



INDIANA DEPARTMENT OF TRANSPORTATION

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Eric Holcomb, Governor
Joe McGuinness, Commissioner

AGENDA

December 19, 2019 Standards Committee Meeting

MEMORANDUM

December 4, 2019

TO: Standards Committee

FROM: Scott Trammell, Secretary

RE: Agenda for the December 19, 2019 Standards Committee Meeting

A Standards Committee meeting is scheduled for 09:00 a.m. on December 19, 2019 in the IGCS Building Conference Room 4&5.

The following items are listed for consideration:

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

1. *Approval of the Minutes from the November 20, 2019 meeting*

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

1. *Discussion on the forthcoming major and necessary changes to outdated patching sections in 502, 504, 506, 805, and 901 (2020 Standard Specifications)Mr. Beeson (pg 4)*

C. STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS PROPOSED
ITEMS

OLD BUSINESS

<u>Item No. 3 (2020 SS)(9/19/19)</u>	<u>Mr. Beeson</u>	<u>pg 31</u>
702.05	Proportioning	
702.24	Application of Loads to and Acceptance of New Concrete	
709.05	Sealer Application	

NEW BUSINESS

<u>Item No. 1 (2020 SS)</u>	<u>Mr. Beeson</u>	<u>pg 36</u>
206.08	Preparation of Foundation Surfaces	

<u>Item No. 2 (2020 SS)</u>	<u>Mr. Beeson</u>	<u>pg 41</u>
601.02	Materials	

<u>Item No. 3 (2020 SS)</u>	<u>Mr. Beeson</u>	<u>pg 45</u>
707.02	Materials	
711.65	Bolted Connections Using High Strength Bolts	
802.07	Installing Supports	
908.09	Structural Plate Pipe, Pipe-Arches, and Arches	
908.12	Straps, Hook Bolts and Nuts Used In Anchors	
909.02	For Metal	
910.02	Structural Steel	
910.07	Steel Components of MSE Retaining Walls	
919.01	Traffic Signs	
920.01	Highway Illumination Materials	
922.02	Traffic Signal Control Equipment	
922.03	Signal Head Components	
922.06	Disconnect Hanger Junction Box	
922.07	Signal Support Assemblies	
922.09	Pedestal Poles and Cast Aluminum Pedestal Bases	
922.10	Signal Supports	

<u>Item No. 4 (2020 SS)</u>	<u>Mr. Beeson</u>	<u>pg 62</u>
307.03	Quality Control	
307.15	Proofrolling	
307.16	Milling	
308.03	Quality Control	
308.15	Proofrolling	
308.16	Milling	
416.03	Quality Control	

(CONTINUED)

416.10	Control Strip and Compaction
416.13	Curing
416.14	Milling
417.03	Quality Control
417.13	Control Strip and Compaction
417.16	Curing
417.17	Milling and Pavement Smoothness

<u>Item No. 5 (2020 SS)</u>	<u>Mr. Beeson</u>	<u>pg 72</u>
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401.14	Spreading and Finishing
402.13	Spreading and Finishing
410.14	Spreading and Finishing

<u>Item No. 6 (2020 SS)</u>	<u>Mr. Beeson</u>	<u>pg 76</u>
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902.01	Asphalt
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<u>Item No. 7 (2020 SS)</u>	<u>Mr. Beuchel</u>	<u>pg 80</u>
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108.01	Subletting of Contract
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cc: Committee Members
FHWA
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CONCEPTUAL PROPOSAL
[FOR DISCUSSION ONLY]

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The 502 Portland Cement Concrete Pavement (PCCP) and the 506 PCCP Patching sections are outdated. The current 506 section is only intended to address short pavement repairs that consist of a single transverse joint. Much longer concrete patches are now common and the available time to restrict traffic for patching work is getting shorter. Also, the term ground granulated blast furnace slag (GGBFS) is outdated.

PROPOSED SOLUTION: Update the Standard Specifications with the changes as shown herein. A unique provision for PCCP patching has been used for the past several years that addressed patches based on length and provided an alternative mix for high early strength concrete that includes CSA cement. The proposed revisions include much of the language from the USP. However, modifications have been made to resolve testing frequency problems encountered by construction, as well as, changing mix design target values to be more in line with current practice and the desired design strength.

To address the outdated “GGBFS” terminology it is proposed to change “GGBFS” to “slag cement” throughout the Standard Specifications. Slag cement is the nationally recognized name for the material.

APPLICABLE STANDARD SPECIFICATIONS: 502, 504.04, 506, 805.08, 901.01, 901.03

APPLICABLE STANDARD DRAWINGS: Delete E506-CCPP-01 and E503-CCPJ-06. Revise E503-CCPJ-01 and -03. Create new E506-CCPP-01 thru -06. Incorporate E503-CCPJ-06 into E503-CCPJ-03.

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

PAY ITEMS AFFECTED: None

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad Hoc committee consisting of: Mike Nelson, Jim Reilman, & Tony Zander. These changes were also presented and discussed with IRMCA and IACPA. Kumar Dave, Pankaj Patel, and Zach Corrice prepared the Standard Drawing changes.

IMPACT ANALYSIS (attach report):

CONCEPTUAL PROPOSAL
[FOR DISCUSSION ONLY]

[CONTINUED]

Submitted By: Matt Beeson for Jim Reilman

Title: Director

Organization: INDOT Office of Materials & Tests

Phone Number: 317-522-9662

Date: 11/22/19

CONCEPTUAL PROPOSAL
[FOR DISCUSSION ONLY]

IMPACT ANALYSIS REPORT CHECKLIST

*Explain the business case as to why this item should be presented to the Standards Committee for approval.
Answer the following questions with Yes, No or N/A.*

Does this item appear in any other specification sections? Yes, GGBFS is throughout the spec book.

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

Construction costs? Yes

Construction time? Yes

Customer satisfaction? Yes

Congestion/travel time? NA

Ride quality? NA

Will this proposal reduce operational costs or maintenance effort? Yes

Will this item improve safety:

For motorists? NA

For construction workers? NA

Will this proposal improve quality for:

Construction procedures/processes? Yes

Asset preservation? Yes

Design process? NA

Will this change provide the contractor more flexibility? Yes

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? NA

Is this proposal needed for compliance with:

Federal or State regulations? NA

AASHTO or other design code? NA

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

(Note: Proposed changes shown highlighted gray)

The -Standard Specifications are revised as follows:

SECTION 502, BEGIN LINE 9, DELETE AND INSERT AS FOLLOWS:

MATERIALS

502.02 Materials

Materials shall be in accordance with the following:

Admixtures.....	912.03
Coarse Aggregate, Class AP, Size No. 8	904
Fine Aggregate, Size No. 23	904
Fly Ash.....	901.02
Ground Granulated Blast Furnace Slag.....	901.03
Portland Cement.....	901.01(b)
Rapid Setting Patch Materials.....	901.07
Slag Cement	901.03
Water	913.01

502.03 Concrete Mix Design

A concrete mix design submittal, CMDS, shall be in accordance with 502.04. The CMDS shall be submitted ~~one week prior to production and approved by the Engineer to the DTE.~~ The CMDS shall be submitted *utilizing a minimum of seven calendar days prior to production. The CMDS shall use* the Department provided spreadsheet and shall include the following:

- (a) a list of all ingredients
- (b) the source of all materials
- (c) the fine to total aggregate ratio
- (d) the absorption of the aggregates
- (e) the SSD bulk specific gravity of the aggregates
- (f) the specific gravity of pozzolan
- (g) the batch weights
- (h) the names of all admixtures
- (i) the admixture dosage rates and the manufacturer's recommended range.

The absolute volume of the mix design shall be 27.0 cu ft at the design air content of 6.5%.

Production ~~may commence once the DTE approves the submission as a CMDP.~~ *shall not commence until the DTE has assigned a mix number to the CMDS. The concrete mix design will henceforth be identified as a concrete mix design for production, CMDP.*

Any of the following changes or adjustments to an existing CMDP shall require a new CMDS to be submitted to the DTE.

- (a) cement source or type
- (b) pozzolan source or type

- (c) aggregate source or type
- (d) admixture source or type
- (e) addition or deletion of an admixture
- (f) proportioning of the concrete in accordance with 502.04 as follows:
 - 1. cement content or cement reduction
 - 2. pozzolan to cement substitution ratio
 - 3. target water/cementitious ratio
 - 4. proportion of aggregate by weight exceeding $\pm 2\%$.

A CMDP in accordance with 501.05 or a CMDP in accordance with 502.04 from a previous contract may be submitted for review for use on the current contract upon the approval to the DTE. The DTE will notify the Contractor when the review is complete and whether or not the previously used CMDP can be used on the current contract.

502.04 Concrete Mix Criteria

Chemical admixtures type A, type B, type C, type D, type E, and type F may be allowed with prior written approval. The supplied concrete mix shall include one of the following water reducing admixtures: type A, type D, type E, or type F.

The fine aggregate shall be at least 35% but not more than 45% of the total weight of the aggregate in each cubic yard. Proportions will be based upon saturated surface dry aggregates.

(a) Portland Cement Concrete

The CMD shall produce workable concrete mixtures, with the minimum amount of water, and having the following properties.

Portland cement content.....	564 lbs/cu yd
Maximum water/cementitious ratio.....	0.450
Maximum cement reduction for GGBFS replacement.....	30%
Fly Ash/portland cement substitution ratio.....	1.25 by weight
Maximum cement reduction for fly ash replacement.....	20%
GGBFS/portland cement substitution ratio.....	1.00 by weight
Slump, formed.....	2 to 6 in.
Slump, slipformed.....	1.25 to 3 in.
Air.....	5.0% to 8.0%
Minimum flexural strength, third point loading, with fly ash.....	550 psi at 28 days
Relative yield.....	0.98 to 1.02

Targets for the CMD:

Portland cement content	564 lbs/cu yd ^A
Maximum portland cement content.....	752 lbs/cu yd ^A
Minimum water/cementitious ratio	0.340 ^B
Maximum water/cementitious ratio	0.435 ^B
Maximum portland cement reduction for slag cement replacement.....	30%
Slag cement /portland cement substitution ratio	1.00 by weight
Maximum cement reduction for fly ash replacement.....	20%

Fly ash/portland cement substitution ratio	1.25 by weight
Air Content.....	6.5%
Minimum modulus of rupture.....	570 psi at 7 days ^C
Relative Yield	1.00

Field Acceptance Properties:

Minimum water/cementitious ratio	0.320 ^B
Maximum water/cementitious ratio	0.450 ^B
Slump.....	2 to 6 in.
Air content.....	5.0% to 8.0%
Minimum modulus of rupture.....	570 psi at 7 days ^C
Relative yield.....	0.98 to 1.02

^A The target cement content during production shall not be adjusted from the value stated on the CMDP.

^B The water cementitious ratio during production shall not deviate more than 0.020 from the target stated in the CMDP and shall not fall outside the limits above.

^C Beams shall be standard cured in a water tank in accordance with AASHTO T23 and 505.01(a). The water does not need to be saturated with calcium hydroxide. Minimum flexural strength for opening to traffic shall be in accordance with 506.11.

Class C concrete in accordance with 702 using Class AP coarse aggregate may be substituted in PCCP.

~~Chemical admixtures type A, type B, type C, type D, type E, and type F may be allowed with prior written approval.~~

~~Blended portland pozzolan cements, fly ash, or GGBFS slag cement~~ used as an additive, ~~or blended cements~~ may only be incorporated in the concrete mix ~~between April 1 and October 15 of the same calendar year~~ when the ambient temperature is above 50°F during the entire placement period and will remain consistently above 50°F for a period of 24 hours immediately following the completion of placement. If type IP, type IP-A, type IS or type IS-A cements are to be used, the ~~minimum~~ portland cement content shall be increased to 598 lbs/cu yd. The use of fly ash or ~~GGBFS slag cement~~ as an additive will not be allowed when blended cement types IP, IP-A, IS, or IS-A are used.

(b) High-Early Strength Concrete

~~The Contractor shall submit, along with the CMDS, all supporting test results for approval to the DTE prior to placing concrete. Testing shall be conducted by an American Concrete Institute, ACI, certified concrete field testing technician, grade 1. The supporting test results shall be signed by the technician and include air content, slump, relative yield, water cement ratio, and the flexural strengths at 1 day, 2 days, and 7 days.~~

~~The CMD shall produce workable concrete mixtures, with the minimum amount of water, and having the following properties:~~

Minimum portland cement content (types I, II or III)	564 lbs/cu yd
Maximum fly ash addition.....	10% of cement content

Maximum water/cementitious ratio (types I or II).....	0.42
Maximum water/cementitious ratio (type III).....	0.45
Maximum GGBFS addition.....	15% of cement content
Slump, formed.....	2 to 6 in.
Slump, slipformed.....	1.25 to 3 in.
Air content.....	5.0% to 8.0%
Minimum flexural strength, third point loading.....	550 psi at 2 days
Relative yield.....	0.98 to 1.02

~~Fly ash or GGBFS used as an additive may only be incorporated in the concrete mix between April 1 and October 15 of the same calendar year.~~

~~Chemical admixtures type A, type B, type C, type D, type E, and type F may be allowed with prior written approval. Patching concrete in accordance with 506.04(b) shall be used.~~

502.05 Job Control

Control of PCCP for air content, slump, or relative yield will be determined on the basis of tests performed by the Engineer in accordance with 505. Concrete and necessary labor for sampling shall be furnished as required by the Engineer. Testing will be in accordance with the Frequency Manual.

SECTION 502, BEGIN LINE 338, DELETE AND INSERT AS FOLLOWS:

502.18 Opening to Traffic

When fly ash, ~~GGBFS~~slag cement, or cement type IP, type IS, type IP-A, or type IS-A is incorporated into the PCCP, traffic shall not be allowed on the PCCP until the test beams indicate a modulus of rupture of 550 psi or greater. Opening to traffic of PCCP not containing the above additives shall be based on the following.

SECTION 503, BEGIN LINE 9, INSERT AS FOLLOWS:

503.02 Materials

Materials shall be in accordance with the following:

Chemical Anchor System.....	901.05
Dowel Bars.....	910.01(b)10
Epoxy Coated Reinforcing Bars.....	910.01(b)9
<i>Hot Poured Joint Sealant</i>	<i>906.02(a)2</i>
Joint Filler	906.01
Joint Materials.....	906
PCC Sealer/Healers.....	901.06
Reinforcing Bars	910.01

SECTION 503, BEGIN LINE 44, DELETE AND INSERT AS FOLLOWS:

(a) Type D-1 Contraction Joint

Type D-1 contraction joints shall be created by sawing slots in the pavement unless alternative methods are approved. The sawed contraction joint spacing shall be as shown on the plans or as directed, but shall not exceed 18 ft.

~~Sawed contraction joints shall be cut in two operations. The initial~~ saw cut shall commence as soon as the concrete has hardened sufficiently to enable sawing without

raveling, usually 2 to 12 h after placement. All joints shall be saw cut through the edges of the pavement to the required depth before uncontrolled shrinkage cracking takes place. The sawing operations shall be carried on during day and night, regardless of weather conditions. The sawing of a joint shall be omitted if a crack occurs at or near the joint location prior to the time of sawing. Sawing shall be discontinued if a crack develops ahead of the saw. Formed contraction joints may be used where conditions make sawing impractical.

~~The second saw cut shall be made after the concrete has sufficiently cured, but before opening the pavement to non-construction traffic. The width of the saw cut shall be measured for specification compliance at the time of the sawing operations.~~ Slurry or saw residue remaining in the slot shall be immediately flushed with water. Construction traffic shall not be allowed on the PCCP after the ~~second~~ saw cut until the joint is sealed.

The sawed slot shall be cleaned to remove all foreign matter from the entire depth of cut. Joint sealing shall be in accordance with 503.05.

(b) Longitudinal Joint

Longitudinal joints shall be created by sawing slots in the pavement unless alternative methods are approved. The longitudinal joint spacing shall be as shown on the plans or as directed, but shall not exceed ~~16~~14 ft. Tie bars shall be placed by mechanical equipment in accordance with 508.04(a), or rigidly secured in place.

Longitudinal joints shall be cut to the depth, width, and line shown on the plans. The longitudinal joint slots shall be sawed concurrently with the ~~initial~~ D-1 contraction joint slots. If random cracking occurs ahead of sawing, the sawing operations shall be discontinued in that area. ~~A second saw cut shall be made when construction traffic uses the PCCP prior to sealing. The sawed joint shall be cleaned as specified in 503.03(a).~~ Joint sealing shall be in accordance with 503.05.

Longitudinal joints may be replaced with longitudinal construction joints when approved by the Engineer.

