Florida Department of Transportation

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JARED W. PERDUE, P.E.
SECRETARY

August 8, 2022

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: **4500704 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 Frank Thomas and Tim Counts from the State Materials Office to update language to be consistent with the proposed changes to Section 105. Changes to Subarticle 450-8.2.1 are updated to provide clarification of requirements for prestressed concrete testing and inspection personnel associated with the changes made to Section 105. Changes to Article 450-7 is based on a request from the Florida Prestressed Concrete Association to use a two-part sheathing in routine production. Changes to Subarticle 450-10.4, addresses consolidation of all precast prestressed products, not just piling and 450-13 includes the Section 930 concrete repair materials as an option for repairs
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 (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.
State Specifications Engineer

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

PRECAST PRESTRESSED CONCRETE CONSTRUCTION
(REV 6-8-22)

SUBARTICLE 450-7.4 is deleted and the following substituted:

450-7.4 Debonded Strands: Install debonding material (sheathing) according to the prestressing strand locations and lengths shown in the Plans, and manufacturer's instructions, except as modified herein. Do not install sheathing over the full length of a product. Extend the ~~tubular debonding material (~~sheathing~~)~~ through the header ~~for debonded prestressing strand~~. Tape~~ie~~ and tie~~ape~~ the sheathing ~~debonding material~~ at the terminus located at the inside of the member. The tape must be strong enough to hold the sheathing closed.

Use ~~slit or~~ non-slit tubular or two-part sheathing that is high-density plastic. The sheathing must have a minimum wall thickness of 0.025 inch, and an inside diameter exceeding the maximum outside diameter of the ~~pretensioning~~ strand by 0.020~~5~~ inch to 0.15~~4~~0 inch. Tape the entire length of seams to ensure mortar tightness when using two-part sheathing. The sheathing and tape must not react with concrete, coating, steel, or FRP components.

Slit tubular sheathing may be used to repair minor defects such as breakages or punctures in non-slit tubular sheathing, rectifying an improperly debonded strand, or incorrect debonded length of a strand. ~~The slit sheathing must maintain its integrity during the placement of fresh concrete without opening the seam.~~ Tape the entire length of the slit tubular sheathing seam and tie the ends to ensure mortar tightness ~~of the sheathing tube~~.

~~Do not use strands debonded over the full length of a product.~~

SUBARTICLE 450-8.2.1 is deleted, and the following is substituted:

450-8.2 Operations:

450-8.2.1 General: The tensioning operations consist of the application of the final force or load required by the Plans and with adjustments for abutment rotation, bed shortening, anchorage header movement, live end seating, dead end seating, splice chuck seating, friction in the jacking system and any other elements as applicable for the type of bed and anchorage used. Also, adjust the force when the temperature differential between the ambient temperature at time of stressing and the expected concrete temperature at time of placement is greater than 25ºF. Increase the force at the rate of 1% for each 10ºF increment that the ambient temperature at time of stressing is below the expected concrete temperature at time of placing. Decrease the force at the rate of 1% for each 10ºF that the ambient temperature at time of stressing is above the expected concrete temperature at the time of placing. Do not allow the stress in the steel prestressing strand to exceed 80% of the specified tensile strength of the strand, after seating. Do not allow the stress in the CFRP prestressing strand to exceed 70% of the specified tensile strength of the strand, after seating. During each tensioning operation, for the verification of the live and dead end seating, check the seating of at least 4 strands or a minimum of 10% of the total number of strands, whichever is greater. Maintain a record of the tensioning operation.

Compensation for temperature differential and abutment rotation are not required for self-stressing beds. However, adjust the final load for the effects of bed shortening due to the load from all the strands.

If the placement of concrete is delayed for more than seven calendar days after the completion of the stressing operation, check and adjust the final strand load as necessary before placement of concrete and maintain a record of the stressing operation.

Accomplish tensioning by either single strand tensioning or multiple strand tensioning, and ensure that it is symmetrical about the vertical axis of the product. Tensioning methods, in general, consist of tensioning to the required loads indicated by the jacking system, or tensioning to the required load while monitoring the elongation of the prestressing strand.

