Iowa Department of Transportation

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

January 12, 2012

Members Present:	Jim Berger	Office of Materials
	Eric Johnsen, Secretary	Specifications Section
	Deanna Maifield	Office of Design
	Dan Redmond	District 4 - Materials
	Tom Reis, Chair	Specifications Section
	John Smythe	Office of Construction
	Willy Sorensen	Office of Traffic & Safety
Members Not Present:	Roger Bierbaum	Office of Contracts
	Donna Buchwald	Office of Local Systems
	Bruce Kuehl	District 6 - Construction
	Doug McDonald	District 1 - Marshalltown RCE
	Gary Novey	Office of Bridges & Structures
	John Selmer	Statewide Operations Bureau
Advisory Members Present:	Lisa Rold	FHWA
Others Present:	John Dostart	Office of Local Systems
	Ed Kasper	Office of Contracts
	Maria Hobbs	Office of Employee Services
	Kevin Merryman	Office of Construction

Tom Reis, Specifications Engineer, opened the meeting. The following items were discussed in accordance with the revised agenda dated January 5, 2012:

1. Article 1102.17, G, 2, Post Construction Requirements (Disadvantaged Business Enterprises).

The Office of Contracts requested changes to clarify the price adjustment for not using each DBE.

2. Article 2303.03, D, 4, c, Smoothness.

The Office of Materials requested changes to ensure a minimum level of ride quality for HMA projects when Sections 2316 and 2317 are not applied.

3. Article 2407.02, A, 1, Aggregates (Precast and Prestressed Concrete Bridge Units).

The Office of Materials requested changes to add Class L fine aggregate specifications to Section 2407.

4. Article 2524.03, B, 1, c, Erection of Signs, Milepost Markers, and 6 Inch by 6 Inch (150 mm by 150 mm) Route Markers.

The Office of Traffic and Safety requested changes to add embedment depth for wood posts to the specifications.

5. DS-09XXX, Partial Depth Finish Patching.

The Office of Construction requested approval of Developmental Specifications for Partial Depth Finish Patching.

6. DS-09XXX, Perforated Square Steel Tube Posts and Anchors.

The Office of Traffic and Safety requests approval of Developmental Specifications for Perforated Square Steel Tube Posts and Anchors.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Roger Bierbaum / Maria Hobbs	**Office:** Contracts	**Item 1**
Submittal Date: December 8, 2011	**Proposed Effective Date:** October 2012 GS	
Article No.: 1102.17, G **Title:** Post Construction Requirements (Disadvantaged Business Enterprises)	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 1/12/2012	**Effective Date:** 10/19/2012

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The Office of Construction asked if this is a change to how price adjustments will be assessed for not using DBE firms. The Office of Contracts explained that this is only meant to clarify existing practice by removing reference to the goal and treat each commitment separately.

Specification Section Recommended Text:

1102.17, G, 2.

Replace the Article:

If the contract contained a DBE commitment, the Engineer will verify that the Contractor has attained the DBE commitment specified to each DBE firm listed on Form 102115. ~~If the commitment is not met and was less than the goal, the price adjustment is the difference between the actual dollars paid and the commitment. If the commitment is not met and was greater than the goal the price adjustment is the difference between the actual dollars paid and the goal.~~ A price adjustment will be assessed for the amount of commitment not paid to each DBE firm used unless the DBE commitment to that DBE firm was reduced as allowed by Article 1102.17, G, 3.

Comments: The language in the first sentence was rearranged to read more clearly.

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

Replace Article 1102.17, Paragraph G2 with the following:

2. If the contract contained a DBE commitment, the Engineer will verify that the Contractor has attained the DBE commitment specified on Form 102115 to each DBE firm listed on the form. ~~If the commitment is not met and was less than the goal, the price adjustment is the difference between the actual dollars paid and the commitment. If the commitment is not met and was greater than the goal the price adjustment is the difference between the actual dollars paid and the goal.~~ A price adjustment will be assessed for the amount of any commitment not paid to each DBE firm used unless the DBE commitment to that DBE firm was reduced as allowed by Paragraph 3 of this Article.