SECTION 503, BEGIN LINE 204, DELETE AS FOLLOWS:

503.05 Sealing Cracks and Joints

~~Cracks and~~ All joints ~~and cracks~~ in the PCCP shall be cleaned and sealed ~~with hot poured joint sealant~~ in accordance with the sealant manufacturer's recommendations. Water blasting shall not be applied under pressure which may damage the concrete. All cracks and joints shall be sealed prior to discontinuing work for the winter.

~~When preformed elastomeric joint seals are used, the material shall be installed in one continuous piece by means of an approved machine. The seal shall not be stretched more than 5% while being placed and show no twisting, rollover, folding, cutting, or excess lubricant adhesive on the top of the seal. Elastomeric joint seal may be installed in two separate pieces for phased construction with the splice point occurring at the highest point of the joint. The splicing method used shall be in accordance with the seal manufacturer's recommendations.~~

SECTION 504, BEGIN LINE 52, INSERT AS FOLLOWS:

504.04 Curing

Curing materials shall be applied to exposed surfaces and sides of newly placed PCCP within 30 minutes after the finishing operations have been completed, or as soon as marring of the concrete does not occur. Paving operations shall be immediately suspended if sufficient curing materials are not available on site.

When forms are used, the edges of the pavement shall be cured immediately upon removal of the forms. The edge shall be covered with curing materials equal to the material used on the surface or banked with soil 12 in. wide or greater.

When conditions arise which prevent immediate application of curing materials, the paving operation shall be suspended and the PCCP shall be kept wet with a fine spray of water. The fine spray of water shall continue until application of curing materials resumes.

When blended portland pozzolan cements, fly ash, or slag cement are used in the concrete mix, immediately following the 24 h period after placement, the average ambient temperature must be above 50°F for the remainder of the curing period. The average temperature shall be calculated based on hourly temperature measurements taken at the jobsite or from published weather station data within 10 miles of the jobsite. If the temperature restrictions are not met during placement or during the required curing period, curing shall continue and the PCCP shall not be opened to traffic until the strength requirements are met. If there are no strength requirements specified, the PCCP may be opened to traffic when test specimens indicate a flexural strength of 500 psi for third-point loading. If no test specimens are available to determine the concrete strength, curing shall continue and the concrete will be adjudicated as failed material. In no case shall the curing period be reduced below the time frame specified below.

Curing shall be continuous for 96 h unless a longer period is ordered and shall be in accordance with the following.

(a) Liquid Membrane Forming Compounds

~~Immediately after surface water has disappeared, a uniform coating of the liquid membrane forming curing compound shall be applied.~~

~~The compound shall be applied in a continuous uniform film at a rate not less than 1 gal./150 sq ft. It shall be applied in two applications. The curing compound shall be mixed thoroughly within 1 h before use. The rate of application shall be as approved, with a minimum spreading rate per application of 1 gal. of liquid coating for 150 sq ft of concrete surface. Curing compound shall be applied to provide a uniform, solid, white opaque coverage on all surfaces, similar to a white sheet of paper. All concrete cured by this method shall receive two applications of the curing compound. The first application shall be applied immediately after surface water has disappeared and surface texturing has been applied. If formwork has been used, both applications of curing compound shall be applied immediately after the formwork is removed. The second application shall be applied after the first application has set.~~ The curing compound may be warmed in a water bath during cold weather at a temperature not exceeding 100°F. Thinning with solvents will not be allowed. Non-uniform film rates will result in the discontinuance of that application method.

A new coat of curing compound shall be applied to areas damaged by rain or other means during the curing period. The recoating shall be applied as soon as possible and at a rate equal to that specified for the original coat.

SECTION 506, BEGIN LINE 3, DELETE AND INSERT AS FOLLOWS:

506.01 Description

This work shall consist of the removal and replacement of *jointed plain PCCP or jointed reinforced PCCP* in accordance with 105.03.

MATERIALS

506.02 Materials

Materials shall be in accordance with the following:

Admixtures.....	912.03
Calcium Chloride, Type L.....	913.02
Chemical Anchor System.....	901.05
Coarse Aggregate, Class A or Higher, Size No. 11	904
Coarse Aggregate, Class AP, Size No. 8	904
Dowel Bars.....	910.01(b)10
<i>Dowel Bar Assemblies.....</i>	<i>503.04</i>
Fine Aggregate, Size No. 23	904
<i>Fly Ash</i>	<i>901.02</i>
<i>Joint Fillers</i>	<i>906.01^A</i>
<i>Joint Sealing Materials</i>	<i>906.02(a)2</i>
Portland Cement.....	901.01(b)
<i>Rapid Hardening Hydraulic Cement</i>	<i>901.01(d)</i>
<i>Slag Cement</i>	<i>901.03</i>
Water	913.01

^A *A flexible foam expansion joint material meeting the requirements of ASTM D 5249, type 2 may also be used for the retrofit pressure relief joint. If the flexible foam expansion joint is used, the basis for use will be a type C certification in accordance with 916.*

Coarse aggregate for partial depth patching shall be size No. 11. Coarse aggregate for full depth patching shall be size No. 8. Coarse aggregate for patching shall be *dolomite, limestone, or gravel.*

Retrofitted tie bars shall be No. 5 or No. 6 epoxy coated reinforcing bars in accordance with 910.01(b)9.

The rapid hardening hydraulic cement or calciumsulfoaluminate, CSA, cement type selected shall be a type shown in ASTM C1600 that will enable opening to traffic in accordance with the contract requirements. Food grade citric acid may be used as an organic retarding admixture in concrete utilizing CSA cement. The use and strength of food grade citric acid, or any other admixture, shall be approved in writing by the manufacturer of the CSA cement. The basis for use for the food grade citric acid will be visual inspection.

A bonding agent shall be selected from the Department's list of approved Non-Vapor Barrier Type Bonding Agents.

~~Dowel bars and dowel bar assemblies shall be in accordance with 503.04.~~

506.03 Concrete Mix Design

A concrete mix design submittal, CMDS, shall be in accordance with 506.04. The CMDS shall be submitted to ~~and approved by~~ the DTE. The CMDS shall be submitted a minimum of seven calendar days prior to the trial batch, ~~utilizing~~ *The CMDS shall use* the Department provided spreadsheet and shall include the following:

- (a) a list of all ingredients, *including the type of CSA cement, if applicable*
- (b) the source of all materials
- (c) the fine to total aggregate ratio
- (d) the absorption of the aggregates
- (e) the SSD bulk specific gravity of the aggregates
- (f) *the specific gravity of pozzolan*
- ~~(f)~~(g) the batch weights
- ~~(g)~~(h) the names of all admixtures
- ~~(h)~~(i) the admixture dosage rates and the manufacturer's recommended range.

~~The absolute volume of the mix design shall be 27.0 cu ft at the design air content of 6.5%.~~

The CMDS ~~is~~ *shall be* used to conduct a trial batch in accordance with 506.05. Upon completion of the trial batch, the Contractor shall submit the ~~concrete mix design for production, CMDP CMDS and the Contractor's and Engineer's trial batch results for the CMDS to the DTE.~~ The ~~CMDP results~~ shall be submitted to the DTE utilizing the Department furnished spreadsheet a minimum of three work days prior to production. Production shall not commence ~~without an approved~~ *until the DTE has assigned a mix number to the CMDS. The concrete mix design will henceforth be identified as a concrete mix design for production, CMDP.* ~~Both the Contractor's and Engineer's test results from the trial batch will be included in the CMDP submittal.~~

A CMDP may be changed or adjusted in accordance with the following:

(a) Change in Materials

A change in a previously approved CMDP, for a given contract, to any of the following shall be submitted to the DTE as a CMDS, referencing the original CMDP.

1. cement source or type
2. pozzolan source or type
3. coarse aggregate source or type
4. admixture type.

~~A trial batch shall be conducted in accordance with 506.05, or verification of the new CMDS may be made during the first day of production by tests conducted by the Contractor and the Engineer. Production may continue until flexural strength tests are~~

~~completed, provided all other properties are in accordance with 506.04. The test results shall be submitted to the DTE utilizing the Department spreadsheet no later than one day after the flexural strength test results are complete. If the flexural strength is not in accordance with 506.04, production shall stop and all PCCP patching constructed with the new CMDS will be adjudicated as a failed material in accordance with normal Department practice as listed in 105.03.~~

(b) Adjustments to Materials

An adjustment in a previously approved CMDP, for a given contract, to any of the following shall be submitted to the DTE as a CMDS, referencing the original CMDP.

1. admixture source
2. admixture product of same type and from same source designated in the original CMDP
3. fine aggregate source
4. fine to total aggregate ratio in excess of $\pm 3\%$ from the value designated by the original CMDP
5. Increase in cement content from amount designated in the original CMDP.

The new CMDS shall be submitted to the DTE utilizing the Department spreadsheet a minimum of one work day prior to production. A trial batch or verification testing is not required for approval. Production shall not commence without an approved CMDP.

(c) Other Adjustments

Other adjustments in previously approved CMDP, for a given contract, to ~~any of the following~~ *the admixture dosage rate* will be allowed and DTE notification and ~~approval~~ *review* prior to use is not required.

- ~~1. admixture dosage rate~~
- ~~2. fine aggregate to total aggregate ratio within $\pm 3\%$ of the value designated by the original CMDP.~~

~~An approved CMDP, from another contract in the current or previous calendar year may be used on additional contracts submitted for review for use on the current contract to the DTE. The DTE will notify the Contractor when the review is complete and whether or not the previously used CMDP can be used on the current contract. The CMDP shall be submitted to the DTE for review and approval prior to use.~~

506.04 Concrete Mix Criteria

The design flexural strength of each CMDP shall be set such that the minimum opening to traffic strength is achieved at an age consistent with the work schedule, including any lane closure restrictions.

The fine aggregate shall be at least ~~35~~40% but not more than 45% of the total weight of the aggregate in each cubic yard. Proportions ~~will~~ *shall* be based upon SSD aggregates.

Chemical admixtures type A, type B, type C, type D, type E, and type F may be allowed with prior written approval. The supplied concrete mix shall include one of the following water reducing admixtures: type A, type D, type E, type F, or type G.

Type C admixtures or calcium chloride, type L, shall not be used in conjunction with type III portland cement. Calcium chloride, type L, may only be used in mixes for non-reinforced PCCP and for mixes in accordance with 506.04(a).

Blended portland pozzolan cements, fly ash, or slag cement may only be incorporated in the concrete mix when the ambient temperature is above 50°F during the entire placement period and will remain consistently above 50°F for a period of 24 hours immediately following the completion of placement. If type IP, type IP-A, type IS or type IS-A cements are to be used, the minimum portland cement content shall be increased to 598 lbs/cu yd. The use of fly ash or slag cement as an additive will not be allowed when blended cement types IP, IP-A, IS, or IS-A are used.

The Contractor may use either portland cement or CSA cement in the concrete. Fly ash or slag cement may also be used.

If concrete has a permeability of 900 coulombs or less at 56 days, the acceptable range of air content will be 0-6.0%. Verification of this property for a mix design will be determined by testing specimens cast at the trial batch. Testing will be done per AASHTO T 23 Section 10.1 Standard Cure conditions.

The CMD shall produce workable concrete mixtures, ~~with the minimum amount of water,~~ having the following ~~targets and field acceptance~~ properties:

(a) Patches Less than or Equal to 15 ft in Length

The Contractor shall use either concrete as described below or concrete in accordance with 506.04(b). If concrete in accordance with 506.04(b) is used, 506.11(b) shall be used for the minimum open to traffic strength.

Targets for the CMD:

Minimum portland cement content	658 ^A lbs/cu yd ^A
Maximum portland cement content.....	752 lbs/cu yd ^A
Minimum CSA cement content.....	564 lbs/cu yd ^{A, B}
Maximum CSA cement content	658 lbs/cu yd ^{A, B}
Minimum water/cementitious ratio (types I or IL).....	0.340 ^C
Maximum water/cementitious ratio (types I or IL)	0.400 ^C
Minimum water/cementitious ratio (type III or CSA)	0.340 ^C
Maximum water/cementitious ratio (type III or CSA)	0.435 ^C
Maximum fly ash or slag cement addition	30% of the cement content ^B
Maximum silica fume addition.....	7% of the cementitious content
Air Content.....	6.5%
Minimum modulus of rupture.....	400 psi at 24 h
Minimum modulus of rupture.....	550 psi at 3 days ^D
Relative Yield	1.00

Field Acceptance Properties:

Minimum water/cementitious ratio (types I or IL).....	0.320 ^C
Maximum water/cementitious ratio (types I or IL)	0.420 ^C

Minimum water/cementitious ratio (type III or CSA)	0.340 ^C
Maximum water/cementitious ratio (type III or CSA)	0.450 ^C
Maximum water/cement ratio	0.45
Minimum Slump	2 to 6 in.
Air Content	6.5% ± 1.5 5.0% to 8.0%
Minimum Flexural strength, third point loading	300 psi at 24 h
Minimum flexural strength, third point loading modulus of rupture	5050 psi at 3 days ^D
Relative yield	0.98 to 1.02

^A The cement content shall not be adjusted from the target stated on the CMDP during production.

^B Fly ash or slag cement shall not be used in combination with CSA cement unless approved in writing by the manufacturer of the CSA cement.

^C The water/cementitious ratio shall not deviate more than 0.020 from the target stated in the CMDP and shall not fall outside the limits shown.

^D Beams shall be standard cured in a water tank in accordance with AASHTO T23 and 505.01(a). The water does not need to be saturated with calcium hydroxide.

When a calcium chloride solution is added, a maximum of the maximum amount of solid calcium chloride contained in solution shall not exceed 2%, by of the total batch weight of cement, shall be used. The percentage shall be reduced to 1 if the ambient temperature is above 80°F. If the mixture is used in an 805 application, calcium chloride shall not be used. If the ambient temperature is above 80°F, the maximum amount of solid calcium chloride contained in solution shall not exceed 1% of the total batch weight of cement.

(b) Patches Greater than 15 ft in Length

The Contractor shall use either concrete as described below, or portland cement concrete in accordance with 502.04(a). If concrete in accordance with 502.04(a) is used, a trial batch is not required.

Targets for the CMD:

Minimum portland cement content (types I, IL or III)	564 lbs/cu yd ^A
Maximum portland cement content (types I, IL, or III)	752 lbs/cu yd ^A
Minimum CSA cement content	564 lbs/cu yd ^{A, B}
Maximum CSA cement content	658 lbs/cu yd ^{A, B}
Minimum water/cementitious ratio (types I or IL)	0.340 ^C
Maximum water/cementitious ratio (types I or IL)	0.400 ^C
Minimum water/cementitious ratio (type III or CSA)	0.340 ^C
Maximum water/cementitious ratio (type III or CSA)	0.435 ^C
Maximum fly ash or slag cement addition	30% of the cement content ^B
Maximum silica fume addition	7% of the cementitious content
Air Content	6.5%
Minimum modulus of rupture	425 psi at 24 h
Minimum modulus of rupture	550 psi at 3 days ^D
Relative Yield	1.00

Field Acceptance Properties:

Minimum water/cementitious ratio (types I or IL).....	0.320 ^C
Maximum water/cementitious ratio (types I or IL).....	0.420 ^C
Minimum water/cementitious ratio (type III or CSA).....	0.340 ^C
Maximum water/cementitious ratio (type III or CSA).....	0.450 ^C
Slump.....	2 to 6 in.
Air content.....	5.0% to 8.0%
Minimum modulus of rupture.....	550 psi at 3 days ^D
Relative yield.....	0.98 to 1.02

^A The target cement content during production shall not be adjusted from the value stated on the CMDP.

^B Fly ash or slag cement shall not be used in combination with CSA cement unless approved in writing by the manufacturer of the CSA cement.

^C The water cementitious ratio during production shall not deviate more than 0.020 from the target stated in the CMDP and shall not fall outside the limits above.

^D Beams shall be standard cured in a water tank in accordance with AASHTO T23 and 505.01(a). The water does not need to be saturated with calcium hydroxide.

506.05 Trial Batch

A trial batch shall be produced and tested by the Contractor's certified technician to verify that the CMDS is in accordance with the concrete mix criteria. Concrete produced at a plant shall be batched within the proportioning tolerances of 502.10. An American Concrete Institute certified concrete field testing technician, grade 1 shall be on site to direct all sampling and testing. The trial batch shall be produced at the plant prior to production. A sufficient number of flexural strength test beams will be made and tested to demonstrate that opening to traffic strength is achieved at an age consistent with the proposed range of usage of the mixture. At a minimum, flexural strength gain will be determined at the target opening to traffic times and at the specified 24 h and 3 day targets as specified by the respective mix criteria. The Engineer will test the concrete's air content and determine the water/cementitious ratio, and prepare and test flexural beams. The flexural strength will be determined by averaging a minimum of two beam breaks. The Department will provide the apparatus to test the beams for flexural strength. Personnel shall be provided to assist the Department in casting, curing, and testing the beams. The Engineer will provide the Contractor the results of the tests. The Contractor shall submit, along with the CMDS, all supporting test results for approval to the DTE prior to placing concrete. The supporting test results shall be signed by the technician and include air content, slump, relative yield, water cement ratio, and the flexural strengths at the targets listed in 506.04(a) or 506.04(b). Maturity in accordance with ITM 402 may be used as an alternate method to determine the flexural strength for opening to traffic. The Engineer will provide the Contractor the results of the tests.

