

Section 2310. Portland Cement Concrete Overlay

2310.01 DESCRIPTION.

Overlay an existing pavement with one of the following types of PCC overlay:

- A. **Bonded overlay:** a PCC overlay over an existing PCC pavement.
- B. **Unbonded overlay:** a PCC overlay over an existing pavement where a stress relief layer is placed on top of the existing PCC pavement or an existing PCC pavement that has been overlaid with HMA (composite pavement).
- C. **Whitetopping:** a PCC overlay over an existing, full depth asphalt pavement.

2310.02 MATERIALS.

A. Concrete.

Meet the requirements of Article 2301.02.

- 1. Use Class C concrete for PCC Overlays as specified in [Materials I.M. 529](#), except use a C-3WR or C-4WR mix design for Bonded Overlays. Allowable substitutions shall comply with [Article 2301.02, B](#).
- 2. For coarse aggregate, meet the requirements of Section 4109.02, Aggregate Gradation Table, [Gradation No. 3](#) or [5](#) of the [Appendix](#). Ensure the nominal maximum coarse aggregate size is no greater than one-third the overlay thickness.
- 3. Unless otherwise specified, use coarse aggregate for bonded overlays that is the same type of aggregate as the existing pavement.

B. Hot Mix Asphalt Stress Relief Course.

- 1. Use an HMA stress relief course for unbonded overlays consisting of a nominal 1 inch (25 mm) course of HMA meeting the requirements of [Section 2303](#).
- 2. Use PG 58-28 asphalt binder.
- 3. Use a mixture meeting the following:
 - a. 300,000 ESAL, 3/8 inch (9.5 mm) HMA mix requirements.
 - b. Target air voids of 3.0%.
 - c. No maximum film thickness restriction and no minimum filler/bitumen ratio restriction.
 - d. Type B Aggregate with no percent crushed particle requirements and gradation falling below the restricted zone.

2310.03 CONSTRUCTION.

Apply the requirements of [Section 2301](#) to this work with the modifications for each type of work identified below.

A. ~~Equipment.~~

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

~~1. Scarifying or Shotblasting Equipment.~~

~~Use power operated equipment capable of uniformly scarifying or removing the existing surface in a satisfactory manner and to depths required. Other types of removal devices may be used if their operation is suitable and if they can be demonstrated to the satisfaction of the Engineer. The contract documents will include a pay item for such work.~~

~~2. Sand Blasting Equipment.~~

~~Use sand blasting equipment capable of removing rust, oil, and concrete laitance from the existing surface of the pavement.~~

B. Preparation of Surface.

1. General.

- a. If full depth base repair is included in the project, complete it prior to surface preparation of the existing pavement surface.
- b. When required, include the entire surface area to be resurfaced in surface preparation of the existing pavement surface. Materials removed in the preparation operation may be placed in the shoulder area unless specified otherwise in the contract documents.

2. Bonded Overlays.

- a. Prepare the surface by shot blasting, or scarifying followed by either shot blasting or sand blasting. Scarify to a nominal depth of 1/4 inch (5 mm).
- b. Ensure preparation removes all dirt, oil, foreign materials, laitance, or loose material from the surface and edges against which new concrete will be placed.

3. Unbonded Overlays and Whitetopping.

- a. When jointing is specified in which panels are smaller than a normal lane width, scarify the entire surface to create a roughened surface. This will not apply when a new HMA stress relief layer is constructed as a part of the contract. Prepare surface by scarifying per Section 2214.
- b. When placement of HMA stress relief layer is included as part of the contract for unbonded overlays, pavement scarification will not be required.
- c. At the direction of the Engineer, trim high spots found in the existing HMA pavement. This work will be accomplished during the scarification operation, only at isolated locations, and will be considered incidental to the surface preparation pavement scarification.
- d. Work covered by Article 2310.03, B, 3, will be paid for according to Article 2310.05, D, Pavement Scarification.

