | | |

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** Jim Berger | **Office:** Materials | **Item 7** |
| **Submittal Date:** August 23, 2010 | **Proposed Effective Date:** April 2011 | |
| **Article No.:** 2529.02, B, 8<br>**Title:** Transit Mix Concrete **(**Full Depth Finish Patches) | **Other:** | |

**Specification Committee Action:** This item was deferred until the next Specifications Committee meeting.

| | | | |
|---|---|---|---|
| **Deferred:** X | **Not Approved:** | **Approved Date:** | **Effective Date:** |

**Specification Committee Approved Text:**

**Comments:** The District 6 Office questioned whether I.M. 403 gives times for the determined dosage rates.

The District 6 Office asked if the Office of Materials will be doing testing on use of retarder and calcium chloride.

Deferred per request (following meeting) from the Office of Materials. The Offices of Materials and Construction will review prior to next meeting.

**Specification Section Recommended Text:**

**2529.02, B, 8, Transit Mix Concrete.**

**Replace** the Article:

Use a mix from a plant from which the concrete can be delivered and placed within 60 minutes from the time of mixing. With the Engineer's approval, ~~T~~the time may be extended ~~to 90 minutes~~ when a retarding admixture~~, used according to~~ in Materials I.M. 403 ~~including temperature dosage guidelines (and at no additional cost to the Contracting Authority),~~ is added at the plant (at no additional cost to the Contracting Authority). Determine dosage rate based on desired haul time. Continuous mixing equipment using volumetric proportioning may be used according to Article 2001.20, E. Place the concrete within 30 minutes after introduction of calcium chloride.

**Comments:**

**Member's Requested Change (Redline/Strikeout):**

**8. Transit Mix Concrete.**

Use a mix from a plant from which the concrete can be delivered and placed within 60 minutes from the time of mixing. With the Engineer's approval, t~~T~~he time may be extended ~~to 90 minutes~~ when a retarding admixture~~, used according to~~ in Materials I.M. 403 ~~including temperature dosage guidelines (and at no additional cost to the Contracting Authority),~~ is added at the plant (at no additional cost to the Contracting Authority). Determine dosage rate based on desired haul time. Continuous mixing equipment using volumetric proportioning may be used according to Article 2001.20, E. Place the concrete within 30 minutes after introduction of calcium chloride.

**Reason for Revision:**

| | | |
|---|---|---|
| **County or City Input Needed (X one)** | **Yes** | **No** |
| **Comments:** | | |

| | | | | | |
|---|---|---|---|---|---|
| **Industry Input Needed (X one)** | | | **Yes** | **No** | |
| **Industry Notified:** | **Yes** X | **No** | **Industry Concurrence:** | **Yes** | **No** |

**Comments:** Clarification of retarder usage for patching.

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** Deanna Maifield | **Office:** Design | **Item 8** |
| **Submittal Date:** 2010.10.04 | **Proposed Effective Date:** 4/19/10 | |
| **Article No.:** 2529.03, A,<br>**Title:** General | **Other:** | |

**Specification Committee Action:** Approved as recommended.

| | | | |
|---|---|---|---|
| **Deferred:** | **Not Approved:** | **Approved Date:** 10/14/2010 | **Effective Date:** 4/19/2011 |

**Specification Committee Approved Text:** See Specification Section Recommended Text.

**Comments:** No comments.

**Specification Section Recommended Text:**

**2529.03, A, 1.**

**Delete** the last sentence:

~~A detail, typical of each type of patch, will be shown.~~

**Comments:**

**Member's Requested Change:** **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**

**2529.03, A, 1, General.**

**Delete** the last sentence:

~~A detail, typical of each type of patch, will be shown.~~

**Reason for Revision:** We do not have standards or details for HMA patches.

| | | |
|---|---|---|
| **County or City Input Needed (X one)** | **Yes** | **No** X |
| **Comments:** | | |

| | | | | | |
|---|---|---|---|---|---|
| **Industry Input Needed (X one)** | | | **Yes** | **No** X | |
| **Industry Notified:** | **Yes** | **No** X | **Industry Concurrence:** | **Yes** | **No** |
| **Comments:** | | | | | |

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** Deanna Maifield | **Office:** Design | **Item 9** |
| **Submittal Date:** 9/24/10 | **Proposed Effective Date:** 4/19/11 | |
| **Article No.:** 2529.04<br>**Title:** Method of Measurement<br>**Article No.:** 2529.05<br>**Title:** Basis of Payment | **Other:** | |

**Specification Committee Action:** This item was deferred until the next Specification Committee meeting in November.

| | | | |
|---|---|---|---|
| **Deferred:** X | **Not Approved:** | **Approved Date:** | **Effective Date:** |

**Specification Committee Approved Text:**

**Comments:** Some offices are concerned that the DOT is paying for transverse subdrains on all patches whether they are required or not, because the contractor doesn't know if they will be required. This will hopefully reduce the cost of patches, since the transverse subdrains will be paid for separately.