A trial batch will not be required when the total quantity of ~~partial depth patching~~ or full depth patching ~~will~~ requires less than 10 cu yd of material per contract.

The trial batch shall be of sufficient quantity to allow the Engineer to perform all required tests from the same batch. Trial batch concrete shall not be used for more than one test, except concrete used to measure relative yield may also be used to measure air content.

506.06 Job Control

Control of PCCP for air content, *relative yield*, and flexural strength beams will be determined on the basis of tests performed by the Engineer in accordance with 505. Concrete and necessary labor for sampling shall be furnished as required by the Engineer. Testing for air content *and relative yield* will be on the first load of the day and once per every 50 cu yd.

(a) Beams for Validation of CMDP

Beams. At least one set consisting of three beams per set will be made once per every 150 cu yd of concrete placed and tested for compliance with either the three day or seven day flexural strength requirements stated in 506.04, for the purpose of CMDP validation. Air content and relative yield will be measured on each sample of concrete from which beams are made. Beams for validation shall be placed on the concrete pavement or shoulder adjacent to the patch and cured in a similar manner as the patch in accordance with 505.01(a) until patch area is open to traffic. At which point the beams shall be relocated off-site and standard cured in accordance with AASHTO T 23, Section 10.1.2 with the exception that the water does not need to be saturated with calcium hydroxide until the three or seven day time period has elapsed. Failure of the validation beams to meet or exceed the three day or seven day flexural strength requirements specified herein will result in the use of the CMDP being suspended until the Department concludes an investigation into why the failure occurred. If the CMDP is subsequently shown to be acceptable, another set of validation beams will be tested on the next use of the CMDP.

(b) Beams for Opening to Traffic

Additional beams will be cast for the purpose of opening to traffic for concrete meeting the requirements of 506.04(a) or 506.04(b). Such beams will be cast from sampling the last load to finish the patching operations for the day's production for each of the concrete mixes used. Beams for opening to traffic shall be placed on top of a concrete patch that they represent and cured in a similar manner as the patch.

The Engineer will notify the Contractor when test results for air content, *relative yield*, or flexural strength are outside the requirements of 506.04. Rounding will be in accordance with 109.01(a).

CONSTRUCTION REQUIREMENTS

Patch areas shown on the plans or marked by the Engineer as greater than 15 ft in length shall be placed as one continuous patch and shall not be subdivided into multiple smaller patches.

506.07 PCCP Removal

PCCP removal areas will be marked. *The Contractor may saw cut the patch areas prior to removing the patch. When the lane is subject to intermittent closures, the saw cutting shall occur no more than 24 hours prior to removing the patch.* Vertical saw cuts around the perimeter of the removal areas shall be made in the PCCP. Transverse cuts shall be perpendicular to the centerline of the PCCP. *In no case shall the transverse joint be over-cut into the adjacent pavement. Following the saw cutting, the concrete that remains in the corners of the patch area shall be removed by mechanical methods that do not damage the adjacent PCCP pavement or shoulders.*

PCCP removal areas shall not remain open overnight. Shoulders or adjacent PCCP damaged during the removal shall be repaired as directed.

(a) Partial Depth Removal

The saw cut shall be a minimum of ~~1~~2 in., to a maximum of ~~3~~*one-third the thickness of the existing pavement*. Removal of all unsound concrete to a minimum depth of ~~1~~2 in. shall be by hand chipping tools or handheld mechanically driven equipment. Mechanical hammers shall not be heavier than a nominal 45 lb class. Mechanically driven tools shall be operated at a maximum angle of 45° from the PCCP surface. If the saw cut face is damaged, a parallel saw cut 1 in. outside the initial saw cut shall be made and the concrete in this area shall be removed by hand chipping. *In lieu of using hand chipping tools or handheld mechanically driven equipment, a milling machine may be used. If a milling machine is used it shall be one that does not damage the adjacent pavement.*

~~If reinforcing bars are encountered during the removal operation shall be cause for, the patch shall be changed to~~ a full depth patch in accordance with 506.07(b). Wire mesh reinforcement exposed during the removal operations shall be removed.

~~Exposure of unsound concrete below 3 in. shall be cause for~~*If concrete is exposed below one-third the thickness of the existing pavement, the patch shall be changed to a full depth patch in accordance with 506.07(b).*

~~The~~*Partial depth cavities shall be thoroughly sandblasted and, just prior to placing new concrete, cleaned of all dust, chips, and water. The air lines for sandblasting and air cleaning shall be equipped with oil traps to prevent contamination of the surfaces.*

(b) Full Depth Removal

The saw cut shall be full lane width and thickness of the PCCP. After the full depth saw cut is completed, vehicle mounted removal equipment may be used to remove the concrete provided this equipment does not damage the adjacent sound concrete.

Removal areas in the same lane which are closer than 10 ft shall require the PCCP between these areas to be removed and replaced. If a transverse joint is located within the removal area, the limits of removal shall be ~~increased to a minimum of 1 ft beyond the joint as shown on the plans.~~

Full depth removal shall be extended until sound PCCP is encountered to allow ~~the drilling and installation of dowel bars to be firmly anchored~~*for load transfer, without inflicting further damage to the existing PCCP.*

All subbase material disturbed during the removal operation shall be recompacted as directed.

506.08 Concrete Mixing and Transportation

(a) For Patches Less than or Equal to 15 ft in Length

~~Concrete mixing and transportation shall be completed by central mixed, shrink mixed, or transit mixed methods.~~*Concrete batching tolerances, mixing, and transportation shall be in accordance with 502.10 and the following.* Discharge from non-agitating

equipment shall be completed within 30 minutes of mixing the water, cement, aggregates, and calcium chloride solution. Discharge from a truck agitator or a truck mixer shall be completed within 90 minutes of mixing the water, cement, and aggregates or within 30 minutes of the addition of calcium chloride solution. If the location of the plant is such that this time limit cannot be met, the calcium chloride solution shall be added to the concrete in a transit mixer at the site and the concrete shall then be mixed for an additional 40 revolutions prior to discharge.

~~Concrete shall be uniformly mixed when delivered to the job site. Tickets for each load of PCC shall indicate the weight of cement, and aggregates, volume of water, and the type and volume of admixtures. The weight of the cement shall be within 1% of the CMDP and the saturated surface dry weight of the aggregates shall be within 2% of the CMDP.~~

~~Wash water shall not be used as a portion of the mixing water.~~

~~When concrete is delivered in transit mixers, additional water to increase the workability of a load may be added within 45 minutes of initial mixing. Any addition of water shall be noted on the ticket and shall not occur as a continuing operation.~~

~~(a)~~ **1. Central Mixed Concrete**

Central mixed concrete shall be in accordance with 502.10(a).

~~(b)~~ **2. Shrink Mixed Concrete**

Shrink mixed concrete shall be in accordance with 502.10(b).

~~(c)~~ **3. Transit Mixed Concrete**

Transit mixed concrete shall be in accordance with 502.10(c).

(b) For Patches Greater than 15 ft in Length

For patches containing Portland cement, the mixing and transportation shall be in accordance with 502.10. If concrete containing CSA cement is used, it may be batched and mixed in a mobile volumetric mixer meeting the requirements of 722.09, regardless of the patch length. Calibration of the mobile mixer shall be in accordance with 722.13. Alternatively, a mixer from a CSA cement supplier may be used, contingent upon approval by the Engineer.

506.09 Weather Limitations

~~Placement of PCCP patches in continuous reinforced concrete pavement shall be after 1:00 p.m. when the next day's forecasted ambient temperature is 70°F or greater, unless otherwise directed.~~

PCCP patches shall not be placed on frozen subgrade, subbase, or PCCP.

506.10 Placing Concrete

The concrete shall be placed level to the adjacent PCCP and consolidated by internal vibration. The concrete shall be hand finished in accordance with 504. Texturing and tining are not required if the PCCP is to be resurfaced with HMA or diamond ground in accordance with 507.06.

The PCCP patch shall be cured *with liquid membrane forming curing compound in accordance with 504.04(a). In addition to applying liquid membrane forming curing compound, if the ambient temperature is below 55°F at the time of placement,* polyethylene film shall be placed over the patch and covered with a 4 in. layer of rigid or flexible insulation and firmly anchored. *Otherwise, polyethylene film, insulation, or any other covering shall not be used.* Small dimension lumber weighted with sandbags may be used, but large objects such as rocks or concrete blocks shall not be used. *Covering with polyethylene film or any other covering does not replace the requirement to use liquid membrane forming curing compound.*

The PCCP patch shall be inspected in accordance with 502.17.

For patches which are not to be overlaid and have a length greater than 20 ft, pavement smoothness will be in accordance with 501.25 except profilograph requirements will not apply.

(a) Partial Depth

A non-vapor barrier type bonding agent shall be applied to the vertical and horizontal surfaces prior to placing concrete. Coated surfaces shall be protected from contaminants such as dust and dirt. Contaminated surfaces shall be recleaned and recoated. The bonding agent and concrete shall be placed in accordance with the bonding agent manufacturer's recommendations. The recommended time limits will be strictly enforced.

Existing joint openings within the patch shall be maintained for the full depth of the patch by preformed joint fillers or forms. After the patch has cured, these joints shall be sawed and sealed in accordance with 503.

(b) Full Depth

~~Patches shall be anchored with dowel bars to the adjacent PCCP as shown on the plans.~~ Dowel bars shall be installed to provide load transfer from the adjoining PCCP to the patch. Dowel bars shall be placed parallel to the pavement surface and to the longitudinal joint. Dowel bars shall be installed using a slab-riding concrete dowel drilling machine and a chemical anchoring system. The drilled holes shall be free of dust, moisture, and grease prior to installation of the dowel bars. The chemical anchor system shall be injected to the back of the hole to eliminate air pockets prior to inserting the dowel bar. The quantity of material injected shall be sufficient to disperse the chemical anchor material along the entire length of the dowel bar and completely fill all voids around the bar. After the anchor system has been injected, the dowel bar shall be fully inserted in the hole using a back-and-forth twisting motion, leaving the proper length exposed. A lightweight plastic, clear or semi-transparent grout retention ring shall be installed after each dowel bar is inserted into the hole. The grout retention ring shall be pushed flush to the vertically sawn concrete surface and shall be used to help retain the chemical anchor system in the dowel hole. If it is necessary to use a hammer to seat the dowel bar, the exposed end shall be protected with a wood block. Application of the chemical anchor system by buttering it onto the dowel bar will not be allowed.

~~Patches constructed adjacent to transverse contraction joints or random cracks that are to remain in place shall be constructed with type D-1 contraction joints. The joint shall be made continuous across the width of the PCCP to match the existing joint or random~~

crack. Patches greater than 18 ft shall have type D-1 contraction joints in accordance with 503.

All patches greater than 15 feet shall be placed in accordance with 502.12 and shall have joints in accordance with 503. Dowel bars shall be installed within the boundaries of the patch at a spacing as shown on the plans or as approved by the Engineer.

Patches longer than 15 feet shall be finished in accordance with 504.

Patches longer than 15 feet, constructed with concrete containing Portland cement, shall be cured in accordance with 504.04(a) unless ambient air and concrete temperatures warrant following the requirements in 506.10.

Patches constructed in accordance with 506.04(b) and containing CSA cement shall be water cured in accordance with 702.22(a)1 except that soaker hoses will not be required. Water curing shall be initiated after finishing and as soon as the concrete patch can support the wet covering. Water curing shall be maintained for a minimum of 1-1/2 hours, and shall be removed no sooner than 1 hour before the patch is opened to traffic.

Concrete shall be placed around manholes or similar structures in accordance with 720.

Sawing and sealing of transverse joints may be omitted when the existing PCCP is to be overlaid as part of the contract.

506.11 Opening to Traffic

For purposes of this section, traffic shall include construction vehicles, construction equipment, and all non-construction vehicles. Any construction vehicle or equipment that may damage the PCCP shall not be used on the PCCP unless adequate protection is provided. Joint cutting saws may be operated on the PCCP as determined by the Contractor.

(a) For Patches Less than or Equal to 15 ft in Length

A patch may be opened to traffic in accordance with the following when calcium chloride is used *in accordance with 506.04(a).*

T	H	HT	T	H	HT
40 - 42°F	30	26	61 - 63°F	14	9
43 - 45°F	27	23	64 - 66°F	14	9
46 - 48°F	24	21	67 - 69°F	14	8
49 - 51°F	21	19	70 - 72°F	14	7
52 - 54°F	19	16	73 - 75°F	14	6
55 - 57°F	16	14	above 75°F	14	5
58 - 60°F	16	11			
T = Lowest ambient temperature during placement, or the temperature of concrete at time of delivery, whichever is lower H = Time in hours to open to traffic HT = Time in hours to open to traffic when the average daily traffic is less than 10,000					

PCCP patches with calcium chloride may be opened to traffic sooner than specified in the above table if test beams indicate a modulus of rupture of 300 psi or greater. ITM 402 may be used as an alternative method to determine the flexural strength.

When other admixtures or admixture systems are used, the PCCP patches may be opened to traffic when flexural strength tests indicate a modulus of rupture of 300 psi or greater. ITM 402 may be used as an alternate method to determine the flexural strength.

(b) For Patches Greater than 15 ft in Length

Traffic shall not be allowed on the PCCP until a modulus of rupture of 425 psi from flexural strength testing is achieved. The modulus of rupture will be determined by averaging two beams.

506.12 Method of Measurement

Partial depth patching and full depth patching will be measured by the square yard.

D-1 contraction joints and retrofitted tie bars used in PCCP patching will be measured in accordance with 503.07.

PCCP removal, subbase, and subgrade excavation, when required, subbase and subgrade recompaction *not otherwise addressed*, ~~non-vapor barrier bonding agent, individual dowel bars, chemical anchor system~~, concrete, finishing, curing, and sawing and sealing of joints will not be measured for payment.

Retrofit pressure relief joints, retrofit contraction joints, non-vapor barrier bonding agent, anchored dowel bars installed at the beginning and end of the patch, individual dowel bars, joint fillers, joint materials, drilling holes for dowel bars, grout retention rings, and chemical anchor systems will not be measured for payment.

506.13 Basis of Payment

PCCP patching will be paid for at the contract unit price per square yard for the type of patching required.

D-1 contraction joints and retrofitted tie bars used in PCCP patching will be paid for in accordance with 503.08.

Partial depth patches which have been directed to be full depth will be paid for at the contract unit price per square yard for PCCP patching, partial depth, plus 80% of the contract unit price per square yard for PCCP patching, full depth.

Payment will be made under:

Pay Item	Pay Unit Symbol
PCCP Patching, Full Depth.....	SYS
PCCP Patching, Partial Depth.....	SYS

The cost of PCCP removal, subbase, and subgrade excavation, when required, subbase and subgrade recompaction *not otherwise addressed*, ~~non-vapor barrier bonding agent, individual dowel bars, chemical anchoring system,~~ concrete, finishing, and curing, and sawing and sealing of joints shall be included in the cost of PCCP patching.

The cost of retrofit pressure relief joints, retrofit contraction joints, non-vapor barrier bonding agent, anchored dowel bars installed at the beginning and end of the patch, individual dowel bars, joint fillers, joint materials, drilling holes for dowel bars, grout retention rings, and chemical anchoring system shall be included in the cost of PCCP patching.

The cost of corrections for pavement smoothness and re-texturing shall be included in the cost of PCCP patching.

Repair or replacement of adjacent PCCP or shoulder damaged by the Contractor shall be made at no additional cost to the Department.

SECTION 805, BEGIN LINE 310, INSERT AS FOLLOWS:

A minimum of 12 in. and a maximum of 18 in. of loop wire duct will be allowed in the detector housing for each loop lead. Concrete used in the installation of detector housings shall be in accordance with 506.04(a), except 506.05 will not apply *and calcium chloride shall not be used*. A CMDS in accordance with ~~502.03~~ 506.03 shall be submitted, however, utilization of the Department provided spreadsheet is not required. Where a portion of the road is closed or where there is no vehicular traffic, then class A concrete in accordance with 702 may be used. The concrete shall be placed flush with existing surface and shall be covered with a steel plate during the setting time.

