Florida Department of Transportation

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GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

KEVIN J. THIBAULT, P.E.
SECRETARY

June 1, 2020

Khoa Nguyen
Director, Office of Technical Services
Federal Highway Administration
3500 Financial Plaza, Suite 400
Tallahassee, Florida 32312

Re: State Specifications Office
Section: **450**
Proposed Specification: **4500601 Precast Prestressed Concrete Construction.**

Dear Mr. Nguyen:

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

The changes are proposed by Cheryl Hudson from the Structures Design Office to incorporate language from the Developmental 450 Florida Slab Beam Specification into the Standard Specification.
Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to daniel.strickland@dot.state.fl.us.

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.
State Specifications Engineer

DS/rf
Attachment
cc: Florida Transportation Builders' Assoc.
State Construction Engineer

PRECAST PRESTRESSED CONCRETE CONSTRUCTION
(REV 4-13-20)

SUBARTICLE 450-6.1 is deleted and the following substituted:

450-6 Forms.

450-6.1 General: Use metal side and bottom forms, unless otherwise specified in the Contract Documents. For members with special shapes such as corner sheet piles, wood forms are permitted. Slab beams, slab units and sheet piles may be cast on concrete surfaces meeting the profile dimensional tolerances of 450-6.3. Apply release agents in accordance with the manufacturer's recommendations. Liquid membrane curing compounds may be used to prevent bonding of slab products and sheet piles to the existing concrete surface, when applied in two or more coatings. Ensure the last application of liquid membrane is applied immediately before placement of the slab or sheet pile.

For all beam members, use side forms designed to be removed without damaging the top flange of the beam. Remove the forms horizontally away from the beam by a method that prevents any contact of the form with the top flange after release of the form. Do not subject the top flange to any vertical force at any time. Include the form details and method of removal in the Producer QC Plan.

For all Florida I-Beams, use forms that do not have more than two horizontal joints.

Use void forms of a type for which service adequacy has been demonstrated, having sufficient strength to provide stability during handling and placing and to withstand hydrostatic pressures and other forces imposed upon them during concrete placement. Use form material that is neutral with respect to the generation of products harmful to the physical and structural properties of the concrete. Ensure that the presence of the form materials does not cause any detrimental effect to the concrete or other materials within the member. Positively vent all voids to the outside of the member. For end headers and inside forms, other materials capable of resisting the pressure from concrete are permitted, except that end headers used with CFRP strands must be either timber headers or steel headers with rubber grommets to protect the CFRP strands from damage.

Use end headers so designed that they can be placed and maintained in correct position between the side forms. Hold the headers in place with devices capable of being removed or loosened after the concrete has attained its initial set allowing free form expansion during curing methods that involve heat. Use end headers with openings conforming to the prestressing strand pattern to permit passage of the prestressing strand. Locate the openings accurately within 1/8 inch of planned location of prestressing strand elements.

Construct circular openings for strands a maximum of 1/4 inch larger than the nominal strand diameter. Construct square or rectangular openings a maximum of 1/4 inch larger, horizontally and vertically, than the nominal strand diameter. Ensure that all headers are mortar tight.

SUBARTICLE 450-10.3.2.1 is deleted and the following substituted:

450-10.3.2.1 AASHTO Type II, Florida I-Beam 36 and Double T-Beams, Piling, Slab Beams and Precast Slab Units (Except Voided Piling and Slabs): Place concrete in one or more layers or lifts. If more than one layer is used for Double T-Beams, end the first layer such that the top of the concrete is slightly below the bottom of the flange.

SUBARTICLE 450-10.5.4 is deleted and the following substituted:

450-10.5.4 Slabs and Double-T Beams: When the Plans show the top surface of prestress slab units, slab beams, or Double T-Beams units to be the riding surface, apply a Class 4 floor finish in accordance with Section 400. When the Plans show the surface to be overlaid with asphalt or concrete, rough float the top surface and then scrub it transversely with a coarse brush to remove all laitance and to produce a roughened surface for bonding. For the other external surfaces of slabs and Double T-beams, unless otherwise specified, apply a General Surface Finish in accordance with 400-15.1.

SUBARTICLE 450-12.3.6.1.2 is deleted and the following substituted:

450-12.3.6.1.2 Non-Critical Location Cracks: Non-critical locations of cracks are defined by the position within a product's length, the position within a product's depth, and the orientation of the crack.

