Item 439
Bridge Deck Overlays

1. DESCRIPTION

Overlay concrete bridge deck surface with concrete overlay (CO), latex-modified concrete overlay (LMC), or multi-layer polymer overlay (MLPO).

2. MATERIALS

Provide materials conforming to the pertinent requirements of the following Items except as noted below.

- Item 421, “Hydraulic Cement Concrete,” and
- Item 440, “Reinforcement for Concrete.”

2.1. Latex for LMC. Provide latex admixture meeting the requirements of DMS-4640, “Chemical Admixtures for Concrete.”

Store latex at temperatures between 40°F and 85°F. Do not allow latex to freeze.

2.2. Grout for CO or LMC. Provide grout for bonding new concrete to existing concrete consisting of equal parts by weight of hydraulic cement and sand when shown on the plans. Mix with sufficient water to form a stiff slurry, which can be applied with a stiff brush or broom to the existing concrete in a thin, even coating that will not run or puddle in low spots.

2.3. Materials for MLPO.

2.3.1. Crack Sealant. Furnish epoxy crack sealant conforming to DMS-6100, “Epoxies and Adhesives,” Type IV, and compatible with the multiple layer polymer overlay determined by the manufacturer of the overlay system. Epoxy, methacrylate, or polymer crack sealant not meeting the requirements of DMS-6100, “Epoxies and Adhesives,” for Type IV epoxy may be used if part of the manufacturer’s overlay system.

2.3.2. Sand. Furnish finely graded, oven-dry mason’s sand (for broadcast over crack sealant) that is compatible with the multiple layer polymer overlay determined by the manufacturer of the overlay system.

2.3.3. Aggregate. Furnish aggregate (for polymer overlay) that conforms to the gradation specified in Table 1. Use an angular-shaped aggregate with a Mohs scale hardness of 6 or greater. Use aggregates that are non-friable, non-polishing, clean, kiln-dried to a maximum moisture content of 0.2% by weight, and free of dirt, clay, asphalt, and other organic materials. All aggregate materials retained in the #8 sieve must have at least 1 mechanically fractured face. Aggregate not meeting the gradation requirements in Table 1 may be accepted if part of an overlay system.

<table>
<thead>
<tr>
<th>Sieve Gradation Requirements1</th>
<th>Sieve #4</th>
<th>Sieve #8</th>
<th>Sieve #16</th>
<th>Sieve #30</th>
</tr>
</thead>
<tbody>
<tr>
<td>% by weight passing sieve</td>
<td>100%</td>
<td>30–75%</td>
<td>0–5%</td>
<td>0–1%</td>
</tr>
</tbody>
</table>

1. Based on the washed sieve analysis given in Tex-200-F, Part II.

2.3.4. Resin for Polymer Overlay. Furnish a polymer resin composed of epoxy, modified epoxy or methyl methacrylate (MMA). The resin (neat) and resulting polymer overlay system (composite consisting of resin and aggregate) must comply with the property requirements specified in Table 2. Furnish a 2-component, 100% solid, 100% reactive resin free of volatile solvents for epoxy-based resin. Formulate the resin to volumetric mixing proportions such as 1 part “A” to 1 part “B” according to the overlay system manufacturer’s
recommendations. Furnish a flexibilized methyl methacrylate (Component A) and a powdered hardener (Component B) for MMA resin.

