SP- 150286
(New)

SPECIAL PROVISIONS
FOR
ACCELBRIDGE FULL DEPTH PRECAST DECK PANELS

Jackson County
BRFN-052-1(97)--39-49

Effective Date
July 18, 2017

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150286.01 DESCRIPTION.

A. This specification describes full depth precast concrete deck panels to be used in the construction of bridge decks. Furnish all materials, tools, and labor necessary to fabricate, transport, erect, epoxy bond, grout, fill longitudinal joint with Ultra High Performance Concrete, grind deck to achieve grade and profile, and groove full depth precast concrete deck panels as specified on the plans.

B. Submittals.

1. Provide submittals to the Office of Bridges and Structures in electronic format, in accordance with Article 1105.03 of the Standard Specifications.

2. Submit the Full Depth Precast Deck Panel Plans for written approval from the Engineer prior to fabrication.

3. The Full Depth Precast Deck Panel Plans shall include, but not necessarily be limited to, the following:

- Lifting details, including details for lifting hardware and adjustment procedures. Where lifting locations deviate from those shown on the plans, submit plans and design calculations to the Bridge Engineer for review and acceptance prior to fabricating the panels. The plans and calculations shall be signed and sealed by a registered Civil Engineer in the state of Iowa.
- Erection plans, including details of erection and deck compression operations which assure that the time elapsing between mixing components of the first batch of epoxy bonding agent applied to the joining surfaces of precast deck panels and the application of a compressive contact pressure across the joint does not exceed 70% of the open time for the particular formulation of epoxy bonding agent used. Also, include details of how the minimum closing contact pressure of approximately 40 psi

will be applied uniformly to each joint to which epoxy is applied during the epoxy curing period.
- Locations and details of openings for deck drains and for concrete pier diaphragms.
- Layout of reinforcing steel including bar couplers, panel couplers and embedded sleeves.
- Quality control / quality assurance procedures for verification of dimensions, concrete strength, gout strength and concrete smoothness.

150286.02 MATERIALS.

A. Except as amended, comply with the following Sections of the Standard Specifications and other specifications:

• Structural Concrete	2403
• Reinforcement	2404
• High Performance Concrete	2407
• Ultra High Performance Concrete	Special Provisions for Ultra High Performance Concrete
• Epoxy	Special Provisions for Assembling Match-Cast Joint with Epoxy Bonding

B. Grout.

1. Grout used for grouting the beam haunches and precast panel shear pockets shall be a commercial, prepackaged cement-based, non-shrink grout mixture. Field mixed grouts shall not be used. Grout shall be Class "C" grout in accordance with Section 10 of the latest edition of the AASHTO LRFD Construction Specifications or the latest edition of PTI M55.1-12. Prepackaged grout shall be stored in moisture proof containers until use. Grout bags shall indicate application, date of manufacture, lot number and mixing instructions. Refer to Special Provisions for Post-Tensioning Tendons for grout strength requirements and/or testing requirements. Alternatively, grouting of girder haunch and shear pockets can be conducted in two steps with two different grout mixtures. The grouting of first level (defined as all beam haunches and shear pockets less than 1 inch above bottom surface of the deck panel) is conducted with grout as specified above. The grouting of second level (the remaining portion of the shear pockets) can use the same grout base as first level with pea aggregate. The second level grouting has to be poured before the adjacent first level reaches initial set. The contractor shall follow the grout manufacturer's recommendations for pea aggregate, including as the allowed total amount, aggregate size and shape, surface cleanness, moisture content, etc. The strength of grout / pea aggregate mix shall meet the design requirement. If grout / pea aggregate mix is used, the contractor shall submit mix design and testing result to the Engineer for approval prior to application.

2. Any change of materials or material sources requires new testing and certification of the conformance of the grout with this Provision. A copy of the Quality Control Data Sheet for each lot number and shipment sent to the job site shall be provided to the Contractor by the grout supplier and furnished to the Engineer. Materials shall be transported and stored in accordance with the manufacturer's recommendations and shall be used prior to their expiration date or six months from date of manufacture, whichever is less, otherwise they shall be removed and replaced.