Production personnel will perform tensioning operations under supervision of a QC Inspector/Technician in accordance with Section 105 for prestressed concrete plant quality control personnel,~~personnel possessing a certificate of completion of PCI Quality Control Personnel Certification Level II, and Section 450 Specification examination~~, or certified personnel may perform tensioning operations directly.

SUBARTICLE 450-10.4 is deleted and the following substituted:

450-10.4 Vibration of Concrete: Except for SCC, consolidate concrete in steel reinforced products~~iling~~ by internal or external vibration, or combination of these methods. For SCC, meet the requirements of Section 8.4 of the Materials Manual for production batch verification. For CFRP strand reinforced products~~iling~~, use SCC without the use of vibration. If further consolidation is needed, manual rodding is permitted.

Design external form vibrators for the specific use. Design forms used in conjunction with external vibration and build them to effectively transmit vibration to the concrete mass. Mount and operate form vibrators in compliance with the vibrator manufacturer's recommendations, a copy of which must be on file at the plant. Secure vibrators to the form mounts by positive locking devices so that maximum vibration is transmitted into the form. Modify or replace external form vibrator systems that are demonstrated to be ineffective. Operate vibrators at each mount location for the time necessary for complete concrete consolidation. Do not allow progressive points of vibration to exceed twice the visually effective radius of vibration. Keep forms equipped with external vibrators clean, and free of any buildup of hardened concrete.

Ensure internal vibrators are available before concrete placement is started. Use an internal vibrator with a head of such size that proper vibration of the concrete will be secured without causing movement of the prestressing strand or reinforcing bars. The vibrating frequency range must be 8,000 to 15,000 impulses per minute. Have at least one standby vibrator available on-site. Insert the vibrator in the concrete at points spaced to ensure uniform vibration of the entire mass of the concrete. Do not allow points of insertions to be further apart than the radius over which the vibrator is visibly effective. Allow the vibrator to sink into the concrete by its own weight and penetrate into the underlying layers sufficiently so that the layers are thoroughly consolidated. After the concrete is thoroughly consolidated, slowly withdraw the vibrator to avoid formation of holes.

Revise the existing placement and consolidation procedure to improve the consolidation of the concrete, if the existing placement and consolidation procedure has produced unacceptable surface defects such as honeycombing, aggregate or mortar pockets, or excessive air bubbles.

ARTICLE 450-13 is deleted and the following substituted:

450-13 Repair Methods and Materials.

450-13.1 General: Before beginning the repairs of bug holes, spalls, chips, surface porosity, and honeycomb, remove all laitance, loose material, form oil, curing compound and any other deleterious matter from the repair area. Repair cosmetic or minor deficiencies by methods specified herein. Submit alternative repair methods as needed.

For each project, maintain the record of deficiencies and their repair methods. Ensure the record includes information about product description, unit serial number, date cast, defect description including dimensions, repair method and materials, defect discovery date, and signature of producer's QC Manager indicating concurrence with the information.

Cure repaired surfaces for the full 72 hour curing time or for the curing time as recommended by ~~recommendations from~~ the manufacturer of the repair material. Ensure the repaired surfaces have a surface texture, finish and color which matches the appearance of the unaffected surrounding area of the product.

450-13.1.1 Product Acceptance on the Project: Use only ~~non-shrink grout and/or epoxy that is~~ materials listed on the Approved Product List (APL)~~,~~ in accordance with the following Sections.

Epoxy Compounds (Type F) …….. Section 926
Materials for Concrete Repair……. Section 930
Non-shrink Grout…… Section 934

450-13.2 Cosmetic Surface Filling: Repair areas to be filled with an approved ~~high-strength, non-metallic,~~ non-shrink grout or material for concrete repair ~~meeting the requirements of Section 934~~. Mix, apply, and cure the material~~grout~~ in accordance with the manufacturer's recommendations. Coating of the prepared surface with epoxy compound~~bonding agent~~ before ~~grout~~ placement is not required.

