

Revision of Section 202 Removal of Portions of Present Structure (Class ♦1, ▲2 ▲♠and 3)

Revise Section 202 of the Standard Specifications for this project to include the following:

Description

This work consists of saw cutting, removing, and disposing of existing deteriorated bridge deck and approach slab concrete. Removal operations shall be conducted so that the traveling public is protected, and so that interference with the traveling public using the structure is minimized.

Perform the applicable classes of removal as defined in the plans. The Engineer will determine the locations and limits of removal.

Construction Requirements

(a) *General:*

At least 10 working days before beginning removal, the Contractor shall submit a method statement to the Engineer with details of the removal operations including the means, methods, sequence of removal, tools, and equipment to be used.

The Contractor's Method Statement shall also include proposed methods used to:

- Determine the locations and limits of deteriorating concrete.
- Prevent debris from falling to the ground or waterways below the structure.
- Protect the traveling public using the structure, and adjacent to the structure, from airborne debris generated by the removal operations.

The Engineer must approve all removal operations, methods, and equipment before the work begins.

The Contractor shall control dust and run-off per applicable governmental regulations. The Contractor is responsible for disposing per regulation of all material removed, including but not limited to, material collected by vacuuming the deck.

Before removal of concrete, sound the bridge deck for delamination per ASTM D4580, Procedure B Chain Drag. Mark the areas of deteriorated concrete to be removed as directed by the Engineer. Removal and patching areas not designated for removal by the Engineer will not be measured or paid for.

Remove the existing concrete as shown on the plans or as directed by the Engineer. Saw cut along the removal limits before removal. Removal operations shall not occur before approval of the Engineer. Concrete sawing shall be done to a true line, with a vertical face, unless otherwise specified. Feathered edges will not be acceptable. The depth of the saw cut shall be approximately 3/4-inch.

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■The Contractor shall remove and repair only the amount of work that can be completed and reopened to traffic within the designated lane closure times as specified in the Traffic Control Plan.

The Contractor shall take all steps necessary to prevent cutting or otherwise damaging reinforcing steel, including any vertical stirrups, and structural steel including welded shear connectors projecting into the bridge deck. Repair and replace all bars or shear connectors damaged by the Contractor's operations at the Contractor's expense using means and methods approved by the Engineer with no allowance for contract time extension.

♣The Contractor shall take all steps necessary to prevent damage to longitudinal and transverse post-tensioning ducts and tendons. Repair damage to ducts or tendons that are shown on the as-built drawings at the Contractor's expense with no allowance for contract time extension.

Following the removal of the concrete, straighten all exposed non-epoxy reinforcing steel to remain in place as required and thoroughly cleaned to sound metal by sandblasting per subsection 202. Do not sandblast epoxy coated reinforcing steel, if present, but clean with hand tools. Repaint epoxy coating on reinforcing steel, if damaged, with epoxy paint, before placement of the concrete.

Following sandblasting, the condition of all exposed reinforcing bars will be inspected by the Engineer. If, in the opinion of the Engineer, the loss of original cross-sectional area of the bar due to deterioration is 25 percent or more, the Contractor shall add additional bars to replace the section area loss due to deterioration, as approved by the Engineer. Lap Splice newly added bars as shown in the plans. Use a mechanical splice, if the required lap splice length cannot be used. The mechanical splice shall develop at least 125 percent of the specified yield strength of the bar. Maintain all minimum clearances as defined in the plans. As an alternative, the Contractor may remove additional sound concrete to achieve the required lap length. Payment for additional removals and repairs will be based on the unit price for the appropriate class of removal and repair method.

Secure all reinforcing steel to adjacent bars or to the bridge deck as provided in subsection 602.

Thoroughly clean all areas of the prepared surface contaminated by oil or other materials detrimental to bonding by a method approved by the Engineer.

(b) Surface Preparation Equipment

Pneumatic hammers heavier than nominal 15-pound class will not be permitted. Pneumatic hammers and chipping tools shall not be operated at an angle exceeding 60 degrees relative

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to the surface of the slab. Such tools may be started in the vertical position but must be immediately tilted to a 60-degree operating angle.

Provide hand tools such as hammers and chisels for removing final particles of loose, unbonded concrete. Only short, one-handed hammers with a maximum head weight of five pounds will be allowed unless Class 3 Removal is designated. Use hydraulic demolition with the Engineer's approval.

Sandblasting equipment shall meet the requirements of subsection 202.

(c) ♦ Class 1:

Removal of Portions of Present Structure (Class 1) repairs shall only be used in isolated areas where polyester concrete is the required patching material.

If patching materials other than polyester concrete are used, the removal shall be taken down to the minimum depths specified for Class 2 removals, such that the patching material will encapsulate the top mat reinforcing steel.

Class 1 removal shall consist of removing the surface of the existing bridge deck concrete within the limits shown on the plans, or as designated by the Engineer. Class 1 removal shall begin at the surface of the existing concrete bridge deck and extend to sound concrete but shall conform to the maximum and minimum for Class 1 shown in the plans.

Perform Removal by chipping, hand tools, shot blasting, or sandblasting per these specifications or as otherwise approved by the Engineer.

If Class 1 is immediately adjacent to Class 2 or 3 removals, it shall be taken down to Class 2.