SECTION 901, AFTER LINE 157, INSERT AS FOLLOWS:

(d) Rapid Hardening Hydraulic Cement

Rapid hardening hydraulic or CSA cement shall be furnished from a manufacturer or manufacturer/distributor on the Department's list of Cement Sources. It shall be CSA cement or a blended CSA cement. A source may be added to the approved list by completing the requirements of ITM 806, Procedure U.

SECTION 901, BEGIN LINE 263, DELETE AND INSERT AS FOLLOWS:

~~901.03 Ground Granulated Blast Furnace Slag~~ Cement Used As a Pozzolan

(a) General

~~Blast furnace slag~~ **cement** shall consist of the non-metallic product, consisting essentially of silicates and aluminosilicates of calcium and other bases, that is developed in a molten condition simultaneously with iron in a blast furnace. A glassy granular material is formed when molten blast furnace slag is rapidly chilled by immersion in water. This material is then ground to cement fineness, producing ~~ground granulated blast furnace slag~~ **cement**.

~~Ground granulated blast furnace slag~~ **cement** will be accepted from one of the sources on the Department's list of approved ~~Fly Ash and Ground Granulated Blast Furnace Slag~~ **Pozzolan** Sources. ~~Ground granulated blast furnace slag~~ **cement** from different sources or different grades of ~~ground granulated blast furnace slag~~ **cement** shall not be mixed or used alternately in the same construction unless approved in writing. ~~Ground granulated blast furnace slag~~ **cement** will be subject to random assurance sampling and testing by the Department. Failure of these random samples to be in accordance with the specified requirements will be cause for suspension of ~~ground granulated blast furnace~~ **the slag cement** source approval.

(b) Acceptance Criteria

~~Ground granulated blast furnace slag~~ **cement** will be accepted based on the manufacturer's or manufacturer/distributor's documented ability to consistently furnish these materials in accordance with the applicable ASTM and AASHTO requirements.

1. Requirements

~~The ground granulated blast furnace slag~~ **cement** shall be in accordance with ASTM C 989 for grade 100 or 120.

For each 2,500 t produced, a complete ASTM C 989 analysis shall be performed on a sample composited randomly from the daily samples. The method of randomization shall be subject to approval by the Department.

2. Test and Calibration Procedure

The testing procedures followed shall be in accordance with ASTM C 989 or other methods approved in writing by the Department.

The minimum frequency for calibration of test equipment is:

- a. The No. 325 (45 μ m) sieve shall be calibrated every 100 determinations or every six months, whichever comes first.
- b. The analytical balances and scales shall be calibrated each year.
- c. The concrete compression machine shall be calibrated annually.
- d. The Blaine apparatus shall be calibrated annually.
- e. All instrumentation used for rapid chemical analysis shall be in accordance with the applicable requirements of ASTM C 114 using NIST reference materials.

3. Documentation

~~Ground granulated blast furnace~~ slag ~~cement~~ suppliers requesting approval shall supply the following:

a. For the initial approval, a current ~~Materials~~ Safety Data Sheet and a summary of results for all specified tests for six consecutive months shall be submitted. No test results shall be more than one year old at the time of request.

b. To maintain approval, a summary of results for all specified tests shall be submitted monthly. The results of the daily tests shall be available by telephone during normal working hours.

c. The ~~ground granulated blast furnace~~ slag ~~cement~~ suppliers shall furnish a QCP in accordance with the applicable requirements of ITM 806. The QCP shall ensure the Department of a continuous supply of ~~ground granulated blast furnace~~ slag ~~cement~~ which is in accordance with the requirements. This QCP will be reviewed to determine its adequacy.

d. Certification:

(1) For source approval, the supplier shall furnish a certification indicating the grade of ~~ground granulated blast furnace~~ slag ~~cement~~, the name, location, and type of manufacturing facility. It shall state that the ~~ground granulated blast furnace~~ slag ~~cement~~ shipped for use on Department projects will be produced under appropriate quality control and shall be in accordance with the specified requirements. A sample certification form addressing all of the required information is included in ITM 804.

(2) For certification of test reports, the test results generated in accordance with 901.03(b) shall be summarized and submitted monthly. The reports shall state the name and location of the testing facility, and shall be signed by the chemist or technical manager. This certification shall also identify the concrete plants receiving ~~ground granulated blast furnace~~ slag ~~cement~~ represented by these results.

DISCUSSION:

AGENDA

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED:

The use of fly ash, GGBFS (aka. slag cement), or blended cements in bridge deck concrete is limited to between April 1 and October 15 of the same calendar year. These pozzolans may produce a secondary retarding effect which is beneficial in warmer temperatures, but can cause detrimental effects (i.e. surface scaling) in cooler temperatures. The date restriction is intended to ensure that the materials are used when appropriate ambient temperatures exist. However, the calendar date restriction creates problems because calendar dates do not necessarily coincide with the appropriate placement temperatures. The window of allowable temperatures is typically longer in southern Indiana than in northern Indiana. Also, date restrictions do not allow flexibility if unseasonably warmer temperatures exist outside of the allowed dates. Likewise, date restrictions do not restrict placement if unseasonably cooler temperatures exist within the date window. Pozzolans are also frequently used in other structural elements, but the current date restriction only applies to the use in bridge decks even though the same material limitations exist.

Pozzolans are very beneficial for the long-term durability of concrete that is exposed to deicing salts. Therefore, the benefits for including pozzolans are very high for bridge decks. The specification currently allows pozzolans as an option, but they are not required. This has created scenarios on multi-phased deck pours where half of a deck includes a pozzolan and half does not.

PROPOSED SOLUTION:

1. Eliminate date-based restrictions for the use of fly ash, GGBFS (slag cement) or blended cements and add appropriate temperature restrictions.
2. Expand temperature restrictions for the use of pozzolans to include all structural concrete.
3. Require either slag cement or silica fume in all deck concrete.

APPLICABLE STANDARD SPECIFICATIONS: 702.05

APPLICABLE STANDARD DRAWINGS: none

APPLICABLE DESIGN MANUAL SECTION: none

APPLICABLE SECTION OF GIFE: none

APPLICABLE RECURRING SPECIAL PROVISIONS:

PAY ITEMS AFFECTED: none

APPLICABLE SUB-COMMITTEE ENDORSEMENT: INDOT-IRMCA committee

IMPACT ANALYSIS (attach report):

Submitted By: Matt Beeson for Mike Nelson

Title: Director

Organization: INDOT Office of Materials Management

Phone Number: 317-522-9662

Date: 11/22/19

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

Construction costs? N/A

Construction time? N/A

Customer satisfaction? Yes

Congestion/travel time? N/A

Ride quality? Yes

Will this proposal reduce operational costs or maintenance effort? NO

Will this item improve safety:

For motorists? N/A

For construction workers? N/A

Will this proposal improve quality for:

Construction procedures/processes? Yes

Asset preservation? Yes

Design process? N/A

Will this change provide the contractor more flexibility? No

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? Yes

Is this proposal needed for compliance with:

Federal or State regulations? No

AASHTO or other design code? No

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: N/A

REVISION TO STANDARD SPECIFICATIONS

SECTION 702 – STRUCTURAL CONCRETE

702.05 PROPORTIONING

702.24 APPLICATION OF LOADS TO AND ACCEPTANCE OF NEW CONCRETE

SECTION 709 - PORTLAND CEMENT CONCRETE SEALERS

709.05 SEALER APPLICATION

(Note: Proposed changes shown highlighted gray)

The Standard Specifications are revised as follows:

SECTION 702, BEGIN LINE 99, DELETE AND INSERT AS FOLLOWS:

~~Blended portland pozzolan cements, fly ash, and ground granulated blast furnace slag used as a pozzolan may only be used in concrete bridge decks between April 1 and October 15 of the same calendar year. Slag cement or silica fume in accordance with 709.05(c) shall be used in all bridge decks and reinforced concrete bridge approaches.~~

Blended portland pozzolan cements, fly ash, and slag cement may be used in concrete when the ambient temperature is above 50°F during the entire placement period. Immediately following placement the average ambient temperature shall be above 50°F for the entire curing period. The average temperature shall be calculated based on hourly temperature measurements taken at the jobsite or from published weather station data within 10 miles of the jobsite. If the temperature restrictions are not met during placement or during the required curing period, curing shall continue and the element shall not be put into service until the strength requirements in section 702.24 are met. If no test specimens are available to determine the concrete strength, curing shall continue and the concrete will be adjudicated as failed material. In no case shall the curing period be reduced below the minimum number of days specified for the element.

SECTION 702, BEGIN LINE 1286, INSERT AS FOLLOWS:

702.24 Application of Loads to and Acceptance of New Concrete

Except as otherwise hereinafter provided, application of loads to new concrete shall be in accordance with the following:

- (a) Equipment or traffic will not be allowed on structures until test beams representing all concrete required to carry live loads have attained a flexural strength of 550 psi for third-point loading.
- (b) Unbalanced backfill will not be allowed until test beams representing the concrete required to resist it have attained a flexural strength of 440 psi for third-point loading. The unbalanced height shall not exceed 10 ft until test beams representing the concrete have attained a flexural strength of 480 psi for third-point loading.
- (c) The dead weight of steel or precast concrete superstructure shall not be placed on concrete until test beams representing the concrete have attained a flexural strength of 400 psi for third-point loading. A dead load shall not be placed on hammer-head piers until test beams representing have attained a flexural strength of at least 480 psi for third-point loading. The concrete

REVISION TO STANDARD SPECIFICATIONS

SECTION 702 – STRUCTURAL CONCRETE

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floor, if to be placed thereon, shall not be poured until test beams representing the concrete supporting the superstructure have attained a flexural strength of at least 440 psi for third-point loading.

- (d) Test beams representing concrete anchoring inserts to support falsework shall attain a flexural strength of a minimum of 480 psi for third-point loading, before a dead load of concrete is applied.

(e) When blended portland pozzolan cements, fly ash, or slag cement are used in bridge railings or concrete barrier and the temperature limitations in section 702.05 are not met, the bridge railings or concrete barrier may be put into service when flexural strength testing performed on test specimens indicate a modulus of rupture of 500 psi has been attained.

SECTION 709, BEGIN LINE 79, DELETE AND INSERT AS FOLLOWS:

(c) Alternate to Concrete Sealers

In lieu of concrete surface sealing for concrete barrier wall, ~~bridge decks, reinforced concrete bridge approaches, [terminal joint lugs,]~~ (Note: see [RSP 709-R-693](#)) pier and bent caps, bridge railing, and bridge railing transitions, an alternate concrete mix design may be used.

The concrete mix design shall be as specified, except either 3% silica fume by weight of cementitious material shall be added to the mix design or 30% ~~ground granulated blast furnace slag cement~~ substitution based on the required cement content shall be incorporated into the mix. The substitution of ~~ground granulated blast furnace slag cement~~ shall be in accordance with 702.05. A water-reducing admixture or a water-reducing retarding admixture shall be used in the mix design, and the amount of water added shall be adjusted accordingly. The use of these admixtures shall be in accordance with 702.05.

When one of these alternate concrete mix designs are used in lieu of a concrete surface sealer, a finish in accordance with 702.21 will be required.

COMMENTS AND ACTION

702.05 PROPORTIONING

702.24 APPLICATION OF LOADS TO AND ACCEPTANCE OF NEW CONCRETE

709.05 SEALER APPLICATION

DISCUSSION:

<p>Motion:</p> <p>Second:</p> <p>Ayes:</p> <p>Nays:</p> <p>FHWA Approval:</p>	<p>Action:</p> <p>— Passed as Submitted</p> <p>— Passed as Revised</p> <p>— Withdrawn</p>
<p>Standard Specifications Sections referenced and/or affected:</p> <p>702 pg 578; 709.05 pg 637.</p>	<p>— 2022 Standard Specifications</p> <p>— Revise Pay Items List</p>
<p>Recurring Special Provision affected:</p> <p>702-R-691 STRUCTURAL CONCRETE; 709-R-693 ALTERNATE TO CONCRETE SEALERS</p>	<p>— Create RSP (No. __)</p> <p>Effective:</p> <p>RSP Sunset Date:</p>
<p>Standard Drawing affected:</p> <p>NONE</p>	<p>— Revise RSP (No. __)</p> <p>Effective:</p> <p>RSP Sunset Date:</p>
<p>Design Manual Sections affected:</p> <p>NONE</p>	<p>— Standard Drawing</p> <p>Effective:</p>
<p>GIFE Sections cross-references:</p> <p>NONE</p>	<p>— Create RPD (No. __)</p> <p>Effective:</p> <p>— GIFE Update</p> <p>— SiteManager Update</p>

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEMS(S) ENCOUNTERED: Spread footings being constructed over karst voids.

PROPOSED SOLUTION: The added language allows the Department's Geotechnical Services Division to be notified prior to proof-testing. If construction is in karst area the Department's Geotechnical Services Division can provide additional guidance to the Engineer.

APPLICABLE STANDARD SPECIFICATIONS: 206

APPLICABLE STANDARD DRAWINGS: NA

APPLICABLE DESIGN MANUAL SECTION: NA

APPLICABLE SECTION OF GIFE: No

APPLICABLE RECURRING SPECIAL PROVISIONS: NA

PAY ITEMS AFFECTED: No

APPLICABLE SUB-COMMITTEE ENDORSEMENT: NA

IMPACT ANALYSIS (attach report): NA

Submitted by: Matt Beeson for Nayyar Siddiki

Title: Director

Organization: INDOT Office of Materials Management

Phone Number: 317-522-9662

Date: 11/22/2019

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

Construction costs: N/A

Construction time: N/A

Customer satisfaction? Yes

Congestion/travel time? N/A

Ride quality? N/A

Will this proposal reduce operational costs or maintenance effort? Yes

Will this item improve safety:

For motorists? No

For construction workers? N/A

Will this proposal reduce operational costs or maintenance effort? Yes

Will this item improve safety:

For motorists? No

For construction workers? N/A

Will this proposal improve quality for:

Construction procedures/processes? Yes

Asset preservation? N/A

Design process? N/A

Will this change provide the contractor more flexibility? No

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? N/A

Is this proposal needed for compliance with:

Federal or State regulations: No

AASHTO or other design code: No

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: _____

REVISION TO STANDARD SPECIFICATIONS

SECTION 206 - STRUCTURE EXCAVATION

206.08 PREPARATION OF FOUNDATION SURFACES

(Note: Proposed changes shown highlighted gray)

The Standard Specifications are revised as follows:

SECTION 206, BEGIN LINE 142, DELETE AND INSERT AS FOLLOWS:

206.08 Preparation of Foundation Surfaces

Excavation for foundations on rock without piles shall extend a minimum of 2 ft into solid rock. All rock or other hard material, if to be left in place as a foundation surface, shall be freed of loose material, cleaned, and cut to a firm surface. The final surface shall be level, stepped, or serrated as directed. Seams shall be cleaned and filled with concrete, cement mortar, or grout. These conditions shall prevail when the foundation masonry is placed.

Where the masonry is to rest on a foundation surface other than those described above, the approximate bottom of the excavation shall not be disturbed. The final removal of material to the required grade shall be done carefully just prior to placing the foundation masonry. The final surface shall be left smooth and, unless otherwise designated, be level.

Notification shall be given after final excavation of each foundation is completed. No masonry shall be placed until the depth of the excavation and the character of the foundation material have been approved.

Before foundations that do not require piling are poured, sufficient test borings shall be made to determine the character of the underlying material for a depth of at least 5 ft below the bottom of the footing. Also, before pilings are driven in foundations requiring piling, sufficient soundings shall be made to determine the character of the underlying material for a depth of 10 ft below the bottom of the footing.

Rock at the bottom of spread footings shall be proof-tested. *The Department's Office of Geotechnical Services shall be contacted prior to proof-testing.* ~~Exploratory holes~~ *Proof-testing* with a small diameter test hole of *a minimum 2 in. inside* diameter shall be drilled into the foundation base *using rotary or percussive drilling methods*. Holes shall be drilled into sound rock to a depth of 5 ft or as directed. Three holes shall be drilled into each foundation base. Observations shall be made at each hole as follows:

1. speed of drilling
2. drill pressure
3. dropping or clogging of drill bit
4. loss of drill water, if used

REVISION TO STANDARD SPECIFICATIONS

SECTION 206 - STRUCTURE EXCAVATION

206.08 PREPARATION OF FOUNDATION SURFACES

5. probing of the sides of the holes with a right angled chisel point. The chisel shall be formed from a rod of 3/8 or 1/2 in. diameter
6. continuity of bearing material;
7. *rock quality designation in accordance with ASTM D 6032*
8. *photos shall be taken of the rock core and the sidewall of the borehole from which core has been extracted.*

~~A professional engineer~~ *The Engineer* shall supervise the proof testing work. A report for each hole shall be prepared and submitted to the *Department's Office of Geotechnical Services* for review and approval.