### Table 2

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity (neat)</td>
<td>7–70 poises</td>
<td>Tex-614-1</td>
</tr>
<tr>
<td>Gel time (neat)</td>
<td>15 min. minimum</td>
<td>Tex-614-1</td>
</tr>
<tr>
<td>Compressive strength at 5 hr. (composite)</td>
<td>1,000 psi minimum</td>
<td>Tex-618-J</td>
</tr>
<tr>
<td>Compressive strength at 48 hr. (composite)</td>
<td>3,000 psi minimum</td>
<td>Tex-618-J</td>
</tr>
<tr>
<td>Tensile strength at 7 days (neat)</td>
<td>1,800–5,000 psi</td>
<td>Tex-618-J</td>
</tr>
<tr>
<td>Resilience at 48 hr. (neat)</td>
<td>70% minimum</td>
<td>Tex-618-J</td>
</tr>
<tr>
<td>Elongation at 7 days (neat)</td>
<td>30% minimum</td>
<td>Tex-618-J</td>
</tr>
<tr>
<td>Bond Strength (neat)</td>
<td>250 psi minimum</td>
<td>Tex-614-1</td>
</tr>
<tr>
<td>Shore D hardness (neat)</td>
<td>60–70</td>
<td>ASTM D2240</td>
</tr>
<tr>
<td>Absorption at 24 hr. (neat)</td>
<td>1% maximum</td>
<td>ASTM D570</td>
</tr>
<tr>
<td>Thermal compatibility (composite)</td>
<td>No delamination of overlay</td>
<td>ASTM C884 with modifications; one cycle is 8 hr. at 60°C followed by 16 hr. at -21°C. Determine results after 9 cycles.</td>
</tr>
</tbody>
</table>

1. Values are based on composite specimens or neat samples cured or aged and tested at 24°C (75°F).

### 3. EQUIPMENT

#### 3.1. Surface Preparation Equipment.

3.1.1. **Concrete Removal and Surface Preparation.** Provide equipment meeting the requirements of Item 483, “Concrete Bridge Deck Surfacing.”

3.1.2. **Abrasive Blasting.** Provide equipment capable of removing oil, dirt, slurry, curing compound, laitance, etc., from the surface of the concrete.

3.1.3. **Sawing.** Provide equipment capable of sawing concrete to the specified depth when required.

3.1.4. **Power-Driven Chipping Tools.** Provide tools not heavier than a nominal 30 lb. class for bulk removal of concrete.

3.1.5. **Chipping Hammers.** Provide chipping hammers not heavier than a nominal 15 lb. class to remove concrete beneath any reinforcing bars.

3.1.6. **Cleaning.** Provide magnetic equipment followed by vacuum equipment to remove spent steel shot. Provide vacuum equipment for final cleaning of prepared surfaces unless otherwise approved.

3.1.7. **Test Apparatus for MLPO.** Provide all equipment to perform tensile adhesion test prescribed in ASTM C1583.

#### 3.2. Proportioning and Mixing Equipment.

3.2.1. **Grout Mixer.** Provide a volumetric continuous or mortar mixer.

3.2.2. **Concrete Overlay.** Follow applicable provisions of Item 421, “Hydraulic Cement Concrete.”

3.2.3. **Latex-Modified Concrete Overlay.** Follow the applicable provisions of Item 421, “Hydraulic Cement Concrete.” Proportion and mix the latex-modified concrete at the project site using a suitable approved mixer capable of thoroughly mixing the ingredients to a uniform consistency.

3.2.4. **Multi-Layer Polymer Overlay.** Furnish equipment suitable for mixing and placing the overlay system components recommended by the manufacturer of the overlay system. Furnish paint rollers or notched squeegees to apply crack sealant and resin.
Provide aggregate spreading equipment or methods capable of uniformly applying the aggregate so 100% of the polymer material is covered to excess.

3.3. Placing and Finishing Equipment.


3.3.2. Finishing Equipment for Concrete Overlay. Provide an approved surface vibrator moving ahead of the finishing machine or an approved vibrating screed for overlay consolidation. Provide work bridges or other suitable facilities to perform all finishing operations.

3.3.3. Finishing Equipment for Latex-Modified Concrete Overlay. Provide a mechanical strike-off to ensure a uniform thickness of concrete in front of the screed. Design the bottom face of the screed to minimize tearing of the surface of the plastic concrete.

Provide a finishing machine capable of forward and reverse motion under positive control. Make appropriate provisions for raising the screeds to clear the screed surface for traveling in reverse. Equip the finishing machine to travel on and screed off of any adjacent completed lane without damaging it. Use approved manual screeds and vibrators to consolidate and finish small or irregular areas inaccessible to the finishing machine. Provide work bridges or other suitable facilities to perform finishing operations and density checks.

