

## **Section 2413. Bridge Deck Surfacing, Repair, and Overlay**

### **2413.01 DESCRIPTION.**

#### **A. Deck Surfacing.**

Place a wearing course on the prepared surface of a new bridge deck. Perform other necessary work shown in the contract documents.

#### **B. Deck Repair.**

##### **1. Class A Deck Repair.**

Remove deck concrete below the level described for Deck Overlay, but less than full depth. Replace the excavated volume with concrete to a level bounding the Deck Overlay classification.

##### **2. Class B Deck Repair.**

Remove deck concrete below the level described for Deck Overlay for the full depth of the floor. Replace the excavated volume with concrete to a level bounding the Deck Overlay classification.

#### **C. Deck Overlay.**

Remove deck concrete to a depth 1/4 inch (5 mm) below the existing finished surface, and overlay with a concrete course of a depth designated. Unless specified otherwise in the contract documents, overlay is to accomplish a raise of the existing roadway surface and cover the entire concrete deck surface, including those areas to be repaired.

### **2413.02 MATERIALS.**

- A.** Use materials meeting the requirements for the respective items in [Division 41](#). When structural repairs are included in the project, Class C concrete may be mixed using equipment meeting requirements of [Article 2413.03, A, 3](#). The concrete mixture used for the overlay may be used for the repair. Use the water and consistency specified in [Article 2403.02, B, 2](#).
- B.** Use a single source of cement during an individual placement.
- C.** Apply [Sections 4110](#) and [4115](#) to the aggregates. Use only those coarse aggregates specifically allowed by [Article 4115.05](#) for this work.
- D.** Use one of the following mixes:
  - 1. Class O Portland Cement Concrete.**
    - a.** Use Class O PCC meeting the requirements of [Materials I.M. 529](#) and the following requirements:
      - 1)** The slump, measured according to [Materials I.M. 317](#), shall be 3/4 inch (20 mm) with a maximum of 1 inch (25 mm) and no minimum requirement. Commence testing for concrete slump from a continuous mixer within 2 to 4 minutes after the concrete is discharged.
      - 2)** The intended air entrainment of the finished concrete is 6%. Ensure the air content of fresh, unvibrated concrete at the time

of placement, as determined by [Materials I.M. 318](#) is 6.5%, with a maximum variation of plus 2.0% and minus 1.0%.

- b. Fly ash substitution is not permitted for Class O PCC.

## 2. **Class HPC-O High Performance Concrete.**

Meet the requirements of [Materials I.M. 529](#) and the following:

- a. A slump of 1 inch (25 mm) to 4 inches (100 mm), measured according to [Materials I.M. 317](#), with a maximum of 5 inches (125 mm). Commence testing for concrete slump from a continuous mixer within 2 to 4 minutes after the concrete is discharged. Before placing ready mix concrete, test the slump.
- b. Use a mid-range water reducing admixture meeting the requirements of [Materials I.M. 403](#), [Appendix C](#) and a retarder listed in [Materials I.M. 403 Appendix G](#). When the expected haul time is less than 30 minutes or the maximum air temperature expected is less than 75°F (24°C), addition of a retarder is not required. The intent of the mid-range water reducer is to achieve a workable, dense, and low w/c ratio concrete. The Engineer may approve other admixtures or combinations of admixtures and dosages to achieve a workable low w/c ratio mix.
- c. Increase moisture testing of coarse and fine aggregate to ensure batch-to-batch consistency and reduce water addition at job site. Perform moisture testing of coarse and fine aggregate prior to batching when batch weights are determined and then again half-way through the placement.
- d. Air content is to be the same as required for Class O PCC.
- e. Use Type IS or Type IP cement. If Type I/II is used, 25% replacement with GGBFS is required.
- f. Limit fly ash substitution to 20% replacement by weight.
- g. For projects with deck overlay quantities greater than 1800 square yards (1500 m<sup>2</sup>), make a trial batch of the mix (minimum 3 cubic yards) at the anticipated concrete temperature during delivery. Initially test the slump and air content. Let the mixer run for the time anticipated, including batching, delivery to the project, estimated waiting time for discharge of the load, and the time to discharge the load. Test the slump and air content again. If the slump at the discharge time is 2 inches (50 mm) or less, the proposed mix is not suitable and an additional trial batch will be required. The intent is to ensure the admixture or combination of admixtures will maintain the desired slump without additional water at the discharge site. If unacceptable slump loss occurs during the project placement so that the slump is 2 inches (50 mm) or less, one or all of the following steps will be required:
  - 1) Change the dosage rate of admixture(s).
  - 2) Change the brand of admixture(s).
  - 3) Change the location of mixing admixture(s). For example: incorporate admixture(s) in the ready mix truck on the project site instead of at the ready mix plant.
  - 4) Reduce the concrete temperature. For example: use ice or chilled water.