The Office of Contracts asked if "Longitudinal Subdrains (Patches)" is the correct name for this item since they are constructed in the transverse direction. The Office of Design used the longitudinal subdrain designation because they are constructed per longitudinal subdrain details.

The Specifications Section asked how the patching specifications connect back to the subdrain specifications. Specification language will need to be added to Section 2529 to include materials and construction methods (can be handled by reference to Section 2502).

The Office of Design will re-submit this item with added specification language for patch subdrains.

**Specification Section Recommended Text:**

**2529.04, D, 2.**

**Delete** the third bullet:

- ~~Construction of transverse subdrains, and~~

**2529.04, Method of Measurement**

**Renumber** Articles E and F and **Add** new article:

**E. Longitudinal Subdrains (Patches).**
By count.

~~**E**~~ **F. Removal of Anchor Lugs.**

~~**F**~~ **G. Rumble Strip Panel (In Full Depth Patch)**

**2529.05, Basis of Payment.**

**Renumber** Articles E and F and **Add** new article:

**E. Longitudinal Subdrains (Patches).**

**1.** Each.

**2.** Payment is full compensation for furnishing and installing shoulder material, impervious fill, porous backfill, 4 inch (100 mm) perforated corrugated polyethylene pipe, and rodent guard.

~~**E**~~ **F. Removal of Anchor Lugs.**

**~~F~~ G. Rumble Strip Panel (In Full Depth Patch)**

**Comments:**

**Member's Requested Change:** **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**

**2529.04, Method of Measurement.**

**D. Subbase (Patches).**

**2.** Payment is full compensation for:

- Furnishing and installing subbase,
- Additional excavation necessary for this placement and the removal of excavated material,

**Remove third bullet**

- ~~Construction of transverse subdrains, and~~
- Placing backfill material in the disturbed shoulder area.

**Add** a new article:

**E. Longitudinal Subdrains (Patches).**

By count.

Renumber Articles E and F as Articles F and G respectively.

**2529.05, Basis of Payment.**

**Add** a new article:

**E. Longitudinal Subdrains (Patches).**

**1.** Each.

**2.** Payment is full compensation for furnishing and installing shoulder material, impervious fill, porous backfill, 4 inch perforated corrugated polyethylene pipe, and rodent guard.

Renumber Articles E and F as Articles F and G respectively.

**Reason for Revision:** This change is associated with Standard Road Plan RR-26. Because of the work and materials involved, Design feels installation of the subdrain should be paid for separately. Contracts will create a bid item after this change has been approved.

| | | | | | |
|---|---|---|---|---|---|
| **County or City Input Needed (X one)** | | | **Yes** | **No** X | |
| **Comments:** | | | | | |
| **Industry Input Needed (X one)** | | | **Yes** | **No** X | |
| **Industry Notified:** | **Yes** | **No** X | **Industry Concurrence:** | **Yes** | **No** |
| **Comments:** | | | | | |

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** Jim Berger | **Office:** Materials | **Item 10** |
| **Submittal Date:** August 23, 2010 | **Proposed Effective Date:** April 2011 | |
| **Article No.:** 2530.02, B, 4, h<br>**Title:** Transit Mix Concrete (Partial Depth Finish Patches) | **Other:** | |

**Specification Committee Action:** This item was deferred until the next Specification Committee meeting.

| | | | |
|---|---|---|---|
| **Deferred:** X | **Not Approved:** | **Approved Date:** | **Effective Date:** |

**Specification Committee Approved Text:**

**Comments:** The District 6 Office questioned whether I.M. 403 gives times for the determined dosage rates.

The District 6 Office asked if the Office of Materials will be doing testing on use of retarder and calcium chloride.

Deferred per request (following meeting) from the Office of Materials. The Offices of Materials and Construction will review prior to next meeting.

**Specification Section Recommended Text:**

**2530.02, B, 4, h, Transit Mix Concrete.**

**Replace** the Article:

Use a mix from a plant from which the concrete can be delivered and placed within 60 minutes from the start of mixing. With the Engineer's approval, ~~T~~the time may be extended ~~to 90 minutes~~ when a retarding admixture~~, used according to~~ in Materials I.M. 403 ~~including temperature dosage guidelines (and at no additional cost to the Contracting Authority),~~ is added at the plant (at no additional cost to the Contracting Authority). Determine dosage rate based on desired haul time. Continuous mixing equipment using volumetric proportioning may be used according to Article 2001.20, E.

**Comments:**

**Member's Requested Change (Redline/Strikeout):**

**h. Transit Mix Concrete.**

Use a mix from a plant from which the concrete can be delivered and placed within 60 minutes from the start of mixing. With the Engineer's approval, t~~T~~he time may be extended ~~to 90 minutes~~ when a retarding admixture~~, used according to~~ in Materials I.M. 403 ~~including temperature dosage guidelines (and at no additional cost to the Contracting Authority),~~ is added at the plant (at no additional cost to the Contracting Authority). Determine dosage rate based on desired haul time. Continuous mixing equipment using volumetric proportioning may be used according to Article 2001.20, E.