450-13.3 Surface Restoration: Maintain the surface continuously wet for a minimum of three hours before application of repair material. Repair areas to be restored with a mortar mix consisting by volume of one part cement, 2.5 parts sand that will pass a No. 16 sieve, and sufficient water to produce a viscous slurry mix or repair areas to be restored with an approved ~~high-strength, non-metallic,~~ non-shrink grout ~~meeting the requirements of Section 934~~ or material for concrete repair. Mix, apply, and cure the material~~grout~~ in accordance with the manufacturer's recommendations. Cure areas repaired with a mortar mix in accordance with 450-10.6. Coating of the prepared surface with epoxy compound~~bonding agent~~ before ~~grout~~ placement is not required.

450-13.4 Cutting and Filling: Carefully cut all feathered edges of the area to be repaired back perpendicular to (or slightly undercut from) the surface and to the depth of sound concrete or to a minimum depth of 1/2 inch, whichever is deeper. Coat the prepared surface with an approved epoxy bonding compound~~agent~~ applied in accordance with the manufacturer's recommendations. Fill the cutout area with an approved ~~high-strength, non-metallic,~~ non-shrink grout, material for concrete repair, or epoxy mortar. M~~m~~ix~~,ed and~~ apply~~,ied~~ and cure in accordance with the manufacturer's recommendations. Firmly consolidate the material~~grout mix~~ in the cutout area.

450-13.5 Restoration of Surfaces and Edges: When reinforcement is exposed, remove concrete from around the items to provide a 1-inch clearance all around. When less than one-half the reinforcement diameter is exposed, a positive connection utilizing anchor screws may be

proposed in lieu of 1-inch clearance all around. Do not damage the reinforcement. Form surfaces and edges to the original dimensions and shape of the product. Coat the prepared surface with an approved epoxy bonding compound~~agent~~ applied in accordance with the manufacturer's recommendations. Restore surfaces and edges with an approved ~~high-strength, non-metallic,~~ non-shrink grout, material for concrete repair, or epoxy mortar. ~~mixed and applied~~ Mix, apply, and cure in accordance with the manufacturer's recommendations. ~~An epoxy mortar meeting the requirements of Section 926, Type F may be used as an alternative to non-shrink grout.~~ Firmly consolidate the material ~~grout or epoxy mortar~~ in the area to be repaired. Restore surfaces and edges to the original dimensions and shape of the product.

450-13.6 Removal and Restoration of Unsound Concrete: Carefully cut the area of unsound concrete to be repaired back perpendicular to (or slightly undercut from) the surface and to the depth of sound concrete or to a minimum depth of 1 inch, whichever is deeper. When reinforcement is exposed, remove the concrete from around the items to provide a 1-inch clearance all around. When less than one-half the reinforcement diameter is exposed, a positive connection utilizing anchor screws may be proposed in lieu of 1-inch clearance all around. Do not damage the reinforcement. Coat the prepared surface with an approved epoxy bonding compound ~~agent~~ applied in accordance with the manufacturer's recommendations. Fill the area to be repaired ~~and then filled~~ with an approved ~~high-strength, non-metallic,~~ non-shrink grout, concrete repair material, or epoxy mortar. ~~mixed and applied in accordance with the manufacturer's recommendations. An epoxy mortar meeting the requirements of Section 926, Type F may be used as an alternative to non-shrink grout.~~ Mix, apply, and cure in accordance with the manufacture's recommendations. Firmly consolidate the material ~~grout or epoxy mortar~~ in the area to be repaired. Restore surfaces and edges to the original dimensions and shape of the product.

450-13.7 Surface Grinding: Grind off misshaped formed surfaces with an abrasive stone. Apply two coats of penetrant sealer in accordance with the requirements of Section 413, to any surfaces which are not subsequently encased in concrete, immediately after grinding has been accepted. Do not apply a penetrant sealer to any surfaces to be subsequently encased in concrete.

450-13.8 Treatment of Cracks: Treat cracks in accordance with 450-12.3.6.