3. Prior to beginning grouting operations, the Contractor shall furnish to the Engineer, the results of tests performed by an independent Cement Concrete Research Laboratory (CCRL), which shows that the proposed grout mixture meets the requirements of this special provision. This information shall include a graph relating the compressive strength of the grout to its age, covering ages from 24 hours to 28 days.

150XXX.03 CONSTRUCTION.

Fabricate the panels according to the details shown in the contract documents and the approved shop drawings. Submit shop drawings according to Article 1105.03 of the Standard Specifications.

A. Quality Assurance.

The Contractor shall be responsible for the arrangement of all lifting and handling devices. At least 45 working days prior to panel erection, the Contractor shall submit, to the Engineer, a geometry control plan that indicates the proposed means and methods of panel erection. The geometry control plan shall indicate the measures that will be implemented to achieve the finished elevations.

The Engineer of Record, or his representative, shall be in present for the first day of panel erection, and the day of deck jacking operation.

B. Fabrication.

1. Fabricate the panels in accordance with the plans. Unless specified in the plans, reinforcing steel shall not be cut and/or removed to permit proper alignment of other embedded hardware. Any conflict or interference with the proper location of embedded hardware, reinforcing steel and/or block outs shall be promptly resolved. Submit proposed correction(s) to the Engineer for review and acceptance prior to placing the panel concrete. Once accepted, updated the shop drawings to reflect the correction(s) to the panel.

2. Submit to the Engineer for review and acceptance a unique identification numbering scheme to be placed on each panel prior to removal from the forms. This identification number will be used to identify each panel, associated calculations and/or any other document pertaining to the fabrication and erection of the panels.

3. The precast manufacturer shall work with the contractor to develop a system of surveying marks to aid the panel placement on site. The proposed system of surveying marks shall be submitted to the Engineer for approval prior to panel casting.

C. Forming and Casting Beds.

Comply with Article 2407.03, A of the Standard Specifications and the following:

1. Cast panels in steel forms with sealed bolted joints or seams to minimize bleeding. Maintain outside surfaces of forms in reasonably clean condition, free of concrete build-up.

2. Forms and casting beds used for casting concrete panels shall meet the following requirements:

- Structurally adequate to support the panels without settlement or distortion.
- Producing panels within the tolerance specified in the plans.
- Accommodating block outs, openings and protrusions.
- Stripping without damage to the concrete.

D. Placing Concrete.

Comply with Article 2407.03, C of the Standard Specifications for placing concrete. Do not place concrete into forms until the forms, reinforcing steel placement, and embedded items have been inspected and accepted. Take special care in planning the sequence of placing concrete to assure that voids do not occur within the concrete, especially in areas where air is likely to be entrapped within the forms or in areas where flow of the plastic concrete is constrained by embedded items.

G. Concrete Curing.

Comply with Article 2407.03, D of the Standard Specifications. Cure precast members for 3 curing days using steam method, moist cure method, or a combination of the two.

H. Concrete Surface Finishes.

Comply with Article 2407.03, L of the Standard Specifications for all surfaces of panels, except the top surface and match cast face.

Comply with Article 2407.03, L of the Standard Specifications for top surface finish of panels. Leave the surface of the panel on which the bridge barrier railing will be placed unfinished or roughened. Upon completion of the placement of the panels, pour the bridge barrier rails, diamond grind the entire deck surface to the required surface profile and cross section shown in the plans and provide transverse grooving by sawing to provide a uniform texture. See plans for limits of transverse grooving on panels.