**Reason for Revision:**

| | | |
|---|---|---|
| **County or City Input Needed (X one)** | **Yes** | **No** |
| **Comments:** | | |
| **Industry Input Needed (X one)** | **Yes** | **No** |

| | | | | | |
|---|---|---|---|---|---|
| **Industry Notified:** | **Yes** X | **No** | **Industry Concurrence:** | **Yes** | **No** |

**Comments:** Clarification of retarder usage for patching.

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** John M. Smythe | **Office:** Construction | **Item 11** |
| **Submittal Date:** July 9, 2010 | **Proposed Effective Date:** April 2011 | |
| **Article No.:** 2533.05, A<br>**Title:** Basis of Payment (Partial Payments, Mobilization) | **Other:** | |

**Specification Committee Action:** Approved with changes.

| | | | |
|---|---|---|---|
| **Deferred:** | **Not Approved:** | **Approved Date:** 10/14/2010 | **Effective Date:** 4/19/2011 |

**Specification Committee Approved Text:**

**2533.05, A, 1.**

**Replace** the Article:

Partial payment of mobilization will be made for each project within 30 calendar days after receipt of a signed contract. This partial payment will be either 10% of the contract price for this item or 1% of the original project sum, whichever is less. If the partial payment for a project is less than $1000, the Engineer will delay this partial payment until 5% of the ~~original~~ awarded project ~~sum~~ total is earned.

**Comments:** Since payments are made on a project basis, adding "for a project" may keep the DOT from having to write small partial payment of mobilization checks for tied projects.

The Office of Local Systems requested that the phrase "original project sum" be revised because it can be misleading.

The FHWA pointed out that this revision does not change when the contractor earns the partial payment of mobilization. Changing the language to say the contractor earns the partial payment of mobilization 30 days after receipt of a signed contract will not necessarily solve the issue.

**Specification Section Recommended Text:**

**2533.05, A, 1.**

**Replace** the Article:

Partial payment of mobilization will be made for each project within 30 calendar days after receipt of a signed contract. This partial payment will be either 10% of the contract price for this item or 1% of the original project sum, whichever is less. If the partial payment for a project is less than $1000, the Engineer will delay this partial payment until 5% of the original project sum is earned.

**Comments:** Since the committee member who proposed this revision could not attend the September Specification Committee meeting, this item was deferred to the October meeting.

**Member's Requested Change:** **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**

**Section 2533**

**2533.05, A, 1.**

**Replace** the Article:

Partial payment of mobilization will be made for each project within 30 days after receipt of a signed contract. This partial payment will be either 10% of the contract price for this item or 1% of the original project sum, whichever is less. If the partial payment for a project is less than $1000, the Engineer will delay this partial payment until 5% of the original project sum is earned.

**Reason for Revision:** The FHWA has determined that the initial partial payment is due immediately upon receipt of a signed contract. The 30 day window allows for normal processing time after receipt of the signed contract. For multiple project contracts, mobilization for each project will be considered separately.

| | | |
|---|---|---|
| **County or City Input Needed (X one)** | **Yes** | **No** X |
| **Comments:** | | |
| **Industry Input Needed (X one)** | **Yes** | **No** X |

| **Industry Notified:** | **Yes** | **No** | **Industry Concurrence:** | **Yes** | **No** |
|---|---|---|---|---|---|
| **Comments:** | | | | | |

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** Jim Berger | **Office:** Materials | **Item 12** |
| **Submittal Date:** 2010.10.01 | **Proposed Effective Date:** 2011.04 | |
| **Article No.:** 4133.04<br>**Title:** Granular Backfill Material<br>**Article No.:** 4109.02, note 9.<br>**Title:** Granular Backfill Material Gradation note | **Other:** | |

**Specification Committee Action:** Approved as recommended.

| | | | |
|---|---|---|---|
| **Deferred:** | **Not Approved:** | **Approved Date:** 10/14/2010 | **Effective Date:** 4/19/2011 |

**Specification Committee Approved Text:** See Specification Section Recommended Text.

**Comments:** District 4 Materials explained that this revision resolves conflicts between Article 4133.04 and Note 9 of the Aggregate Gradation Table.

**Specification Section Recommended Text:**

**4133.04 BACKFILL MATERIAL UNDER FLOWABLE MORTAR.**

**Replace** Articles B and C and **Add** new Article:

**B.** Porous Backfill Material complying with ~~the requirements for Gradation No. 29 of the Aggregate Gradation Table, Article 4109.02~~ Section 4131.