COMMENTS AND ACTION

206.08 PREPARATION OF FOUNDATION SURFACES

DISCUSSION:

Motion:	Action:
Second:	
Ayes:	<input type="checkbox"/> Passed as Submitted
Nays:	<input type="checkbox"/> Passed as Revised
FHWA Approval:	<input type="checkbox"/> Withdrawn
Standard Specifications Sections referenced and/or affected:	<input type="checkbox"/> 2022 Standard Specifications
206.08 pg 211.	<input type="checkbox"/> Revise Pay Items List
Recurring Special Provision references in:	<input type="checkbox"/> Create RSP (No. __)
NONE	Effective:
	RSP Sunset Date:
Standard Drawing affected:	<input type="checkbox"/> Revise RSP (No. __)
NONE	Effective:
	RSP Sunset Date:
Design Manual Sections affected:	<input type="checkbox"/> Standard Drawing
NONE	Effective:
GIFE Sections cross-references:	<input type="checkbox"/> Create RPD (No. __)
NONE	Effective:
	<input type="checkbox"/> GIFE Update
	<input type="checkbox"/> SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The specification and approved list are inconsistent. The approved list is titled Certified Guardrail Installers, but we are looking to approve material manufacturers using the NTPEP audit program.

PROPOSED SOLUTION: Making the two proposed revisions to 601.02, followed by a revision to the approved list to read Certified Guardrail Manufacturers will create consistency between the specifications and approved list.

APPLICABLE STANDARD SPECIFICATIONS: 601.02

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

PAY ITEMS AFFECTED: None

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad Hoc: Mike Pelham and Jim Reilman

IMPACT ANALYSIS (attach report):

Submitted By: Matt Beeson for Mike Pelham

Title: Director

Organization: INDOT Office of Materials Management

Phone Number: 317-522-9662

Date: 11/22/19

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? Yes

Will this proposal improve:

Construction costs? NA

Construction time? NA

Customer satisfaction? NA

Congestion/travel time? NA

Ride quality? NA

Will this proposal reduce operational costs or maintenance effort? NA

Will this item improve safety:

For motorists? NA

For construction workers? NA

Will this proposal improve quality for:

Construction procedures/processes? Yes

Asset preservation? NA

Design process? NA

Will this change provide the contractor more flexibility? NA

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? NA

Is this proposal needed for compliance with:

Federal or State regulations? NA

AASHTO or other design code? NA

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO STANDARD SPECIFICATIONS

SECTION 601 - GUARDRAIL

601.02 MATERIALS

The Standard Specifications are revised as follows:

SECTION 601, BEGIN LINE 12, DELETE AND INSERT AS FOLLOWS:

601.02 Materials

Materials shall be in accordance with the following:

Alternate Material Blockouts	926.03
Guardrail Posts	910.10
Rail Accessories, Fittings, and Hardware	910.11
Steel Thrie-Beam Rail	910.09
Steel W-Beam Rail	910.09
Timber Posts and Blockouts	911.02(f)

All guardrail, post, accessories, fittings, and hardware shall be supplied from a ~~source~~ *manufacturer* listed on the Department's list of Certified Guardrail ~~Suppliers~~ *Manufacturers* in accordance with 910.09. Guardrail end treatments shall be selected from the Department's list of approved Guardrail End Treatments in accordance with 601.07 and impact attenuators shall be selected from the Department's list of Approved Impact Attenuators in accordance with 601.08.

COMMENTS AND ACTION

601.02 MATERIALS

DISCUSSION:

Motion:	Action:
Second:	
Ayes:	<input type="checkbox"/> Passed as Submitted
Nays:	<input type="checkbox"/> Passed as Revised
FHWA Approval:	<input type="checkbox"/> Withdrawn
Standard Specifications Sections referenced and/or affected:	<input type="checkbox"/> 2022 Standard Specifications
601.02 pg 447; 910.09 pg 1002.	<input type="checkbox"/> Revise Pay Items List
Recurring Special Provision references in:	<input type="checkbox"/> Create RSP (No. __)
NONE	Effective:
	RSP Sunset Date:
Standard Drawing affected:	<input type="checkbox"/> Revise RSP (No. __)
NONE	Effective:
	RSP Sunset Date:
Design Manual Sections affected:	<input type="checkbox"/> Standard Drawing
NONE	Effective:
GIFE Sections cross-references:	<input type="checkbox"/> Create RPD (No. __)
NONE	Effective:
	<input type="checkbox"/> GIFE Update
	<input type="checkbox"/> SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The references to high strength structural bolts, nuts, and washers is not correct. Also, some references to coating or galvanizing this hardware is out of date.

PROPOSED SOLUTION: Update the Standard Specifications with the changes as shown herein to indicate the correct ASTM references for nuts, washers, coating, and galvanizing.

APPLICABLE STANDARD SPECIFICATIONS: 707, 711, 802, 908, 910, 919, 920, and 922

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

PAY ITEMS AFFECTED: None

APPLICABLE SUB-COMMITTEE ENDORSEMENT: None

IMPACT ANALYSIS (attach report):

Submitted By: Matt Beeson for Jim Reilman

Title: Director

Organization: INDOT Office of Materials & Tests

Phone Number: 317-522-9662

Date: 11/22/19

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

Construction costs? NA

Construction time? NA

Customer satisfaction? NA

Congestion/travel time? NA

Ride quality? NA

Will this proposal reduce operational costs or maintenance effort? NA

Will this item improve safety:

For motorists? NA

For construction workers? NA

Will this proposal improve quality for:

Construction procedures/processes? Yes

Asset preservation? Yes

Design process? NA

Will this change provide the contractor more flexibility? NA

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? NA

Is this proposal needed for compliance with:

Federal or State regulations? NA

AASHTO or other design code? NA

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO STANDARD SPECIFICATIONS

SECTION 707 - PRECAST AND PRECAST PRESTRESSED CONCRETE STRUCTURAL MEMBERS

707.02 MATERIALS

SECTION 711 - STEEL STRUCTURES

711.65 BOLTED CONNECTIONS USING HIGH STRENGTH BOLTS

SECTION 802 - SIGNS

802.07 INSTALLING SUPPORTS

SECTION 908 - METAL PIPE

908.09 STRUCTURAL PLATE PIPE, PIPE-ARCHES, AND ARCHES

908.12 STRAPS, HOOK BOLTS AND NUTS USED IN ANCHORS

SECTION 909 - PAINT AND LIQUID EPOXY

909.02 FOR METAL

SECTION - 910 METAL MATERIALS

910.02 STRUCTURAL STEEL

910.07 STEEL COMPONENTS OF MSE RETAINING WALLS

SECTION 919 - TRAFFIC SIGNS

919.01 TRAFFIC SIGNS

SECTION 920 - HIGHWAY ILLUMINATION MATERIALS

920.01 HIGHWAY ILLUMINATION MATERIALS

SECTION 922 - TRAFFIC SIGNAL MATERIALS AND EQUIPMENT

922.02 TRAFFIC SIGNAL CONTROL EQUIPMENT

922.03 SIGNAL HEAD COMPONENTS

922.06 DISCONNECT HANGER JUNCTION BOX

922.07 SIGNAL SUPPORT ASSEMBLIES

922.09 PEDESTAL POLES AND CAST ALUMINUM PEDESTAL BASES

922.10 SIGNAL SUPPORTS

(Note: Proposed changes shown highlighted gray)

The Standard Specifications are revised as follows:

SECTION 707, BEGIN LINE 30, DELETE AND INSERT AS FOLLOWS:

Structural steel for steel intermediate diaphragms shall be in accordance with 910.02(a) and shall be galvanized in accordance with ASTM A 123 after cutting, bending, and welding. Bolts for steel intermediate diaphragms shall be 7/8 in. and in accordance with 910.02(g), except they shall be type 1. All bolts, nuts, washers, and similar threaded fasteners shall be ~~galvanized in accordance with ASTM A 123 or may be mechanically zinc coated in accordance with ASTM B 695, class 50~~ *either hot dip galvanized in accordance with ASTM F 2329 or mechanically galvanized in accordance with ASTM B 695, Class 55.*

SECTION 711, BEGIN LINE 957, DELETE AND INSERT AS FOLLOWS:

711.65 Bolted Connections Using High Strength Bolts

(a) General

This subsection covers the assembly of structural joints using ASTM F 3125, grade A 325 high strength ~~carbon steel heavy hex bolts, or equivalent fasteners,~~ tightened to a high tension. The bolts are to be used in holes provided in accordance with 711.21, 711.22, and 711.23.

SECTION 802, BEGIN LINE 99, DELETE AND INSERT AS FOLLOWS:

(b) Overhead Sign Structures

When erection of the structure has been started, it shall be completed the same day.

REVISION TO STANDARD SPECIFICATIONS

SECTION 707 - PRECAST AND PRECAST PRESTRESSED CONCRETE STRUCTURAL MEMBERS

707.02 MATERIALS

SECTION 711 - STEEL STRUCTURES

711.65 BOLTED CONNECTIONS USING HIGH STRENGTH BOLTS

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908.09 STRUCTURAL PLATE PIPE, PIPE-ARCHES, AND ARCHES

908.12 STRAPS, HOOK BOLTS AND NUTS USED IN ANCHORS

SECTION 909 - PAINT AND LIQUID EPOXY

909.02 FOR METAL

SECTION - 910 METAL MATERIALS

910.02 STRUCTURAL STEEL

910.07 STEEL COMPONENTS OF MSE RETAINING WALLS

SECTION 919 - TRAFFIC SIGNS

919.01 TRAFFIC SIGNS

SECTION 920 - HIGHWAY ILLUMINATION MATERIALS

920.01 HIGHWAY ILLUMINATION MATERIALS

SECTION 922 - TRAFFIC SIGNAL MATERIALS AND EQUIPMENT

922.02 TRAFFIC SIGNAL CONTROL EQUIPMENT

922.03 SIGNAL HEAD COMPONENTS

922.06 DISCONNECT HANGER JUNCTION BOX

922.07 SIGNAL SUPPORT ASSEMBLIES

922.09 PEDESTAL POLES AND CAST ALUMINUM PEDESTAL BASES

922.10 SIGNAL SUPPORTS

The structure shall be loaded, to prevent vibration, by attaching signs or lighting supports the same day.

An oxidation inhibitor in accordance with 802.07(b)4 shall be applied to all surfaces that mate with a dissimilar material.

Fasteners for chord splice connections shall be high-strength *heavy hex* bolts conforming to ASTM F 3125, grade A 325 with matching lock nuts having steel inserts. Installation shall be in accordance with 711.65. Other bolts and hardware shall conform to the requirements of 910.19.

SECTION 908, BEGIN LINE 152, DELETE AND INSERT AS FOLLOWS:

2. Assembly bolts shall be *high strength heavy hex* in accordance with ASTM F 3125, grade A 325, or ASTM A 449. Nuts shall be *heavy hex and* in accordance with ASTM A 563, grade C3 ~~or ASTM F 3125, grade A 325. Washers shall be in accordance with ASTM F 436. Assembly bolts, nuts, and washers shall be hot dip galvanized in accordance with ASTM A-153F 2329, or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153, class C in accordance with ASTM B 695, Class 55.~~

SECTION 908, BEGIN LINE 181, DELETE AND INSERT AS FOLLOWS:

908.12 Straps, Hook Bolts and Nuts Used in Anchors

Straps shall be of the type and size shown on the plans. Reinforcing bars used for straps shall meet the applicable requirements of 910.01 and shall be galvanized in

REVISION TO STANDARD SPECIFICATIONS

SECTION 707 - PRECAST AND PRECAST PRESTRESSED CONCRETE STRUCTURAL MEMBERS

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SECTION 711 - STEEL STRUCTURES

711.65 BOLTED CONNECTIONS USING HIGH STRENGTH BOLTS

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SECTION 908 - METAL PIPE

908.09 STRUCTURAL PLATE PIPE, PIPE-ARCHES, AND ARCHES

908.12 STRAPS, HOOK BOLTS AND NUTS USED IN ANCHORS

SECTION 909 - PAINT AND LIQUID EPOXY

909.02 FOR METAL

SECTION - 910 METAL MATERIALS

910.02 STRUCTURAL STEEL

910.07 STEEL COMPONENTS OF MSE RETAINING WALLS

SECTION 919 - TRAFFIC SIGNS

919.01 TRAFFIC SIGNS

SECTION 920 - HIGHWAY ILLUMINATION MATERIALS

920.01 HIGHWAY ILLUMINATION MATERIALS

SECTION 922 - TRAFFIC SIGNAL MATERIALS AND EQUIPMENT

922.02 TRAFFIC SIGNAL CONTROL EQUIPMENT

922.03 SIGNAL HEAD COMPONENTS

922.06 DISCONNECT HANGER JUNCTION BOX

922.07 SIGNAL SUPPORT ASSEMBLIES

922.09 PEDESTAL POLES AND CAST ALUMINUM PEDESTAL BASES

922.10 SIGNAL SUPPORTS

accordance with ASTM A 767, class I. Aircraft cable used for straps shall be made of zinc coated steel wire, 3/8 in. nominal diameter, consisting of seven 19-wire flexible steel strands, with a minimum breaking strength of 14,000 lb. The cable shall be in accordance with Military Specification MIL-W-83420D.

Hook bolts and nuts shall be of the size shown on the plans, shall be in accordance with ASTM A 307, and shall be galvanized in accordance with ASTM A-153F 2329. Threads shall be American Standard Coarse Thread Series Class 2 fit. Threads shall be cleaned after galvanizing to provide a free running fit. Maximum oversizing of the nut threads shall be 1/64 in.

SECTION 909, BEGIN LINE 32, DELETE AND INSERT AS FOLLOWS:

909.02 For Metal

Paints for metal surfaces shall be in accordance with the requirements shown below.

(a) Zinc Primers

Both inorganic zinc primer and organic zinc primer for use on faying surfaces at all slip-critical structural bolted connections using ASTM F 3125, grade A 325 or grade A 490, high-strength *heavy hex* bolts in primary members shall meet class B slip coefficient in accordance with Test Method to Determine the Slip Coefficient for Coatings Used in Bolted Joints as adopted by the Research Council on Structural Connections.

SECTION 910, BEGIN LINE 190, DELETE AND INSERT AS FOLLOWS:

All fasteners used in conjunction with ASTM A 709, grade 50W steel shall be friction type high-strength *steel heavy hex* bolts in accordance with ASTM F 3125, grade A 325 type 3. Certification and a sample shall be submitted to the Engineer prior to start of

REVISION TO STANDARD SPECIFICATIONS

SECTION 707 - PRECAST AND PRECAST PRESTRESSED CONCRETE STRUCTURAL MEMBERS

707.02 MATERIALS

SECTION 711 - STEEL STRUCTURES

711.65 BOLTED CONNECTIONS USING HIGH STRENGTH BOLTS

SECTION 802 - SIGNS

802.07 INSTALLING SUPPORTS

SECTION 908 - METAL PIPE

908.09 STRUCTURAL PLATE PIPE, PIPE-ARCHES, AND ARCHES

908.12 STRAPS, HOOK BOLTS AND NUTS USED IN ANCHORS

SECTION 909 - PAINT AND LIQUID EPOXY

909.02 FOR METAL

SECTION - 910 METAL MATERIALS

910.02 STRUCTURAL STEEL

910.07 STEEL COMPONENTS OF MSE RETAINING WALLS

SECTION 919 - TRAFFIC SIGNS

919.01 TRAFFIC SIGNS

SECTION 920 - HIGHWAY ILLUMINATION MATERIALS

920.01 HIGHWAY ILLUMINATION MATERIALS

SECTION 922 - TRAFFIC SIGNAL MATERIALS AND EQUIPMENT

922.02 TRAFFIC SIGNAL CONTROL EQUIPMENT

922.03 SIGNAL HEAD COMPONENTS

922.06 DISCONNECT HANGER JUNCTION BOX

922.07 SIGNAL SUPPORT ASSEMBLIES

922.09 PEDESTAL POLES AND CAST ALUMINUM PEDESTAL BASES

922.10 SIGNAL SUPPORTS

erection.