Reason for Revision: The current specification is unclear if a price adjustment is made for not using each DBE for their commitment or if the price adjustment is waived for any DBE commitment which exceeds the DBE goal

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

Industry Input Needed (X one)			**Yes**	**No** X	
Industry Notified:	**Yes** X	**No**	**Industry Concurrence:**	**Yes**	**No**
Comments: Notification (and explanation) sent to Ron Otto (AGC) on December 8, 2011					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger	**Office:** Materials	**Item 2**
Submittal Date: December 20, 2011	**Proposed Effective Date:** October 2012	
Article No.: 2303.03, D, 4, c **Title:** Smoothness	**Other:**	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 1/12/2012	**Effective Date:** 10/19/2012

Specification Committee Approved Text:

2303.03, D, 4, c, Smoothness.

Replace the Article:

Construct pavement to have a smooth riding surface according to the following:

1) Apply Section 2317 to HMA surface mixture bid items of a Primary project if any individual HMA mixture bid item is 1000 tons (1000 Mg) or greater or 5000 square yards (4200 m^2) or greater. Apply Section 2316 to all other Primary projects with a surface course and when specifically required for other projects.

2) When neither Section 2316 nor Section 2317 is applied to a project, periodically check the riding surface longitudinally with a 10 foot (3 m) straightedge. The surface shall not deviate from a straight line by more than 1/8 inch in 10 feet (3 mm in 3 m). If a deviation is present, correct the area following Article 2316.03, B, 2, or the Engineer may assess a price adjustment in the amount of $XXX for each deviation.

Comments: The Office of Materials explained that this change was at the request of a county so that when they do not use the DOT's smoothness specifications, they can still require a level of smoothness. The Office of Construction asked if the counties and cities would rather see a price adjustment than a grinding requirement. The specification has been revised to give the Engineer the option of a price adjustment.

Specification Section Recommended Text:

2303.03, D, 4, c, Smoothness.

Replace the Article:

Construct pavement to have a smooth riding surface according to the following:

1) Apply Section 2317 to HMA surface mixture bid items of a Primary project if any individual HMA mixture bid item is 1000 tons (1000 Mg) or greater or 5000 square yards (4200 m^2) or greater. Apply Section 2316 to all other Primary projects with a surface course and when specifically required for other projects.

2) When neither Section 2316 nor Section 2317 is applied to a project, periodically check the riding surface longitudinally with a 10 foot (3 m) straightedge. The surface shall not deviate from a straight line by more than 1/8 inch in 10 feet (3 mm in 3 m). If a deviation is present, correct the area following Article 2316.03, B, 2.

Comments:

Member's Requested Change (Redline/Strikeout):

Smoothness.

Construct the pavement to have a smooth riding surface according to the following:

1) Apply Section 2317 to HMA surface mixture bid items of a Primary project if any individual HMA mixture bid item is 1000 tons (1000 Mg) or greater or 5000 square yards (4200 m2) or greater. Apply Section 2316 to all other Primary projects with a surface course and when specifically required for other projects.

2) When neither Section 2316 nor Section 2317 is applied to a project, periodically check the riding surface longitudinally with a 10 foot (3 m) straightedge. The surface is not to deviate from a straight line by more than 1/8 inch in 10 feet (3 mm in 3 m).If a deviation is present, correct the area following Article 2316.03,B,2.					
Reason for Revision: To ensure a minimum level of ride quality for HMA projects when 2316 and 2317 are not applied					
County or City Input Needed (X one)			**Yes (X)**	**No**	
Comments:					
Industry Input Needed (X one)			**Yes (X)**	**No**	
Industry Notified:	**Yes**	**No**	**Industry Concurrence:**	**Yes**	**No**
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger / Mahbub Khoda	**Office:** Materials	**Item 3**
Submittal Date: 2011.12.06	**Proposed Effective Date:** October 2012	
Article No.: 2407.02, A **Title:** Aggregates (Materials, Precast and Prestressed Concrete Bridge Units)	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 1/12/2012	**Effective Date:** 10/19/2012

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

2407.02, A, 1.

Replace the first sentence of the Article:

Apply Sections 4110, 4111, and 4115, except the gradation requirements of Articles 4110.02, 4111.02, and 4115.03.

Comments:

Member's Requested Change (Redline/Strikeout):

2407.02 MATERIALS.

Use materials in prestressed and precast concrete meeting the requirements of Division 41 for the respective material, and the following:

A. Aggregates.

1. Apply Sections 4110, 4111 and 4115, except the gradation requirements of Articles 4110.02, 4111.02 and 4115.03.

If high performance concrete (HPC) is being used for prestressed concrete beams, use a coarse aggregate consisting of crushed limestone meeting class 3 durability or better.