**C.** Floodable Backfill Material complying with Section 4134.

**D.** Granular Subbase Material complying with Section 4121.

**Appendix, Aggregate Gradation Table (English)**

**Delete** Note 9:

~~**9.** When granular backfill material is used in floodable applications, use gradation 35 or 36. When granular backfill material is used under flowable mortar, one of the following alternative materials shall be used: natural sand compliant with Section 4110 (except the % passing the No. 200 sieve shall not exceed 4%) or gravel, crushed stone, or crushed concrete meeting the gradation requirements of Section 4121.~~

**Appendix, Aggregate Gradation Table (Metric)**

**Delete** Note 9:

~~**9.** When granular backfill material is used in floodable applications, use gradation 35 or 36. When granular backfill material is used under flowable mortar, one of the following alternative materials shall be used: natural sand compliant with Section 4110 (except the % passing the 75 µm sieve shall not exceed 4%) gravel, crushed stone, or crushed concrete meeting the gradation requirements of Section 4121.~~

**Comments:**

**Member's Requested Change (Redline/Strikeout):**

**Section 4133. Granular Backfill Material**

**4133.04 BACKFILL MATERIAL UNDER FLOWABLE MORTAR.**

Use one of the following:

**A.** Natural sand complying with the requirements for Gradation No. 1 of the Aggregate Gradation Table, Article 4109.02, with a maximum of 4% passing the No. 200 (75 µm) sieve.

**B.** ~~Material~~ Porous Backfill complying with ~~the requirements for Gradation No. 29 of the Aggregate Gradation Table, Article 4109.02.~~ Section 4131.

**C.** ~~Material~~ Floodable Backfill Material complying with Section 4134.

**D.** Granular Subbase complying with Section 4121.

**Section 4109. Aggregate Gradations**

**4109.02 Gradation**

Note 9. ~~When granular backfill is used in floodable applications, use gradation 35 or 36. When granular backfill is used under flowable mortar, one of the following alternative materials shall be used: natural sand compliant with Section 4110, except the % passing the No. 200 sieve shall not exceed 4%; gravel, crushed stone, or crushed concrete meeting the gradation requirements of Section 4121.~~

**Reason for Revision:**

For consistency and clarification.

**4133**

4133.04 Granular Backfill Material did not list Granular Subbase and Gradation Table note 9 does.

4133.04 Granular Backfill Material lists Porous Backfill and Gradation Table note 9 does not.

4133.04 Granular Backfill Material does not list the use of recycled PCC and Gradation Table note 9 does.

Adding D. would allow recycled PCC under Flowable Mortar.

All though with the reference to the different material in 4133 (rather than the gradations) will require different quality requirements; this will be easier to understand as a Producer can go to stockpiles produced for specific products. This more directly addresses the intent rather than referring to the gradation number.

**Note 9.**

Note 9 reference to floodable applications was written before Floodable Backfill became 4134.

With the reference within the specification to other products, there is no need for note 9.

| | | | | | |
|---|---|---|---|---|---|
| **County or City Input Needed (X one)** | | | **Yes** | **No** X | |
| **Comments:** | | | | | |
| **Industry Input Needed (X one)** | | | **Yes** | **No** X | |
| **Industry Notified:** | **Yes** | **No** X | **Industry Concurrence:** | **Yes** | **No** |
| **Comments:** | | | | | |

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** Jim Berger / Todd Hanson | **Office:** Materials | **Item 13** |
| **Submittal Date:** August 30, 2010 | **Proposed Effective Date:** April 2011 | |
| **Article No.:** 4112.02, A<br>**Title:** Intermediate Aggregate (PCC) | **Other:** | |

**Specification Committee Action:** Approved as recommended.

| | | | |
|---|---|---|---|
| **Deferred:** | **Not Approved:** | **Approved Date:** 10/14/2010 | **Effective Date:** 4/19/2011 |

**Specification Committee Approved Text:** See Specification Section Recommended Text.

**Comments:** No comments.

**Specification Section Recommended Text:**

**4112.02, A, Intermediate Aggregate.**

**Replace** the first line of the gradation limits:

| | |
|---|---|
| 1/2 inch (12.5 mm) | 95-100 |

**Comments:**

**Member's Requested Change (Redline/Strikeout):**

**4112.02 GRADATION.**

**A. Intermediate Aggregate.**

For gradations, intermediate aggregate is considered coarse aggregate. Meet the following gradation limits:

| **Sieve Size** | **% Passing** |
|---|---|
| 1/2 inch (12.5 mm) | 95-100 |
| No. 4 (4.75 mm) | 0-10 |

**Reason for Revision:**

| | | |
|---|---|---|
| **County or City Input Needed (X one)** | **Yes** | **No** |

**Comments:**

| | | | | | |
|---|---|---|---|---|---|
| **Industry Input Needed (X one)** | | | **Yes** | **No** | |
| **Industry Notified:** | **Yes** X | **No** | **Industry Concurrence:** | **Yes** x | **No** |

**Comments:** Some pea gravel sources have a very small amount of material retained on the ½ sieve. Most are 98-99% passing the 1/2" sieve. When using in QMC or BR mixes, this small amount has little affect on the overall combined grading. Allowing 95-100% passing will prevent issues for producers and project audits.