SECTION 910, BEGIN LINE 228, DELETE AND INSERT AS FOLLOWS:

1. General Use

High strength *heavy hex* bolts shall be in accordance with ASTM F 3125, grade A 325. Type 3 bolts ~~will be required~~ *shall be provided* if the structural steel is to remain unpainted. High strength *heavy hex* nuts shall be of the grade and finish specified in ASTM F 3125, ~~grade A 325~~ and in accordance with ASTM A 563 or ASTM A 194. High strength ~~washers~~ shall be of the type specified in ASTM F 3125, ~~grade A 325~~ and in accordance with ASTM F 436. The bolts, ~~washers, and nuts, and washers~~ shall be ~~coated after fabrication in accordance with ASTM A 153, class C or ASTM B 695, class 55~~ *either hot dip galvanized in accordance with ASTM F 2329 or mechanically galvanized in accordance with ASTM B 695, Class 55.*

SECTION 910, BEGIN LINE 253, DELETE AS FOLLOWS:

(1) Rotational Capacity

High strength fasteners shall be subjected to the rotational capacity test in accordance with ASTM F 3125, ~~grade A 325, Section 6.3~~. The fastener shall complete two times the required number of turns from snug tight conditions in accordance with AASHTO LRFD Bridge Construction Specifications, in a Skidmore-Wilhelm calibrator or equivalent tension measuring device without stripping or failure. During this test, the maximum recorded tension shall be at least 1.15 times the required fastener tension indicated in AASHTO LRFD Bridge Construction Specifications. The measured torque required to produce the required fastener tension shall not exceed the value obtained by the following equation.

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SECTION 910, BEGIN LINE 284, DELETE AND INSERT AS FOLLOWS:

1. General

Bolts shall be unfinished, turned, or ribbed bolts ~~conforming to the requirements for Grade A bolts of specification for low carbon steel externally and internally threaded fasteners, in accordance with~~ ASTM A 307, grade A. Bolts shall have single, self-locking nuts or double nuts unless otherwise shown on the plans or in the special provisions. Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis.

Bolts, ~~washers, and~~ nuts, ~~and washers~~ utilized in the U channel steel post splice as shown on the plans shall be in accordance with ASTM A 449, SAE J429-G7.9, or ASTM F 3125, grade A 325 and shall be ~~galvanized~~ *either hot dip galvanized in accordance with ASTM F 2329 or mechanically galvanized in accordance with ASTM B 695, Class 55.*

SECTION 910, BEGIN LINE 467, DELETE AND INSERT AS FOLLOWS:

The clevis connector shall be fabricated of cold-drawn steel wire in accordance with ASTM A 1064. Loops shall be galvanized in accordance with ASTM A ~~153 class B-3,~~ *ASTM A 123, coating grade 55641, class 5 or class C.*

A type A certification in accordance with 916 shall be furnished for the clevis connector. The results of the tension, bend, and coating adhesion tests, and measurements of coating thickness and average weight of the coating, shall be included on the certification for the clevis connector.

3. Connector Bar

The connector bar, if used, shall be fabricated of cold-drawn steel wire in

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accordance with ASTM A 1064, and galvanized, if so shown on the plans, in accordance with ASTM A 123, ~~coating grade 55641, class 5 or class C.~~

SECTION 910, BEGIN LINE 521, DELETE AND INSERT AS FOLLOWS:

(c) Fasteners

Fasteners shall consist of 1/2 in. diameter, bolts, nuts, and washers and shall otherwise be in accordance with 910.02(g)1 with the exception that the hardware shall be coated in accordance with ASTM ~~A 153, class CF~~ 2329.

SECTION 910, BEGIN LINE 635, DELETE AND INSERT AS FOLLOWS:

3. Bolts and nuts of the sizes specified on the plans shall be in accordance with ASTM A 307. Cut washers and lock washers shall be standard round steel washers of the sizes specified on the plans. The diameter of cut washers shall be 1 3/4 in. for 5/8 in. bolts and 2 in. for 3/4 in. bolts with a thickness of 0.134 in. ± 0.026 in. measured at the hole. The bolts, ~~washers, and nuts, and washers~~ shall be coated after fabrication ~~in accordance with ASTM A 153, or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements for class C of ASTM A 153 by either hot dip galvanizing in accordance with ASTM F 2329 or mechanically galvanizing in accordance with ASTM B 695, Class 55.~~

SECTION 910, BEGIN LINE 689, DELETE AND INSERT AS FOLLOWS:

High strength ~~heavy hex~~ bolts shall be in accordance with ASTM F 3125, grade A 325 or ASTM A 449. High strength ~~heavy hex~~ nuts shall be in accordance with ASTM A 563, ~~grade B or better. Galvanizing shall be in accordance with ASTM A 153 or mechanically galvanized and conform to the coating thickness, adherence, and quality~~

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~~requirements for class C of ASTM A 153. Bolts, nuts, and washers shall be either hot dip galvanized in accordance with ASTM F 2329 or mechanically galvanized in accordance with ASTM B 695, Class 55.~~ Foundation plates and bearing plates shall be in accordance with ASTM A 36, and shall be galvanized after fabrication in accordance with ASTM A 123, except the weight of zinc coating per square foot of actual surface shall average no less than 2.0 oz and shall be no less than 1.8 oz for any individual specimen. Welding shall be in accordance with AWS D1.1.

SECTION 910, BEGIN LINE 898, DELETE AND INSERT AS FOLLOWS:

(b) Wide Flange Posts

Structural steel members for the support of signs shall be in accordance with ASTM A 36 and ASTM A 709, grade 36. These members shall be galvanized in accordance with ASTM A 123. Base plates and stiffeners shall be in accordance with the requirements of ASTM A 709, grade 36. Fuse and hinge plates shall be in accordance with the requirements of ASTM A 36 and shall be galvanized in accordance with ASTM A 123. All bolts, ~~nuts, and washers~~ nuts shall be high strength *heavy hex* and be in accordance with ASTM F 3125, *grade A 325, and ASTM A 563. Washers shall be in accordance with ASTM F 436.* Direct Tension Indicator hardware shall be in accordance with ASTM F 959.

SECTION 910, BEGIN LINE 1321, DELETE AND INSERT AS FOLLOWS:

Anchor bolts, nuts, and washers shall be in accordance with ASTM F 1554, grade 36. A hexagon nut, leveling nut, and flat washer shall be furnished with each anchor bolt. Top ends of anchor bolts and associated hardware as shown on the plans, shall be ~~coated in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153, class C either hot dip~~

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galvanized in accordance with ASTM F 2329 or mechanically galvanized in accordance with ASTM B 695, Class 55.

SECTION 910, BEGIN LINE 1353, DELETE AND INSERT AS FOLLOWS:

Gusset, flange, and base plates shall be in accordance with ASTM A 36 and shall be galvanized after fabrication in accordance with ASTM A 123. Base plates for upright poles shall develop the full strength of the poles. Castings for the vertical pole top and horizontal arm and cap shall be in accordance with ASTM A 126 and shall be galvanized with a minimum coating of 2 oz/sq ft. ~~High strength heavy hex bolts and nuts, except anchor bolts, shall be in accordance with ASTM F 3125, grade A 325, Type 1, and ASTM A 563. Two nuts for use in plumbing upright poles shall be furnished with each anchor bolt. Anchor bolts for overhead steel structures shall be in accordance with 910.19(a). Steel bolts, nuts, washers, and the top ends of anchor bolts shall be coated in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153, class C either hot dip galvanized in accordance with ASTM F 2329 or mechanically galvanized in accordance with ASTM B 695, Class 55. Welding shall be in accordance with 711.32.~~

SECTION 910, BEGIN LINE 1391, DELETE AND INSERT AS FOLLOWS:

- (e) Threaded rods, nuts, and washers shall be in accordance with ASTM F 3125, grade A 325, ~~and ASTM A 563, and ASTM F 436, respectively.~~

SECTION 919, BEGIN LINE 129, DELETE AND INSERT AS FOLLOWS:

1. Sheet Signs

The bolts, steel flat washers, and lock-nuts used to attach sheet signs to posts shall be stainless steel in accordance with ASTM A 276, or type 304 carbon steel in accordance with ASTM A 307, grade A. Carbon steel hardware shall be galvanized in accordance with

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ASTM ~~A-153F~~ 2329. Lock washers and hex nuts shall be used in lieu of the lock-nuts when carbon steel hardware is furnished.

SECTION 920, BEGIN LINE 188, DELETE AND INSERT AS FOLLOWS:

7. Anchor Bolts

Anchor bolts shall be 1 in. with 8NC rolled threads in accordance with ASTM A 307. The minimum length of threads shall be 6 in. Mean diameter of rod stock shall be 0.918 in. ± 0.011 in. and out-of-round tolerance shall be ± 0.012 in. The top 10 in. of the bolt shall be galvanized in accordance with ASTM ~~A-153F~~ 2329. Anchor bolts shall be in accordance with 910.19(b). The bolts shall be a minimum of 36 in. in length for poles 8 in. outside diameter or less and 48 in. in length for poles 9 in. or 10 in. outside diameter. In addition to the minimum length, the bolt shall have a 4 in. right angle bend at the unthreaded end. The anchor bolts in bridge structures shall be as shown on the plans.

SECTION 920, BEGIN LINE 403, DELETE AND INSERT AS FOLLOWS:

10. Anchor Bolts

Anchor bolts for high mast poles shall be furnished in a pre-clustered form and shall be a hooked deformed reinforcing bar or a hooked smooth bar. The bolts shall be in accordance with ASTM A 615 modified to a minimum yield strength of 75,000 psi. The top 12 in. of each anchor bolt, nut, and washer shall be *hot-dip* galvanized in accordance with ASTM A 153 or be mechanically galvanized and in accordance with the coating thickness, adherence, and quality requirements of ASTM ~~A-153, class CB 695, class 55.~~

SECTION 922, BEGIN LINE 554, DELETE AND INSERT AS FOLLOWS:

The top 6 in. of the bolt shall be threaded with 13 NC threads on 1/2 in. bolts and 11 NC threads on 5/8 in. bolts. The hexagon nut, the flat washer, and the threaded end of the bolt shall be *hot-dip* galvanized in accordance with ASTM A 153 or be mechanically

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galvanized and in accordance with the coating thickness, adherence, and quality requirements of ASTM A 153, class CB 695, class 55.

SECTION 922, BEGIN LINE 709, DELETE AND INSERT AS FOLLOWS:

Nuts, bolts, and lock washers shall be *hot-dip* galvanized in accordance with ASTM A 153 or be mechanically galvanized and be in accordance with the coating thickness, adherence, and quality requirements of ASTM A 153, class CB 695, class 55.

SECTION 922, BEGIN LINE 878, DELETE AND INSERT AS FOLLOWS:

922.06 Disconnect Hanger Junction Box

Traffic signal disconnect hanger junction boxes shall consist of a span hanger, a balance adjuster, a disconnect hanger clevis, and a housing with a hinged door with a positive latching device. The span hanger, balance adjuster, and all related hardware shall be *hot-dip* galvanized in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153, class CB 695, class 55. The housing shall be made of a die-cast, corrosion resistant, copper free, non-ferrous metal which shall be in accordance with ASTM B 85. The balance adjuster fitting shall be made of ferrous or non-ferrous metal. When made of ferrous metal it shall be galvanized in accordance with the requirements for the components and related hardware as set out above.

SECTION 922, BEGIN LINE 941, DELETE AND INSERT AS FOLLOWS:

(c) Span Hanger

The span hanger, balance adjuster, weatherhead, and all related hardware shall be made of a non-corrosive metal or shall be *hot-dip* galvanized in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153, class CB 695, class 55. The weatherhead shall have

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a minimum of 2 1/2 in. of exposed threads. The weatherhead shall have two set screws to fasten the nipple to the weatherhead. If the weatherhead and threaded pipe has a slip-in connection, the locking device shall be a double nut assembly. If the weatherhead and threaded pipe has a screw-in connection, the locking device shall be a double set screw assembly.

SECTION 922, BEGIN LINE 1000, DELETE AND INSERT AS FOLLOWS:

Upper and lower arms shall be cast from aluminum in accordance with ASTM B 26, alloy 713.0-T5 or 356.0-T6. The vertical support tube shall be extruded from aluminum in accordance with to ASTM B 241, alloy 6061-T6 or 6063-T6, and the strapping to attach the bracket to the arm shall be stainless steel. All steel or malleable iron parts shall be *hot-dip* galvanized in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM ~~A-153, class CB 695, class 55.~~

SECTION 922, BEGIN LINE 1000, DELETE AND INSERT AS FOLLOWS:

The base shall be attached to a foundation by four anchor bolts, with an anchor bolt circle of 12 3/4 in. Slotted lugs shall be integrally cast into the four corners of the base for attachment of the anchor bolts. The anchor bolts shall be steel in accordance to ASTM A 36. The diameter of the anchor bolt shall be 3/4 in. with a minimum length of 18 in. ±1/2 in., plus 2 1/2 to 3 in. right angle hook on the unthreaded end. The top 4 in. of the bolt shall be threaded with 10 NC threads. The threads, plus 3 in., shall be ~~coated after fabrication~~ *hot-dip galvanized* in accordance with ASTM A 153 or be mechanically galvanized and in accordance with the coating thickness, adherence, and quality requirements of ASTM ~~A-153, class CB 695, Class 55.~~ Each anchor bolt shall be provided with two *high strength heavy* hex head nuts in accordance with ASTM ~~F 3125, grade A-325~~ *A 563* and three

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washers. Two of the washers shall have a minimum 2 in. and maximum 2 1/8 in. outside diameter and be in accordance to ANSI B 27, type B regular series and one shall be a nominal 3/4 in. series W washer, in accordance with ASTM F 436.

SECTION 922, BEGIN LINE 1109, DELETE AND INSERT AS FOLLOWS:

All hardware, handhole cover and latching device, *and* band-type steel polebands, ~~steel bolts, nuts, and washers~~ shall be *hot-dip* galvanized in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of ASTM A 153, class ~~CB~~ 695, Class 55. All nuts and bolts, except anchor bolts, shall be in accordance with ASTM A 307, *and shall be either hot dip galvanized in accordance with ASTM F 2329 or mechanically galvanized in accordance with ASTM B 695, Class 55.* If a cast pole top or cap is used it shall be in accordance with ASTM A 126 and shall be galvanized with a minimum coating of 2 oz/sq ft.

SECTION 922, BEGIN LINE 1138, DELETE AND INSERT AS FOLLOWS:

Four high strength steel anchor bolts, 2 1/4 in. in diameter and 96 in. long, including the hook, shall be furnished with each pole. Each bolt shall have two *heavy* hex nuts and two washers in accordance with ASTM A 307, ~~grade A A 563 and F 436 respectively.~~ The anchor bolt material shall be in accordance with ASTM A 576 or ASTM A 675 with a minimum yield strength of 55,000 psi or ASTM A 36, special quality, modified to 55,000 psi or approved equal. The threaded end of the anchor bolt shall have 12 in. of 4 1/2 NC threads and shall be galvanized the length of the threads, plus 3 in. The threaded end shall be ~~coated after fabrication~~ *hot-dip galvanized* in accordance with ASTM A 153 or be mechanically galvanized ~~and be in accordance with the coating thickness, adherence, and quality requirements of ASTM A 153, class C in accordance with ASTM B 695, Class 55.~~ The unthreaded end of the anchor bolt shall have a standard L bend for a distance of 9 in.

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from the centerline of the anchor bolt to the end of the L. In lieu of the standard bend a steel plate 4 1/2 sq in. and 1 1/4 in. thick may be welded to the embedded end of the anchor bolt.

SECTION 922, BEGIN LINE 1203, DELETE AND INSERT AS FOLLOWS:

4. Hardware

~~High strength heavy hex bolts for the pole splice shall be in accordance with ASTM F 3125, grade A 490 and shall be galvanized-coated in accordance with ASTM F 1136, ASTM F 2833, or ASTM F 3019, as shown in ASTM F 3125. The contact area for both pole splice plates shall be class B in accordance with AASHTO Standard Specifications for Highway Bridges, Table 10.32.3C with a minimum slip coefficient of 0.5. The surfaces shall be blast cleaned with class B coatings. The arm flange plate connection bolts shall be in accordance with ASTM F 3125, grade A 325. All other hardware shall be in accordance with ASTM A 307 and galvanized in accordance with ASTM A 153, or be mechanically galvanized and in accordance with the coating thickness, adherence, and quality requirements of ASTM A 153, class C by either hot dip galvanized in accordance with ASTM F 2329 or mechanically galvanized in accordance with ASTM B 695, Class 55. A cast pole cap shall be in accordance with ASTM A 126 and shall be galvanized with a minimum coating of 2 oz/sq ft.~~

5. Anchor Bolts

Four steel anchor bolts, each fitted with two *high strength heavy* hex nuts and two flat washers, shall be furnished with each pole. The anchor bolt shall be as shown on the plans with a minimum of 15 in. of seven NC threads on the upper end. The threads, nuts, and washers shall be ~~galvanized in accordance with ASTM A 153 or be mechanically galvanized and conform to the coating thickness, adherence, and quality requirements of~~

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910.02 STRUCTURAL STEEL

910.07 STEEL COMPONENTS OF MSE RETAINING WALLS

SECTION 919 - TRAFFIC SIGNS

919.01 TRAFFIC SIGNS

SECTION 920 - HIGHWAY ILLUMINATION MATERIALS

920.01 HIGHWAY ILLUMINATION MATERIALS

SECTION 922 - TRAFFIC SIGNAL MATERIALS AND EQUIPMENT

922.02 TRAFFIC SIGNAL CONTROL EQUIPMENT

922.03 SIGNAL HEAD COMPONENTS

922.06 DISCONNECT HANGER JUNCTION BOX

922.07 SIGNAL SUPPORT ASSEMBLIES

922.09 PEDESTAL POLES AND CAST ALUMINUM PEDESTAL BASES

922.10 SIGNAL SUPPORTS

~~ASTM A 153~~ either hot dip galvanized in accordance with ASTM F 2329 or mechanically galvanized in accordance with ASTM B 695, Class 55. The steel for the bolt shall be in accordance with ASTM F 1554, with a yield strength of 36,000 or 55,000 psi.

