Florida Department of Transportation

RICK SCOTT
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

ANANTH PRASAD, P.E.
SECRETARY

July 17, 2012

Monica Gourdine
Program Operations Engineer
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Re: Office of Design, Specifications
Section **400**
Proposed Specification: **4000300 Concrete Structures.**

Dear Ms. Gourdine:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

These changes were proposed by Steve Plotkin of the State Construction Office to remove unused language and include references for finishing of bridge and sidewalks, curing and cleaning of bridges and repair of deck cracks after grinding and grooving.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to SP965TT or trey.tillander@dot.state.fl.us.

If you have any questions relating to this specification change, please call me at 414-4140.

Sincerely,

V. Y. "Trey" Tillander, III, P.E.
State Specifications Engineer

TT/cah
Attachment
cc: Florida Transportation Builders' Assoc.
State Construction Engineer

CONCRETE STRUCTURES.
(REV *7*4-~~1~~*16*~~2~~-12)

Article 400-3 (Page 373 - 374) is deleted and the following substituted:

400-3 Depth of Footing.

Refer to Section 455, "D. SPREAD FOOTINGS".~~Consider the elevations of the bottoms of footings, as shown in the plans, as approximate only. The Engineer may change dimensions or elevations of footings as necessary to secure a satisfactory foundation. If the elevation of a footing as shown in the plans is changed to a higher or lower elevation, the Engineer will not consider such change as a material change to the original Contract Documents, a waiver of any condition of the Contract, or an invalidation of any of the provisions of the Contract. If the excavation must be carried deeper than shown in the plans to obtain a satisfactory foundation, the Engineer will revise the plans in accordance with one of the following methods:~~

~~(a) The Engineer will keep the top of the footing at the elevation shown in the original plans and will increase the thickness to obtain a satisfactory foundation. The Engineer will follow this method when the change in bottom elevation of the footing is 12 inches or less. When this method is followed, place the reinforcing steel the same as if the footings, as shown in the original plans, were placed on a subfooting of plain concrete; make no alteration in the position of the reinforcing bars relative to the top of the footing.~~

~~(b) The Engineer will revise the plans and lower the footing, thereby increasing the height of stem, to obtain a satisfactory foundation. Generally, the Engineer will increase the thickness and width of footing over that shown in the original plans. If this method is followed, use the dimensions, sizes, and location of reinforcing steel shown in the revised plans. The Engineer will follow this method when the change in elevation of the bottom of footing exceeds 12 inches.~~

~~The Engineer will determine which of the above methods to use.~~

SUBARTICLE 400-10.3 (Page 393) is deleted and the following substituted:

400-10.3 Joint System Installation: Install expansion joints before or after the deck planing required by 400-15.2.5.5 following the manufacturer's instructions. When installed after deck planing, install the edge rail assemblies in the blockouts on a profile tangent between the ends of the deck and/or approach slab to within a ~~±~~*plus* 0 and ~~-~~*minus* 1/4 inch variation.

When installed before deck planing, install the edge rail assemblies 3/8 inch, ~~±~~*plus or minus* 1/16 inch, below the top surface of the deck or approach slab to compensate for concrete removal during planing.

SUBARTICLE 400-11.3 (of the Supplemental specification) is deleted and the following substituted:

400-11.3 Bearing Pads: Use bearing pads for seating bridge shoes, ends of beams, and slabs of the types specified or required in the ~~p~~*P*lans.

Furnish and install Composite Neoprene Pads as detailed in the plans. Place neoprene pads, where specified or required, directly on masonry surfaces finished in accordance with the requirements of this Article. Ensure that pads, bearing areas of bridge seats, and metal bearing plates are thoroughly cleaned and free from oil, grease, and other foreign materials.

Exercise care in fabrication of related metal parts to avoid producing conditions detrimental to the performance of the pads, such as uneven bearing, excessive bulging, etc.

The Engineer will evaluate the degree of deformation and condition of bearing pads in the completed bridge on or before the final inspection required by ~~Specification~~ 5-10 or when requested by the Contractor. As directed by the Engineer, correct horizontal bearing pad deformations that at the time of inspection exceed 50% of the bearing pad thickness or that the Engineer predicts will exceed 50% of the bearing pad thickness during future high or low temperature periods. Payment for this correction effort will be considered extra work in accordance with 4-3.