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** Jim Berger / Vanessa Goetz | **Office:** Materials | **Item 14** |
| **Submittal Date:** September 29, 2010 | **Proposed Effective Date:** April 2011 | |
| **Article No.:** 4163.02<br>**Title:** Species of Wood | **Other:** | |

**Specification Committee Action:** Approved as recommended.

| | | | |
|---|---|---|---|
| **Deferred:** | **Not Approved:** | **Approved Date:** 10/14/2010 | **Effective Date:** 4/19/2011 |

**Specification Committee Approved Text:** See Specification Section Recommended Text.

**Comments:** The Office of Materials explained that only Douglas Fir (coast region), Northern Pine, and Southern Pine can be treated except in the case of wood posts when any species within the pine family can be used.

**Specification Section Recommended Text:**

**4163.02, A.**

**Replace** the Article:

Unless specified otherwise, ~~T~~treat only Douglas Fir (coast region), Northern Pine, and Southern Pine.

**Comments:**

**Member's Requested Change:** **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**

**4163.02 SPECIES OF WOOD.**

**A.** Unless specified otherwise, treat only Douglas Fir (coast region), Northern Pine, and Southern Pine.

**Reason for Revision:** Specification Section 4164.02-B-2 allows the use of pine species without restriction within the pine family. This includes lodge pine, ponderosa pine, white pine, etc.

| | | | | | |
|---|---|---|---|---|---|
| **County or City Input Needed (X one)** | | | **Yes** | **No** | |
| **Comments:** | | | | | |
| **Industry Input Needed (X one)** | | | **Yes** | **No** | |
| **Industry Notified:** | **Yes** | **No** | **Industry Concurrence:** | **Yes** | **No** |
| **Comments:** | | | | | |

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** John Smythe / Melissa Serio | **Office:** Construction | **Item 15** |
| **Submittal Date:** September 23, 2010 | **Proposed Effective Date:** January 19, 2011 | |
| **Article No.:**<br>**Title:** | **Other:** DS-09XXX Developmental Specifications for Compaction with Moisture and Density Control | |

**Specification Committee Action:** Approved as recommended.

| | | | |
|---|---|---|---|
| **Deferred:** | **Not Approved:** | **Approved Date:** 10/14/2010 | **Effective Date:** 1/19/2011 |

**Specification Committee Approved Text:** See attached Draft DS for Compaction with Moisture and Density Control.

**Comments:** Melissa Serio will be the controller of this DS.

The Office of Design asked if this DS will be used every time the bid item for Compaction with Moisture and Density Control is used. It will not be used all of the time, Melissa will assign the DS when applicable. This DS may become standard practice in the future and incorporated into the Standard Specifications.

**Specification Section Recommended Text:** See attached Draft DS for Compaction with Moisture and Density Control.

**Comments:**

**Member's Requested Change:** **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**

**See attached Developmental Specifications**

**Reason for Revision:**

Created DS to provide for contractor QC testing when project has compaction with moisture and density control.

| | | |
|---|---|---|
| **County or City Input Needed (X one)** | **Yes** | **No** X |
| **Comments:** None | | |
| **Industry Input Needed (X one)** | **Yes** | **No** X |

| | | | | | |
|---|---|---|---|---|---|
| **Industry Notified:** | **Yes** | **No** | **Industry Concurrence:** | **Yes** | **No** |
| **Comments:** None | | | | | |

**DS-09XXX**
**(New)**

Iowa Department of Transportation

**DEVELOPMENTAL SPECIFICATIONS**
**FOR**
**COMPACTION WITH MOISTURE AND DENSITY CONTROL**

**Effective Date**
**January 19, 2011**

**THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.**

**09XXX.01 DESCRIPTION.**
Place and compact embankment materials at the required moisture content and density as shown in the contract documents. Test and ensure moisture content of soil being placed is within specified range and in-place density meets minimum requirements.

**09XXX.02 MATERIAL.**
Soils placed with compaction with moisture and density control may be select, Class 10, or unsuitable.

**09XXX.03 CONSTRUCTION.**

**A. Quality Control Program (Embankment Construction).**

**1.** Provide and maintain a Quality Control Program (Embankment Construction), defined as all activities of sampling, testing, process control inspection, and necessary adjustments for construction of embankments to meet the requirements of this specification.

**2.** Provide a Quality Control Technician as part of the Quality Control Program (Embankment Construction), to perform testing on all embankment soils placed with Compaction with Moisture and Density Control. As a minimum, the Quality Control Technician shall have a high school education and shall obtain 'Soils Technician Lab Certification' through a two day course held at Des Moines Area Community College (DMACC) in Boone through the Technical Training and Certification Program (TTCP) of the Department. Arrange training through the Iowa DOT's Office of Construction (telephone 515.239.1280). TTCP requirements of Materials I.M. 213 apply.