I. Review and Repair of Damaged or Defective Panels.

The Engineer will determine what constitutes damage and/or defects in panels. When it is determined that a panel is damaged or a defect exists, the Engineer shall classify the damage or defect. Two classifications of damage and/or defects include but are not limited to the following:

1. **Cosmetic**: Cosmetic damage and/or defects are those which do not affect the ability of the panel to resist construction and/or service loads or reduces the life expectancy of the structure. This category of defect includes superficial discontinuities such as cracks, small spalls or honeycombed areas, or any defect that does not extend beyond the centerline of any reinforcing steel. Cosmetic damage and/or defects of other types and causes may also be designated by the Engineer.

2. **Structural**: Structural damage and/or defects are those that will impair the ability of the panel to adequately resist construction and/or service loads or reduces the life expectancy of the structure. Any damage and/or defect that extends beyond the centerline of any reinforcing steel or into any element of the post-tensioning system (if applicable) or occurs in the deck portion of the panel is considered a structural defect. Examples of such damage and/or defects include cracks, large spalls or honeycombed areas and major segregation or breakage of concrete. Structural damage and/or defects of other types and causes may also be designated by the Engineer.

J. Defects.

If it is determined that a panel defect exists, the Engineer will determine the type of defect. The two types of defects are the following:

- **Isolated defects** - Defects that occur randomly and infrequently.
- **Recurring defects** – Defects of the same general type and nature, which continue to be found in the same general location of the panels at an unacceptable frequency.

As a minimum, the first five panels cast will be jointly inspected by the Engineer and the Contractor after casting, after moving to storage from the casting machine and before and after erection. All panel defects shall be identified and categorized during this inspection. The Contractor shall examine the defects and propose to the Engineer, the following in writing:

- The measures that the Contractor shall take to prevent recurring defects in future panels.
- The method of repair of all defects discovered as a result of the inspection as required herein.

If recurring defects continue following implementation of the Contractor's preventive measures, or as detected at any time during fabrication, the Engineer will instruct the Contractor to cease operations producing panels. The Contractor shall examine the defects and propose a solution in accordance with the above measures.

K. Repairs.

Repairs, if allowed by the Engineer, shall be made prior to the erection of the damaged and/or defective panel(s). Structural repairs shall be such that the structural integrity of the panel shall be completely restored. The Contractor shall be responsible for construction load analysis, service load analysis, and life expectancy determinations. Cosmetic and structural repairs shall only be made following procedures prepared by the Contractor and accepted by the Engineer. The repair procedures shall be submitted in writing and submitted to the Engineer for review and acceptance prior to performing the repair. The repair procedure shall be signed and sealed by a registered Civil Engineer in the state of Iowa and shall include the following minimum information:

- Identification of the panel and a detailed description and sketch of the defect.
- The magnitude and type of the most critical construction loading and service life condition to which the defective area will be subjected.
- Detailed reinforcement requirements, material types, surface treatments, curing methods and general repair procedures proposed.
- The specific nondestructive testing method and procedure by which the Contractor shall demonstrate to the Engineer that the defect no longer exists and the panel has been restored to a condition to be expected had the defect or damage not occurred.

L. Rejection of Panels.

Acceptance of damaged and/or defective panels (cosmetic or structural) will be at the discretion of the Engineer. Reasons for rejection include but are not limited to:

- Failure of the panel concrete to achieve the compressive strength equal to or greater than the strength specified in the plan set.
- Failure of the Contractor to execute the repair according to the approved procedure.
- Rejection of the proposed repair procedure or repair by the Engineer.
- Failure of the Contractor to provide the required certification or demonstration that the repair was successful and that the damage and/or defect no longer exist.
- Failure of the Contractor to eliminate recurring defects.
- Determination by the Engineer that the work or materials used in the work does not meet other requirements of the contract documents and is not acceptable.
- Panels with cosmetic damage and/or defects may be paid for at the contract unit price, and panels with structural damage and/or defects, that have not been rejected, may be paid for at a reduced contract unit price. However, such payment is subject to review by the Engineer, and failure of the Contractor to perform the required repairs properly and in a timely manner shall be cause for withholding of payments sufficient to protect the Department's interests. If a panel is repaired, the Contractor shall not be compensated for the panel until the repair procedure is complete and accepted by the Engineer.