SUBARTICLE 400-15.2.5.6 (Page 399) is deleted and the following substituted:

400-15.2.5.6 Grooving: After the concrete surface profile, as required by 400-15.2.5, has been accepted by the Engineer, and prior to opening the bridge to traffic, groove the bridge deck and approach slabs perpendicular to the centerline of the structure. Do not groove the deck surface of pedestrian or trail bridges unless otherwise shown in the Contract Documents. Cut grooves into the hardened concrete using a mechanical saw device which will leave grooves nominally 1/8 inch wide and 3/16 inch deep. Space the grooves apart in random spacing center of grooves in the following sequence: 3/4 inch, 1 1/8 inch, 5/8 inch, 1 inch, 5/8 inch, 1 1/8 inch, 3/4 inch in 6 inch repetitions across the width to be grooved in one pass of the mechanical saw device. One 6 inch sequence may be adjusted by 1/4 sequence increments to accommodate various cutting head widths provided the general pattern is carried out. The tolerance for the width of the grooves is ~~±~~*plus* 1/16 to ~~–~~*minus* 0 inch and the tolerance for the depth of grooves is ~~±~~*plus or minus* 1/16 inch. The tolerance for the spacing of the grooves is ~~±~~*plus or minus* 1/16 inch.

Cut grooves continuously across the deck or approach slab to within 18 inches of gutter lines at barrier rail, curb line and median divider. At skewed metal expansion joints in bridge deck surfaces, adjust groove cutting by using narrow width cutting heads so that all grooves of the bridge deck surface or approach slab surface end within 6 inches, measured normal to centerline of the joint, leaving no ungrooved surface adjacent to each side of the joint greater than 6 inches in width. Ensure that the minimum distance to the first groove, measured normal from the edge of the concrete joint or from the junction between the concrete and the metal leg of the armored joint angle, is 1 inch. Produce grooves that are continuous across construction joints or

other joints in the concrete surface less than 1/2 inch wide. Apply the same procedure described above where the gutter lines at barrier rails, curb lines and median dividers are not parallel to the centerline of the bridge to maintain the 18 inches maximum dimension from the grooves to the gutter line. Cut grooves continuously across formed concrete joints.

SUBARTICLE 400-15.2.6.3 & 400-15.2.6.4 (Page 400) is deleted and the following substituted:

400-15.2.6.3 Surface Preparation: Prepare the surface prior to the application of an applied finish coating by providing a surface finish in accordance with the requirements of 400-15.1. The Engineer will not require surface voids that are 1/4 inch or less in width and depth to be grouted prior to application of the finish coating. Fill surface void larger than 1/4 inch in width and depth an approved high strength, non metallic, non shrink grout meeting the requirements of Section 934, mixed and applied in accordance with the manufacturer's recommendations. Apply the grout by filling the surface voids using burlap pads, float sponges, or other acceptable methods. As soon as the grout has taken its initial set, brush the surface to remove all loose grout, leaving the surface smooth and free of any voids. Ensure that the surface to be coated is free from efflorescence, flaking coatings, curing compound, dirt, oil, and other substances deleterious to the applied finish coating. Prior to application of the finish coating onto precast or cast-in-place concrete surfaces, test the concrete surface at 30 foot intervals for the presence of curing compound using one or two drops of muriatic acid placed on the concrete surface. If curing compound is present, there will be no reaction between the acid and the concrete. If there is no reaction, remove the compound by pressure washing the concrete surfaces. Prepare the surfaces in accordance with the manufacturer's recommendations, and ensure that they are in a condition consistent with the manufacturer's requirements. *Clean surfaces of existing structures in accordance with 400-19.*

400-15.2.6.4 Application: Apply the finish coating utilizing a method recommended by the manufacturer. When applying the finish coating by spraying, supply heavy duty spray equipment capable of maintaining a constant pressure necessary for proper application. Mix and cure all coating materials in accordance with the manufacturer's printed instructions. Apply the finished coating at a rate of 50 ~~±~~*plus or minus* 10 ft^2/gal.