**3.** Ensure the Quality Control Technician is present on the project when embankment is being placed with Compaction with Moisture and Density Control.

**4.** Provide a laboratory facility and necessary calibrated equipment to perform required tests.

**B. Test Procedures.**

**1.** Use test procedures and equipment complying with applicable Materials I.M.'s, Iowa DOT Materials Laboratory Test Methods, or equivalent standards of AASHTO or ASTM.

**2.** Allow the Engineer to review equivalent standards. Use equivalent standards only if approved by the Engineer.

**3.** Acceptable test methods for determining moisture content and density are:

- Oven drying AASHTO T 265
- Pan drying AASHTO T 265 modified to use an open burner
- Microwave ASTM D 4643
- Nuclear gauge Materials I.M. 334
- Density of soil cores Materials I.M. 326
- Sand Cone Test ASTM D 1556

**4.** Use AASHTO T 265 oven drying method for the reference method for calibration.

**C. Embankment Construction.**

**1. General.**
Apply Section 2107 of the Standard Specifications, except when amended by requirements of this specification. Verify embankment placed with moisture and density control meets the requirements of Article 2107.03, H of the Standard Specifications.

**2. Moisture and Density Control.**

**a.** Determine optimum moisture content and maximum density by Proctor testing of soil being placed. Determine optimum moisture and maximum density for each type of excavated or mixed soil which varies as to change the expected AASHTO classification, or if directed by the Engineer.

**b.** With Engineer's approval, and for soils that can be identified during excavation, the Contractor may use the optimum moisture content and maximum density as shown on the soils 'Q' sheets in the contract documents. In lieu of using values from the 'Q' sheets, the Contractor may choose to determine optimum moisture and maximum density from a field sample.

**c.** If the Engineer deems the optimum moisture and maximum density of material being excavated and/or mixed is not represented by that shown on the 'Q' sheets, determine optimum moisture and maximum density from a field sample.

**d.** When determined from a field sample at the option of the Contractor or at the Engineer's request, the optimum moisture and maximum density values from the field sample prevail over that shown on the 'Q' sheets.

**e.** Test and verify that moisture content of material placed under the item 'Compaction with Moisture and Density Control' is within optimum moisture content range and greater than or equal to required minimum density. Upper and lower control limits for field moisture content of embankment material will be shown in the contract documents**.**

**f.** Disk to reduce moisture if, after initial disking to break down lumps greater than 12 inches (0.3 m) as required by Article 2107.03, D, 2, d, of the Standard Specifications, the deposited soil material contains moisture in excess of the specified moisture limits.

**g.** If, after initial disking as required by Article 2107.03, D, 2, d, of the Standard Specifications, the material is dry to the extent that it is not within the range of the optimum moisture of the soil to allow satisfactory compaction by rolling, uniformly moisten the material to the required limits before it is compacted.

**h.** Proceed with aeration, watering, and compaction operations in an orderly fashion without unreasonable and unnecessary delay. Compensation will not be allowed for delays resulting from the ordering of moistening or disking.

**i.** Verify soil accepted for final placement is within the specified moisture control limits and meets the in-place density requirements.

**3. Compaction.**
Apply Article 2107.03, E, of the Standard Specifications.

**4. Equipment.**
Apply Article 2107.03, B of the Standard Specifications, except that for compaction of granular sand soils classified as AASHTO M 145 Group A-1, A-2, or A-3 and having 15% or less combined silt/clay content (percent passing the No. 200 (75 µm sieve) use:

- Pneumatic tired rollers as described in Articles 2001.05, C and 2001.05, D of the Standard Specifications, or
- Self-propelled vibratory rollers as described in Article 2001.05, F of the Standard Specifications.

**D. Test Frequency during Embankment Construction.**

**1.** Test for proctor optimum moisture content and embankment moisture content and density at minimum frequencies in Materials I.M. 204. Samples will be randomly selected.

**2.** If source of excavation and moisture have been consistent and within moisture control limits, moisture and density testing of each lift by Article 2107.03, H of the Standard Specifications will be waived for areas less than 1300 cubic yards (1000 $m^3$), or for embankment placed as median dikes (Standard Road Plan RL-4) or safety dikes (Standard Road Plan RL-7). Where testing per lift is waived, test randomly selected samples at a minimum frequency of one test per compacted volume of 1300 cubic yards (1000 $m^3$).

**E. Field Records.**
Document observations, records and inspection, changes in soil type, soil moisture and density, fill placement procedures, and test results on a weekly basis. Note results of observations and records of inspection in a permanent field record as they occur. Submit copies of field moisture and density tests to the Engineer weekly. Submit original testing records (raw field and lab data sheets) and control charts to the Engineer in a neat and orderly manner within five calendar days after completion of the project.