1. Piles**:** Surface cracks in any direction and of a length not exceeding twice the width of the pile.

2. Simple Span Pretensioned Concrete Beams: End zones (within a distance of three times the depth of the product from the end):

a. Horizontal or diagonal cracks at either or both ends in the top flange and web of the product, not in the plane of nor intersecting any row of prestressing strands, and extending from the end of the product for a length not to exceed the product's depth.

b. Vertical cracks extending through the top flange not to exceed one-half of the product's depth after detensioning.

c. Mid-span region (between end zones): Vertical cracks extending through the top flange and web of the product.

d. Any Location: Horizontal crack at the interface of the web and top flange which is not longer than the product's depth.

e. Intermediate diaphragms of Florida U-Beams: cracks at any location.

3. Simple Span Double T-Beams:

a. End zones (within a distance of twice the depth of the product from the end): One horizontal crack at either or both ends and in the top flange of the product, not in the plane of nor intersecting any row of prestressing strands, and extending from the end of the product for a length not to exceed half the product's depth.

b. Mid-span Region (between end zones): Vertical cracks extending through the top flange and not exceeding half the web depth of the product.

c. Any Location: Horizontal crack at the interface of the web and top flange which is not longer than the product's depth.

4. Pretensioned I-Beams Containing Longitudinal Post-Tensioning Ducts:

a. End zones (within a distance of twice the depth of the beam from the end): Vertical cracks in the bottom half of the beam within an end zone with no post-tensioning anchorages and where the post-tensioning ducts are located in the top of the beam at the location of a permanent substructure support. Horizontal or diagonal cracks at either or both ends in the top flange and web of the product where no post-tensioning anchorage zone is present.

b. Mid-span Region (between quarter points): Vertical cracks in the web and top flange of the beam provided the beam is to be supported at each end in its final position in the structure.

c. Any Location: Horizontal cracks not longer than the beam's depth and only at the interface of the web and top flange provided the beam is to be supported at each end in its final position in the structure.

5. Post-Tensioned Beams for Drop-In Spans:

a. Pier Sections: Horizontal or diagonal cracks at either or both ends in the top flange and web of the product.

b. Drop-In Sections: Same as simple span pretensioned concrete beams.

c. End Sections: At end of beam with post-tensioning anchorages: same as pretensioned I-Beams containing longitudinal post-tensioning ducts. At end of beam adjacent to pier sections: same as for simple span pretensioned concrete beams.

6. Simple Span Prestressed Slab Beams and Slab Units:

a. End Zones (within a distance of twice the depth of the product from the end): One horizontal crack at either or both ends in the top half of the product, which is not in the plane of nor intersecting any row of prestressing strands, and extending from the end of the product for a length not to exceed half the product's depth.

b. Any Location (after detensioning): Vertical cracks in the top half of the product's depth.

7. Pretensioned Concrete Poles:

a. Longitudinal cracks - Any location: The length of each crack must be less than twice the base width of the pole, or transverse or diagonal cracks perpendicular to or at an inclined angle to the longitudinal direction of the pole.

b. Edge cracks: Cracks exhibiting at the edge and extending across one or two adjacent planes of a square pole, less than 2.0 inches of total length across all planes.

SUBARTICLE 450-14.2 is deleted and the following substituted:

450-14.2 Storage: Store precast prestressed beams, Double T-Beams, slab beams and slab units on only two points of support located within 18 inches of the end of the product or as calculated. Support skewed beams, Double T-Beams, slab beams or slab units within 18 inches of the end of the full product section or as calculated. Do not support slab beams on the outer

6 inches of the product width. Support other products on an adequate number of supports so as to keep stresses in the products within the allowable stresses at release listed in the Department's Structures Design Guidelines. Locate multiple supports (more than two) within 1/2 inch of a horizontal plane through the top surface of the supports. Adequately brace beams as necessary to maintain stability.

All supports must be level and on adequate foundation material that will prevent shifting or differential settlement which may cause twisting or rotation of products. Immediately pick up products in storage that have rotated or twisted and adjust the supports to provide level and uniform support for the product.