~~4. Whitetopping.~~

- ~~a. When jointing is specified in which panels are smaller than a normal lane width, scarify the entire surface using a cold-milling operation to create a roughened surface.~~
- ~~b. At the Engineer's direction, trim high spots found in the existing HMA pavement. This work will be accomplished during the scarification operation, only at isolated locations, and will be considered incidental to the surface preparation.~~

C. Placing and Finishing Overlay.

1. General.

- a. Apply Section 2317 to all PCC Pavement bid items of a Primary project if any individual PCC Pavement bid item for that project is 5000 square yards (4200 m²) or greater. Apply Section 2316 to all other Primary projects and when specifically required for other projects.
- b. Control the placing equipment to the proper elevation by string line. Take cross sections and establish a grade line. The Engineer will review and approve the new grade lines. Information detailing the pavement design thicknesses at the various survey points and material quantities will also be provided. During construction, do not alter these grades solely to account for concrete overruns. Some overrun is normal, and only with the Engineer's approval will they be adjusted.

2. Bonded Overlays.

a. Surface Cleaning.

Clean the entire surface with an air blast prior to placing concrete. After cleaning, no traffic will be permitted on the cleaned surface except that necessary for overlay construction.

b. Surface Condition.

Ensure the prepared surface is dry in order to allow some absorption of the concrete mortar.

c. Joints.

- 1) Use a reliable method to exactly locate and identify on both sides of the road:
 - a) Each contraction and expansion joint in the existing pavement.
 - b) The joint to be sawed at each full depth patch.
- 2) Saw joints in the resurfacing directly over existing transverse joints. Saw transverse joints to the full depth of new resurfacing concrete, including depressions created in

the existing surface and as specified in the widening areas. Saw transverse joints as soon as possible without causing excessive raveling. Saw joints directly over existing longitudinal joints to a depth of one-half the overlay thickness, with a maximum depth of 3 inches (75 mm).

3. Unbonded Overlays.

a. Hot Mix Asphalt Stress Relief Course.

Construct in accordance with Article 2303.03. Compact according to Article 2303.03, C, 5, Use Class II Compaction, except use only static steel wheeled rollers. Article 2303.04 shall also apply.

b. Surface Cleaning.

Clean the existing surface of all loose or adhering foreign material prior to placement of the PCC over HMA pavement. Normally this will be accomplished with a power broom. Make this broom available during paving operations to clean any loose material that the construction equipment may track onto the surface.

c. Surface Condition.

Ensure the prepared surface is dry when concrete is placed on the surface of the HMA pavement in order to allow some absorption of the concrete mortar. If the surface of the HMA is above 110°F (40°C), the Contractor may apply water to the surface of the HMA ahead of the paving operation in order to cool the surface. Apply water far enough in advance of the paving operation so that the surface will dry from evaporation before concrete is placed. Do not apply water to the surface of the pavement when the HMA surface temperature is below 100°F (38°C).

d. Joints.

When jointing is specified in which panels are smaller than a normal lane width, construct the joints to be 1/8 inch (3 mm) wide. No cleaning or sealing is required.

4. Whitetopping.

a. Surface Cleaning.

Clean existing surface of loose or adhering foreign material prior to placement of the PCC over HMA pavement. Normally this will be accomplished with a power broom. Make this broom available during paving operations to clean any loose material that the construction equipment may track onto the surface.

b. Surface Condition.

Ensure the prepared surface is dry when concrete is placed on the surface of the HMA pavement in order to allow some absorption of the concrete mortar. If the surface of the HMA is above 110°F (40°C), the Contractor may apply water to the surface of the HMA ahead of the paving operation in order to cool the surface. Apply water far enough in advance of the paving operation so that the surface will dry from evaporation before concrete is placed. Do not apply water to the surface of the pavement when the HMA surface temperature is below 100°F (38°C).

c. Joints.