- E.** To bond new concrete to previously placed concrete, use a grout consisting of a mixture of about 5 to 6 gallons of water to each 94 pound bag (0.45 to 0.50 L/kg) of cement. Mix to a consistency such that the slurry can be applied with a stiff brush or broom to the previously placed concrete in a thin, even coating that will not run or puddle in low spots. An equivalent grout of Portland cement and water, applied by pressure spray may be substituted with approval of the Engineer. For sealing vertical joints between adjacent lanes and at the curbs, thin this grout to paint consistency.

### **2413.03 CONSTRUCTION.**

#### **A. Equipment.**

Use equipment approved by the Engineer and complying with the following:

##### **1. General.**

- a.** Ensure the overall combination of labor and equipment for proportioning, mixing, placing, and finishing the new surface is of such minimum capability as to meet the requirements of Table 2413.03-1, except when noted otherwise in the contract documents.

**Table 2413.03-1: Minimum Capacity and Labor Requirements**

<b>Total Surface Area per Bridge, sq. yd. (m<sup>2</sup>)</b>	<b>Minimum Requirement, cu. yd. per hour (m<sup>3</sup> per hour)</b>
0-328 (0-274)	1.0 (0.8)
329-492 (274.1-410)	1.5 (1.2)
493-656 (410.1-550)	2.0 (1.6)
over 656 (over 550.1)	2.5 (2.0)

- b.** Use a finishing machine designed so the elapsed time between depositing the mixture on the floor and final screeding does not exceed 10 minutes when the mixture is being mixed and placed at the specified minimum rate under normal operating conditions.

##### **2. Preparation Equipment.**

Use the following types of preparation equipment:

###### **a. Sawing Equipment.**

Use sawing equipment capable of sawing concrete to the specified depth.

###### **b. Sandblasting or Shot Blasting Equipment.**

Use sandblasting or shot blasting equipment capable of removing rust, oil, and concrete laitance from the existing surface of the bridge deck and exposed uncoated reinforcing bars.

###### **c. Power Driven Hand Tools.**

Power driven hand tools will be permitted with the following restrictions:

- 1)** Do not use jack hammers heavier than nominal 30 pound class (14 kg)