Support prestressed products that are stacked by dunnage placed across the full width of each bearing point and aligned vertically over lower supports. Move dunnage points in accordance with 450-2.3 with the approval of the QC Manager. Do not use stored products as a storage area for either shorter or longer products or heavy equipment.

Where feasible, base the selection of storage sites, storage conditions and orientation upon consideration of minimizing the thermal and time-dependent creep and shrinkage effects on the camber and/or sweep of the precast pretensioned products.

Continuous application of water during the initial 72 hour moist curing period may be interrupted for a maximum of one hour to allow relocation of precast prestressed concrete elements within the manufacturing facility. Keep the moist burlap in place during relocation of the element.

SUBARTICLE 450-14.3 is deleted and the following substituted:

450-14.3 Shipping: Do not ship precast prestressed concrete products to the project site prior to the completion of the 72 hour curing period and attainment of the required 28-day strength. Verification of the shipping strength test, before 28 days, is permitted by testing compressive strength cylinders that are cured under the conditions similar to the product or by testing temperature match cured cylinders.

The use of maturity method, ASTM C1074, pulse velocity method in accordance with ASTM C597, or any other nondestructive test method acceptable to Engineer, is permitted to estimate the strength before its verification by test cylinders. The shipping strength test is the average compressive strength of two test cylinders. Do not ship products until accepted and stamped by the QC Manager or the inspectors under the direct observation of the QC Manager or designee.

In the case of elements repaired due to major defects, notify the Engineer at least 72 hours in advance of shipping to verify compliance with the Specification.

At the beginning of each project, provide a notarized statement to the Engineer from a responsible company representative certifying that the plant will manufacture the products in accordance with the requirements set forth in the Contract Documents and Producer QC Plan.

The QC Manager’s stamp on each product indicates certification that the product was fabricated in conformance with the Producer QC Plan, the Contract, and the Specifications. Ensure that each shipment of prestressed concrete products to the project site is accompanied with a signed or stamped delivery ticket providing the description and the list of the products.

Evaluate the temporary stresses and stability of all products during shipping and locate supports, generally within 18 inches from the beam end, in such a manner as to maintain

stresses within acceptable levels. Include impact loadings in the evaluation. Do not support slab beams on the outer 6 inches of the product width.

SUBARTICLE 450-15.4 is deleted and the following substituted:

450-15.4 Prestressed Concrete Slab Units and Slab Beams: Payment will be made at the Contract unit price per foot for the units, complete in place and accepted. Final pay lengths will be plan quantity based on casting lengths, as detailed in the Plans, subject to the provisions of 9-3.2.

ARTICLE 450-16 is deleted and the following substituted:

450-16 Basis of Payment.

Price and payment will be full compensation for all work and materials specified in this Section, including reinforcement, pretensioning strand, embedded ducts, hardware, inserts and other materials as required, to fabricate, transport and place the product into its permanent position in the structure.

Payment for the items will be made under the following:

Item No. 450- 1-	Prestressed Beams - per foot.
Item No. 450- 2-	Prestressed Beams: Florida I-Beams - per foot.
Item No. 450- 3-	Prestressed Slab Units - per foot.
Item No. 450- 4-	Prestressed Beam U-Beams - per foot.
Item No. 450- 8	Prestressed Beams: Florida Slab Beam – per foot.
Item No. 450- 88-	Prestressed Slab Units Transversely Post-Tensioned - per square foot.

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For all Florida I-Beams, use forms that do not have more than two horizontal joints.

Use void forms of a type for which service adequacy has been demonstrated, having sufficient strength to provide stability during handling and placing and to withstand hydrostatic pressures and other forces imposed upon them during concrete placement. Use form material that is neutral with respect to the generation of products harmful to the physical and structural properties of the concrete. Ensure that the presence of the form materials does not cause any detrimental effect to the concrete or other materials within the member. Positively vent all voids to the outside of the member. For end headers and inside forms, other materials capable of resisting the pressure from concrete are permitted, except that end headers used with CFRP strands must be either timber headers or steel headers with rubber grommets to protect the CFRP strands from damage.

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Construct circular openings for strands a maximum of 1/4 inch larger than the nominal strand diameter. Construct square or rectangular openings a maximum of 1/4 inch larger, horizontally and vertically, than the nominal strand diameter. Ensure that all headers are mortar tight.

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c. Mid-span region (between end zones): Vertical cracks extending through the top flange and web of the product.

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