Reason for Revision: To apply for both Precast and Prestressed Concrete Units

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** X
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Willy Sorenson	**Office:** Traffic and Safety	**Item 4**
Submittal Date: 12/30/11	**Proposed Effective Date:** October 2012	
Article No.: 2524.03, B **Title:** Erection of Signs, Milepost Markers, and 6 Inch by 6 Inch (150 mm by 150 mm) Route Markers	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 1/12/2012	**Effective Date:** 10/19/2012

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

2524.03, B, 1, c.

Replace the Article:

Set wood posts in 12 inch (300 mm) diameter holes of the proper depth with a minimum embedment of 5.0 feet (1.5 m).

Comments:

Member's Requested Change:

B. Erection of Signs, Milepost Markers, and 6 Inch by 6 Inch (150 mm by 150 mm) Route Markers.

1. Type A and B Signs.

a. Accurately erect all Type A and B signs to comply with the dimensions and details shown in the contract documents. Obtain the Engineer's approval for all deviations from the contract documents before starting the work.

b. After installation, modify each 4 inch by 6 inch (100 mm by 150 mm) wood sign post by field drilling holes as shown in the contract documents. All labor and equipment necessary for this modification is included in the price bid for the post and no separate payment will be made.

c. Set wood posts in 12 inch (300 mm) diameter holes of the proper depth with a minimum embedment of 5.0 feet.

Reason for Revision: This requirement was formerly included in the Standard Road Plans, but not in the current one. For wood post, this is the desired minimum depth of embedment.

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: John Smythe / Kevin Merryman	**Office:** Construction	**Item 5**
Submittal Date: December 20, 2011	**Proposed Effective Date:** April 17, 2012	
Article No.: **Title:**	**Other:** DS for Partial Depth PCC Finish Patches	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 1/12/2012	**Effective Date:** 4/17/2012

Specification Committee Approved Text: See attached DS for Partial Depth PCC Finish Patches.

Comments: The detail sheet will be included in the DS until the specifications are incorporated into the standard specifications. Some information will be added to the detail to indicate how to pay for joint and crack repair patches that must be widened for a portion of the length. Also, the irregular shaped patches shown on the detail will be eliminated.

The Office of Contracts questioned Article 2530.03, B, 1, b, where it indicates that patch "shape and depth may be irregular". Overdepth patches may be irregular in shape and finish patches may vary in depth. This sentence will be deleted so as not to cause confusion.

The Office of Local Systems asked about specifying the use of duct tape as a bond breaker. Grease and form oil were added as well as other methods approved by the Engineer.

The Office of Contracts asked about the depth of saw cuts for the patches. Since the nominal patch depth is 2 inches, the specification will indicate 2 inches for the depth of saw cut.

The specification language allowing the use of Class B and C patching material for full depth patches was eliminated, as this is covered by the full depth patching specifications.

The Office of Contracts had concerns about the 30 day warranty period specified in the DS. The Office of Construction indicated the warranty period was proposed by the PCC patching industry and should identify patches that are poorly constructed. The Office of Construction is anticipating any failures will present themselves and the inspection staff will not be checking each patch daily during the warranty period. The committee decided to include the warranty at this time.

Kevin Merryman will be the controller of this DS.

Specification Section Recommended Text: See attached Draft DS for Partial Depth Finish Patching.

Comments:

Member's Requested Change (Redline/Strikeout):
See draft DS.

Reason for Revision: This specification allows the use of the Minnesota method for partial depth PCC patching. The method requires patch edges to be tapered at 30 to 60 degrees and has been in use in Minnesota for over 20 years.

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: The specification was reviewed with patching industry members in a meeting on December 1, 2011.					

DS-09XXX
(New)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATION
FOR
PARTIAL DEPTH PCC FINISH PATCHES

Effective Date
April 17, 2012

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.

This specification replaces Section 2530 of the Standard Specifications for Partial Depth Portland Cement Concrete Patches.

2530.01 DESCRIPTION.

A. This specification contains requirements for Partial Depth PCC Patches.

B. Remove pavement in areas designated in the contract documents. This includes furnishing and placing patching material to provide a new traffic surface, and restoring adjacent shoulder as shown in the contract documents. This work is in areas where the size, shape, and depth of patch depends on extent of pavement deterioration and shall be determined during removal operation.

C. Patches may be identified and constructed as one of the following types:

1. Finish Patches.
Finish patches are square or rectangular in shape. They will be less than 6 feet (2 m) in length when placed on a longitudinal or transverse joint or random crack. Patches will be identified by tabulation in the contract documents. The patch size and location for each lane will be shown. Patch size and locations may be adjusted by the Engineer to fit field conditions.