SUBARTICLE 400-15.2.8 (Page 401) is deleted and the following substituted:

400-15.2.8 Finishing Bridge Sidewalks: *Finish* ~~Provide~~ bridge sidewalks ~~, that are not finished~~ in accordance with the *applicable* requirements of Section 522~~, a Class 4 finish~~.

SUBARTICLE 400-17.4 (Page 405) is deleted and the following substituted:

400-17.4 Alternate Procedure: As an alternate procedure, in lieu of the time delay periods set forth in 400-17.1 and 400-17.3, test beams or cylinders may be cast from representative concrete and cured identically with the concrete in the corresponding structural component. Make the test beams in accordance with ASTM C 31 and test them in accordance with ASTM C 78. When the test results indicate a minimum flexural strength of 550 psi for beams or the minimum 28-day compressive strength shown in the plans, concrete bridge decks and culverts may be opened to traffic or the superstructure and beams may be placed on caps. *However, regardless of beam or cylinder break results, fully comply with the bridge deck curing provisions of 400-16.4, including the requirement for curing blankets to remain in place for 7 days.* ~~*including the requirement for curing blankets to remain in place for 7 days.*~~

ARTICLE 400-19 (Page 406) is deleted and the following substituted:

400-19 Cleaning and Coating Concrete Surfaces *of Existing Structures*.

For the purposes of this article, an existing structure is one that was in service prior to the start of the project to which this specification applies. For existing structures, clean concrete surfaces that are designated in the Contract Documents as receiving Class 5 Applied Finish Coating~~,~~ *by pressure washing*~~Water blast existing concrete surfaces~~ *prior to the application of coating.* ~~as shown in the plans to be coated.~~ Use *pressure washing*~~water blast~~ equipment producing a minimum working pressure of 2,*5*~~9~~00 psi~~ with a gauge~~ *when measured* at or near the nozzle~~ to confirm the working pressure~~. *Do not damage or gouge uncoated concrete surfaces or previously coated concrete surfaces during cleaning operations.* ~~-~~ *Remove all previously applied coating that is no longer adhering to the concrete or that is peeling, flaking or delaminating. Ensure that after the pressure wash cleaning and the removal of non-adherent coating, that the cleaned surfaces are free of efflorescence, grime, mold, mildew, oil or any other contaminants that might prevent proper adhesion of the new coating.* ~~-~~ After cleaning *has been successfully completed*, apply ~~a~~ Class 5 Applied Finish Coating *in accordance with 400-15.2.6 or* as *otherwise specified* ~~directed~~ in the *P*~~p~~lans.

SUBARTICLE 400-21.5.2 (Pages 408 – 412) is deleted and the following substituted:

400-21.5.2 Structural Cracks: Provide a structural evaluation signed and sealed by the Contractor's Engineer of Record that includes recommended repair methods and a determination of structural capacity and durability to the Engineer. Upon approval by the Engineer, repair the cracked concrete. Complete all repairs to cracks in a member inside a cofferdam prior to flooding the cofferdam.

Table 1
DISPOSITION OF CRACKED CONCRETE OTHER THAN BRIDGE DECKS
[see separate Key of Abbreviations and Footnotes for Tables 1 and 2]

Elev. Range	Crack Width Range (inch) (2) x = crack width	Cracking Significance Range per LOT (1)											
		Isolated Less than 0.005%			Occasional 0.005% to<0.017%			Moderate 0.017% to<0.029%			Severe 0.029% or gtr.		
		Environment Category											
		SA	MA	EA	SA	MA	EA	SA	MA	EA	SA	MA	EA
Elevation: 0 to 6 ft AMHW	x ≤ 0.004	NT	NT	PS (6)	NT	PS (6)	PS (6)	PS (6)	PS (6)				
	0.004< x ≤ 0.008	NT	PS (6)	EI (3)	PS (6)	EI (3)	EI (3)	PS (6)					
	0.008< x ≤ 0.012	NT	PS (6)	EI									
	0.012< x ≤ 0.016	PS (6)											
	0.016< x ≤ 0.020												
	0.020< x ≤ 0.024												
	0.024< x ≤ 0.028												
	x > 0.028												
Elev.: More Than 6 ft to 12 ft AMHW	Crack Width	SA	MA	EA	SA	MA	EA	SA	MA	EA	SA	MA	EA
	x ≤ 0.004	NT	NT	PS (6)	NT	PS (6)	PS (6)	PS (6)	PS (6)	PS (6)	PS (6)		
	0.004< x ≤ 0.008	NT	PS (6)	EI (3)	PS (6)	PS (6)	EI (3)	PS (6)	EI (3)				
	0.008< x ≤ 0.012	NT	PS (6)	EI	EI	EI							
	0.012< x ≤ 0.016	PS (6)	EI	EI	EI								
	0.016< x ≤ 0.020	EI											
	0.020< x ≤ 0.024												
	0.024< x ≤ 0.028												
	x > 0.028												
Elev.: Over Land or	Crack Width	SA	MA	EA	SA	MA	EA	SA	MA	EA	SA	MA	EA
	x ≤ 0.004	NT	NT	NT	NT	PS (6)	PS (6)	PS (6)	PS (6)	PS (6)	PS (6)		