When jointing is specified in which panels are smaller than a normal lane width, construct joints 1/8 inch (3 mm) wide. No cleaning or sealing is required.

D. Limitation of Operations.

1. At forecasted air temperatures below 55°F (13°C) use the maturity method to determine the opening time. Do not place resurfacing concrete when the air or pavement temperature is below 40°F (4°C).
2. The Contractor may use the shoulders for construction activities. It will be the Contractor's responsibility to repair the shoulders, as the Engineer deems necessary, to restore the shoulders to a condition acceptable for shoulder work. This work shall be done at no additional cost to the Contracting Authority. The Contractor may elect to limit the use and vehicle loadings to minimize this work and its cost.
3. Place bonded concrete overlays between June 1 and September 30.
4. Do not place unbonded overlay or whitetopping materials on HMA when the pavement surface temperature exceeds 120° F (50°C).

2310.04 METHOD OF MEASUREMENT.

Measurement for the various items of work involved in the construction of PCC overlay will be as follows:

A. Portland Cement Concrete Overlay, Furnish Only.

Cubic yards (cubic meters) using a count of batches incorporated. Includes concrete placed in widening sections and partial depth patches.

B. Portland Cement Concrete Overlay, Placement Only.

Square yards (square meters) shown in the contract documents. Area will be determined from the longitudinal surface and the nominal pavement width, including widening sections.

C. Surface Preparation.

Square yards (square meters) shown in the contract documents. Area will be determined from the longitudinal surface and the nominal width of existing pavement.

D. Pavement Scarification

1. Measurement by Weight (Mass).

The quantity of Pavement Scarification will be determined in accordance with Article 2214.06, A, 1.

2. Measurement by Area.

The quantity of Pavement Scarification will be determined in accordance with Article 2214.06, A, 2.

~~DE~~. Hot Mix Asphalt Stress Relief Course.

1. Measurement by Weight (Mass).

- a. HMA will be measured according to [Article 2303.04, A](#).
- b. Asphalt binder will be measured according to [Article 2303.04, B](#).

2. Measurement by Area.

- a. HMA will be measured according to [Article 2303.04, A, 2](#).
- b. Asphalt binder used will not be measured separately for payment.

2310.05 BASIS OF PAYMENT.

Payment will be at the contract unit price as follows for the performance of acceptable work, measured as provided above.

A. Portland Cement Concrete Overlay, Furnish Only.

1. Per cubic yard (cubic meters).
2. Payment is full compensation for furnishing raw materials, proportioning, mixing, and delivery of concrete to the paving machine.

B. Portland Cement Concrete Overlay, Placement Only.

1. Per square yard (square meter).
2. Payment is full compensation for:
 - a. Furnishing all materials, labor, and equipment necessary to place, finish, texture, and cure the concrete.
 - b. Placement of tie bars for widening, if required.
 - c. Sawing, cleaning, and sealing the joints, if required.
 - d. Surface cleaning.

C. Surface Preparation.

1. Per square yard (square meter).

2. Payment is full compensation for preparation of the existing pavement, sandblasting scarifying or shot blasting, and for removal of the existing pavement surface material according to Article 1104.08.

D. Pavement Scarification

1. **Measurement by Weight (Mass).**

The Contractor will be paid the contract unit price for Pavement Scarification in accordance with Article 2214.07, A, 1.

2. **Measurement by Area.**

The Contractor will be paid the contract unit price for Pavement Scarification in accordance with Article 2214.07, A, 2.

DE. Hot Mix Asphalt Stress Relief Course.

1. **Measurement by Weight (Mass).**

- a. Article 2303.05 applies.
- b. Payment is full compensation for furnishing and placing the HMA stress relief course.
- c. Asphalt binder will be paid for separately according to Article 2303.05, B.

2. **Measurement by Area.**

- a. Article 2303.05 applies.
- b. Payment is full compensation for furnishing and placing the HMA stress relief course, including the cost of the asphalt binder.