SPECIAL PROVISION

PROJECT # XXXXX
PIN # XXXXX

SECTION 03934S

STRUCTURAL POTHOLE PATCHING

Delete Section 03934 in its entirety and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Repair of potholes and delaminated areas on bridge decks and approach slabs.

1.2 RELATED SECTIONS

A. Section 03055: Portland Cement Concrete

B. Section 03211: Reinforcing Steel and Welded Wire

C. Section 03310: Structural Concrete

1.3 REFERENCES

A. ASTM C 309: Liquid Membrane-Forming Compounds for Curing Concrete

B. ASTM C 928: Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs

C. ASTM D 4285: Indicating Oil or Water in Compressed Air

D. ASTM D 4580: Measuring Delaminations in Concrete Bridge Decks by Sounding

1.4 DEFINITIONS **Not Used**

1.5 SUBMITTALS

A. Manufacturer’s product data sheets for review.
   1. Include recommended installation instructions for information.

B. Curing procedure for review if using rapid setting repair mortar. Include at least the following:
   1. Curing method
   2. Curing period

C. Qualifications for review
   1. Manufacturer's technical representative information. Include at least the following:
      a. The company name
      b. The name, phone number, and documented experience of the technical representative.
   2. Experience of superintendent in charge of the Structural Pothole Patching.
      a. Required when the manufacturer's technical representative will not be present during placement.
      b. Include at least the following for at least five previous UDOT projects completed in the last five years:
         1) Project name
         2) Project location
         3) Structural Pothole Patching material used
         4) Year of construction
         5) EOR and owner contact information (phone and email)

D. Structural Pothole Patching Documentation for information
   1. Document the size, location, and repair material used in structural pothole repair areas.
   2. Use the "Structural Pothole Patching As-Built" template found at the Department's website for each bridge.
      a. Refer to http://www.udot.utah.gov/go/standardsreferences.
      b. Submit digitally in .pdf and .xlsx format.

1.6 QUALITY CONTROL

A. Manufacturer's Technical Representative
   1. Provide a technical representative from the structural pothole patching product manufacturer for training and consultation.
      a. Provide training in surface preparation, proper mixing, placing and finishing technique, safety precautions, traffic opening time, and environmental requirements.
         1) Train workers who will mix, place, or finish the structural pothole patching product during production work in a pre-production meeting.
         2) Use a mockup to demonstrate proper mixing, placing, and finishing technique.

3) Coordinate training with the Engineer.

b. The manufacturer's technical representative must:

1) Be onsite during surface preparation and application of the structural pothole patching product on the initial structure and for the first day the structural pothole patching product is used on the project.

2) Be available for consultation but not necessarily present at the job site for the remaining work.

3) Be available to train workers who did not attend the preproduction training before they can perform production work.

2. Do not use workers for the production work who have not been trained by the manufacturer's technical representative.

3. The Engineer may waive the requirement for the manufacturer's technical representative to be onsite if the Contractor can demonstrate that the superintendent for the work has performed at least five satisfactory applications of the structural pothole patching product in the last five years on similar bridges in similar environments.

a. The manufacturer's technical representative must be available for consultation throughout the duration of the application.

4. The Department reserves the right to require the manufacturer's technical representative to be onsite if at any time the Engineer is concerned with the product installation quality.

PART 2 PRODUCTS

2.1 MATERIALS

A. Concrete – Class AA(LS), ¾ inch maximum aggregate. Refer to Section 03055.

B. Rapid Setting Repair Mortar – Refer to ASTM C 928.

1. Type R3.
2. Free of magnesium phosphate.
3. Capable of being placed into a single lift layer thickness of at least 6 inch.

a. Provide $^{3}/_{8}$ inch maximum aggregate when aggregates are not pre-blended.

C. Reinforcing Steel

1. Coated reinforcing steel according to Section 03211.

D. Water – Use potable water free from harmful salts, reactive chemicals, and other contaminants.

E. Curing Compound – Refer to ASTM C 309, Type 2.

2.2 EQUIPMENT

A. Jackhammer
   1. 30 lb class
   2. 15 lb class

B. Pressure Washer
   1. At least 3000 psi but no more than 7000 psi

C. Sandblaster/Air Compressor
   1. Verify air is free of water and oil according to ASTM D 4285.

PART 3 EXECUTION

3.1 PREPARATION

A. Locate delaminated and spalled concrete in the bridge deck and approach slabs.
   1. Remove asphalt surfacing before conducting sounding survey.
   2. Mark a rectangular area surrounding each pothole as shown. Refer to ASTM D4580.
   3. Notify the Engineer if sounding indicates the pothole patching quantity will exceed the estimated quantity by more than 25 percent.
      a. Do not proceed with saw cutting and concrete removal without the Engineer's authorization.