- 2) Do not operate jack hammers or mechanical chipping tools at an angle exceeding 45 degrees measured from the surface of the deck.
    - 3) Do not use chipping hammers heavier than a nominal 15 pound (7 kg) class.
  - d. **Hand Tools.**  
Provide hand tools, such as hammers and chisels, for removal of final particles of unsound concrete or to achieve the required depth.
  - e. **High Pressure Water Blasting Equipment.**  
Use high pressure water blasting equipment capable of removing rust, oil, concrete laitance, and unsound concrete from the existing surface of the bridge floor and exposed uncoated reinforcing bars.
3. **Proportioning and Mixing Equipment.**
  - a. Use proportioning and mixing equipment for Class O PCC or Class HPC-O that meets requirements of [Articles 2001.20, E, and 2001.21, D](#). Use equipment capable of proportioning water accurately to within 1.0%. Use a rotating paddle type concrete mixer (construction or stationary). A continuous mixer used in conjunction with volumetric proportioning, described above, is acceptable.
  - b. Provide sufficient mixing capacity so the intended quantity can be placed without interruption.
  - c. The cement, fly ash, and GGBFS for Class HPC-O shall be pre-blended by the producer or by using equipment capable of thoroughly mixing the materials to the tolerances in ASTM C 685 when concrete is produced using a volumetric mixer.
  - d. For Class HPC-O, ready mixed concrete equipment meeting the requirements of [Articles 2001.20 and 2001.21](#) is acceptable. For ready mixed concrete, the cement, fly ash, and GGBFS are not required to be pre-blended.
4. **Placing and Finishing Equipment for Deck Surfacing and Deck Overlay.**
  - a. Include adequate hand tools for placing the mixture and working it down to approximately the correct level for striking off with the screed. A self propelled finishing machine is required for all surfacing and overlays. Use a machine that operates on supporting rails which:
    - Are adequately secured to the previously placed surface and are adjustable to the correct profile without shimming,
    - Do not deflect under the load of the machine, and
    - May be removed without damage to the edge of the new surface that remains in place.
  - b. When placing the mixture in a lane abutting a previously completed lane, equip the side of the finishing machine adjacent to the completed lane to travel on the completed lane. The Engineer will inspect the finishing machine. The Engineer's approval of the finishing machine is required before starting work on each project.
  - c. Use a finishing machine meeting the requirements of [Article 2412.03, D](#). This machine shall be self propelled, capable of forward and reverse movement under positive control, and provide

for raising all screeds to clear the screeded surface for traveling in reverse. The machine shall meet the following additional requirements for the type of mixture to be placed.

**1) Class O Portland Cement Concrete.**

The machine shall:

- a) Have a mechanical strike off to provide a uniform thickness of mixture in front of the screed designed to consolidate the mixture by vibration, as specified.
- b) Have a front screed designed to consolidate the mixture to be placed to 100% of the rodded density.
- c) Have the bottom face for each screed at least 5 inches (125 mm) wide with a turned up or rounded leading edge to minimize tearing of the surface of the plastic concrete.
- d) Have an effective weight (mass) for each screed at least 75 pounds for each square foot ( $365 \text{ kg/m}^2$ ) of bottom face area.
- e) Have positive control of the vertical position, the angle of tilt, and the shape of the crown for each screed provided.
- f) Be designed so that, together with appurtenant equipment, obtains positive machine screeding of the plastic concrete within 1 inch (25 mm) of the face of the existing curbs.
- g) Have a screed long enough to:
  - Extend at least 6 inches (150 mm) beyond the line where a saw cut is intended to form the edge of a subsequent placement section, and
  - Overlap the sawed edge of a previously placed course at least 6 inches (150 mm).
- h) Have internal vibration equipment for consolidation at the edges of the placement.

**2) Class HPC-O High Performance Concrete.**

The machine shall:

- a) Be capable of finishing the surface to within 1 foot (0.3 m) of the edges of the area being placed.
- b) Have positive control of the vertical position of the screeds.
- c) **Be equipped to provide vibration at the finishing drum.**
- d. Provide supplemental vibration for the concrete between the curb and the end of the drum finisher and along the construction joint adjacent to the current or future placement. Vibration with a standard stinger, whether point vibrating or dragging through the concrete, is not an acceptable method of supplemental vibration.

**B. Preparation of Surface for Deck Surfacing and Deck Overlays.**

- 1. Remove material for test wells (for Class O PCC density testing) and all loose, disintegrated, or unsound concrete from the bridge deck, as designated by the Engineer. Test wells for nuclear density checks shall have nominal dimensions of 1 1/2 inches x 10 inches x 10 inches (40 mm x 250 mm x 250 mm). On bridge deck overlays, Class A bridge deck repair removal areas may be used as test wells provided they meet the nominal dimensions and are located in the testing frequency

areas. Nuclear density testing of Class O PCC will be according to [Materials I.M. 358](#).