2. Joint and Crack Repair Patches.
Joint and crack repairs are square or rectangular in shape. They will be placed at a longitudinal or transverse joint or random crack. They will be a minimum of 6 feet (2 m) in length, and will be identified by tabulation in the contract documents. Size and location will be shown. Repair size and location may be adjusted to fit field conditions.

3. Overdepth Patches
Overdepth Patches are irregular in shape. They are placed to the full depth of existing pavement in areas of unsound concrete as designated by the Engineer. Repair size and location will be determined at time of construction.

2530.02 MATERIALS.
Meet the requirements for the type of material specified.

A. PCC Patching Material.

Meet one of the requirements below. When patching encroaches on an adjacent lane open to traffic or when there is patching on two lane pavements or other locations where overnight closures are not permitted, use Class A or Class B patching material. Pavements with three or more lanes and when overnight closure is permitted, use Class C patching material.

1. Class A Patching Material.

a. Use a modified Portland cement type manufactured to provide rapid set and high early strength. Meet requirements of Materials I.M. 491.20.

b. When a mortar is furnished, add the manufacturer's recommended quantity of coarse aggregate. Use pea gravel, minimum Class 2 durability, meeting requirements of Section 4112.

2. Class B Patching Material.

Use high early strength rapid set (5 hour) concrete meeting requirements of Materials I.M. 529 and the following requirements:

- Use Class M mixture patching material with calcium chloride. Class M mixtures with calcium chloride shall not contain fly ash.
- Place concrete within 30 minutes after introduction of calcium chloride.
- For coarse aggregate, use crushed carbonate stone chips or pea gravel, minimum Class 2 durability, meeting requirements of Section 4112.

3. Class C Patching Material.

Use mixture with an early set that will allow time of opening to traffic in 24 to 36 hours as directed by the Engineer. For coarse aggregate, meet requirements for Class B patching material. Use Class M mixture meeting requirements of Materials I.M. 529 without addition of calcium chloride.

4. Modifications to Mixtures for Class B and Class C Patching Material.

Apply the following modifications to mixtures for Class B and Class C patching material:

a. Slump.

1) Slump, measured according to Materials I.M. 317 prior to addition of calcium chloride solution, shall be between 1 and 2.5 inches (25 and 65 mm) as a target range, allowing a maximum of 3 inches (75 mm). If calcium chloride solution is not to be added, slump shall be between 1 and 3 inches (25 and 75 mm) as a target range, allowing a maximum of 4 inches (100 mm).

2) When a Type A Mid Range water reducing admixture is used, the slump, tested prior to the addition of calcium chloride, shall be between 1 and 4 inches (25 and 100 mm) as a target range, allowing a maximum of 5 inches (125 mm).

b. Air Entrainment.

Entrained air content of unconsolidated concrete will be determined according to Materials I.M. 318, prior to addition of calcium chloride if it is to be added. When calcium chloride is to be added, air entrainment shall be 5.0%, with a tolerance of ± 2.0%. When calcium chloride is not to be added, air entrainment shall be 6.5%, with a tolerance of ± 1.5%.

c. Temperature.

Temperature of Class B patching material, as delivered to job site, shall be as required in Article 2530.02, B, 4, d. Ensure temperature of Class C patching material, as delivered to the job site, is greater than 65°F (18°C). Heating water, aggregate, or both, may be necessary. Cost of heating is incidental to patching.

d. Cement.

1) For Class M concrete mixtures, meet requirements of Section 4101.

2) Refer to Table 2530.02-1 for cement types and maximum allowable substitution rates. Maximum substitution for Type IS shall not exceed 25%.

Table 2530.02-1: Cement Types and Maximum Allowable Substitution Rates

Patch Class	Cement Type	Maximum Allowable Substitution	Minimum Mix Temperature
B	Type I, Type II Type IS	0% Fly Ash 0% Fly Ash	75ºF (24ºC) 80ºF (27ºC)*
C	Type I, Type II Type IS	10% Fly Ash 0% Fly Ash	65ºF (18ºC) 70ºF (21ºC)*
* When a Type A Mid Range water reducing admixture is used, limit the minimum mix temperature to that required when Type I/II cement is used.			

e. Calcium Chloride.