4. CONSTRUCTION OF CONCRETE OR LATEX MODIFIED CONCRETE OVERLAYS

4.1. General. Provide for approval a detailed work plan including equipment and manpower before beginning any work.

The Engineer will inform the Contractor if night placements become necessary. No additional compensation will be provided for night placements of concrete. Provide sufficient lighting to make quality workmanship and adequate inspection possible during night placements. Lighting must be approved before operations begin.

Provide sufficient labor and equipment for proportioning, mixing, placing, and finishing concrete overlay at a rate of at least 40 ft. of finished overlay per hour. Do not allow traffic other than construction equipment for the overlay on any portion of the prepared bridge deck before the overlay has been placed. Provide side and end forms for supporting the screed and containing the overlay concrete. Provide reinforcement, when required, in accordance with Item 440, “Reinforcement for Concrete,” and the details shown on the plans.

Place concrete only when the air or deck temperature is 40°F or above and the concrete temperature is between 50°F and 85°F. Do not cart concrete batches over the completed overlay until the overlay concrete has attained a 3,000-psi compressive or 425-psi flexural strength. If carts are used, provide timber planking of at least 3/4 in. thickness for the remainder of the curing period. Provide carts equipped with pneumatic tires. Do not interrupt curing operations for the purpose of carting concrete over finished slabs.

Open the structure with the completed overlay to normal construction traffic or to the traveling public in accordance with Section 422.4.1., “Schedule Restrictions and Inspection Hold-Points.”

4.2. Classification and Mix Design. Provide a mix design in accordance with Item 421, “Hydraulic Cement Concrete.” Use a water reducing chemical admixture as necessary to achieve the desired consistency without exceeding the specified water to cementitious material ratio. Provide a mix design with an entrained air content of the fresh concrete of 6% with a tolerance of ±1% when tested in accordance with Tex-414-A or Tex-416-A together with the following requirements:

4.2.1. Concrete Overlay. Provide Class CO concrete with a coarse aggregate factor of at least 0.55.

4.2.2. Latex-Modified Concrete. Provide Class LMC concrete with a cement content of at least 658 lb. per cubic yard, a latex admixture content of at least 24.5 gal. per cubic yard, and a water content of no more than 18.9 gal. per cubic yard. Provide a mix design using a coarse aggregate volume of 30% to 45% by weight of the
total aggregate and a weight ratio of cement-to-sand to coarse aggregate of 1.0:2.8:1.7 based on aggregate in a saturated surface-dry condition. Use a commercially available antifoaming agent with the polymer modifier as necessary to control the air content in the mix.

4.3. **Surface Preparation.** Do not scarify concrete surfaces with a grooved or tined finish unless shown on the plans. Prepare these surfaces by abrasive blasting or water-injected abrasive blasting as required to remove dirt, oil, curing compound, laitance, surface mortar, and other material that would inhibit bonding of the overlay, but leave the striations intact.

Scarify the surfaces of slabs to be rehabilitated to the depths shown on the plans using the method specified in accordance with Item 483, "Concrete Bridge Deck Surfacing."

Remove and dispose of deteriorated or delaminated areas of concrete as shown on the plans or as determined by the use of a sounding hammer, chain drag, or other acceptable device, and by visual inspection after scarifying as approved.

Remove and repair deteriorated concrete below the indicated depth of scarification in accordance with Item 429, "Concrete Structure Repair." Use only hydraulic-cement concrete for these repairs. Ensure the repaired surface is flush with the surrounding scarified surfaces. Allow the repair concrete to cure before placing the overlay concrete unless approved otherwise. When approved, placing repair concrete in partial depth deck repairs may be done concurrently when placing the overlay concrete.

Use a jackhammer not heavier than a nominal 30 lb. class to remove deteriorated concrete in small areas not accessible to the mechanical scarifier, and to spot-remove small areas of deteriorated concrete to a depth down to the existing top reinforcing steel. This class of jackhammer may also be used for concrete removal between existing reinforcing bars to a greater depth. Use chipping hammers not heavier than a nominal 15 lb. class to remove concrete from beneath any reinforcing bars near the perimeter of the removal area. Avoid cutting, stretching, or damaging exposed reinforcing steel by direct impact of these power tools. Repair or replace reinforcing steel damaged during the concrete removal process at no additional expense to the Department. Operate all jackhammers and chipping hammers at an angle of 45° or less measured from the surface of the slab.