2. For bridge deck overlays, uniformly scarify or prepare the entire existing concrete floor area to a depth of 1/4 inch (5 mm), except over areas of Class A and Class B repair where the 1/4 inch (5 mm) removal may be coincidental with operations for repair removal. Removal to a greater depth will be required at drains and elsewhere as noted in the contract documents. Measure the thickness of the concrete overlay from a level 1/4 inch (5 mm) below the original surface to a final raised surface as shown. Use a minimum thickness of abutting overlay of 3/4 inch (20 mm) and taper to the full designated thickness where removal to a level lower than 1/4 inch (5 mm) below the original surface is necessary because of surface fixtures.
3. Place all new concrete above the prepared surface for bridge deck surfacing at the thickness specified in the contract documents. The thickness of concrete above the prepared surface (for bridge deck surfacing) and above the prepared surface or reinforcing steel (for bridge deck overlay) is to be at least 1 3/4 inches (45 mm), and greater if specified in the contract documents. Check the thickness and clearance in the following manner before concrete is placed:
  - a. To the bottom of the screed, attach a filler block having a thickness 1/4 inch (5 mm) less than the overlay thickness. With screed guides in place, pass the screed over the area to be concreted. An alternate to passing the finishing machine is passing an approved template, supported by the screed guides, over the area to be concreted. Where the intended clearance does not allow use of this method, use a string line or other means as approved by the Engineer. If the filler block or other method used to check does not clear the area to be concreted, adjust the profile of the new surface to the Engineer's satisfaction.
  - b. Prepare the surface for placement of new concrete by sandblasting or shot blasting, followed by an air blast. Ensure this cleaning removes all dirt, oil, and other foreign material. Ensure it removes all unsound concrete, laitance, or loose material from the surface and edges against which the surface mixture is to be placed. The cleaning should roughen the surface in order to provide satisfactory bond with the surfacing mixture. Protect metal floor drains and areas of the curb or railing above the proposed surface from the cleaning.
  - c. Keep areas from which concrete has been removed free of slurry produced by wet sawing of concrete joints. Remove all slurry from prepared areas before placing new concrete.
  - d. Use hand tools to remove final particles of concrete or to achieve the required depth. Sandblast or shot blast the entire surface against which new concrete is to be placed, including curbs and exposed reinforcement. Remove all dirt, oil, and other foreign material, as well as any unsound concrete. Clean epoxy coated reinforcing with hand tools that will not damage the epoxy coating. Clean the surface with an air blast immediately before applying grout in preparation for placement of concrete.

- e. Do not presaturate existing concrete prepared for repair, surfacing, or overlay with water before placing grout and new concrete. Allow the prepared surface to dry to allow some absorption of the grout.
- f. At the time of placement of either Class O PCC or Class HPC-O, ensure the area is clean and all exposed reinforcement free of rust. Rust forming overnight because of dew on clean reinforcement will not be considered objectionable, but reinforcement with a greater amount of rust must be recleaned before the concrete is placed. Clean the area by air blast before the concrete is placed.

**C. Preparation of Surface for Deck Repair.**

Remove concrete from each area (either designated in the contract documents or by the Engineer) to a depth and in a manner consistent with the classification for that area. Areas as shown in the contract documents are based on the best information available. The Engineer will determine actual areas.

**1. General.**

- a. Keep areas from which concrete has been removed free of slurry produced by wet sawing concrete joints. Remove all slurry from prepared areas before concrete is placed.
- b. Use hand tools to remove final particles of concrete or to achieve the required depth. Sandblast or shot blast all surfaces against which new concrete is to be placed, including curbs and exposed reinforcement. Remove all dirt, oil, and other foreign material, as well as any unsound concrete. Clean the surface with an air blast immediately before applying grout in preparation for placement of new concrete.
- c. Thoroughly clean all reinforcing bars and newly exposed concrete by sandblasting or shot blasting. Clean epoxy coated reinforcing with hand tools that will not damage the epoxy coating. Where bond between existing concrete and reinforcing steel has been destroyed, remove the concrete adjacent to the bar to a depth that will permit new concrete to bond to the entire periphery of the exposed bar. A minimum of 3/4 inch (20 mm) clearance is required around the bar. Exercise care to prevent cutting, stretching, or damaging any exposed reinforcing steel. The Engineer may require enlarging a designated area should inspection indicate deterioration of concrete or corrosion of reinforcing beyond the limits previously designated.
- d. Do not presaturate existing concrete prepared for surfacing before grout and new concrete is placed. Allow the prepared surface to dry to allow some absorption of the grout.
- e. At the time of placement of either Class O PCC or Class HPC-O, ensure the area is clean and the reinforcement free of rust. Rust forming overnight because of dew on clean reinforcement will not be considered objectionable; however, reinforcement with a greater amount of rust shall be recleaned before placing the concrete. Clean the area with an air blast before the concrete is placed.