1) Where calcium chloride is required, furnish it in water solution form and add it to the mix at job site. Use a commercial 32% calcium chloride solution, or equivalent, prepared according to Table 2530.02-2:

Table 2530.02-2: Proportions for 32% Calcium Chloride Solutions

Type of Solid Calcium Chloride	Pounds (Grams) of Solid per Gallon (liter) of Water	Solution Produced per Gallon (liter) of Water
Type 1 – Regular Flake (77% material)	6 (720)	1.3
Type 2 – Concrete Flake or Pellets (94% material)	4.5 (540)	1.2

2) Engineer will check solution concentration using a hydrometer according to Materials I.M. 373. Add solution at the rate of 3.0 gallons per cubic yard (14.8 L/m^3) of concrete. Calcium chloride solutions of different concentrations may be approved by the Engineer, provided appropriate adjustments in the total concrete composition are made.

3) Agitate mixture until calcium chloride is completely in solution, and continue agitation as necessary to maintain uniformity.

4) Except when using continuous mixing equipment described in Article 2001.20, E, ensure calcium chloride solution is present in mix for at least 2 minutes of mixing.

f. Water Reducer.

Type A Mid Range water reducing admixture may be used. Use one listed in Materials I.M. 403, at manufacturer's recommended dosage.

g. Transit Mix Concrete.

Use mix from a plant which can be delivered and placed within 60 minutes from start of mixing. Time may be extended to 90 minutes when a retarding admixture, used according to Materials I.M. 403 including temperature dosage guidelines (and at no additional cost to Contracting Authority), is added at the plant. Continuous mixing equipment using volumetric proportioning may be used according to Article 2001.20, E.

h. Prepackaged Mixture.

A prepackaged mixture, proportioned as specified above for Class B or Class C matching material, may be furnished as a Class B or Class C patching material with the Engineer's approval. Coarse aggregate for prepackaged mixtures shall meet the requirements of Article 4115.05. Mix prepackaged mixtures in an on-site paddle type mixer; or proportion and mix with continuous mixing equipment using volumetric proportioning according to Article 2001.20, E.

B. Joint Boards.

Comply with the following:

1. Joint boards for recreating joints and cracks: use a resilient filler, cellulosic fiber, paraffin coated cardboard, or other compressible material of proper shape to recreate joint during placement of patch material.

2. Boards for recreating transverse joints: one piece. One piece boards will not be required in lengths exceeding 6 feet (1.8 m).

3. Boards for recreating longitudinal joints: one piece. One piece boards will not be required in lengths exceeding 6 feet (1.8 m).

4. Joints and open transverse cracks: use a board with a nominal width of 0.25 inch (5 mm). Metal strips may be used for narrow cracks.

5. Extend boards and metal strips into the pavement to bottom of patch; no horizontal joints permitted.

6. Use of a bond breaker on board surfaces is encouraged.

C. Joint Sealer.
Use hot poured joint sealer meeting requirements of Section 4136.

2530.03 CONSTRUCTION.

A. Equipment.

1. Remove using milling machine, jack hammer, or similar equipment. Equip milling machines to stop at preset depths to prevent damage to dowel bars and reinforcement. Hand equipment may be necessary to achieve designated shape.

2. The following additional equipment is required:
- **a.** Sandblasting equipment for cleaning prepared patch area.
- **b.** Air chisel, 15 pound (7 kg) (or less), to complete patch area preparation. Larger air chisel, not to exceed 30 pound (14 kg), may be used if it does not result in significant damage to patch area and edges.
- **c.** Air compressor that emits oil and moisture free air for cleaning prepared area.
- **d.** On-site paddle type concrete mixer for mixing Class A patching material or other prepackaged mixtures.

B. Patch Construction.

1. General.
- **a.** Tabulations for partial depth patches shown in the contract documents are for estimating purposes only. Engineer will designate location and limits of patches.
- **b.** Hand operated equipment may be necessary for all or some removal.
- **c.** Remove pavement within designated area to a minimum depth of 2 inches (50 mm) or to sound concrete as determined by the Engineer. Material removed and not designated for salvage becomes property of the Contractor and be removed according to Article 1104.08.

2. Preparation of Patch Area.
- **a.** Remove concrete in designated repair area using either of the following methods:
  - **1)** Mill transversely or longitudinally matching general alignment of patch. Use a mill that produces patch edges with a 30 to 60 degree angle or chip back patch edges to a 30 to 60 degree angle. Chip out secondary spalling resulting from milling at no additional cost to the Contracting Authority.