Remove the concrete surrounding the reinforcing bars to a minimum depth of 1/2 in. below the bar to permit the new concrete to bond to the entire periphery of the exposed bar if reinforcing steel is exposed during bridge deck surfacing.

Clean all exposed reinforcing steel, scarified surfaces, and newly exposed concrete surfaces including construction joints against curbs or parapet walls by wet or dry abrasive blasting. Blast corroded reinforcing steel to gray metal. Remove and place all blast debris in an approved disposal site. Repair or replace damaged reinforcing steel as required.

Place, support, and tie new reinforcing steel on prepared surface in accordance with Item 440, "Reinforcement for Concrete," when shown on the plans.

4.4. **Placing and Finishing Concrete.** Grade the screed rails or headers to ensure the concrete is finished to the required profile. Place the rails or headers outside the area to be overlaid unless otherwise approved. Provide anchorage of headers or supporting rails for horizontal and vertical stability as necessary. A hold-down device anchored into the concrete will not be permitted unless the concrete is to be subsequently overlaid. Obtain approval for plans for anchor support of headers or rails before beginning work.

Provide the overlay thickness specified on the plans. Adjust the screed and screed rail as necessary to provide the approved grade and required thickness. Check the clearance between the screed and existing surface for nonreinforced overlays by attaching a filler block with a thickness of 1/8 in. less than the overlay thickness to the bottom of the screed. Pass the screed over the area to be overlaid with the filler block in place. Correct any areas with insufficient clearance by adjusting the screed and rail system or by chipping or scarifying as approved by the Engineer. Check screed clearance and reinforcement cover for reinforced overlays as approved by the Engineer.
Construct longitudinal joints at locations shown on the plans or as approved. Construct a straight and vertical edge at transverse and longitudinal construction joints. Saw joints before placing the adjacent overlay course.

Install expansion joints in the overlay at the same locations as the expansion joints in the deck.

Provide clean surface before moistening surface to receive overlay by clean air blasting or water blasting to remove all dust, spent abrasives, laitance, and other contaminants that can reduce bond strength of overlay to concrete surface.

Moisten the prepared surface to a near saturated surface-dry condition just before placing the overlay concrete. Remove standing water from the surface before placing the overlay concrete.

Do not use bonding grout unless otherwise required on the plans or by this Item. When bonding grout is required, moisten the prepared surface to a near saturated surface-dry condition before placing bonding grout. Ensure all surfaces including vertical joints receive a thorough, even coating and that no excess grout collects in pockets. Apply the grout so it does not become dry before it is covered with concrete.

Coat areas of the bridge deck where concrete has been removed below the top mat of reinforcing steel with bonding grout if required, and fill them with overlay concrete or Class S concrete as applicable to cover the reinforcing steel, if deck repairs were not previously finished. Adequately consolidate and rough float these areas just ahead of the overlay placement. Stop all operations if grout dries out, and remove the grout using high-pressure water blasting.

Place and mechanically strike off the overlay concrete slightly above the final grade. Follow this strike-off by mechanically consolidating and screeding the surface to the final grade. Vibrate all concrete into the corners and angles of the edges. Hand-finish the surface with a float as necessary to produce a tight, uniform surface.

Assure dense, watertight construction joints by properly consolidating the concrete and float-finishing the top surface of the joint flush with the adjacent concrete.

Meet the straightedge and finishing requirements specified in Section 422.4.7., “Finish and Interim Curing of Bridge Slabs,” for the finishing of the concrete overlay.

4.5. **Curing.** Apply wet-burlap to cure the overlay as soon as possible after the concrete has been textured. Overlay that dries out or cracks before the wet burlap is applied will be rejected. Keep the burlap continuously wet for 48 hr. for LMC and for 4 days for CO overlays. Allow LMC overlay to air cure for an additional 48 hr. before opening to traffic. Water-cure the CO overlay in accordance with Section 422.4.8., “Final Curing,” for an additional 4 days. Do not place traffic on overlay until required strength is obtained. Maintain the surface temperature of the concrete above 40°F for the required curing period. Remove and replace rejected overlay concrete at no additional cost to the Department.