## **2. Class A Deck Repair.**

- a. Class A repair removal is considered to start 1/4 inch (5 mm) below the existing surface. This does not preclude removal coincidental with preparation for overlay. Removal for Class A repair extends at least to the level of the top reinforcing bars, and deeper, as determined by the Engineer, to remove unsound concrete.
- b. Concrete may be removed by chipping, shot blasting, hydro blasting, or by a combination of these. Complete the final cleanup using hand tools.
- c. For Class A repair and in preparation for bridge deck overlay, the deck surface may also be prepared or partially prepared using a high pressure water system, at the Contractor's option. Use the equipment manufacturer's recommended procedures, subject to the Engineer's approval, and within such limitations as may be imposed.
- d. Additional removal may be required to provide for test wells.

## **3. Class B Deck Repair.**

- a. Class B repair removal is considered to start 1/4 inch (5 mm) below the existing surface. This does not preclude removal coincidental with preparation for overlay. Remove all concrete within all areas designated for Class B repair, and in all areas designated for Class A repair in which the depth of the remaining sound concrete is less than 50% of the original depth of the bridge deck.
- b. Designated Class A repair areas will be measured as Class B Deck Repair when full depth removal is required. At the Engineer's direction, limited areas of removal greater than 50% of the floor thickness (such as beneath reinforcing) may be allowed. These limited areas of excess depth will be measured as Class A Deck Repair.
- c. Remove concrete using a jack hammer or chipping hammer, or by using a combination of a scarifier and chipping hammer. Accomplish the final removal at the periphery of Class B repair using a 15 pound (7 kg) jack hammer, chipping hammer, or hand tools. Provide a method of removal at the bottom of the bridge deck that will prevent feather edging of the concrete.
- d. Provide forms to enable placement of new concrete in the full depth opening. Use forms that, preferably, are suspended from existing reinforcing bars by wire ties. In the case of large area openings, forms may be supported by blocking from the beam flanges. Support all forms by elements of the existing superstructure unless specifically noted or shown otherwise in the contract documents.

## **D. Proportioning and Mixing.**

### **1. General.**

- a. Proportion and mix Class O PCC at the project site. Ready mixed concrete will not be approved.
- b. For Class HPC-O, ready mixed concrete or portioned and mixed concrete at the project site will be allowed.

- c. Mix the water reducing admixture for improved workability of Class O PCC or HPC-O into the concrete according to the manufacturer's recommendations and the Engineer's instructions.

## **2. Stationary Mixer.**

When a construction or stationary mixer is used, proportion and mix according to applicable provisions of [Article 2403.02, D](#).

## **3. Continuous Mixing Equipment.**

When continuous mixing equipment is used, apply the following:

- a. Use mobile continuous mixers that accurately proportion all materials for the specified mixture.
- b. Calibrate the proportioning equipment for each material in the presence of the inspector. The Engineer may accept a previous calibration and require satisfactory verification checks only, at the settings indicated by the previous calibration.
- c. Operate the proportioning equipment at the speed recommended by the manufacturer during calibration, checks, or normal operation.
- d. Recharge continuous mixers at the site.
- e. The Contractor may make yield checks or other checks and the inspector will cooperate in such checking.
- f. Mix the materials in an approved mixer within 1 mile (2 km) of the site of placement. Mix the materials according to the specified requirements for the equipment used. Ensure the mixture, as discharged from the mixer, is uniform in composition and consistency.

