SP-090070
(New)

Iowa Department of Transportation

SPECIAL PROVISIONS
FOR
PARTIAL DEPTH BRIDGE DECK PATCHING

HAMILTON AND POLK COUNTIES
MBIN-035-1(501)139--0M-40
MBIN-080-1(502)145--0M-77

Effective Date
June 15, 2010

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

090070.01 DESCRIPTION.
Partial depth bridge deck patching consists of removing deteriorated bridge deck concrete in areas designated by the contract documents. This includes furnishing and placing patching material to provide a new traffic surface. This work is in areas where the size, shape, and depth of patch depends on the extent of deck deterioration and will be determined during the removal operation.

090070.02 MATERIALS AND EQUIPMENT.

A. Materials.

1. All materials listed in Appendix A of Materials I.M. 491.20 are approved for use on this project.

2. Follow the manufacturer's recommendations for the patching material except as modified by this specification. Furnish two copies of the manufacturer's product information, mixing procedures, placement procedures and curing procedures to the Engineer at least ten (10) working days prior to the Preconstruction Conference.

3. Calcium chloride shall not be added to patching material.

4. Patching materials may be used with or without coarse aggregate in accordance with manufacturer's recommendations.

5. Aggregate for extending grout shall be pea gravel with a minimum durability of Class 2 meeting the following gradation:

Sieve Size	Percent Passing
0.5 inch (12.5 mm)	100
0.375 inch (9.5 mm)	85 - 100
No. 8 (2.36 mm)	0 - 8

6. Manufacturer's recommendations shall be followed for adding aggregates to these mixes.

B. Equipment.

1. Remove existing deck surface material by wet or dry saws, jack hammers, or similar equipment. Hand equipment may be necessary to achieve a vertical edge and designated shape.

2. The following additional equipment will be required:
- **a.** Sandblasting equipment for cleaning the prepared patch area before placing the patch.
- **b.** Preparation of the patch area shall be completed using equipment no heavier than a 15 pound (7 kg) air chisel. With the approval of the Engineer, a 30 pound (14 kg) air chisel may be used if its use does not result in significant damage to patch area and edges.
- **c.** Compressed air for cleaning the prepared area shall be oil and moisture free.
- **d.** An on-site mortar or paddle type concrete mixer shall be used for mixing patching material.

090070.03 CONSTRUCTION.

Tabulations for partial depth bridge deck finish patches shown in the contract documents are for estimating purposes only. The Engineer will designate the location and limits of the patches. The shape and depth may be irregular, thus requiring the use of hand-operated equipment for some or all removal. Existing deck material shall be removed within the designated area to sound concrete as determined by the Engineer. All material removed and not designated for salvage shall become the property of the Contractor and be removed in accordance with Article 1104.08 of the Standard Specifications.

Visually survey the bottom of the deck over open roadways or railroads prior to beginning removal operations. Care shall be taken to prevent material from falling onto traffic below. Lane closures below the bridge deck being patched may be required.

A. Patching Procedures.

1. Area to be Patched.

The Engineer will determine areas to be patched by hand sounding. The patching area will normally include 2 to 3 inches (50 to 75 mm) of sound concrete around patch edges. Efforts will be made to mark the patching area to accommodate sawing patch edges by using a square, triangle, rectangle, or similar straight edged shape. The minimum depth of patch shall be 1 inch (25 mm).

2. Sawing.
- **a.** Determine the depth of existing reinforcing bars before sawing.
- **b.** Saw at a depth of 0.75 to 1 inch (20 to 25 mm) around the designated area. Care shall be taken to avoid cutting into reinforcing bars.
- **c.** Keep areas where concrete has been removed free of slurry produced from wet sawing.

3. Removal.
- **a.** Remove unsound concrete to a minimum depth of 1 inch (25 mm) and no deeper than 1 inch (25 mm) below the top mat of reinforcing steel. Avoid jack hammering on reinforcing steel to prevent damage to reinforcing bars. Care shall to be taken to avoid breaking through the bridge deck. Keep patch edges as straight and square as possible when removal depth exceeds the initial sawcut.
- **b.** Within 24 hours of placing patching material, thoroughly clean all reinforcing bars and newly exposed concrete by sand blasting or shot blasting. Where the bond between existing concrete and reinforcing steel has been broken, remove the concrete adjacent to the reinforcing bar to a depth that will permit new concrete to bond to the entire periphery of the exposed bar. A minimum of 0.75 inch (20 mm) clearance will be required around the bar. Exercise care to prevent cutting, stretching, or damaging reinforcing steel. Do not

sand blast or shot blast epoxy coated reinforcing steel. Clean epoxy coated reinforcing steel with hand tools and compressed air to avoid damaging the epoxy coating. Repair damage to the epoxy coating by a method approved by the Engineer.

c. After sand blasting, remove all loose material with compressed air.