	0.004< x ≤ 0.008	NT	PS (6)	PS (6)	PS (6)	PS (6)	EI (3)	PS (6)	EI (3)	EI (3)	PS (6)		
	0.008< x ≤ 0.012	NT	PS (6)	EI	EI	EI	EI	EI	EI				
	0.012< x ≤ 0.016	PS (6)	EI	EI	EI	EI	EI						
	0.016< x ≤ 0.020	EI	EI	EI	EI								
	0.020< x ≤ 0.024	EI											
	0.024< x ≤ 0.028												
	x > 0.028												

Table 2
DISPOSITION OF CRACKED CONCRETE BRIDGE DECKS
[see separate Key of Abbreviations and Footnotes for Tables 1 and 2]

Elev. Range	Crack Width Range (inch) [2] x = crack width	Cracking Significance Range per LOT [1]											
		Isolated less than 0.005%			Occasional 0.005% to<0.017%			Moderate 0.017% to<0.029%			Severe 0.029% or gtr.		
		Environment Category											
		SA	MA	EA	SA	MA	EA	SA	MA	EA	SA	MA	EA
Elevation: 12 feet or Less AMHW	x ≤ 0.004	NT	NT	NT	NT	NT	NT	NT	NT	NT			
	0.004< x ≤ 0.008	NT	NT	EI/M	NT	NT	EI/M	EI/M	EI/M	EI/M			
	0.008< x ≤ 0.012	NT	NT	EI/M	NT	EI/M	EI/M	EI/M	EI/M				
	0.012< x ≤ 0.016	NT	NT	EI/M	NT	EI/M							
	0.016< x ≤ 0.020	EI/M	EI/M	EI	EI								
	0.020< x ≤ 0.024	EI/M	EI	EI									
	0.024< x ≤ 0.028	EI/M	EI										
	x > 0.028												
Elevation: Over Land or More Than 12 feet AMHW	Crack Width	SA	MA	EA	SA	MA	EA	SA	MA	EA	SA	MA	EA
	x ≤ 0.004	NT	NT	NT	NT	NT	NT	NT	NT	NT			
	0.004< x ≤ 0.008	NT	NT	NT	NT	NT	EI/M	NT	EI/M	EI/M			
	0.008< x ≤ 0.012	NT	NT	EI/M	NT	NT	EI/M	EI/M	EI/M				
	0.012< x ≤ 0.016	NT	NT	EI/M	NT	EI/M							
	0.016< x ≤ 0.020	NT	EI/M	EI	EI/M								
	0.020< x ≤ 0.024	NT	EI/M	EI									
	0.024< x ≤ 0.028	NT	EI/M										
	x > 0.028												

Key of Abbreviations and Footnotes for Tables 1 and 2		
Type Abbreviation	Abbreviation	Definition
Repair Method	EI	Epoxy Injection
	M	Methacrylate
	NT	No Treatment Required
	PS	Penetrant Sealer
Environment Category	EA	Extremely Aggressive
	MA	Moderately Aggressive
	SA	Slightly Aggressive
Reference Elevation	AMHW	Above Mean High Water

Footnotes

(1) Cracking Significance Range is determined by computing the ratio of Total Cracked Surface Area (TCSA) to Total Surface Area (TSA) per LOT in percent [(TCSA/TSA) x 100] then by identifying the Cracking Significance Range in which that value falls. TCSA is the sum of the surface areas of the individual cracks in the LOT. The surface area of an individual crack is determined by taking width measurements of the crack at 3 representative locations and then computing their average which is then multiplied by the crack length.