# **E. Placing and Finishing.**

## **1. Repairs.**

Apply the following to repair work:

- a. Although repair classes are considered to begin 1/4 inch (5 mm) below the original concrete surface, place repair concrete monolithically with the overlay course, except as described for larger areas of Class B repair. Internally vibrate fresh concrete 3 inches (75 mm) or more in thickness.
- b. For Class B repair areas 2 square yards (2 m<sup>2</sup>) or greater:
  - 1) Use floor forms supported by beams or stringers.
  - 2) Bring the individual concrete replacement to the lower boundary for the superimposed overlay.
  - 3) Use Class C structural concrete meeting the requirements of [Sections 2403](#) and [2412](#) for Class B repair.
  - 4) Leave the surfaces of individual placements rough.
  - 5) Complete placements for each construction stage before starting the overlay course.
  - 6) If a full depth repair is staged, provide a beveled keyway not less than 1 1/2 inch by 3 inches (35 mm by 75 mm) at the vertical joint.
  - 7) Ensure concrete placement and reinforcing support comply with applicable portions of these specifications except as modified by the contract documents.

- 8) Deck repair concrete, described in [Article 2413.02](#), or Class C structural concrete, meeting requirements of [Sections 2403](#) and [2412](#), may be used when individual placements are placed to the lower boundary for the superimposed overlay.
- 9) Wet cure the partial placement for 96 hours.
- 10) After the cure, surface dry, sandblast or shot blast, and clean individual placements before applying overlay course or grout.
- c. For Class A repair areas, use Class O or Class HPC-O concrete when repair concrete is placed monolithically with the overlay.

## 2. Deck Surfacing and Deck Overlay.

- a. Use an approved finishing machine as specified in [Article 2413.03, A, 4](#).
- b. Place the support rails upon which the finishing machine travels outside the area to be surfaced. Make provisions for anchorage of supporting rails that provide for horizontal and vertical stability. The Engineer may require positive anchorage. Do not use a hold down device shot into concrete unless the concrete shall be subsequently surfaced. Hold down devices of other types leaving holes in exposed areas will be approved provided the holes remaining are grouted full. Submit support rail anchoring plans and the mixture placing procedure to the Engineer for approval.
- c. The locations of longitudinal joints may be shown in the contract documents. If not shown, locate longitudinal joints as approved by the Engineer. The approval will be based on avoiding joints in the wheel paths as much as practical.
- d. In order to assure a junction with properly consolidated concrete, saw the surface course previously placed to a straight and vertical edge at longitudinal and transverse joints and remove before adjacent concrete is placed. The Engineer will determine the extent of such removal.
- e. Take every reasonable precaution to secure a smooth riding bridge deck. Prior to placement operations, review the equipment, procedures, personnel, and previous results with the Engineer. The Engineer will review inspection procedures to assure coordination. Include the following precautions:
  - 1) Assurance that concrete can be produced and placed within the specified limits, continuously and with uniformity.
  - 2) After finishing, check the surface with a 10 foot (3 m) straightedge. Eliminate causes for irregularities exceeding 1/8 inch (3 mm) and make corrections, if practical.
  - 3) The Engineer will check each placement according to [Section 2428](#) the day following placement or before another section is placed.
- f. After cleaning the surface and immediately before placing Class O PCC or Class HPC-O, scrub a thin coating of bonding grout into the dry, prepared surface. At the Contractor's option, the grout may be sprayed onto the surface in a manner subject the Engineer's approval. Exercise care to assure that all parts receive a thorough even coating, and that no excess grout is permitted to collect in pockets. Limit the rate of progress for applying grout so that the grout does not become dry before it is covered with new concrete.

If the grout becomes dry, remove it by sandblasting and apply new grout.

- g. Place concrete in a continuous operation. For Class O PCC, manipulate the new concrete and mechanically strike it off slightly above final grade. Then mechanically consolidate it to 100% of the rodded density, with a minus tolerance of 2%. Screed the new concrete to final grade. The Engineer will determine rodded density according to [Materials I.M. 358](#).
- h. The rodded density measurement is not required for Class HPC-O.
- i. For Class O PCC, use internal vibration for consolidation at the curb side, and along the longitudinal construction joint adjacent to a previously constructed lane. For Class HPC-O PCC, use supplemental surface vibration for consolidation at the curb side, and along the longitudinal joint adjacent to the current or future placement.
- j. Ensure concrete temperature and theoretical evaporation rate comply with [Article 2412.03, C](#).
- k. Apply [Section 2428](#) to smoothness of the completed bridge deck surfacing and bridge deck overlay for Interstate and Primary projects and when specifically required for other projects.