4.6. **Final Surface Texture.** Provide final surface texture to hardened concrete surface when required and in accordance with Section 422.4.11, “Final Surface Texture.”

5. **CONSTRUCTION FOR MULTI-LAYER POLYMER OVERLAY**

5.1. **Contractor Submittals.** Submit to the Engineer the following documentation, and obtain approval before work commences:

5.1.1. **Product Data.** Submit a list of materials to be used. Provide manufacturer’s product data sheets that include: material specifications for the proposed polymer overlay system; mechanical, physical, and chemical properties; environmental durability; limitations; maintenance instructions; and general recommendations on storage, mixing, application, cleanup, and disposal of materials. Submit a resin mix design which includes the name and type of all ingredients, the mix ratios to be used, and the application rate for each material. Include
in the submittal a chart showing the expected cure times (in minutes) at the corresponding temperatures between 40°F and 100°F (in 10°F increments) for the proposed mix designs.

5.1.2. **Certification of Compliance**. Provide a certificate of compliance from an independent, nationally recognized laboratory stating the materials to be used meet the requirements of this specification. Furnish samples of the materials to be used as required by the Engineer.

5.1.3. **Material Safety Data Sheets**. Provide manufacturer’s Material Safety Data Sheets (MSDS) for all materials to be used on site and certification the materials conform to local, state, and federal environmental and worker’s safety laws and regulations.

5.1.4. **Work Plan**. Submit a work plan for constructing the overlay including at least the following: proposed equipment, materials, and procedures for preparing the surface and placing the overlay; proposed removal and replacement of existing non-compatible deck repair materials; repair procedures for patching deteriorated areas and repairing cracks exposed by surface preparation; and an anticipated schedule for traffic control. The work plan must meet the approval of the manufacturer of the polymer overlay system. Any deviations from the application prescribed by this specification must be approved.

5.1.5. **Technical Support Representative**. Submit name and qualifications of overlay system manufacturer’s representative who will be on the jobsite at initiation of work. The Engineer may request the manufacturer’s representative return to the jobsite to address issues that may arise during the work.

5.2. **Handling of Materials**. Transport and store polymer materials in their original containers in accordance with the manufacturer’s recommendations and requirements. Clearly mark containers as “Part A—Contains Resin” or “Part B—Contains Curing Agent,” and include the following information on each container: name of product, name and address of manufacturer, mixing proportions and instructions, lot and batch numbers, date manufactured, and quantity contained. Store aggregates in a clean and moisture-free atmosphere that is protected from all potential sources of contamination.

5.3. **Deck Repair**. Repair the deck in accordance with Item 429, “Concrete Structure Repair,” before surface preparation and if indicated on the plans. Use only repair materials that are compatible with the crack sealant and overlay systems the system manufacturers’ determined. Do not use phosphate-based repair materials unless the overlay system manufacturer determines them to be compatible.

5.4. **Surface Preparation**. Prepare the entire concrete deck surface after all repairs have cured in accordance with the repair material manufacturer’s recommendations by removing weak concrete, asphaltic materials, oils, dirt, rubber, curing compound, paint, carbonation, laitance, weak surface mortar, and other potentially detrimental materials that, in the opinion of the overlay system manufacturer’s representative or the Engineer, would prevent proper bonding to or curing of the overlay material. Use power-driven hand tools only in areas where mechanical surface preparation equipment cannot reach. Conduct all hand tool operations before using mechanical surface preparation equipment. Select a surface preparation technique such as size and flow of abrasive or water pressure, travel speed, and number of passes that will provide a surface profile equivalent to ICRI Guide No. 03732, Profile 5 or higher. Use advanced surface removal methods in accordance with Item 483, “Concrete Bridge Deck Surfacing,” when shown on the plans.

Use compressed air equipment to clean all dust, debris, and concrete fines from the deck surface and vertical faces of curbs and barrier walls up to a height of 1 in. above the overlay after hand tool and mechanical surface preparation is complete.