COMMENTS AND ACTION

707.02 MATERIALS
 711.65 BOLTED CONNECTIONS USING HIGH STRENGTH BOLTS
 802.07 INSTALLING SUPPORTS
 908.09 STRUCTURAL PLATE PIPE, PIPE-ARCHES, AND ARCHES
 908.12 STRAPS, HOOK BOLTS AND NUTS USED IN ANCHORS
 909.02 FOR METAL
 910.02 STRUCTURAL STEEL
 910.07 STEEL COMPONENTS OF MSE RETAINING WALLS
 919.01 TRAFFIC SIGNS
 920.01 HIGHWAY ILLUMINATION MATERIALS
 922.02 TRAFFIC SIGNAL CONTROL EQUIPMENT
 922.03 SIGNAL HEAD COMPONENTS
 922.06 DISCONNECT HANGER JUNCTION BOX
 922.07 SIGNAL SUPPORT ASSEMBLIES
 922.09 PEDESTAL POLES AND CAST ALUMINUM PEDESTAL BASES
 922.10 SIGNAL SUPPORTS

DISCUSSION:

Motion:	Action:
Second:	
Ayes:	<input type="checkbox"/> Passed as Submitted
Nays:	<input type="checkbox"/> Passed as Revised
FHWA Approval:	<input type="checkbox"/> Withdrawn
Standard Specifications Sections referenced and/or affected:	<input type="checkbox"/> 2022 Standard Specifications
707, 711, 802, 908, 910, 919, 920, and 922.	<input type="checkbox"/> Revise Pay Items List
Recurring Special Provision references in:	
NONE	<input type="checkbox"/> Create RSP (No. __) Effective: RSP Sunset Date:
Standard Drawing affected:	
NONE	<input type="checkbox"/> Revise RSP (No. __) Effective: RSP Sunset Date:
Design Manual Sections affected:	
NONE	<input type="checkbox"/> Standard Drawing Effective:
GIFE Sections cross-references:	
NONE	<input type="checkbox"/> Create RPD (No. __) Effective:
	<input type="checkbox"/> GIFE Update
	<input type="checkbox"/> SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: It has been noted that there may be some slightly ambiguous or confusing language in the recycling USPs. Milling for cross slope has resulting in significant portions of the reclaimed base we just paid for to be milled out. FDR proofrolling needs to be documented. CIR and CCPR do not require optimum density to be determined after initial start of production.

PROPOSED SOLUTION: Add language to help provide clarity. Remove cross-slope language from milling requirements and only allow scarification (more specificity will be in the pavement design/plans). Require proofrolling as part of the Type D certification (ITM 804) and QC requirements for FDR. Require optimum field density during production for CIR and CCPR.

APPLICABLE STANDARD SPECIFICATIONS: 307, 308, 416, 417

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: 304-6.04(03) In-Place Recycling

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS:

PAY ITEMS AFFECTED: N/A

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Recycling Committee which is represented by OMM, Pavement Division, and Industry

IMPACT ANALYSIS (attach report):

Submitted By: Matt Beeson

Title: Director

Organization: INDOT Office of Materials Management

Phone Number: 317-522-9662

Date: 11/12/19

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? N

Will approval of this item affect the Approved Materials List? N

Will this proposal improve:

Construction costs? N

Construction time? N

Customer satisfaction? N

Congestion/travel time? N

Ride quality? N

Will this proposal reduce operational costs or maintenance effort? Y

Will this item improve safety:

For motorists? Y

For construction workers? N

Will this proposal improve quality for:

Construction procedures/processes? Y

Asset preservation? Y

Design process? Y

Will this change provide the contractor more flexibility? N

Will this proposal provide clarification for the Contractor and field personnel? Y

Can this item improve/reduce the number of potential change orders? Y

Is this proposal needed for compliance with:

Federal or State regulations? N

AASHTO or other design code? N

Is this item editorial? N

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: This is to help further improve our recycling processes and make the spec book flow better and provide clarity. The referenced changes regarding ITM 804 and the frequency have been submitted to the appropriate persons.

REVISION TO STANDARD SPECIFICATIONS

SECTION 307 - CEMENT STABILIZED FULL DEPTH RECLAMATION, FDR
307.03 QUALITY CONTROL
307.15 PROOFROLLING
307.16 MILLING
SECTION 308 - ASPHALT EMULSION STABILIZED FULL DEPTH RECLAMATION, FDR
308.03 QUALITY CONTROL
308.15 PROOFROLLING
308.16 MILLING
SECTION 416 - COLD IN-PLACE RECYCLING, CIR
416.03 QUALITY CONTROL
416.10 CONTROL STRIP AND COMPACTION
416.13 CURING
416.14 MILLING
SECTION 417 - COLD CENTRAL PLANT RECYCLING, CCPR
417.03 QUALITY CONTROL
417.13 CONTROL STRIP AND COMPACTION
417.16 CURING
417.17 MILLING AND PAVEMENT SMOOTHNESS

(Note: Proposed changes shown highlighted gray)

The Standard Specifications are revised as follows:

SECTION 307, BEGIN LINE 24, INSERT AS FOLLOWS:

307.03 Quality Control

A quality control plan, QCP, shall be submitted to the Engineer a minimum of five calendar days prior to the JITT. The QCP shall include the proposed FDR mix design; a start to finish process description including discussion on corrective action measures; a list of proposed equipment; a list of proposed QC tests and testing frequencies; the curing methods applied to the cement stabilized RBC and the stabilization process applied to the RBC and subgrade after a failed proofroll. All QC test results *and responses to test results* shall be maintained during the duration of the contract and made available to the Engineer upon request.

The following table provides the type and minimum frequency for tests.

QC Testing	
Test	Frequency ^{1,2}
Depth of Pulverization	1 per 500 ft
Pulverized Material Gradation	1 per 0.5 day of production
In-place Moisture of Pulverized Material	1 per 0.5 day of production
Cement Application Rate	1 per 500 ft
Maximum Density and Moisture Content of Stabilized Material	1 per 0.5 day of production
Compacted In-Place Field Density ³	1 per 1,000 ft
<i>Proofrolling</i>	<i>1 operation per each RBC, covering the entire RBC.</i>

REVISION TO STANDARD SPECIFICATIONS

SECTION 307 - CEMENT STABILIZED FULL DEPTH RECLAMATION, FDR

307.03 QUALITY CONTROL

307.15 PROOFROLLING

307.16 MILLING

SECTION 308 - ASPHALT EMULSION STABILIZED FULL DEPTH RECLAMATION, FDR

308.03 QUALITY CONTROL

308.15 PROOFROLLING

308.16 MILLING

SECTION 416 - COLD IN-PLACE RECYCLING, CIR

416.03 QUALITY CONTROL

416.10 CONTROL STRIP AND COMPACTION

416.13 CURING

416.14 MILLING

SECTION 417 - COLD CENTRAL PLANT RECYCLING, CCPR

417.03 QUALITY CONTROL

417.13 CONTROL STRIP AND COMPACTION

417.16 CURING

417.17 MILLING AND PAVEMENT SMOOTHNESS

- | |
|---|
| <ol style="list-style-type: none">1. The Contractor shall perform all QC tests within the first 500 ft after startup and after any change in the mix design.2. Testing frequency is based upon linear feet of FDR laydown.3. The density probe shall be no more than 2.0 in. above the bottom of the FDR treatment. |
|---|

SECTION 307, BEGIN LINE 326, DELETE AND INSERT AS FOLLOWS:

In locations of failing subgrade the RBC shall be removed and subgrade treatment Type IC shall be placed in accordance with 207. HMA patching, type B shall be placed in accordance with 304 *in place of the RBC.*

307.16 Milling

The entire surface of the asphalt emulsion stabilized RBC shall be scarified in accordance with 306.04 ~~to the specified cross slope~~ in preparation for the overlay, *except liquidated damages will not apply.* Construction engineering in accordance with 105.08(b) shall be provided.

SECTION 308, BEGIN LINE 24, DELETE AND INSERT AS FOLLOWS:

308.03 Quality Control

A quality control plan, QCP, shall be submitted to the Engineer a minimum of five calendar days prior to the JITT. The QCP shall include the proposed FDR mix design; a start to finish process description including discussion on corrective action measures; a list of proposed equipment; a list of proposed QC tests and testing frequencies; the curing methods applied to the asphalt emulsion stabilized RBC and the stabilization process applied to the RBC and subgrade after a failed proofroll. All QC test results *and responses to test results* shall be maintained during the duration of the contract and made available to the Engineer upon request.

The following table provides the type and minimum frequency for tests.

REVISION TO STANDARD SPECIFICATIONS

SECTION 307 - CEMENT STABILIZED FULL DEPTH RECLAMATION, FDR

307.03 QUALITY CONTROL

307.15 PROOFROLLING

307.16 MILLING

SECTION 308 - ASPHALT EMULSION STABILIZED FULL DEPTH RECLAMATION, FDR

308.03 QUALITY CONTROL

308.15 PROOFROLLING

308.16 MILLING

SECTION 416 - COLD IN-PLACE RECYCLING, CIR

416.03 QUALITY CONTROL

416.10 CONTROL STRIP AND COMPACTION

416.13 CURING

416.14 MILLING

SECTION 417 - COLD CENTRAL PLANT RECYCLING, CCPR

417.03 QUALITY CONTROL

417.13 CONTROL STRIP AND COMPACTION

417.16 CURING

417.17 MILLING AND PAVEMENT SMOOTHNESS

QC Testing	
Test	Frequency ^{1,2}
Depth of Pulverization	1 per 500 ft
Pulverized Material Gradation	1 per 0.5 day of production
In-place Moisture of Pulverized Material	1 per 0.5 day of production
Asphalt Emulsion Content	1 per 500 ft
Maximum Density and Moisture Content of Injected Material	1 per 0.5 day of production
Compacted In-Place Field Density ³	1 per 1,000 ft
Field Moisture Content for Curing	1 per each day of production
<i>Proofrolling</i>	<i>1 operation per each RBC, covering the entire RBC.</i>
Notes: 1. The Contractor shall perform all QC tests within the first 500 ft after startup and after any change in the mix design. 2. Testing frequency is based upon linear feet of FDR laydown. 3. The density probe shall be no more than 2.0 in. above the bottom of the FDR treatment.	

SECTION 308, BEGIN LINE 329, DELETE AND INSERT AS FOLLOWS:

In locations of failing subgrade the RBC shall be removed and subgrade treatment Type IC shall be placed in accordance with 207. HMA patching, type B shall be placed in accordance with 304 *in place of the RBC.*

308.16 Milling

The entire surface of the asphalt emulsion stabilized RBC shall be scarified in accordance with 306.04 ~~to the specified cross slope~~ in preparation for the overlay, *except liquidated damages will not apply.* Construction engineering in accordance with 105.08(b) shall be provided.

SECTION 416, BEGIN LINE 23, DELETE AND INSERT AS FOLLOWS:

416.03 Quality Control

REVISION TO STANDARD SPECIFICATIONS

SECTION 307 - CEMENT STABILIZED FULL DEPTH RECLAMATION, FDR

307.03 QUALITY CONTROL

307.15 PROOFROLLING

307.16 MILLING

SECTION 308 - ASPHALT EMULSION STABILIZED FULL DEPTH RECLAMATION, FDR

308.03 QUALITY CONTROL

308.15 PROOFROLLING

308.16 MILLING

SECTION 416 - COLD IN-PLACE RECYCLING, CIR

416.03 QUALITY CONTROL

416.10 CONTROL STRIP AND COMPACTION

416.13 CURING

416.14 MILLING

SECTION 417 - COLD CENTRAL PLANT RECYCLING, CCPR

417.03 QUALITY CONTROL

417.13 CONTROL STRIP AND COMPACTION

417.16 CURING

417.17 MILLING AND PAVEMENT SMOOTHNESS

A quality control plan, QCP, shall be submitted to the Engineer a minimum of five calendar days prior to the JITT. The QCP shall include the proposed CIR mix design, a start to finish process description to include discussion on corrective action measures, a list of proposed equipment, a list of proposed QC tests and testing frequencies, and the curing methods applied to the CIR. All QC test results *and responses to test results* shall be maintained during the duration of the contract and made available to the Engineer upon request.

The following table provides the type and minimum frequency for tests.

QC Testing	
Test	Frequency ^{1,2}
Depth of Pulverization	1 per 500 ft
Pulverized Material Gradation	1 per 0.5 day of processing
Asphalt Emulsion Content	1 per 500 ft
Water Content	1 per 500 ft
Compacted In-Place Field Density	1 per 1,000 ft
Field Moisture Content for Curing	1 per each day of production
<i>Optimum Field Density</i>	<i>1 per 2.0 days of production</i>
Notes: 1. The Contractor shall perform all QC tests within the first 500 ft after startup and after any change in the mix design. 2. Testing frequency is based upon linear feet of CIR processing.	

SECTION 416, BEGIN LINE 289, INSERT AS FOLLOWS:

A rolling pattern that produces the maximum obtainable density, or optimum field density, shall be determined during the control strip *using a roller in accordance with 409.03(d)4*. The Contractor shall provide a sequence and manner of rolling by establishing a roller pass versus density chart that shows the progress of densification from initial lay down through optimum field density using a properly calibrated nuclear gauge in accordance to AASHTO T 310. Production may continue after approval of the control strip.

REVISION TO STANDARD SPECIFICATIONS

SECTION 307 - CEMENT STABILIZED FULL DEPTH RECLAMATION, FDR

307.03 QUALITY CONTROL

307.15 PROOFROLLING

307.16 MILLING

SECTION 308 - ASPHALT EMULSION STABILIZED FULL DEPTH RECLAMATION, FDR

308.03 QUALITY CONTROL

308.15 PROOFROLLING

308.16 MILLING

SECTION 416 - COLD IN-PLACE RECYCLING, CIR

416.03 QUALITY CONTROL

416.10 CONTROL STRIP AND COMPACTION

416.13 CURING

416.14 MILLING

SECTION 417 - COLD CENTRAL PLANT RECYCLING, CCPR

417.03 QUALITY CONTROL

417.13 CONTROL STRIP AND COMPACTION

417.16 CURING

417.17 MILLING AND PAVEMENT SMOOTHNESS

SECTION 416, BEGIN LINE 335, DELETE AND INSERT AS FOLLOWS:

416.13 Curing

Before placing the final surfacing, the recycled surface shall remain in-place for a minimum of three days and meet one of the following conditions:

- (a) there is less than 3.0% moisture remaining in the mixture, or
- (b) the material has remained in-place for a minimum of 10 *consecutive* days without rainfall.

The planned method and duration of curing for CIR shall be in accordance with the QCP. The specified surface course shall be placed within two weeks of the CIR final cure, but no later than November 1.

416.14 Milling

The entire surface of the CIR shall be scarified in accordance with 306.04 ~~to the specified cross-slope~~ in preparation for the overlay, *except liquidated damages will not apply*. Construction engineering in accordance with 105.08(b) shall be provided.

SECTION 417, BEGIN LINE 25, INSERT AS FOLLOWS:

417.03 Quality Control

A quality control plan, QCP, shall be submitted to the Engineer a minimum of five calendar days prior to the JITT. The QCP shall include the proposed CCPR mix design, a start to finish process description to include discussion on corrective action measures, a list of proposed equipment, a list of proposed QC tests and testing frequencies, and the curing methods and procedures applied to the CCPR. All QC test results *and responses to test results* shall be maintained during the duration of the contract and made available to the Engineer upon request.