(2) Crack Width Range is determined by computing the width of an individual crack as computed in (1) above and then identifying the range in which that individual crack width falls.

(3) When the Engineer determines that a crack in the 0.004 inch to 0.008 inch width range cannot be injected then for Table 1 use penetrant sealer unless the surface is horizontal, in which case, use methacrylate if the manufacturer's recommendations allow it to be used and if it can be applied effectively as determined by the Engineer.

(4) (a) Perform epoxy injection of cracks in accordance with Section 411. Seal cracks with penetrant sealer or methacrylate as per Section 413. (b) Use only methacrylate or penetrant sealer that is compatible, according to manufacturer's recommendations, with previously applied materials such as curing compound or paint or remove such materials prior to application.

(5) When possible, prior to final acceptance of the project, seal cracks only after it has been determined that no additional growth will occur.

(6) Methacrylate shall be used on horizontal surfaces in lieu of penetrant sealer if the manufacturer's recommendations allow it to be used and if it can be applied effectively as determined by the Engineer.

(7) Unless directed otherwise by the Engineer, repair cracks in bridge decks only after the grinding and grooving required by 400-15.2.5 is fully complete.

CONCRETE STRUCTURES.
(REV 7-16-12)

Article 400-3 (Page 373 - 374) is deleted and the following substituted:

400-3 Depth of Footing.
Refer to Section 455, "D. SPREAD FOOTINGS".

SUBARTICLE 400-10.3 (Page 393) is deleted and the following substituted:

400-10.3 Joint System Installation: Install expansion joints before or after the deck planing required by 400-15.2.5.5 following the manufacturer's instructions. When installed after deck planing, install the edge rail assemblies in the blockouts on a profile tangent between the ends of the deck and/or approach slab to within a plus 0 and minus 1/4 inch variation.

When installed before deck planing, install the edge rail assemblies 3/8 inch, plus or minus 1/16 inch, below the top surface of the deck or approach slab to compensate for concrete removal during planing.

SUBARTICLE 400-11.3 (of the Supplemental specification) is deleted and the following substituted:

400-11.3 Bearing Pads: Use bearing pads for seating bridge shoes, ends of beams, and slabs of the types specified or required in the Plans.

Furnish and install Composite Neoprene Pads as detailed in the plans. Place neoprene pads, where specified or required, directly on masonry surfaces finished in accordance with the requirements of this Article. Ensure that pads, bearing areas of bridge seats, and metal bearing plates are thoroughly cleaned and free from oil, grease, and other foreign materials.

Exercise care in fabrication of related metal parts to avoid producing conditions detrimental to the performance of the pads, such as uneven bearing, excessive bulging, etc.

The Engineer will evaluate the degree of deformation and condition of bearing pads in the completed bridge on or before the final inspection required by 5-10 or when requested by the Contractor. As directed by the Engineer, correct horizontal bearing pad deformations that at the time of inspection exceed 50% of the bearing pad thickness or that the Engineer predicts will exceed 50% of the bearing pad thickness during future high or low temperature periods. Payment for this correction effort will be considered extra work in accordance with 4-3.

SUBARTICLE 400-15.2.5.6 (Page 399) is deleted and the following substituted:

400-15.2.5.6 Grooving: After the concrete surface profile, as required by 400-15.2.5, has been accepted by the Engineer, and prior to opening the bridge to traffic, groove the bridge deck and approach slabs perpendicular to the centerline of the structure. Do not groove the deck surface of pedestrian or trail bridges unless otherwise shown in the Contract Documents. Cut grooves into the hardened concrete using a mechanical saw device which will leave grooves nominally 1/8 inch wide and 3/16 inch deep. Space the grooves apart in random spacing center of grooves in the following sequence: 3/4 inch, 1 1/8 inch, 5/8 inch, 1 inch, 5/8 inch, 1 1/8 inch, 3/4 inch in 6 inch repetitions across the width to be grooved in one pass of the mechanical saw device. One 6 inch sequence may be adjusted by 1/4 sequence increments to accommodate various cutting head widths provided the general pattern is carried out. The tolerance for the width of the grooves is plus 1/16 to minus 0 inch and the tolerance for the depth of grooves is plus or minus 1/16 inch. The tolerance for the spacing of the grooves is plus or minus 1/16 inch.