Do not allow public traffic onto any portion of the deck that has been prepared and cleaned, or onto any area where all courses have not been placed and allowed to fully cure. Overlay application equipment only is allowed to drive on the prepared deck surface or on any intermediate course during the overlay application as long as these surfaces are not contaminated or otherwise damaged.

Protect all prepared surfaces from subsequent contamination, and remove any contamination found on the deck or intermediate courses after initial preparation. The deck surfaces will be inspected for presence of contaminants immediately before placing sealant or any course of the overlay system. Apply the sealant or
first course of the overlay within 24 hr. of surface preparation, and place all intermediate courses of the overlay within 7 days of initial surface preparation.

5.5. **Tensile Adhesion Testing.** Conduct direct pull-off tests in accordance with ASTM C1583 to determine the adequacy of the selected surface preparation (size of shot, flow of shot, forward speed of blast machinery, number of passes, blast pressure, etc.) and cleaning methods. Conduct these tests when the surface temperature is below 80°F. Core through the test overlay to a depth of 0.5 in. into the underlying concrete.

Conduct one tensile adhesion test for each span or 500 sq. yd. whichever is smaller. The Engineer will determine test site locations for each representative portion of deck. In addition to representative portion tests, the Department may require additional tensile adhesion tests be performed on areas inaccessible to mechanical surface preparation equipment. The Contractor must remove residual test materials adhering to the deck, make necessary adjustments to the surface preparation methods, and retest all representative portions with failing test results, at no additional cost to the Department, until one passing tensile adhesion test result (from 3 pull-off tests) is obtained for each area tested.

One tensile adhesion test result is the average of 3 pull-off tests conducted over a 1 ft. × 3 ft. test site prepared with at least 1 layer of polymer. Surfaces with tension adhesion test results demonstrating average tensile bond strengths of at least 250 psi are considered acceptable.

5.6. **Application of Crack Sealant.** Apply the crack sealant in conjunction with the first layer of polymer overlay if the crack sealant and overlay system manufacturers determine it is compatible and the Engineer approves. Do not place crack sealant on new hydraulic cement concrete that is less than 28 days old unless the overlay system manufacturer allows it in writing. Allow the deck and all cracks to dry fully before applying crack sealant. Place the crack sealant on repairs only after completion of curing of the repair material and with the concurrence, in writing, of the polymer overlay system manufacturer. Identify moisture in the deck using a plastic sheet left taped in place for a minimum of 2 hr. (per ASTM D4263) or other approved methods.

Mix, place, and cure the crack sealant in accordance with the sealant manufacturer’s written recommendations. Do not apply crack sealant if the ambient air temperature is expected to drop below the sealant manufacturer’s recommended application temperature range within 8 hr. after application or if the gel time is expected to drop below 10 min.

Broadcast sand at the rate recommended by the sealant manufacturer in such a manner that complete coverage of the treated area is attained while the crack sealant is still tacky. Cure treated area until vacuuming or sweeping can be conducted without tearing or otherwise damaging the treated surface.

Repair at no additional cost to the Department any areas in which the treated surface is damaged, contaminated, or does not receive adequate sand embedment before gelling to create a surface compatible with the overlay system as the overlay system manufacturer determines.

5.7. **Application of Polymer Overlay.** Do not place polymer overlay on new hydraulic cement concrete that is less than 28 days old unless otherwise approved. Place polymer overlay on repairs only after completion of curing of the repair material and with the concurrence, in writing, of the polymer overlay system manufacturer. Allow the deck to dry fully before applying polymer overlay. Identify moisture in the deck using a plastic sheet left taped in place for at least 2 hr. (per ASTM D4263) or other approved methods. Remove all loose sand or aggregate, and attain approval from the Engineer before placement of each polymer overlay course.

Mix, place, and cure the polymer overlay materials in accordance with the overlay system manufacturer’s written recommendations. Do not apply polymer overlay if the ambient air temperature is expected to drop below the overlay system manufacturer’s recommended application temperature range within 8 hr. after application or if the gel time is expected to drop below 10 min. MMA overlays may be placed as a slurry, with resin and aggregate pre-mixed, in accordance with the manufacturer’s recommendations.