M. Handling of Panels.

Handle, store, transport and erect panels without damaging. Maintain panels in a horizontal position at all times and do not store, lift and/or move in a manner that will induce torsion and other undue stress. Panels shall be supported in a manner that will prevent warping.

Prior to shipment, each panel shall be inspected for damage. Thoroughly clean the faces of all joints of laitance, bond breaking compound and any other foreign material by abrasive blasting. Blasting may be supplemented by detergent washing as necessary. Prepare

surfaces that will be in contact with grout by washing with water under pressure and by sandblasting to expose clean, well bonded aggregate.

Special care must be taken for cleaning of match cast surfaces. Remove laitance by light sand blasting, wire brush. Do not destroy the surface shape and profile of the match cast.

Inspect each panel visually for evidence of damage and/or defects before, during and after critical operations and as often as necessary to ensure adequate quality control.

Immediately bring all such evidence of damage and/or defects to the attention of the Engineer. Panels may be inspected at any time during construction as deemed necessary by the Engineer to monitor compliance with the plans and special provisions.

During transport, the support devices shall allow free rotation of the panel at each support point and free of torsional rotation (twist) of the panel at all but one of the support points
.
Upon arrival at the erection site, each panel shall again be inspected. Immediately bring all such evidence of damage and/or defects to the attention of the Engineer. Do not erect damaged panels until they are repaired and accepted by the Engineer.

N. Age of Precast Panels at Time of Jacking.
Unless otherwise specified in the plans, panels will not be jacked until they have reached the age of 45 days.

O. Grouting of Haunch and Shear Pockets.
A sample test of the grouting process shall be submitted to Iowa DOT.

P. Mixing of Pre-Packaged Grout.
This provision will apply if pre-packaged grout is specified in the plans. Mix in accordance with the manufacturer's recommendations and continue until all ingredients are thoroughly mixed and free of lumps and un-dispersed cement. Use potable water clean and free of injurious substances known to be harmful to Portland Cement or reinforcing steel in the grout. Use pre-packaged grout mixed in complete units continuously agitated until it is applied. Once mixed, do not re-temper the grout by the adding water and place the grout within 1 hour or in accordance with the manufacturer's recommendations.

Q. Placing.
Construct forms from wood, metal or other material accepted by the Engineer and constructed to retain the grout without leakage. Design the forms to remain true to shape and rigidly support the weight of all materials, equipment and personnel necessary for placement of the grout. Place the grout continuously in a manner and sequence such that all voids are completely filled. Size and locate vent holes or tubes in the formwork as necessary to prevent air entrapment. If the Engineer determines the Contractor's methods of placement of grout do not achieve full coverage, pumping of the grout will be required. No more than 15 minutes shall elapse between placements of successive batches of grout over a single beam.

R. Bonding of Grout.
Prior to placement of grout, clean all surfaces that have not been prepared and will be in contact with grout to create a prepared surface. The surface shall be prepared by washing with water under pressure and by sandblasting to expose clean, well bonded aggregate. The prepared surface shall be wetted a minimum of three hours before application of the grout and the surface shall be maintained in a dampened condition during that period. One hour before placing the new grout, any excess water shall be removed and the surface shall be allowed to dry. At the time of placement, the surface shall be saturated surface dry (SSD) with no visible moisture or darkening of the bond surface.

The undersides of the precast deck panels (beam haunch areas) that are in contact with the grout are exempt from the provisions in this section.

S. Finishing and Curing.
Strike off exposed top surface of the grout with the top of panel pockets and finished with a float. Wet cure exposed surfaces of grout in accordance with the manufacture's recommendations.

150286.04 METHOD OF MEASUREMENT.
The quantity of Full Depth Precast Deck Panels (each) will be shown in the contract documents.

150286.05 BASIS OF PAYMENT.
Payment shall be based on the contract unit price and shall include all material, labor, equipment, tools and incidentals necessary to complete the work.