Cut grooves continuously across the deck or approach slab to within 18 inches of gutter lines at barrier rail, curb line and median divider. At skewed metal expansion joints in bridge deck surfaces, adjust groove cutting by using narrow width cutting heads so that all grooves of the bridge deck surface or approach slab surface end within 6 inches, measured normal to centerline of the joint, leaving no ungrooved surface adjacent to each side of the joint greater than 6 inches in width. Ensure that the minimum distance to the first groove, measured normal from the edge of the concrete joint or from the junction between the concrete and the metal leg of the armored joint angle, is 1 inch. Produce grooves that are continuous across construction joints or other joints in the concrete surface less than 1/2 inch wide. Apply the same procedure described above where the gutter lines at barrier rails, curb lines and median dividers are not parallel to the centerline of the bridge to maintain the 18 inches maximum dimension from the grooves to the gutter line. Cut grooves continuously across formed concrete joints.

SUBARTICLE 400-15.2.6.3 & 400-15.2.6.4 (Page 400) is deleted and the following substituted:

400-15.2.6.3 Surface Preparation: Prepare the surface prior to the application of an applied finish coating by providing a surface finish in accordance with the requirements of 400-15.1. The Engineer will not require surface voids that are 1/4 inch or less in width and depth to be grouted prior to application of the finish coating. Fill surface void larger than 1/4 inch in width and depth an approved high strength, non metallic, non shrink grout meeting the requirements of Section 934, mixed and applied in accordance with the manufacturer's recommendations. Apply the grout by filling the surface voids using burlap pads, float sponges, or other acceptable methods. As soon as the grout has taken its initial set, brush the surface to remove all loose grout, leaving the surface smooth and free of any voids. Ensure that the surface to be coated is free from efflorescence, flaking coatings, curing compound, dirt, oil, and other substances deleterious to the applied finish coating. Prior to application of the finish coating onto

precast or cast-in-place concrete surfaces, test the concrete surface at 30 foot intervals for the presence of curing compound using one or two drops of muriatic acid placed on the concrete surface. If curing compound is present, there will be no reaction between the acid and the concrete. If there is no reaction, remove the compound by pressure washing the concrete surfaces. Prepare the surfaces in accordance with the manufacturer's recommendations, and ensure that they are in a condition consistent with the manufacturer's requirements. Clean surfaces of existing structures in accordance with 400-19.

400-15.2.6.4 Application: Apply the finish coating utilizing a method recommended by the manufacturer. When applying the finish coating by spraying, supply heavy duty spray equipment capable of maintaining a constant pressure necessary for proper application. Mix and cure all coating materials in accordance with the manufacturer's printed instructions. Apply the finished coating at a rate of 50 plus or minus 10 ft^2/gal.

SUBARTICLE 400-15.2.8 (Page 401) is deleted and the following substituted:

400-15.2.8 Finishing Bridge Sidewalks: Finish bridge sidewalks in accordance with the applicable requirements of Section 522.

SUBARTICLE 400-17.4 (Page 405) is deleted and the following substituted:

400-17.4 Alternate Procedure: As an alternate procedure, in lieu of the time delay periods set forth in 400-17.1 and 400-17.3, test beams or cylinders may be cast from representative concrete and cured identically with the concrete in the corresponding structural component. Make the test beams in accordance with ASTM C 31 and test them in accordance with ASTM C 78. When the test results indicate a minimum flexural strength of 550 psi for beams or the minimum 28-day compressive strength shown in the plans, concrete bridge decks and culverts may be opened to traffic or the superstructure and beams may be placed on caps. However, regardless of beam or cylinder break results, fully comply with the bridge deck curing provisions of 400-16.4, including the requirement for curing blankets to remain in place for 7 days.