If loose or deteriorated concrete exists below Class 1 limits, Class 2 removal is required.

▲ d) Class 2:

Removal of Portions of Present Structure (Class 2) shall consist of removing existing bridge deck concrete within the limits shown on the plans, or as designated by the Engineer. Class 2 removal shall begin at the surface of the existing concrete bridge deck and extend to sound concrete but shall conform to the maximum and minimum for Class 2 shown in the plans.

Wherever solid bond between existing concrete and reinforcing steel is lacking, or where more than half of the diameter of the reinforcing bars is exposed by removal of concrete, the concrete adjacent to the bar shall be removed to a minimum clearance of one inch below and around the bar in all directions to permit new concrete to bond to the entire

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periphery of the bar. Care shall be taken not to fracture sound concrete in the bottom half of the bridge deck.

Perform Removal by power chipping or hand tools per these specifications or as otherwise approved by the Engineer.

If loose or deteriorated concrete exists below Class 2 limits, Class 3 removal is required.

▲♠ e) Class 3:

Removal of Portions of Present Structure (Class 3) shall consist of removing existing bridge deck concrete within the limits shown on the plans, or as designated by the Engineer, following the Class 2 removal work. The concrete within the designated limits shall be removed full depth from the top of bridge deck to bottom of bridge deck.

The Contractor shall take all precautions necessary to prevent damage to diaphragms and girders below the removal limits and to minimize spalling on the bottom of the bridge deck slab adjacent to the removal boundaries.

The Contractor shall implement a containment system that prevents debris from falling to the ground or waterways below the structure.

The Contractor is responsible for disposing of all removed material and debris.

Method of Measurement

Removal of Portions of Present Structure will be measured by the actual quantity completed and accepted to the required depth for each class. Each area of bridge deck removal will only be measured once as ♦Class 1, ▲Class 2 or ▲♠Class 3; measurement of removal areas will not overlap.

Removal and repairs beyond the minimum required lap length of reinforcing steel will not be measured or paid for, but will be at the contractor's expense.

Cleaning of prepared surfaces contaminated by oil or other materials detrimental to bonding will not be measured and paid for separately but shall be included in the work.

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Basis of Payment

Planned deck rehabilitation quantities are approximate. The actual accepted quantities of Removal of Portions of Present Structure will be paid for at the contract unit price.

Payment will be made under:

Pay Item	Pay Unit
♦ Removal of Portions of Present Structure (Class 1)	Square Yard
▲ Removal of Portions of Present Structure (Class 2)	Square Yard
▲♠ Removal of Portions of Present Structure (Class 3)	Square Yard

Payment for Removal of Portions of Present Structure will be total compensation for all labor, materials, tools, equipment, and incidentals required to complete the item including but not limited to:

- Saw cutting.
- Removal of concrete to the required depth.
- Sandblasting or hand cleaning reinforcing steel including epoxy repair.
- Disposal of removed materials and debris.

Methods to prevent debris from falling from the structure, and methods to protect the traveling public using the structure, or adjacent to the structure, from airborne debris will not be paid for separately; include it in the work.

Cleaning, straightening, and repairing epoxy coating of existing reinforcing steel will not be paid for separately; include it in the work.

Sounding and marking repair areas will not be paid for separately; include it in the work.

▲Class 2 and Class 3 removals if needed will be paid for using the Force Account: F/A Deck Rehabilitation.

Payment for the new reinforcement steel will be made per Section 602. Payment for the Mechanical splice will be as the weight of reinforcing steel for the designated lap splice for that bar size.

Instructions to Designers (delete instructions and symbols from final draft):

Use this project special provision for concrete deck and approach slab rehabilitation.

- ♦ Use Class 1 pay item and references in the specification and worksheet for newer bridges, with decks in good condition, where only Class 1 bridge deck removal is anticipated, and

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only polyester concrete will be used as the patching material.

- ▲ Use Class 2 and Class 3 pay items and references in the specification for structures where Class 2 and Class 3 removal is anticipated. For newer structures where Class 1 is used, delete Class 2 and Class 3 pay items and references in the specification only (Leave Class 2 and 3 details and references in the Worksheet). A Force account item (F/A Deck Rehabilitation) may be used to pay for Class 2 and 3 removals if needed.
- ♣ Use Class 3 pay items and references in the specification alone in conjunction with 202 Removal of Portions of Present Structure (Class2) Hydrodemolition for Hydrodemolition applications.
- Use for projects that require work be completed and open to traffic in one evening, weekend, or other limited time frame.
- ♣ Use when there are post-tensioned ducts and tendons.

A Construction Sketch (Deck General Layout Plan) is required per the Bridge Design Manual as part of the Field Pack to help document the location, area, class, and quantity of each as-constructed deck repair area. Designer shall coordinate this effort with CDOT Construction Staff during construction.

Include Revision of Section 202 Sandblasting Reinforcing Steel in specification package.

Permanent Changes to Project Dated Special Provisions

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<u>Date</u>	<u>Author</u>	<u>Description of Change</u>
1/14/19	BPM Cons.	Initial Website Issue
11.1.21	M. Kayen	Revisions to grammar, format as per CDOT Style Guide (4.22.21)
04.06.2023	M. Kayen	Revisions to make spec online accessibility-compliant. 5.22.23 Additional accessibility work.