

SECTION 722 – LATEX MODIFIED CONCRETE BRIDGE DECK OVERLAYS

722.01 Description

This work shall consist of the construction of a latex modified portland cement concrete overlay on an existing or new bridge deck, or it shall consist of patching an existing latex modified portland cement concrete overlay on a bridge deck in accordance with 105.03.

10 722.02 Materials

Materials shall be in accordance with the following:

	Admixtures	912.03
	Coarse Aggregate, Class A or Higher, Size No. 11*	904
	Epoxy Penetrating Sealer	909.09
	Epoxy Resin Adhesive	909.11
	Fine Aggregate	904
	Fly Ash	901.02
	Latex Modifier.....	912.04
20	PCC Sealer/Healer.....	901.06
	Portland Cement	901.01(b)
	Water	913.01
	* Crushed stone only	

722.03 Storage and Handling of Materials

Fine and coarse aggregates shall be stored and handled avoiding contamination and maintaining uniform moisture content. Fine and coarse aggregates which are stored in piles or bins shall remain separated and shall be covered with a moisture proof material which prevents variations in moisture content of the aggregates. The maximum variation of moisture content in successive concrete batches shall be 0.5%.

Cement shall be stored in weatherproof enclosures which protect the cement from dampness. Cement shall not have developed lumps.

The latex modifier shall be stored in accordance with the manufacturer's recommendations. Latex modifier shall be strained to remove solid particles during transfer of the material from storage drums to the mobile mixer tank.

722.04 Proportioning

The amount of fine aggregate shall be $60\% \pm 5\%$ by dry weight of the total aggregate and shall be considered as the amount of aggregate blend passing the No. 4 (4.75 mm) sieve. The coarse aggregate shall be No. 11, class A crushed stone. The cement content shall be a minimum of 658 lbs/cu yd of concrete. The same brand of cement shall be used throughout a bridge structure. The amount of latex modifier shall be 3.5 gal. per 94 lbs of cement. The net water added shall produce a slump of 5 in. \pm 1 in. at 4 to 5 minutes after discharge from the mixer. The moisture content of

the aggregates shall be controlled such that the slump is within the specified limits. The air content shall be a maximum of 6%, by volume, of the plastic mix.

50 The yield will be checked using the 1/4 cu yd box method as follows. The chute shall be cleaned and the box shall be positioned to receive the discharged concrete. The mixer shall be operated until the cement counter indicates that 1/4 cu yd of concrete has been produced. The contents of the box shall be consolidated and struck off. If the box is not essentially full, the gates shall be adjusted and the procedure shall be repeated until the actual and calculated volumes of concrete agree. Yield tests shall be run on the first load of each truck and every third load per truck thereafter. Additional tests will be required after making any adjustments.

Slump and air content tests will be performed after each acceptable yield test.
60 The slump test shall be in accordance with AASHTO T 119 and will be performed 4 to 5 minutes after the concrete is discharged from the mixer. The water flow meter reading will be recorded at the time the slump test is taken. The concrete shall not be disturbed during the waiting period for the slump test. The air content test shall be in accordance with 505. Any concrete mixture which is not properly proportioned or does not conform to the specified slump will be rejected.

Class F or class C fly ash may be used in the latex modified portland cement concrete. The maximum cement reduction shall be 15% and the minimum replacement ratio by weight of fly ash to cement shall be 1.25:1. A concrete mix
70 design shall be submitted in accordance with 702.05. If portland pozzolan cement, type IP is to be used in the concrete mix design, the cement content shall be increased by a multiplier of 1.06 times the specified cement content.

Bridge deck patching concrete shall be composed of the following:

- (a) Fine aggregate shall be 35% to 45% of the total weight of aggregate used.
- 80 (b) The cement shall be 564 lbs/cu yd of portland cement type III or type IIIA, or 846 lbs/cu yd of portland cement type I or type IA.
- (c) Air entraining admixture shall be added to produce 5% to 8% entrained air.
- (d) The net water added shall produce a slump of no more than 4 in.

722.05 Preparation of the Bridge Floor

(a) Concrete Removal

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1. Deck Surface

The top 1/4 in. of the entire bridge deck surface shall be removed if the overlay

is to be placed on a bridge deck constructed under a previous contract. The surface removal operation shall be limited to that portion of the bridge deck that is closed to traffic at any one time. After this initial surface removal, an additional 1/4 in. of surface removal may be required on part or all of the bridge deck as directed.

100 Surface removal shall be performed with a power operated mechanical milling machine. The equipment shall uniformly remove the required depth of concrete surface in a satisfactory manner. Surface removal, which is in areas adjacent to the curb that are inaccessible to milling, shall be done by handchipping. All surface removal residue, including water, dust and concrete, shall be immediately removed.

2. Bridge Floor

110 Following the clean up from the surface removal operation, areas of unsound concrete to be removed will be marked. Removal of the unsound concrete shall be performed by handchipping or hydrodemolition. Handchipping tools may be hand or mechanically driven. Jackhammers shall not be heavier than nominal 45 lb class and chipping hammers shall not be heavier than nominal 15 lb class. Only chipping hammers shall be used when removing concrete within 1 in. of reinforcing bars. Mechanically driven tools shall be operated at a maximum angle of 45° from the bridge floor surface.