ARTICLE 400-19 (Page 406) is deleted and the following substituted:

400-19 Cleaning and Coating Concrete Surfaces of Existing Structures.

For the purposes of this article, an existing structure is one that was in service prior to the start of the project to which this specification applies. For existing structures, clean concrete surfaces that are designated in the Contract Documents as receiving Class 5 Applied Finish Coating by pressure washing prior to the application of coating. Use pressure washing equipment producing a minimum working pressure of 2,500 psi when measured at or near the nozzle. Do not damage or gouge uncoated concrete surfaces or previously coated concrete surfaces during cleaning operations. Remove all previously applied coating that is no longer adhering to the concrete or that is peeling, flaking or

delaminating. Ensure that after the pressure wash cleaning and the removal of non-adherent coating, that the cleaned surfaces are free of efflorescence, grime, mold, mildew, oil or any other contaminants that might prevent proper adhesion of the new coating. After cleaning has been successfully completed, apply Class 5 Applied Finish Coating in accordance with 400-15.2.6 or as otherwise specified in the Plans.

SUBARTICLE 400-21.5.2 (Pages 408 – 412) is deleted and the following substituted:

400-21.5.2 Structural Cracks: Provide a structural evaluation signed and sealed by the Contractor's Engineer of Record that includes recommended repair methods and a determination of structural capacity and durability to the Engineer. Upon approval by the Engineer, repair the cracked concrete. Complete all repairs to cracks in a member inside a cofferdam prior to flooding the cofferdam.

Table 1
DISPOSITION OF CRACKED CONCRETE OTHER THAN BRIDGE DECKS
[see separate Key of Abbreviations and Footnotes for Tables 1 and 2]

Elev. Range	Crack Width Range (inch) (2) x = crack width	Cracking Significance Range per LOT (1)											
		Isolated Less than 0.005%			Occasional 0.005% to<0.017%			Moderate 0.017% to<0.029%			Severe 0.029% or gtr.		
		Environment Category											
		SA	MA	EA	SA	MA	EA	SA	MA	EA	SA	MA	EA
Elevation: 0 to 6 ft AMHW	x ≤ 0.004	NT	NT	PS (6)	NT	PS (6)	PS (6)	PS (6)	PS (6)				
	0.004< x ≤ 0.008	NT	PS (6)	EI (3)	PS (6)	EI (3)	EI (3)	PS (6)					
	0.008< x ≤ 0.012	NT	PS (6)	EI									
	0.012< x ≤ 0.016	PS (6)											
	0.016< x ≤ 0.020												
	0.020< x ≤ 0.024												
	0.024< x ≤ 0.028												
	x > 0.028												
Elev.: More Than 6 ft to 12 ft AMHW	Crack Width	SA	MA	EA	SA	MA	EA	SA	MA	EA	SA	MA	EA
	x ≤ 0.004	NT	NT	PS (6)	NT	PS (6)	PS (6)	PS (6)	PS (6)	PS (6)	PS (6)		
	0.004< x ≤ 0.008	NT	PS (6)	EI (3)	PS (6)	PS (6)	EI (3)	PS (6)	EI (3)				
	0.008< x ≤ 0.012	NT	PS (6)	EI	EI	EI							
	0.012< x ≤ 0.016	PS (6)	EI	EI	EI								
	0.016< x ≤ 0.020	EI											
	0.020< x ≤ 0.024												
	0.024< x ≤ 0.028												
	x > 0.028												
Elev.: Over Land or	Crack Width	SA	MA	EA	SA	MA	EA	SA	MA	EA	SA	MA	EA
	x ≤ 0.004	NT	NT	NT	NT	PS (6)	PS (6)	PS (6)	PS (6)	PS (6)	PS (6)		

	0.004< x ≤ 0.008	NT	PS (6)	PS (6)	PS (6)	PS (6)	EI (3)	PS (6)	EI (3)	EI (3)	PS (6)		
	0.008< x ≤ 0.012	NT	PS (6)	EI	EI	EI	EI	EI	EI				
	0.012< x ≤ 0.016	PS (6)	EI	EI	EI	EI	EI						
	0.016< x ≤ 0.020	EI	EI	EI	EI								
	0.020< x ≤ 0.024	EI											
	0.024< x ≤ 0.028												
	x > 0.028												