3.2 CONCRETE REMOVAL

A. Make 1 inch deep saw cuts in the sound concrete along the rectangular perimeter of the repair areas.
   1. Make saw cuts less than 1 inch deep when shown.
   2. Stop saw cuts and notify the Engineer if reinforcing steel is encountered.
   3. Replace reinforcing steel that has been cut during this operation having a cut depth equal to or greater than 25 percent of the diameter of the reinforcing steel.
      a. Provide lap lengths of the new reinforcing steel with sound existing reinforcing steel at least of 32 bar diameters.

B. Use jackhammers to remove damaged, shattered, and delaminated concrete.
   1. Use 30 lb class jackhammer.
      a. Do not use jackhammers heavier than 15 lb class for removals in areas directly below the top reinforcing steel or within 3 inch of prestressing strand.
      b. Do not place jackhammers directly on reinforcing steel.
   2. Operate jackhammer at an angle greater than 45 degrees as measured from the element surface.
   3. Remove the concrete in the repair area to at least 1½ inch below the concrete surface as shown.
   4. Remove the concrete to the greater of $^{5}/_{8}$ inch or aggregate diameter plus ¼ inch below the bottom of the top mat of reinforcing steel if the reinforcing steel is exposed during concrete removal.
      a. Do not remove concrete below prestressing strands unless it is delaminated.
   5. Protect existing reinforcing steel encountered.
      a. Replace or repair damaged reinforcing steel.
   6. Stop work and contact the Engineer if more than a 2 ft continuous length of prestressing strand is exposed.
      a. Do not resume removal operations until directed by the Engineer.

C. Remove loose materials by dry sweeping or by compressed air with at least 90 psi pressure.

D. Deck Blow Through
   1. Immediately stop the equipment and notify the Engineer and make the necessary adjustments to limit the area of complete concrete removal if removal blows completely through the bridge deck.
   2. Provide appropriate falsework and formwork to support construction loads safely.
   3. Use treated plywood to facilitate stripping.

E. Replace existing reinforcing steel that have 25 percent or greater section loss.
   1. Cut and remove deteriorated existing reinforcing steel.
   2. Match the size of the new reinforcing steel bar to the existing bar.
   3. Provide lap lengths of the new reinforcing steel with sound existing reinforcing steel at least of 32 bar diameters.

3.3 PATCHING CONCRETE

A. Sandblast to remove rust from the exposed reinforcing steel and concrete surfaces before placing the structural pothole patch.
   1. Protect in-place any sound reinforcing steel.
      a. Do not repair damaged epoxy coating on existing reinforcing steel
   2. Re-sandblast reinforcing steel if rust occurs before placement.

B. Clean the repair area by blowing with clean and dry compressed air at 90 psi.

C. Keep the repair area clean until pothole patching materials have been placed.

D. Pressure wash the repair area.
   1. Remove standing water while maintaining a saturated surface.
   2. Repeat pressure washing of the repair area before placing the structural pothole patch if the repair surface shows signs of drying out.

E. Repairs using concrete
   1. Place concrete and strike off level with deck surface. Refer to Section 03310.
   2. Finish surface of bridge deck and approach slab according to Section 03310.
   3. Apply a liquid membrane-curing compound and wet cure the repair area for at least 7 days and until the concrete repair has a compressive strength of at least 3500 psi.

F. Repairs using rapid setting repair mortar
   1. Follow the manufacturer's requirements.
   2. Use a texture process that produces regular ⅛ inch wide transverse grooves spaced randomly from ½ inch to ¾ inch on centers and ⅛ inch deep.
   3. Follow the authorized curing procedure.
   4. Do not allow traffic onto the repaired areas until the patching material has reached an approximate compressive strength of 3000 psi as determined by a rebound hammer.

G. Patch failure – Remove the patch completely and repair the pothole again if the patch fails to bond to the existing concrete.

3.4 PROTECTION

A. Prevent debris from falling into waterways, pedestrian areas, traffic areas, or onto railroad tracks.

END OF SECTION