2) Place 2 inch (50 mm) saw cuts along perimeter of patch area and chip back patch edges to a 30 to 60 degree angle.

b. If a joint or crack is within patch area, construct edge of patch at least 3 inches (75 mm) beyond joint or crack. Minimum patch width will be 10 inches (260 mm).

c. Form or saw patch edges to prevent them from protruding beyond edge of existing pavement by more than 3/8 inch (10 mm).

d. Each patch will have a generally rectangular area. Remove concrete to a minimum depth of 2 inches (50 mm). Many areas will require removal of unsound concrete to a greater depth to reach sound concrete. Maximum depth is one half existing pavement thickness.

e. Do not damage steel reinforcement during removal process. Damaged steel will be the responsibility of the Contractor. If the end of a dowel bar is exposed, cut or remove dowel. Place duct tape, form oil, grease, or other method approved by the Engineer as a bond breaker on exposed dowels not removed.

f. When removal to a depth of one half existing pavement thickness leaves unsound concrete within patch area, the Engineer may designate part of the patch area as a Overdepth Patch. Remove concrete for the full depth of the pavement. Consolidate subgrade or subbase material using mechanical tamper or other compaction equipment as directed by Engineer. Furnish and install No. 4 (No. 15) tie bars at mid-depth of existing pavement using an approved non-shrink grout. Place bar to provide a minimum two inch concrete cover.

g. When it is necessary to go below reinforcing steel to reach sound concrete, cut reinforcing steel flush with perimeter patch edges and remove.

h. Clean patch area by sandblasting, followed by cleaning with compressed air. Completed surfaces shall appear surface dry to visual examination.

i. Recreate a joint or crack in patch area with a joint board of proper size and shape. Extend board to bottom of patch area to completely separate patching material on both sides. Use board of a width approximately equal to joint or crack. For wide openings, several thicknesses may be used. For patches 6 feet (2 m) or greater in length, longitudinal joints may be reestablished by sawing to a depth of 1/3 the pavement thickness.

3. Placing Patch Material.

a. Scrub cement-sand-water grout of creamy consistency onto patch surface, including edges. Grout shall consist of two parts of Type I or Type I/II Portland cement and one part sand mixed with water. Mix grout by mechanical means. Place patch material before grout dries. If grout dries before placement of patch material, clean patch area again by sandblasting and air blasting, then reapply grout.

b. Mix patching material and place in patch area. Consolidate and work into place in a manner ensuring good bonding. Level it with adjacent pavement to provide a smooth riding surface not varying from existing pavement surface by more than 1/8 inch (3 mm) when measured with a 10 foot (3 m) straightedge placed over patch. Replace or grind patch to correct deficiencies. Texture patches longer than 1 foot (0.3 m) in the manner of adjacent pavement surface.

c. For Class A patching materials, perform work according to patching manufacturer's recommendations and limitations, subject to approval of the Engineer. Furnish these recommendations to the Engineer.

4. Surface Finish.

Level partial depth patches with adjacent pavement. Trowel toward edge of the repair when finishing. Edge adjacent to joint boards or inserts in fresh concrete. Ensure they have a smooth riding surface.

5. Protecting and Curing.

a. Class A Patching Material.

Cure according to manufacturer's recommendations. Use minimum curing time according to Materials I.M. 491.20, Appendix A.

b. Class B Patching Material.
1) Cure as specified in Article 2529.03, H.
2) Cure for minimum time specified in Article 2529.02 for mixture used.

c. Class C Patching Material.
1) Cure according to Article 2529.03, H. Patches may be covered immediately with white pigmented curing compound. Specified cure may be delayed as much as 2 hours.
2) Cure patches involving Class M concrete a minimum of 36 hours.
3) After required curing period, insulation blanket and joint forming board may be removed in a manner not damaging the patch, or removal may be delayed until sealing is done provided no damage results from delay.

6. Joint and Crack Sealing.
Where joints and cracks cross patches; saw, seal, and clean patch according to Article 2301.03, P. Complete sealing within 5 working days after patch is placed. When joint and crack sealing is included in the contract, perform sealing as part of that operation.

C. Limitations of Operations.

1. Unless road is closed, maintain traffic during construction operations. Conduct operations with minimum inconvenience to traffic. On two-lane roads, limit operations to one traffic lane at a time, except for minor encroachment in adjacent lane for sawing and installing forms when traffic is maintained. For multiple lane roadways, work area may include one lane in each direction.