The following table provides the type and minimum frequency for tests:

REVISION TO STANDARD SPECIFICATIONS

SECTION 307 - CEMENT STABILIZED FULL DEPTH RECLAMATION, FDR

307.03 QUALITY CONTROL

307.15 PROOFROLLING

307.16 MILLING

SECTION 308 - ASPHALT EMULSION STABILIZED FULL DEPTH RECLAMATION, FDR

308.03 QUALITY CONTROL

308.15 PROOFROLLING

308.16 MILLING

SECTION 416 - COLD IN-PLACE RECYCLING, CIR

416.03 QUALITY CONTROL

416.10 CONTROL STRIP AND COMPACTION

416.13 CURING

416.14 MILLING

SECTION 417 - COLD CENTRAL PLANT RECYCLING, CCPR

417.03 QUALITY CONTROL

417.13 CONTROL STRIP AND COMPACTION

417.16 CURING

417.17 MILLING AND PAVEMENT SMOOTHNESS

QC testing	
Test	Frequency ^{1,2}
Depth of Laydown	1 per 500 ft
Pulverized Material Gradation	1 per 1,000 tons of production
Pulverized Material Moisture Content	1 per 500 tons of production
Asphalt Emulsion Content ³	1 per 500 tons of production
Water Content ³	1 per 500 tons of production
Compacted In-Place Field Density	1 per 1,000 ft
Field Moisture Content for Curing	1 per each day of production
Optimum Field Density	1 per 2.0 days of production
Notes: 1. The Contractor shall perform all QC tests within the first 500 ft after startup and after any change in the mix design. 2. Testing frequency is based upon either linear feet of CCPR laydown or tons of CCPR mixture processing. 3. Asphalt emulsion content and water content shall be taken from the readings of the control settings of the mixing unit.	

SECTION 417, BEGIN LINE 267, INSERT AS FOLLOWS:

A rolling pattern that produces the maximum obtainable density, or optimum field density, shall be determined during the control strip *using a roller in accordance with 409.03(d)4*. The Contractor shall provide a sequence and manner of rolling by establishing a roller pass versus density chart that shows the progress of densification from initial lay down through optimum field density using a properly calibrated nuclear gauge in accordance to AASHTO T 310. Production may continue after approval of the control strip.

SECTION 417, BEGIN LINE 313, DELETE AND INSERT AS FOLLOWS:

417.16 Curing

Before placing the final surfacing, the recycled surface shall remain in-place for a minimum of three days and meet one of the following conditions:

- (a) There is less than 3.0% moisture remaining in the mixture, or;

REVISION TO STANDARD SPECIFICATIONS

SECTION 307 - CEMENT STABILIZED FULL DEPTH RECLAMATION, FDR

307.03 QUALITY CONTROL

307.15 PROOFROLLING

307.16 MILLING

SECTION 308 - ASPHALT EMULSION STABILIZED FULL DEPTH RECLAMATION, FDR

308.03 QUALITY CONTROL

308.15 PROOFROLLING

308.16 MILLING

SECTION 416 - COLD IN-PLACE RECYCLING, CIR

416.03 QUALITY CONTROL

416.10 CONTROL STRIP AND COMPACTION

416.13 CURING

416.14 MILLING

SECTION 417 - COLD CENTRAL PLANT RECYCLING, CCPR

417.03 QUALITY CONTROL

417.13 CONTROL STRIP AND COMPACTION

417.16 CURING

417.17 MILLING AND PAVEMENT SMOOTHNESS

(b)The material has remained in-place for a minimum of 10 consecutive days without rainfall.

The planned method and duration of curing for CCPR shall be in accordance with the QCP. The specified surface course shall be placed within two weeks of the CCPR final cure, but no later than November 1.

417.17 Milling and Pavement Smoothness

When the CCPR material is placed in a single lift, the entire surface of the CCPR shall be scarified in accordance with 306.04 ~~to the specified cross slope~~ in preparation for the overlay, *except liquidated damages will not apply*. Construction engineering in accordance with 105.08(b) shall be provided.

COMMENTS AND ACTION

307.03 QUALITY CONTROL
 307.15 PROOFROLLING
 307.16 MILLING
 308.03 QUALITY CONTROL
 308.15 PROOFROLLING
 308.16 MILLING
 416.03 QUALITY CONTROL
 416.10 CONTROL STRIP AND COMPACTION
 416.13 CURING
 416.14 MILLING
 417.03 QUALITY CONTROL
 417.13 CONTROL STRIP AND COMPACTION
 417.16 CURING
 417.17 MILLING AND PAVEMENT SMOOTHNESS

DISCUSSION:

Motion:	Action:
Second:	
Ayes:	<input type="checkbox"/> Passed as Submitted
Nays:	<input type="checkbox"/> Passed as Revised
FHWA Approval:	<input type="checkbox"/> Withdrawn
Standard Specifications Sections referenced and/or affected:	<input type="checkbox"/> 2022 Standard Specifications
307, 308, 416, and 417.	<input type="checkbox"/> Revise Pay Items List
Recurring Special Provision references in:	<input type="checkbox"/> Create RSP (No. __)
NONE	Effective:
	RSP Sunset Date:
Standard Drawing affected:	<input type="checkbox"/> Revise RSP (No. __)
NONE	Effective:
	RSP Sunset Date:
Design Manual Sections affected:	<input type="checkbox"/> Standard Drawing
304-6.04(03) In-Place Recycling	Effective:
GIFE Sections cross-references:	<input type="checkbox"/> Create RPD (No. __)
NONE	Effective:
	<input type="checkbox"/> GIFE Update
	<input type="checkbox"/> SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The specified range of finished course thickness for HMA and SMA may be too conservative and can hamper in place density and flexibility for designers.

PROPOSED SOLUTION: Change the range from 2 to 4 times the maximum particle size to 2 to 5 times the maximum particle size. Increase the higher end to 5x, but leave the minimum at 2x. This wouldn't affect current design practices, but would open up the range for us to have more options to work with.

APPLICABLE STANDARD SPECIFICATIONS: 401, 402, 410

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: 304-8.02, 304-14.02

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: 401-R-701, 402-R-702, 410-R-703

PAY ITEMS AFFECTED: N/A

APPLICABLE SUB-COMMITTEE ENDORSEMENT: OMM/Pavement Committee, SPR-4211 which included a literature review of lift thicknesses

IMPACT ANALYSIS (attach report):

Submitted By: Matt Beeson for Nathan Awwad

Title: Director

Organization: INDOT, Office of Materials Management

Phone Number: 317-522-9662

Date: 11/22/19

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? N

Will approval of this item affect the Approved Materials List? N

Will this proposal improve:

Construction costs? Y

Construction time? N

Customer satisfaction? Y

Congestion/travel time? N

Ride quality? Y

Will this proposal reduce operational costs or maintenance effort? Y

Will this item improve safety:

For motorists? N

For construction workers? N

Will this proposal improve quality for:

Construction procedures/processes? Y

Asset preservation? Y

Design process? Y

Will this change provide the contractor more flexibility? Y

Will this proposal provide clarification for the Contractor and field personnel? Y

Can this item improve/reduce the number of potential change orders? Y

Is this proposal needed for compliance with:

Federal or State regulations? N

AASHTO or other design code? N

Is this item editorial? N

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: Forgot to include with the last round of HMA and SMA specification changes. Has been desired for some time, but was waiting for the results of SPR-4211 which confirmed the hypothesis.

REVISION TO STANDARD SPECIFICATIONS

SECTION 401 - QC/QA HMA PAVEMENT

401.14 SPREADING AND FINISHING

SECTION 402 - HMA PAVEMENT

402.13 SPREADING AND FINISHING

SECTION 410 - QC/QA HMA - SMA PAVEMENT

410.14 SPREADING AND FINISHING

(Note: Proposed changes shown highlighted gray)

The Standard Specifications are revised as follows:

SECTION 401, BEGIN LINE 412, DELETE AND INSERT AS FOLLOWS:

The finished thickness of any course shall be at least two times but not more than ~~four~~**five** times the maximum particle size as shown on the DMF, except 4.75 mm mixtures shall be at least 1.5 times but not more than 3 times the maximum particle size shown on the DMF.

SECTION 402, BEGIN LINE 206, DELETE INSERT AS FOLLOWS:

The finished thickness of each course shall be at least two times but not more than ~~four~~**five** times the maximum particle size as shown on the DMF. The finished thickness of wedge and level mixtures shall be at least 1 1/2 times but not more than six times the maximum particle size as shown on the DMF. Feathering may be less than the minimum thickness requirements.

SECTION 410, BEGIN LINE 286, DELETE AND INSERT AS FOLLOWS:

The finished thickness of any course shall be at least two times but not more than ~~four~~**five** times the maximum particle size as shown on the DMF.

COMMENTS AND ACTION

401.14 SPREADING AND FINISHING

402.13 SPREADING AND FINISHING

410.14 SPREADING AND FINISHING

DISCUSSION:

Motion:	Action:
Second:	
Ayes:	<input type="checkbox"/> Passed as Submitted
Nays:	<input type="checkbox"/> Passed as Revised
FHWA Approval:	<input type="checkbox"/> Withdrawn
Standard Specifications Sections referenced and/or affected:	<input type="checkbox"/> 2022 Standard Specifications
401.14 pg 297-298; 402.13 pg 316-317, and 410.14 pg 343-344.	<input type="checkbox"/> Revise Pay Items List
Recurring Special Provision references in:	<input type="checkbox"/> Create RSP (No. __) Effective: RSP Sunset Date:
401-R-701 QC/QA HMA PAVEMENT; 402-R-702 HMA PAVEMENT; 410-R-703 QC/QA HMA - SMA PAVEMENT.	<input type="checkbox"/> Revise RSP (No. __) Effective: RSP Sunset Date:
Standard Drawing affected:	<input type="checkbox"/> Standard Drawing Effective:
NONE	<input type="checkbox"/> Create RPD (No. __) Effective:
Design Manual Sections affected:	<input type="checkbox"/> GIFE Update
304-8.02, 304-14.02.	<input type="checkbox"/> SiteManager Update
GIFE Sections cross-references:	
NONE	

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: REOB/VTAE is not specifically prohibited in our binder specifications. It can be detrimental to binder properties. Currently not being used because of good business practices and the fact surrounding states prohibit.

Maintenance QPA uses HFRS-2P, but this emulsion is not in our 902 section (and approved emulsion supplier program) for the QPA to reference.

PROPOSED SOLUTION: Explicitly prohibit REOB/VTAE and similar products in section 902. Add HFRS-2P to section 902.

APPLICABLE STANDARD SPECIFICATIONS: 902

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: 902-M-051

PAY ITEMS AFFECTED: N/A

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Email concurrence from major binder suppliers in the certified binder supplier program.

IMPACT ANALYSIS (attach report):

Submitted By: Matt Beeson for Nathan Awwad

Title: Director

Organization: INDOT, Office of Materials Management

Phone Number: 317-522-9662

Date: 11/22/19

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? N

Will approval of this item affect the Approved Materials List? N

Will this proposal improve:

Construction costs? N

Construction time? N

Customer satisfaction? N

Congestion/travel time? N

Ride quality? N

Will this proposal reduce operational costs or maintenance effort? N

Will this item improve safety:

For motorists? N

For construction workers? N

Will this proposal improve quality for:

Construction procedures/processes? N

Asset preservation? Y

Design process? N

Will this change provide the contractor more flexibility? N

Will this proposal provide clarification for the Contractor and field personnel? Y

Can this item improve/reduce the number of potential change orders? N

Is this proposal needed for compliance with:

Federal or State regulations? N

AASHTO or other design code? N

Is this item editorial? N

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO STANDARD SPECIFICATIONS

SECTION 902 - ASPHALT MATERIALS

902.01 ASPHALT

(Note: Proposed changes shown highlighted gray)

The Standard Specifications are revised as follows:

SECTION 902, BEGIN LINE 8, INSERT AS FOLLOWS:

(a) Performance Graded Asphalt Binders

Performance graded asphalt binders shall be supplied by an approved supplier in accordance with ITM 581.

Re-refined engine oil bottoms, vacuum tower asphalt extenders and reclaimed engine oil based products shall not be used in performance graded asphalt binders.

SECTION 902, BEGIN LINE 71, INSERT AS FOLLOWS:

The requirements for asphalt emulsions are as follows:

RS-2, HFRS-2, and SS-1h shall be in accordance with AASHTO M 140 except the cement mixing test is waived.

CRS-2P *and HFRS-2P* shall be in accordance with AASHTO M 316. The distillation temperature shall be 350°F.

COMMENTS AND ACTION

902.01 ASPHALT

DISCUSSION:

Motion:	Action:
Second:	
Ayes:	<input type="checkbox"/> Passed as Submitted
Nays:	<input type="checkbox"/> Passed as Revised
FHWA Approval:	<input type="checkbox"/> Withdrawn
Standard Specifications Sections referenced and/or affected:	<input type="checkbox"/> 2022 Standard Specifications
902.01 pg 929.	<input type="checkbox"/> Revise Pay Items List
Recurring Special Provision references in:	<input type="checkbox"/> Create RSP (No. __)
902-M-051 ASPHALT MATERIALS.	Effective:
	RSP Sunset Date:
Standard Drawing affected:	<input type="checkbox"/> Revise RSP (No. __)
NONE	Effective:
	RSP Sunset Date:
Design Manual Sections affected:	<input type="checkbox"/> Standard Drawing
	Effective:
GIFE Sections cross-references:	<input type="checkbox"/> Create RPD (No. __)
NONE	Effective:
	<input type="checkbox"/> GIFE Update
	<input type="checkbox"/> SiteManager Update

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Complete and accurate information is not always readily available regarding payments to DBE, MBE, WBE and IVOSB subcontractors.

PROPOSED SOLUTION: The proposed RSP directs contractors and subcontractors to report payment information via the Department's Subcontractor Payment Tracking System. This will provide enhanced management and monitoring of compliance with the DBE, MBE, WBE and IVOSB programs.

APPLICABLE STANDARD SPECIFICATIONS: 108.01

APPLICABLE STANDARD DRAWINGS: NA

APPLICABLE DESIGN MANUAL SECTION: NA

APPLICABLE SECTION OF GIFE: TBD

APPLICABLE RECURRING SPECIAL PROVISIONS: NA

PAY ITEMS AFFECTED: NA

APPLICABLE SUB-COMMITTEE ENDORSEMENT: NA

IMPACT ANALYSIS (attach report): See next page.

Submitted By: Mike Beuchel

Title: Estimating Administrator

Organization: INDOT

Phone Number: 317-232-5326

Date: 11/25/19

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No

Will approval of this item affect the Approved Materials List? No

Will this proposal improve:

Construction costs? No

Construction time? No

Customer satisfaction? No

Congestion/travel time? No

Ride quality? No

Will this proposal reduce operational costs or maintenance effort? No

Will this item improve safety:

For motorists? No

For construction workers? No

Will this proposal improve quality for:

Construction procedures/processes? No

Asset preservation? No

Design process? No

Will this change provide the contractor more flexibility? No

Will this proposal provide clarification for the Contractor and field personnel? No

Can this item improve/reduce the number of potential change orders? No

Is this proposal needed for compliance with:

Federal or State regulations? Yes

AASHTO or other design code? No

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: This item enhances management and reporting of compliance with the DBE, MBE, WBE and IVOSB program.

REVISION TO STANDARD SPECIFICATIONS

SECTION 108 - PROSECUTION AND PROGRESS

108.01 SUBLETTING OF CONTRACT

(Note: Proposed changes shown highlighted gray)

The Standard Specifications are revised as follows:

SECTION 108, BEGIN LINE 34, DELETE AND INSERT AS FOLLOWS:

The Contractor shall submit payment records through the Department's Subcontractor Payment Tracking System (<http://itap.indot.in.gov>) of all payments made to subcontractors and DBE, MBE, WBE and IVOSB firms approved by the Department. Reports shall be submitted no later than 10 days after the end of each month in which a subcontractor is paid for work on the contract. Reports shall include any release of retainage payments made to subcontractors.

All subcontractors and DBE, MBE, WBE and IVOSB firms approved by the Department shall verify all payments made to them through the Department's Subcontractor Payment Tracking System (<http://itap.indot.in.gov>). All payments received for work on the contract shall be verified no later than 20 days after the end of the month in which payment was received.

COMMENTS AND ACTION

108.01 SUBLETTING OF CONTRACT

DISCUSSION:

Motion:	Action:
Second:	
Ayes:	<input type="checkbox"/> Passed as Submitted
Nays:	<input type="checkbox"/> Passed as Revised
FHWA Approval:	<input type="checkbox"/> Withdrawn
Standard Specifications Sections referenced and/or affected:	<input type="checkbox"/> 2022 Standard Specifications
108.01 pg 84.	<input type="checkbox"/> Revise Pay Items List
Recurring Special Provision references in:	<input type="checkbox"/> Create RSP (No. __)
NONE	Effective:
	RSP Sunset Date:
Standard Drawing affected:	<input type="checkbox"/> Revise RSP (No. __)
NONE	Effective:
	RSP Sunset Date:
Design Manual Sections affected:	<input type="checkbox"/> Standard Drawing
NONE	Effective:
GIFE Sections cross-references:	<input type="checkbox"/> Create RPD (No. __)
TBD	Effective:
	<input type="checkbox"/> GIFE Update
	<input type="checkbox"/> SiteManager Update