### 3. Placement of Grooving.

- a. Interstate and Primary Projects.
  - 1) Transverse grooving or tining in plastic concrete of bridge deck surfacing or bridge deck overlay (and bridge approach overlay when included in a bridge deck overlay project) will not be allowed.
  - 2) Perform longitudinal grooving according to [Article 2412.03, D](#).
- b. Other Projects.
  - 1) After achieving a tight, uniform surface, apply a suitable grooving, by hand methods, similar to that described in [Article 2301.03, H, 3](#), with the following exceptions:
    - Grooving is to be transverse to the centerline of roadway.
    - Transverse grooving is to be randomly spaced from 3/4 inch to 1 5/8 inches (20 mm by 40 mm) with no more than 50% of the spacings exceeding 1 1/4 inches (30 mm) with a minimum of four different spacings in a 2 foot (0.6 m) width.
  - 2) Perform this operation at a time and in a manner to achieve the desired texture while minimizing displacement of the larger aggregate particles. The texture should not extend into the areas within approximately 2 feet (0.5 m) of curbs. As soon as finishing has been completed, seal all vertical joints with adjacent concrete by painting with thinned grout.

## F. Curing.

- 1. Place the first layer of prewetted burlap on the concrete as follows:
  - a. **Interstate and Primary Projects.**  
Place within 10 minutes after finishing. If Class O PCC is revibrated because of failure to meet density requirements with initial

vibration, place the prewetted burlap within 10 minutes after finishing of the revibrated area.

**b. Other Projects.**

Immediately after final finishing, cover the area finished with white pigmented curing compound meeting the requirements of [Article 4105.05](#), applied at a rate of no more than 135 square feet per gallon (3.3 square meters per liter). Place the first layer of prewetted burlap on the concrete within 30 minutes after the concrete has been deposited on the deck. If Class O PCC is revibrated because of failure to meet density requirements with initial vibration, this time limit will be extended by 15 minutes.

**2. Cure the concrete as follows:**

**a. For Class O PCC or Class HPC-O:**

- 1) Allow the surface to cure for at least 72 hours. ~~When Class HPC-O is used on projects with a deck overlay quantity greater than 1800 square yards (1500 m<sup>2</sup>), allow the surface to cure for 168 hours.~~
- 2) Keep the burlap continuously wet by means of an automatic sprinkling or wetting system.
- 3) Failure to apply wet burlap within the required time is cause for rejecting the affected work. Remove the surface concrete in the rejected area and replace at no additional cost to the Contracting Authority.

**b. Prewet the burlap with sufficient water, prior to placement, to prevent absorption of moisture from the concrete surface.**

**G. Sealing for Deck Overlay.**

Seal the tops and traffic sides of curbs, retrofit barrier rails, and concrete barrier rails according to [Article 2403.03, P, 3](#). In addition, for Class O PCC overlay or Class HPC-O overlay, apply the sealer along each gutter line, extending 1 foot (0.3 m) onto the roadway. The Engineer or the contract documents may designate other areas requiring concrete sealer.

**H. Limitations of Operations.**

1. Do not commence work on the surface until the lower course meets the requirements of [Article 2403.03, N, 2](#).
2. If traffic shall be maintained during the construction period of this contract, it will be noted in the contract documents. Provide traffic controls required by the contract documents.
3. Night work will be permitted. Furnish adequate lights for nighttime work at the direction of the Engineer at no additional cost to the Contracting Authority. Provide the Engineer with advanced notice.
4. If there is a major delay in the placement operation, place a construction dam or bulkhead. During minor delays of 1 hour or less, the end of the placement may be protected from drying with several layers of wet burlap.