**F. Corrective Action.**
Notify Engineer when a moisture content falls outside the specified control limits or density falls below required minimum. If a single moisture content falls outside of control limits, fill material in this area will be considered unacceptable for compaction. Perform corrective action(s) to bring uncompacted fill material, after a retest, within specified moisture control limits. If material has been compacted, disk it, bring to within moisture control limits, and recompact. If a single density does not meet the requirements, compacted fill material in this area will be considered unacceptable. Perform corrective action(s) to material to meet density requirements.

**G. Quality Assurance.**

**1. Required Testing.**

**a.** Contractor's Quality Control Technician shall perform field testing and data analysis. Quality Control Technician shall retain split samples of Materials I.M. 309 testing when requested by the Engineer. The Engineer may select any or all Contractor-retained split samples for independent assurance testing.

**b.** The Engineer will determine the random location of moisture and density verification tests and will test at the minimum frequencies in Materials I.M. 204. Contractor’s Quality Control Technician shall obtain a sample at the same location as directed by the Engineer and provide results to the Engineer. Verification test results will be provided to the Contractor within one working day after the Contractor's quality control test results have been reported.

**c.** The Engineer will periodically witness field testing being performed by the Contractor. If the Engineer observes quality control field tests are not being performed according to the applicable test procedures, the Engineer may stop production until corrective action is taken. The Engineer will notify the Contractor of observed deficiencies, promptly, both verbally and in writing. The Engineer will document witnessed testing.

**d.** Quality control test results become part of project files.

**2. Verification and Independent Assurance Testing.**

**a.** Contractor's quality control test results will be validated by the Engineer's verification test results using the criteria in Materials I.M. 216. If Engineer's verification test results validate Contractor's test results, Contractor's results will be used for material acceptance.

**b.** In the event that the Contractor's results cannot be validated, Engineer will investigate the reason immediately. Engineer's investigation may include:

- Testing of other locations,
- Observations of Contractor's testing procedures and equipment, and
- Comparison of test results of Contractor with those of the Engineer.

**c.** Personnel and laboratories performing tests used in acceptance of material shall participate in the independent assurance program covered in Materials I.M. 205.

**3. Referee Testing.**

If a difference in procedures for sampling and testing and/or test results exists between the Contractor and the Engineer which they cannot resolve, the Iowa DOT's Central Materials Laboratory will provide referee testing. The Engineer and Contractor will abide by results of referee testing.

**H. Acceptance.**

The Engineer will base final acceptance of tests and materials on results of the Contractor's quality control testing as verified by Engineer's quality assurance.

**09XXX.04 METHOD OF MEASUREMENT.**

**A.** The quantity of embankment requiring Compaction with Moisture and Density Control, in cubic yards (cubic meters), will be the quantity shown in the contract documents as determined by the template fill volume. Shrinkage will not be included in moisture and density control quantity.

**B.** Excavation in preparation for and construction of embankment with moisture and density control will be included in Class 10 Excavation according to Article 2102.04 of the Standard Specifications.

**09XXX.05 BASIS OF PAYMENT.**

**A.** Payment for Compaction with Moisture and Density Control will be the contract unit price in cubic yards (cubic meters) for the quantity of embankment placed with moisture and density control.

**B.** Payment is full compensation for furnishing a Quality Control Technician, sampling and testing, process control inspection, working of drying material, furnishing and applying water, controlling moisture content of the materials, and compacting the materials to the required density, as specified.

**SPECIFICATION REVISION SUBMITTAL FORM**

| | | |
|---|---|---|
| **Submitted by:** John Smythe / Kevin Merryman | **Office:** Construction | **Item 16** |
| **Submittal Date:** September 30, 2010 | **Proposed Effective Date:** December 2010 Letting | |
| **Article No.:**<br>**Title:** | **Other:** DS for PCC Paving 3-D Machine Control | |

**Specification Committee Action:** This item was deferred until the next Specification Committee meeting.

| | | | |
|---|---|---|---|
| **Deferred:** X | **Not Approved:** | **Approved Date:** | **Effective Date:** |

**Specification Committee Approved Text:**

**Comments:** Kevin Merryman will be the controller of this DS.

This specification was developed because at least two paving companies doing work in Iowa currently have this technology.

At least initially, the DOT will not assign this specification to any project that does not include Construction Survey. It will primarily be assigned to QM-C and PCC overlay projects.

There was much discussion on how this item will be bid. The Office of Contracts suggested that the work described in the DS be made incidental to Construction Survey. Another option would be to include alternates on the proposal form. One alternate would include Construction Survey and PCC Paving 3-D Machine Control and the other alternate would only be Construction Survey. This is how Machine Control Grading was handled, at least initially. The final option would be to include a bid item for PCC Paving 3-D Machine Control and have the contractor bid $0 for this item if they will be using traditional methods.

At least initially, it is intended that this specification will not be assigned, but will be available for the Contractors to add at their option by change order.

At a meeting with industry, consultant surveyors requested that we include a bid item for this work so that the surveyors would know how to bid the work. Apparently there had been some miscommunication between surveyors and contractors on what work the surveyors should be bidding on.

This item will be reviewed by the individual offices prior to the next Specification Committee meeting.

