BRIDGE CONCRETE DECK OVERLAY - ASPHALT (5-08-07)

(Milling or Overlay Projects)

Note: Use this Standard Special Provision when placing plant mix surfacing on a concrete bridge deck.

1. BRIDGE CONCRETE DECK OVERLAY – ASPHALT (Revised 5-08-07)

Description. This work includes the preparation of the bridge deck, placing a waterproof membrane and a plant mix overlay.

Construction Requirements

Remove Existing Overlay. Remove existing overlay materials from the deck including bituminous overlays, membranes, chip-seals, and traffic markings, down to the level of the concrete deck surface. Remove traces of overlay materials from the faces of curbs up to the level of the new surfacing. Use abrasive blasting, shot blasting, hammers, chisels, torches and scrapers as necessary to remove the materials. Avoid damaging the deck during this process. Repair damage done to the concrete bridge deck during removal at no cost to the State.

Patch Deck. Remove loose or broken concrete from the deck by abrasive blasting. Clean it off the deck with compressed air. Do not use hammers for this work. This specification does not require removal of delaminations under the deck surface. Repair only those areas of the deck surface that the Project Manager has determined have spalled surfaces that are not intact at the time of construction. Patch holes and spalls to the level of the surrounding surface with a rapid-set high-strength concrete.

Cracks and Joints. Bond reinforced matting material to the deck over cracks and at deck contraction joints wider than 3/16” (4mm), if the membrane supplier requires it. Apply matting compatible with one of the approved systems (see Section C.). If the bridge has expansion joints, see details in the bridge plans for their treatment.

Abrasive blasting. After patching the deck and sealing cracks and immediately prior to placing the waterproof membrane system, use abrasive blasting over the entire deck surface and over the curb faces up to the level of the finished overlay surface. Remove foreign substances, including bituminous materials, dirt, oil, paint and laitance, down to the level of the original concrete surface. After finishing the abrasive blasting, remove blasting abrasive, dust and loose material from the deck with compressed air or with vacuum equipment. Provide a smooth surface for the membrane. Remove sharp edges or projections that could puncture the membrane.

Pavement Removal. Remove the existing pavement on the approach roadway section and the concrete structure in a sequence and manner so that the traveling public does not encounter abrupt transitions. Remove the existing plant mix surfacing as the plans and special provisions specify.

Membrane. Install the selected membrane system as the manufacturer requires and in compliance with the plans and specifications. Begin the membrane application within four hours of completion of the abrasive blasting. Apply the membrane to a clean, dry deck surface and with the deck and ambient air temperatures above 50°F (10°C). Apply primer to the concrete surfaces if the membrane manufacturer requires it. Overlap prefabricated membrane strips a minimum of 4” (100mm). Use hand rollers to ensure a firm, uniform bond between the membrane and the concrete surface. Keep the membrane free of wrinkles, bubbles, tears, and other placement defects. Patch tears or cuts in the membrane prior to placing the plant mix, by placing a piece of membrane bonded firmly to the surface and extending at least 4” (100 mm) beyond the edges of the defect. Seal vertical curb face surfaces with membrane to the height of the finished asphalt surface. If required by the membrane manufacturer, apply a bond coat of an acceptable adhesive to the surface of the membrane prior to applying the overlay. Allow only necessary rubber tire traffic on the membrane. Do not allow public traffic on the membrane. Maintain the membrane in good condition until the overlay covers it.

Pavement Placement. See the Road Plans for plant mix surfacing specification and thickness. Note that the crown may change between the bridge and the adjacent road. Mark the location of the end of each deck and intermediate bent locations before placing the plant mix. The contractor may apply the bridge deck overlay continuously with the final lift of the roadway surfacing. Use care to avoid damaging the membrane while operating equipment on it and while placing the overlay. Repair damage to the membrane with a method the Project Manager has approved prior to placing the overlay. Apply compactive effort as specified in Section 401.03.12B of the Standard Specifications. Do not use vibratory rollers on bridges.

Saw cutting and routing joints. After placing the plant mix surfacing, make a saw cut ¼” (6 mm) wide by 1 3/8” (35 mm) deep between the curbs at deck ends and at the centerlines of intermediate bents. Rout the saw cut to produce a straight, flat-bottomed reservoir 11/2” (38mm) wide withvertical walls 3/8” (10mm) deep. Saw cut and rout when the roadway is dry. Remove the routed material from the roadway and dispose of it before opening the roadway to traffic.