2. Adjacent lane shall be opened to traffic prior to the pavement being removed from a patch area.

3. When approved by the Engineer, patch areas may extend up to 2 feet (0.6 m) into adjacent lane as allowed by the contract documents.

4. Adjust work schedule so work for each patch, including removal of barricades and equipment (except cure period for PCC Class C concrete), will be completed the same day it is started between the hours of 30 minutes after sunrise to 30 minutes before sunset. If unforeseen conditions result in excavated areas being left overnight, assign a sufficient number of flaggers to warn and direct traffic until patches are placed. Additional payment will not be made for necessary flaggers.

5. Place PCC patching material when ambient air and pavement temperatures are at least 45°F (7°C).

6. The Engineer may limit advance sawing.

7. If an emergency makes a DW joint necessary, temporarily fill excavated area following the joint with a suitable hot or cold paving mixture or stable granular material, as directed by the Engineer. The Engineer may direct the lane remain closed to traffic overnight. Provide traffic control.

8. When PCC patches without calcium chloride are constructed, place two drums meeting Article 2528.03, C, in front of each patch location where there is a possibility of turning into or returning to the closed lane. Additional drums need not be placed for patches spaced closer than 150 feet (45 m).

9. Apply Articles 1107.08, 1107.09, and 1108.03.

D. Area Restoration.
When patch is completed, remove forms if they have been used. Fill excavated space along outside pavement edge with material similar to existing shoulder, satisfactory to the Engineer. Thoroughly compact material before section is opened to traffic.

E. Failure Repair.
Repair failed patches that appear within 30 calendar days of original construction or subsequent repair at no cost to Contracting Authority. Failures may include, but are not limited to, loss of bond between patch and underlying pavement or random cracking.

2530.04 METHOD OF MEASUREMENT.
Engineer will determine quantities involved in satisfactory construction of partial depth patches for areas specified as follows:

A. Partial Depth PCC Finish Patches.

1. Engineer will calculate area of each patch in square feet (square meters) from surface measurements. Area of each patch less than 1 square foot (0.1 m^2) will be counted as 1 square foot (0.1 m^2) for payment purposes. If patch area is increased by Contractor to accommodate milling equipment, only area designated by the Engineer will be measured for payment.

2. Removal and repair of areas up to one half existing pavement thickness will not be measured separately for payment.

B. Partial Depth PCC Joint and Crack Repair Patches.

1. Measurement for Partial Depth PCC Joint and Crack Repair Patches will be to the nearest 0.1 linear foot (0.1 m) on the basis of 10 inch (260 mm) width of repair. Areas designated for repair outside the 10 inch (260 mm) repair width will be measured as Partial Depth PCC Finish Patches per Article 2530.04, A, 1.

2. Removal and repair of areas up to one half existing pavement thickness will be included in this payment.

C. Overdepth Patches.
Engineer will calculate area of each Overdepth Patch in square feet (square meters) at the mid-depth of the pavement. Area of each patch less than 1 square foot (0.1 m^2) will be counted as 1 square foot (0.1 m^2) for payment purposes.

2530.05 BASIS OF PAYMENT.
Payment for construction of various types of partial depth patches, satisfactorily constructed, at areas specified, will be the contract unit price as follows:

A. Partial Depth PCC Finish Patches.

1. Per square foot (square meter).

2. Payment is full compensation for repairs up to one half existing pavement thickness and includes removal of pavement, preparing patch area, furnishing and placing material, construction of joints, sawing, finishing, curing, and restoration of area.

B. Partial Depth PCC Joint and Crack Repair Patches.

1. Per linear foot (meter)

2. Payment is full compensation for repairs up to one half existing pavement thickness and includes removal of pavement, preparing the patch area, furnishing and placing material, construction of joints, sawing, finishing, curing, and restoration of area.

C. Overdepth Patches.

1. Per square foot (square meter). Payment for Overdepth Patches will be in addition to Partial Depth PCC Finish Patch or Partial Depth PCC Joint and Crack Repair Patch quantities for the same area.

2. Payment is full compensation for repairs designated in lower half of existing pavement and includes removal of pavement, preparing the patch area, and furnishing and placing material.

When joint and crack sealing is included in the contract, it will be paid for as a part of that work.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Willy Sorenson	**Office:** Traffic and Safety	**Item 6**
Submittal Date: 12/30/11	**Proposed Effective Date:** March 2012	
Article No.: **Title:**	**Other:** DS for Perforated Square Steel Tube Posts and Anchors.	