**Specification Section Recommended Text:** See attached Draft DS for PCC Paving 3-D Machine Control.

**Comments:**

**Member's Requested Change (Redline/Strikeout):**

See attached DS.

**Reason for Revision:** Several PCC contractors have purchased 3-D machine control systems for paving. Current specifications do not permit use of 3-D machine control. A task group, including industry, County, and Department representatives, was organized to write a specification to allow use of 3-D machine control technology for PCC paving. The DS is the result of the task group's efforts.

| | | |
|---|---|---|
| **County or City Input Needed (X one)** | **Yes** X | **No** |

**Comments:** A county representative was involved in the development of the specification.

| **Industry Input Needed (X one)** | | | **Yes** X | **No** | |
|---|---|---|---|---|---|
| **Industry Notified:** | **Yes** X | **No** | **Industry Concurrence:** | **Yes** X | **No** |
| **Comments:** Industry representatives were involved in the development of the specification. | | | | | |

**DS-09XXX**
**(New)**

Iowa Department of Transportation

**DEVELOPMENTAL SPECIFICATIONS**
**FOR**
**PCC PAVING 3-D MACHINE CONTROL**

**Effective Date**
**December 21, 2010**

**THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.**

**09XXX.01 DESCRIPTION.**

**A.** This specification contains requirements for slip formed PCC paving using 3-D machine control techniques. Use this specification in conjunction with Sections 2301 and 2526 of the Standard Specifications.

**B.** The Contractor may use equipment controlled with a PCC Paving 3-D Machine Control System in the construction of the subgrade, subbase, or PCC pavement.

**C.** Prior to letting, the Contracting Authority will provide available electronic surface models of the roadway design in common file formats. When such models are provided, the Contractor will be responsible for manipulating the provided file formats to make them compatible with the respective equipment and systems being used.

**D.** The Contractor may use any type of PCC Paving 3-D Machine Control equipment and system resulting in meeting the elevation, cross slope, thickness, and smoothness specification requirements.

**09XXX.02 EQUIPMENT.**
Provide equipment to accomplish PCC Paving 3-D Machine Control. Use equipment that generates results meeting quality requirements of the Standard Specifications.

**09XXX.03 CONSTRUCTION.**

**A. Contracting Authority Responsibilities.**

**1.** For new construction, the Engineer will set the initial horizontal and vertical control points.

**2.** For reconstruction or PCC overlays, the Engineer will furnish information on existing horizontal and vertical control points.

**3.** The Engineer will review and approve the proposed surface model within two weeks following receipt of the model.

**B. Contractor Responsibilities.**

1. When an electronic surface model is not furnished by the Contracting Authority, develop an electronic model providing the minimum design depth of pavement. For PCC overlays, compute an estimated quantity of overlay concrete based on pavement profiles prior to start of paving and the electronic model. This quantity will serve as the estimated concrete quantity for the project and must be approved by the Engineer prior to start of construction.

2. Provide a digital terrain model (DTM) of the subgrade surface from top of shoulder to top of shoulder for construction grading.

3. Provide an electronic file such as a D45 file, or equivalent, identifying x, y, and z coordinates for shoulder and pavement edges as well as the pavement centerline based on project alignments and elevations.

4. Make available to the Engineer a rover for use during paving operations. Provide training on the use of the rover to allow the inspector to make random checks of subgrade, subbase, and pavement station locations and surface elevations. The rover will remain property of the Contractor.

5. When total stations are used for the PCC Paving 3-D Machine Control system, set additional control points at maximum 500 foot (150 m) intervals on each side of the pavement. Furnish x,y,z coordinates and station offset information for each point.

6. Set paving hubs with cut/fill to finish pavement elevation at A, B, C, and D points along superelevated curve transitions and at station equation locations. Additional paving hubs will not be required for mainline pavement.

7. Prior to start of construction, provide the Engineer a maximum of 8 hours training on PCC Paving 3-D Machine Control equipment and system.

8. Submit required information to the Engineer for approval at least three weeks prior to start of work.

9. If necessary, check and recalibrate PCC Paving 3-D Machine Control system daily prior to start of work. Include equipment type, control software manufacturer, and software version in the submittal.

**09XXX.04 METHOD OF MEASUREMENT.**

None.

**09XXX.05 BASIS OF PAYMENT.**

**A.** Payment for PCC Paving 3-D Machine Control will be lump sum contract price.

**B.** Payment is full compensation for equipment, preparation of electronic files, survey, training, and all other items required for using PCC Paving 3-D Machine Control System.

**C.** Additional payment or contract period extensions will not be made for:

1. Delays due to late submittal of electronic files,

2. Placement of paving hubs and stringline due to failure of the PCC Paving 3-D Machine Control System,

3. Rework resulting from failure or errors in using a PCC Paving 3-D Machine Control System, or

4. Additional quantities placed resulting from using a PCC Paving 3-D Machine Control System.