Broadcast aggregate onto the still fluid resin binder until a dry layer of aggregate is present over the entire surface. Immediately broadcast additional aggregate until a dry surface is established if wet spots develop.
Accomplish all aggregate broadcasting while binder is still fluid. Cure each course of overlay until vacuuming or sweeping can be conducted without tearing or otherwise damaging the overlay surface. Repair at no additional cost to the Department any intermediate courses in which the treated surface is damaged, contaminated, or does not receive adequate aggregate before gelling to create an intermediate surface compatible with the next overlay course as the overlay system manufacturer determines. Repair damaged areas in accordance with the overlay system manufacturer’s recommendations at no additional cost to the Department if the final polymer overlay surface is damaged or marred.

The nominal finished overlay thickness is at least 3/8 in. measured from the highest point on the deck surface to the peaks of the aggregate. Apply the polymer with aggregates in multiple courses (minimum of 2 for epoxy systems, and at least one course for slurry applied MMA) as prescribed by the overlay system manufacturer but at rates no less than specified in Table 3. Stagger and overlap longitudinal joints between successive courses so no ridges form.

Table 3: Polymer and Aggregate Application Rates

<table>
<thead>
<tr>
<th>Course</th>
<th>Polymer (gal./100 sq. ft)</th>
<th>Aggregate (lb./sq. yd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epoxy 1</td>
<td>Not less than 2.5</td>
<td>&gt; 10</td>
</tr>
<tr>
<td>Epoxy 2</td>
<td>Not less than 5.0</td>
<td>&gt; 14</td>
</tr>
<tr>
<td>MMA 1</td>
<td>Not less than 4.0</td>
<td>&gt; 13</td>
</tr>
</tbody>
</table>

Protect all bridge deck expansion joints from intrusion of polymer overlay materials. Remove overlay over all expansion joints within 12 hr. of application and before opening the overlay surface to traffic. Removal may be accomplished by scoring the overlay before gelling, by saw-cutting after curing, or by other method approved by the overlay system manufacturer.

Obtain approval to open any course to traffic. Obtain approval of cleaning and surface preparation methods for initial courses that were opened to traffic before the final course was applied. Do not allow construction traffic on the final course until it has cured sufficiently to prevent damage by wheel loads. Minimum curing periods will be in accordance with the submitted curing time chart.

5.8. Repair of Defects. The Department will examine the completed work for defects. Immediately repair or take corrective action for delaminations, raveling, weathering, incomplete aggregate coverage, or other defects found during the Department’s examination.

6. MEASUREMENT

Concrete overlay, latex-modified concrete overlay, and multi-layer polymer overlay will be measured by the square yard of surface overlaid using the dimensions shown on the plans. Overlay is a plans quantity measurement item. The quantity to be paid is the quantity shown in the proposal, unless modified by Article 9.2., “Plans Quantity Measurement.” Additional measurements or calculations will be made if adjustments of quantities are required.

7. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Concrete Overlay,” “Reinforced Concrete Overlay,” and “Latex-Modified Concrete Overlay” of the specified depth or for “Multi-Layer Polymer Overlay.”

Payment for “Concrete Overlay” or “Latex-Modified Concrete Overlay” is full compensation for cleaning surface, furnishing and placing grout; cleaning and restoration of reinforcing steel; furnishing and placing reinforcing steel; and furnishing, placing, finishing and curing the concrete overlay.

Payment for “Multi-Layer Polymer Concrete Overlay” is full compensation for: surface preparation; surface preparation testing; presence of overlay system manufacturer’s representative at initiation of the work and as requested; furnishing and applying crack sealant and multi-layer polymer concrete overlay courses; repairing damaged or marred overlay surfaces; and all materials, labor, tools, equipment, and incidentals.
These prices are full compensation for materials, tools, equipment, labor, and incidentals.

Repair of deteriorated concrete below the level of scarification will be paid for in accordance with Item 429, “Concrete Structure Repair.”

Concrete removal and surface preparation beyond cleaning utilizing air, water, and abrasive blasting will be paid for in accordance with Item 483, “Concrete Bridge Deck Surfacing,” when overlaying existing bridge.