Table 2
DISPOSITION OF CRACKED CONCRETE BRIDGE DECKS
[see separate Key of Abbreviations and Footnotes for Tables 1 and 2]

Elev. Range	Crack Width Range (inch) [2] x = crack width	Cracking Significance Range per LOT [1]											
		Isolated less than 0.005%			Occasional 0.005% to<0.017%			Moderate 0.017% to<0.029%			Severe 0.029% or gtr.		
		Environment Category											
		SA	MA	EA	SA	MA	EA	SA	MA	EA	SA	MA	EA
Elevation: 12 feet or Less AMHW	x ≤ 0.004	NT	NT	NT	NT	NT	NT	NT	NT	NT			
	0.004< x ≤ 0.008	NT	NT	EI/M	NT	NT	EI/M	EI/M	EI/M	EI/M			
	0.008< x ≤ 0.012	NT	NT	EI/M	NT	EI/M	EI/M	EI/M	EI/M				
	0.012< x ≤ 0.016	NT	NT	EI/M	NT	EI/M							
	0.016< x ≤ 0.020	EI/M	EI/M	EI	EI								
	0.020< x ≤ 0.024	EI/M	EI	EI									
	0.024< x ≤ 0.028	EI/M	EI										
	x > 0.028												
Elevation: Over Land or More Than 12 feet AMHW	Crack Width	SA	MA	EA	SA	MA	EA	SA	MA	EA	SA	MA	EA
	x ≤ 0.004	NT	NT	NT	NT	NT	NT	NT	NT	NT			
	0.004< x ≤ 0.008	NT	NT	NT	NT	NT	EI/M	NT	EI/M	EI/M			
	0.008< x ≤ 0.012	NT	NT	EI/M	NT	NT	EI/M	EI/M	EI/M				
	0.012< x ≤ 0.016	NT	NT	EI/M	NT	EI/M							
	0.016< x ≤ 0.020	NT	EI/M	EI	EI/M								
	0.020< x ≤ 0.024	NT	EI/M	EI									
	0.024< x ≤ 0.028	NT	EI/M										
	x > 0.028												

Key of Abbreviations and Footnotes for Tables 1 and 2		
Type Abbreviation	Abbreviation	Definition
Repair Method	EI	Epoxy Injection
	M	Methacrylate
	NT	No Treatment Required
	PS	Penetrant Sealer
Environment Category	EA	Extremely Aggressive
	MA	Moderately Aggressive
	SA	Slightly Aggressive
Reference Elevation	AMHW	Above Mean High Water

Footnotes

(1) Cracking Significance Range is determined by computing the ratio of Total Cracked Surface Area (TCSA) to Total Surface Area (TSA) per LOT in percent [(TCSA/TSA) x 100] then by identifying the Cracking Significance Range in which that value falls. TCSA is the sum of the surface areas of the individual cracks in the LOT. The surface area of an individual crack is determined by taking width measurements of the crack at 3 representative locations and then computing their average which is then multiplied by the crack length.

(2) Crack Width Range is determined by computing the width of an individual crack as computed in (1) above and then identifying the range in which that individual crack width falls.

(3) When the Engineer determines that a crack in the 0.004 inch to 0.008 inch width range cannot be injected then for Table 1 use penetrant sealer unless the surface is horizontal, in which case, use methacrylate if the manufacturer's recommendations allow it to be used and if it can be applied effectively as determined by the Engineer.

(4) (a) Perform epoxy injection of cracks in accordance with Section 411. Seal cracks with penetrant sealer or methacrylate as per Section 413. (b) Use only methacrylate or penetrant sealer that is compatible, according to manufacturer's recommendations, with previously applied materials such as curing compound or paint or remove such materials prior to application.

(5) When possible, prior to final acceptance of the project, seal cracks only after it has been determined that no additional growth will occur.

(6) Methacrylate shall be used on horizontal surfaces in lieu of penetrant sealer if the manufacturer's recommendations allow it to be used and if it can be applied effectively as determined by the Engineer.

(7) Unless directed otherwise by the Engineer, repair cracks in bridge decks only after the grinding and grooving required by 400-15.2.5 is fully complete.