5. Protect freshly placed concrete from sudden or unexpected rain. The Engineer may order removal of concrete damaged by rainfall.
6. Screed rails may be removed at any time after the concrete has taken initial set. Protect the edge of the new surface from damage during screed removal.
7. Do not place concrete adjacent to a surface course less than 36 hours old (this restriction does not apply to a continuation of placement in a lane or strip beyond a joint in the same lane or strip).
8. If concrete placement is stopped or delayed for a period of 90 minutes or more, discontinue further placement. Resume only after a period of no less than 12 hours. This restriction does not prohibit continuation of placement provided a gap is left in the lane or strip. Ensure the gap is sufficiently long for the finishing machine to clear previously placed concrete.
9. Preparation work will not be allowed in a lane or strip until the lane is closed to traffic. In areas where there is no traffic, preparation of the area may be started in a lane or strip adjacent to newly placed surface the day following its placement. If this work is started before the end of the 72 hour curing period or 168 hour curing period for Class HPC-O projects with greater than 1800 square yards (1500 m<sup>2</sup>), the work will be restricted as follows:
  - a. Limit the interference sawing, or other operations, has on curing to the minimum time practical, and to the immediate area only. Resume curing promptly.
  - b. Do not use chipping hammers heavier than a nominal 15 pound (with a mass greater than 7 kg) class.
  - c. Operate air compressors on the deck only directly over the piers.
  - d. Do not allow loads, other than construction equipment, on any portion of the bridge deck that has undergone preparation in advance of new concrete placement and curing.
10. Do not allow traffic on a finished surface course until 72 hours after placement or 168 hours for Class HPC-O projects with greater than 1800 square yards (1500 m<sup>2</sup>). At temperatures below 55°F (13°C), the Engineer may require a longer waiting time.
11. Do not place PCC when the air or floor temperature is below 40°F (4°C).
12. Do not place concrete mixture after October 1 and before April 1 without the Engineer's written approval.

#### **2413.04 METHOD OF MEASUREMENT.**

Measurement will be as follows:

- A. Deck Surfacing (Class O PCC), Deck Surfacing (Class HPC-O), Class A Deck Repair, Class B Deck Repair, Deck Overlay (Class O PCC), and Deck Overlay (Class HPC-O): square yards (square meters) computed from measurements of the areas surfaced, repaired, or overlaid. For deck

surfacing, the Engineer may require concrete removal for Class O PCC test wells. This removal will not be measured for payment.

- B. Sealing (as required in [Article 2413.03, G](#)): not measured separately for payment.
- C. Longitudinal Grooving in Concrete: according to [Article 2412.04](#).

**2413.05 BASIS OF PAYMENT.**

Payment will be as described below. The profile may be improved by raising the finished overlay surfaces up to 1/2 inch (15 mm) above that shown in the contract documents, with no additional compensation to the Contractor. Locations where the raise exceeds 1/2 inch (15 mm), payment will be made as extra work for the materials which represent the volume in excess of the 1/2 inch (15 mm) raise.

- A. Deck Surfacing (Class O PCC) or Deck Surfacing (Class HPC-O):
  - 1. Contract unit price per square yard (square meter).
  - 2. Payment is full compensation for furnishing all material, equipment, forms, and labor necessary to complete this work according to the contract documents.
- B. Class A Deck Repair, Class B Deck Repair, Deck Overlay (Class O PCC), and Deck Overlay (Class HPC-O):
  - 1. Contract unit price per square yard (square meters).
  - 2. Payment is full compensation for removal of excess concrete from the project and it becoming the property of the Contractor, for furnishing all material, equipment, forms, and labor necessary to complete the work according to the contract documents.
  - 3. When there is no item for Class B Deck Repair, but such work is required, payment for each square yard for 5 square yards (square meter for 4 m<sup>2</sup>) or less will be at three times the contract unit price per square yard (square meter) for Class A Deck Repair. Should the quantity exceed 5 square yards (4 m<sup>2</sup>), payment will be made as extra work.
- C. Sealing as required in [Article 2413.03, G](#): included in the contract unit price for Deck Overlay (Class O PCC) or Deck Overlay (Class HPC-O).
- D. Longitudinal Grooving in Concrete: according to [Article 2412.05](#).
- E. When [Section 2428](#) applies, payment may be modified as specified therein.