Specification Committee Action: The Office of Traffic and Safety requested that this item be deferred to a future Specification Committee meeting.

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

Specification Committee Approved Text:

Comments: The Office of Traffic and Safety will work through the specification with the Office of Materials.

Specification Section Recommended Text: See attached Draft DS for Perforated Square Steel Tube Posts and Anchors.

Comments: If approved, the DS would be incorporated into the Standard Specifications in October 2012.

Member's Requested Change: **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**
Add Perforated Square Steel Tube posts Special Provisions (attached) to Standard Specifications

Reason for Revision: Field staff preferred post type

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

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

DS- 09XXX
(New)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
PERFORATED SQUARE STEEL TUBE POSTS AND ANCHORS

Effective Date
March 20, 2012

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.
Perforated Square Steel Tube (PSST) posts and anchors shall conform to the requirements of Section 4186 of the Standard Specifications with the following modifications.

09XXX.02 MATERIALS.

A. PSST Posts.

1. Provide square tube posts of the dimensions and gauge required by the contract documents with 7/16 inch (11 mm) knockouts, 1 inch (25 mm) on center, on all four sides. Ensure posts conform to ASTM A 1011, Grade 50 (345).

2. Provide a square post cross section rolled to size and welded in the corner.

3. Furnished members shall be straight and have a smooth uniform finish. Ensure that post can be inserted freely into anchor with a minimum amount of play.

4. If perforated square tube posts are field cut, coat cut ends with zinc rich paint as per specification.

B. PSST Post Anchors.

1. Break-away, soil installation.
42 inch (1065 mm) minimum length, 7 gauge (4.76 mm) heavy duty winged anchor.

2. Break-away, concrete installation.
For posts installed in a concrete island, use a 48 inch (1220 mm) minimum length, 7 gauge (4.76 mm) heavy duty anchor. Core an 8 inch (200 mm) diameter hole through the pavement at least 8 inches (200 mm) deep. After placing anchor, fill the hole with concrete mix approved by the Engineer and level off the top of the concrete.

3. Triangular Slip Base Assembly.
a. Shall be designed in accordance with the *AASHTO Standards and Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, current edition

and shall meet or exceed NCHRP Report 350 and be FHWA accepted.

b. Triangular Slip Base Assembly consists of four parts: one-piece anchor, top half slip base, hardware, and concrete foundation.

1) **O**ne-piece anchor shall meet the following requirements:

a) Anchor shall have a triangular slip plate (1 inches (25 mm) thick) welded directly to anchor leg.

b) Anchoring portion shall be 3 inch (75 mm) square 7 gauge (4.76 mm) material and 42 inches (1065 mm) in length.

c) Galvanizing is by the hot dip process, complying with ASTM A 123, grade 85.

2) Top-half slip base shall meet the following requirements:

a) Cast unit from Ductile Iron ASTM A 536 Class 65-45-12.

b) Top half slip base shall have a triangular dimension to match 8 inch (200 mm) standard triangular slip plate, and shall receive 2.5 inch (63 mm) square sign support.

3) Hardware shall meet the requirements of Article 4186.09 of the Standard Specifications.

4) Concrete Footings: Apply the provisions of Section 2403 of the Standard Specifications.

09XXX.03 CONSTRUCTION.

A. Position posts within anchor at the furthest corner from the likely point of impact from an errant vehicle.

B. Embed post within anchor without any play.

C. Provide minimum insertion length as required by the manufacturer.

D. Keep inside of break-away and slip base anchors installed in concrete free of concrete to allow the interior to drain.

E. Install triangular slip base assembly as required by the manufacturer.

09XXX.04 METHOD OF MEASUREMENT.

A. Perforated Square Steel Tube Posts.
Linear feet (meters), to the nearest foot (meter), measured from the top of the anchor to the top of the post. Embedded length will not be measured separately, but included in the price bid for Perforated Square Steel Tube Posts.

B. Perforated Square Steel Tube Post Anchor.
By count of each type installed.

09XXX.05 BASIS OF PAYMENT.

A. Perforated Square Steel Tube Posts.

1. Per Linear Foot (Meter).

2. Payment is full compensation for furnishing, fabricating, and erecting the posts.

B. Perforated Square Steel Tube Post Anchor.

1. Each, by type.

2. Payment is full compensation for providing and installing the anchor, coring the pavement, backfilling with concrete, slip base hardware and any other details necessary to provide the anchor complete and erected in place.