

715 CONCRETE BRIDGE DECK REPAIR

715.01 DESCRIPTION

This work shall consist of removing a specified amount of the existing bridge deck mechanically or through hydro-jetting, removal of additional areas of deteriorated concrete, cleaning all surface areas to be repaired, replacing deteriorated reinforcing steel, and placing repair concrete.

715.02 MATERIALS

- (A) **Portland Cement Concrete** – Concrete shall conform to Class A or Class B unless otherwise specified or shown on drawings, but shall contain aggregates no greater than 1/2 inch nominal size.
- (B) **Epoxy Resin Adhesive (bonding agent)** – Epoxy adhesive shall conform to AASHTO M235 Type III, two part mix equal parts (1:1), thixotropic, and in accordance with [822.08\(B\) \(1\)](#).
- (C) **Alternate Concrete Bonding Agent** – Bonding agent compound for bonding uncured concrete to existing concrete shall be Thorobond, Weld-Crete, Link, or approved equal with a polyvinyl acetate homopolymer base for surface bonding application.

715.03 EQUIPMENT

(A) Removal Equipment

- (1) Existing Wearing Surface – This equipment shall only be required when the existing bridge contains an asphalt wearing surface. It shall be capable of removing the wearing surface without damaging armored joints that are to remain or the existing concrete surfaces beyond the specified minimum removal depth. When pavement breakers are proposed, broad face chisel blades shall be used and operated at a slight angle with the horizontal to peel off the wearing surface.
- (2) Concrete Surface – Power operated mechanical type or high pressure water jet type equipment shall be capable of uniformly removing the specified minimum depth from the existing concrete surface.
 - (a) Mechanical Type – This equipment shall be limited to depths not closer than ½ inch from the top of the existing reinforcement. When additional removal is required, it shall be performed by high pressure water jet, power driven hand tools or hand tools.
 - (b) High Pressure Water Jet (Hydro-jetting) – This equipment may be used to any depth above and below the reinforcing steel. The runoff water shall be satisfactorily controlled to prevent it from reaching any traveled roadway, waterways, or any other areas designated in the Plans or by the Chief Engineer.
 - (c) Power Driven Hand Tools – This equipment shall be used for removal of unsound concrete or to achieve the required depth when deeper than ½ inch above the top of existing reinforcing steel. Pneumatic hammers heavier than a nominal 60 pound class shall not be used, and chipping hammers heavier than a

nominal 15 pound class shall not be used to concrete from beneath any reinforcing steel.

- (d) Hand Tools – Hand tools such as hammers and chisels shall be provided for removal of remaining particles of unsound concrete from beneath existing reinforcing steel or to achieve the required depth of removal.
- (e) Cleaning – This equipment shall be capable of removing rust scale and old concrete from reinforcing steel and small chips of concrete partially loosened by the removal. Abrasive blasting shall not be used when epoxy coated reinforcing steel is present in the concrete.

(B) Placement Equipment – Equipment shall conform to [905](#).

715.04 REMOVAL

- (A) **Asphalt Wearing Surface Removal** – The asphalt wearing surface, if present, shall be removed to the limits shown in the Plans.
- (B) **Inspection** – The Chief Engineer shall inspect the entire exposed portion of the deck and designate the extent and depth of concrete removal.
- (C) **Concrete Removal** – The previously designated areas to be repaired shall be outlined with saw cuts to a depth of at least 1 inch. The areas of deteriorated concrete shall be removed down to sound concrete by means of the appropriate equipment. At a minimum concrete must be removed $\frac{3}{4}$ inch below the top mat of reinforcing steel in the deck. The proposed removal method is subject to the approval of the Chief Engineer. Where it is anticipated that the depth of removal will be half of the original concrete deck thickness and deeper removal is possible, the Contractor shall furnish and erect temporary protective shields in accordance with [626](#).
- (D) **Reinforcing Steel** – Exposed reinforcing steel shall be cleaned. Epoxy coated reinforcing steel shall not be cleaned by abrasive blasting. Damaged epoxy coating shall be repaired in accordance with [704.09\(D\)](#). Reinforcing steel that is damaged or deemed unsuitable by the Chief Engineer shall be lapped 30 bar diameters on each side of the damaged portion with new bars of the same size if sufficient length of the existing bar is exposed. Otherwise the new bar shall be welded or mechanically connected in accordance with [704](#).

715.05 CONCRETE DECK REPAIR

(A) Surface Preparation

- (1) Cleaning – After the completion of removal of deteriorated concrete, remove all dirt, oil or other foreign material followed by an airblast cleaning using compressed air with a high velocity nozzle.
- (2) Bonding Agent – An epoxy resin adhesive shall be applied to the prepared surface. Adhesive shall be applied when the ambient air temperature is in excess of 60°F unless otherwise recommended by the manufacturer. The adhesive shall be in “Tacky” condition immediately prior to placing repair material.

- (B) **Repair Types** – The top surface of all deck repairs shall be flush with the top of the adjacent concrete deck, and the concrete will be cured in accordance with [703](#).
- (1) **Partial Depth Deck Repair** – This repair shall include all areas where the depth of deck removal is less than the full depth of the original concrete deck. The Contractor shall fill the void with Class A Concrete.
 - (2) **Full Depth Deck Repair** – This repair shall include all areas where the depth of deck removal is the full depth of the original concrete deck. The Contractor shall fill the void with the concrete class specified on the Plans. For areas greater than 4 square feet, forms shall be supported by blocking erected from the existing girders. Otherwise forms may be suspended from existing reinforcing steel by wire ties. All forms shall be removed upon completion of the concrete curing process.

715.06 MEASURE AND PAYMENT

- (A) **Measure** – The unit of measure for the various types of Concrete Bridge Deck Repair will be the square foot, complete in place. The number of square feet will be the actual surface area computed from measurements taken in the field.
- (B) **Payment** – Payment for the specified type of Concrete Bridge Deck Repair will be made at the contract unit price per square foot, which payment will include removal and disposal of existing asphalt surface and membrane waterproofing, abrasive blasting, air cleaning, grouting, and proportioning, mixing, placing, finishing, and curing concrete. Payment will also include the cost of furnishing all materials, tools, equipment, incidentals and labor necessary to complete the item as shown on the plans and specified herein.