4. Mixing of Patch Material.

a. On the first day of placement a representative of the manufacturer of the patch material shall be present on the jobsite to observe and provide guidance of the contractor's procedures.

b. Mix material in accordance with the manufacturer's recommendations and subject to the approval of the Engineer. Furnish two copies of these recommendations to the Engineer at least ten (10) working days prior to the Preconstruction Conference.

c. Organize work so all personnel and equipment are in place before mixing.

d. Mix according to the patch material manufacturer's recommendations and subject to the approval of the Engineer. Mix only the amount of material that can be placed in the time frame designated by the manufacturer.

e. Add ingredients to mixer in order of manufacturer's recommendations.

f. Amount of mix water is very important. Use a properly graduated measuring device to measure out the proper amount of water. Never exceed maximum recommended water content.

5. Patch Material Placement.

a. Patch material shall be placed in accordance with the manufacturer's recommendations and subject to the approval of the Engineer. Furnish two copies of these recommendations to the Engineer at least ten (10) working days prior to the Preconstruction Conference.

b. Thoroughly trowel patching material into patch edges to ensure a good bond and seal. Ensure that all saw cuts extending beyond the patch area are filled with patching material to prevent water from getting around or under the patch.

c. Protect and cure patches according to the manufacturer's recommendations.

d. Match profile of patches to the existing deck grade and cross slope. Texture the surface of patches to match the adjacent deck surface.

e. Prior to final acceptance, the patch shall be level with the adjacent pavement and have a smooth riding surface.

B. Limitations of Operations.

1. Two copies of the manufacturer's product information, mixing procedures, placement procedures, and curing procedures shall be furnished to the Engineer at least ten (10) working days prior to the Preconstruction Conference.

2. A representative of the manufacturer of the patch material being used shall be present at the Preconstruction Conference and at the job site on the first day of patch material placement. Contractor is responsible for notifying the manufacturer's representative of these dates and making sure that the representative will attend.

3. Maintain traffic during construction unless the road is closed. Conduct all operations with minimum inconvenience to traffic. Lane closures shall be in accordance with the Traffic Control Plan. On two-lane roadways, limit work to one traffic lane at a time except for minor encroachment in the adjacent lane for sawing and patch preparation when traffic is maintained. For multiple lane roadways, the work area may include one lane in each direction.

4. When approved by the Engineer, patch areas may extend up to 2 feet (0.6 m) into an adjacent lane as allowed by the Traffic Control Plan.

5. Place patch material within 24 hours of sawing operations.

6. If unforeseen conditions result in excavated areas being left open overnight, furnish a sufficient number of flaggers to warn motorists and direct traffic until patches are complete and the roadway is open to normal traffic. The cost of providing these flaggers shall be at no additional cost to the Contracting Authority.

7. Place concrete patching material only when the ambient air and pavement temperatures are in accordance with the manufacturer's recommendations.

8. Open patched areas to traffic as soon as the manufacturer's recommended patch strength is achieved.

C. Area Restoration.
Keep the bridge deck surface and areas immediately adjacent to patch areas clean of slurry and excess patch materials.

090070.04 METHOD OF MEASUREMENT.

A. The Engineer will calculate the area of each Partial Depth Bridge Deck Finish Patch in square feet (square meters) from surface measurements.

B. The area of each patch less than 1 square foot (0.1 m^2) will be counted as 1 square foot (0.1 m^2) for payment purposes.

090070.05 BASIS OF PAYMENT.

A. Payment for Partial Depth Bridge Deck Finish Patch will be at the contract unit price per square foot (square meter).

B. Payment is full compensation for sawing, removal of bridge deck concrete, preparing patch area, furnishing and placing patch material, finishing, curing, and restoration of the area.