Cleaning. Ensure that the reservoir and joint are dry and free of dust, dirt and loose materials immediately before applying the sealant.

Sealing. Place sealant material within 72 hours of routing the joint. Follow the sealant manufacturer's handling, mixing and application temperature requirements. Fill the routed reservoir flush to the top using a pressure applicator. Do not open the completed work to traffic until the sealant has cured to the point that it will not track. Repair or replace all seal work damaged by traffic at no expense to the Department.

Temperature Limitations. Do not rout when the mat temperature is below 35°F (1.67°C). Apply the sealant only when the roadway surface temperature is between 35°F (1.67°C) and 120° F (49°C).

Materials.

Deck Patching Concrete. Patch the deck with a high strength, rapid-setting, Portland cement-based concrete. Handle, mix and install this material as the product manufacturer specifies. The contractor may use regular Portland cement concrete for patching the deck provided the repair area first receives a coating of an epoxy bonding agent meeting the requirements of AASHTO M235 immediately prior to concrete placement. When using regular concrete, keep traffic off the patch area until the patch concrete achieves a strength of 2400 psi (16.5 MPa), in accordance with Standard Specification 551.03.07.

Reinforcement Matting and Binder. Use a high-strength woven fiberglass fabric and compatible binder with the following requirements.

* Fiberglass Fabric: Use fabric weighing 0.17 lb/sq.ft (814 g/sq.m) minimum.
* Fiberglass Binder: Use a binder compatible with the fiberglass matting and meeting or exceeding the following requirements.

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| Property | Method | Value |
| Penetration,  | ASTM D-540-82 | 0.1mm |
| Softening Point | ASTM D-3668 C | 193° C minimum |
| Viscosity | ASTM D3236 | 1000-1800 cps |
| Low Temp. Flexibility | Vermont DOT (mod) | -18 C |

Waterproof membrane. Use one of the following systems, or a similar one approved by the Project Manager, before the work begins.

Product Name Manufacturer

Bituthene 5000 W.R. Grace

ColdFlex 2000 PolyGuard

Mel-Dek W.R. Meadows

M-400A Protecto Wrap Company

Petrotac Amoco

Pave Prep Pavetech

CCW-711 Carlisle Coatings & Waterproofing

Crack Sealant. Use sealant meeting the following ASTM D 5167 specifications:

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| --- | --- |
| Cone Penetration, 77°F (25°C), dmm (ASTM D5329) | 100-150 |
| Cone Penetration, 0°F (-18°C), dmm (ASTM D5329 modified) | 25 min. |
| Flow, 140°F (60°C), 5h (ASTM D5329) | 0.4inch (10mm) max. |
| Resilience, (ASTM D5329) | 30-60% |
| Bond, -20°F (-29°C), 200% ext. (ASTM D5329) | Pass 3 cycles |
| Recommended Pour Temperature | 380°F (193°C) |
| Safe Heating Temperature | 410°F (210°C) |
| Asphalt Compatibility (ASTM D5329) | Pass |

Two supplier products that meet these requirements are:

Crafco 522

Maxwell Elastoflex 72

Submittals. Submit product documentation for each of the following items to the Project Manager for approval at least one week prior to the intended placement of the item.

Deck patching concrete.

Reinforcement matting and binder.

Membrane. Include the product specifications, the material safety data sheet, the manufacturer’s recommended application procedure and the contractor’s plan for installing the membrane.

Crack sealant.

Do not place any of these items before receiving approval from the Project Manager.

Method of Measurement and Basis of Payment.

Prepare Bridge Deck. Measure Prepare Deck by the square meter (yard) of deck between the curb faces and between the paving notches. The unit price bid for Prepare Deck will include compensation for materials, equipment, tools, labor and incidentals necessary to clean, patch and prepare the deck, and to seal cracks and joint openings.

Waterproof Membrane. Measure Waterproof Membrane for payment by the square meter (yard) of deck between the curb faces and the area of the curb faces covered by membrane, between the paving notches. The unit price bid for Waterproof Membrane will include compensation for labor and materials required to furnish and place the membrane, including necessary primers and bond coats.

Plant Mix Overlay. Include costs associated with supplying and placing the plant mix overlay on the bridge deck, including labor and materials for saw-cutting, routing and sealing joints, in the unit price bid for Plant Mix Surfacing (See the Road Plans Summary).