120 The hydrodemolition machine shall utilize a high pressure water jet system and shall be approved prior to use. Hydrodemolition equipment shall be calibrated to remove only unsound concrete. The pressure of the water jet shall be calibrated for each structure prior to use. All water used in the hydrodemolition operation shall be potable, and stream or lake water will not be allowed. Precautions shall be taken, during the hydrodemolition operations, to prevent damage to surrounding property and traffic. Waste water shall not be discharged into a stream.

Regardless of the method of removal, the removal operation shall be stopped if it is determined that sound concrete is being removed. Appropriate recalibration, or changes in equipment and methods shall be performed prior to resuming the removal operation.

130 Where reinforcing bars have been exposed or the bond between the existing concrete and reinforcing bars has been destroyed, the concrete adjacent to the bars shall be removed to a minimum clearance of 1 in. around the entire periphery of the exposed bars. If the concrete is unsound down to the top layer of bottom reinforcing bars, all of the concrete within the marked area shall be removed and the cavity shall require full depth patching in accordance with 722.06(a). Prepared cavities which are deeper than the level of the adjacent prepared deck surface, but are not full depth, shall require partial depth patching in accordance with 722.06(b). Prepared partial depth cavities shall be made full depth when directed. Exposed reinforcing bars shall not be damaged by the removal operation. Any damaged reinforcing bars shall be repaired as directed with no additional payment.

140 The removal areas shall be thoroughly cleaned of all dirt, foreign materials and loose concrete to the extent necessary to produce a firm solid surface for adherence of the new concrete. A minimum 1 in. vertical surface shall remain, or be cut, 1 in. outside and around the entire periphery of each removal area after removal of all loose and unsound concrete.

(b) Cleaning

150 After the concrete removal operation is completed and just prior to placing the patches or the overlay, the entire deck shall be heavily sandblasted to expose fine and coarse aggregates and to remove unsound concrete or laitance layers from the surface. Exposed reinforcing bars and the concrete under and around the exposed bars shall be thoroughly cleaned by sandblasting. The surface shall be then cleaned free of all dust, chips, water, and foreign material to the extent necessary to produce a firm, solid surface for adherence of the new concrete. The air lines for sandblasting and air cleaning shall be equipped with oil traps.

722.06 Patching of the Bridge Floor

A vacuum device shall be used to remove all water from the prepared cavities.

(a) Full Depth Patching

160 The material used for full depth patching shall be either bridge deck patching concrete or latex modified concrete. Full depth patching shall be performed prior to the overlay operation unless otherwise requested and approved. The patching material shall be consolidated by internal vibration at the time of placement. Equipment shall not be operated on the repaired deck areas until the test beams indicate a minimum modulus of rupture of 550 psi. Curing of the patch shall be as directed.

1. Patching with Bridge Deck Patching Concrete

170 Epoxy resin adhesive shall be used to coat the surfaces of the prepared cavities and all the exposed reinforcement within the cavities. The epoxy coating shall be tacky at the time that the patching concrete is placed. If the epoxy coating has cured beyond the obvious tacky condition, it shall be re-applied prior to patching. The coated cavities shall then be filled with the patching concrete to the level of the adjacent deck surface.

2. Patching with Latex Modified Concrete

The surfaces of the prepared cavities shall be coated with a bond coat in accordance with 722.09. The cavities shall then be filled with the latex modified concrete to the level of the adjacent deck surface.

180 **(b) Partial Depth Patching**

The material used for partial depth patching shall be either bridge deck patching concrete or latex modified concrete. The patching material shall be consolidated by internal vibration at the time of placement. Curing of the patch shall be as directed.

1. Patching with Bridge Deck Patching Concrete

Partial depth patching with bridge deck patching concrete shall be in accordance with 722.06(a) and 722.06(a)1.

2. Patching with Latex Modified Concrete

190 The surfaces of the prepared cavities shall be coated with a bond coat in accordance with 722.09. The cavities shall then be filled with the latex modified concrete at the time that the overlay is placed.

722.07 Overlay Dam

An overlay dam shall consist of the removal of existing concrete from the bridge floor and replacing it with new concrete as shown on the plans or as otherwise directed. Overlay dam material shall be in accordance with 722.04.

200 The existing concrete shall be removed as required in accordance with 722.05(a). Exposed reinforcement shall not be cut or otherwise damaged.

Power driven hand tools for removal by handchipping will be allowed. Pneumatic hammers with a maximum weight of 69 lbs may be used for the tops of mudwalls. If, during the removal process, the tools or methods being used appear to cause damage such as cracks or spalling on the concrete which is to remain, the work shall cease immediately and shall not resume until the Engineer is assured the tools or methods being used will not cause further damage.

210 The surface to be repaired, the reinforcing bars, and the concrete under and around the bars shall be thoroughly cleaned in accordance with 722.05(b). The cavity shall be epoxy coated in accordance with 722.06(a)1 then filled with class A concrete in accordance with 702.

722.08 Mixing

220 Proportioning and mixing of the latex modified concrete shall be performed in a self-contained, self-propelled continuous mixer. The mixer shall be calibrated to accurately proportion the specified mix prior to starting the work. The calibration shall be in accordance with 722.12. Sufficient mixing capacity or mixers shall be provided to enable the intended pour to be placed without interruption. The mixer shall carry sufficient quantities of unmixed ingredients to produce at least 6 cu yd of latex modified concrete at the site.

230 The mixer shall measure and control the flow of ingredients being introduced into the mix and shall record these quantities on an approved visible recording meter equipped with a ticket printer. Water flow shall be readily adjustable to compensate for minor variations in aggregate moisture content, and shall be displayed by an approved flow meter. The flow of the latex modifier shall also be displayed by an approved flow meter. The manufacturer's inspection plate shall clearly show the serial number, proper operating revolutions per minute, and the approximate number of counts on the cement meter to deliver 94 lbs of cement.

The mixer shall automatically proportion and blend simultaneously all the ingredients of the specified mix on a continuous or intermittent basis as required by the finishing operation. The latex modified concrete shall be discharged through a conventional chute directly in front of the finishing machine. The surface ahead of the deposited mixture shall be kept damp by spraying it with water. If the water is applied by the mixer, it shall be dispensed ahead of the water flow meter.

722.09 Placing and Finishing

240 Existing expansion joints shall be maintained throughout the overlayment. A bulkhead, equal in thickness to the joint width, shall be installed to the required grade and profile prior to placing the overlay. Screed rails for the finishing machine shall be placed to the required profile, and stably anchored vertically and horizontally. Screed rails shall not be treated with a bond breaking compound.

250 The overlay shall not be placed unless the ambient temperature is 45°F and rising, unless otherwise approved in writing. Placement may be required during early morning hours, at night, or during other limited work periods if the prevailing daytime temperature exceeds 85°F. The overlay shall not be placed if rain is expected. Adequate precautions shall be taken to protect freshly placed overlay material from sudden or unexpected rain. Damaged material shall be removed and replaced with no additional payment. A construction dam or bulkhead shall be installed in case of a delay in placement of 1 h or more. During delays of less than 1 h, the end of the placed overlay material shall be protected from drying with layers of wet burlap.

260 After the surface has been cleaned, and immediately before placing the overlay material, the surface shall be thoroughly soaked for a period of 1 h. The surface shall not be allowed to dry before placing the overlay material and there shall be no standing water at the time of placement. The surface shall then be thoroughly and evenly coated with a brush applied bond coat of latex modified concrete. The progress of the bond coat application shall be controlled to ensure that the bond coat does not dry before the overlay is placed to the required grade. Aggregate segregated in the brush application of the bond coat shall be removed before the overlay is placed. Surface irregularities shall be filled to approximately three-quarters of their depth sufficiently ahead of the overlay operation to allow the material to stiffen and resist rolling back during the finishing.

270 Following the bond coat application and partial filling of any surface irregularities, the latex modified concrete overlay shall be placed to an elevation approximately 1/2 in. above final grade. The mix shall then be consolidated and machine finished to the required grade. The machine finishing shall be to within 12 in. of the curb line or coping line unless otherwise directed. Supplemental hand finishing with a wood float shall be performed as needed to produce the required tight, uniform surface.

The finishing machine shall be self-propelled and capable of positively controlled forward and reverse motion. The machine shall be equipped with at least two finishing devices. The first finishing device shall be a vibrating mechanism, such as a vibrating pan, for consolidating the deposited mix. The vibrating pan shall be metal and of sufficient dimensions to ensure proper consolidation. The second finishing device shall be either a rotating cylindrical drum, at least 45 in. in length, or a vibrating oscillating metal faced screed of 4 in. minimum in width. The vertical position of the finishing devices shall be positively controlled and the devices shall be raised clear of the finished surface when the machine is operated in the reverse direction. The vibration frequency of any vibrating finishing device shall be variable, with positive control between 3,000 and 6,000 vibrations per minute. Alternate finishing machines may be considered for approval subject to a written request.

290 Screed rails and construction dams shall be separated from the newly finished overlay by passing a pointing trowel along the rail-to-overlay and dam-to-overlay interfaces after the overlay has sufficiently set such that it does not flow back. This trowel cut shall be made for the entire length and depth of the rail or dam. The rails may be removed anytime after the overlay has initially set. Adequate precautions shall be taken during and subsequent to the rail removal to protect the edge of the new overlay from damage. The finished surface shall be in accordance with 504.03.

722.10 Texturing

300 Immediately after the finishing is complete and before the surface film has formed, the surface of the overlay shall be textured by transverse grooving. The grooves may be formed by mechanized equipment using a vibrating beam roller, a series of discs or other approved device. Manual tools such as fluted floats, spring steel tined rakes, or finned floats with a single row of fins may be used. The grooves shall be relatively uniform and smooth and shall be formed without tearing the surface or bringing coarse aggregate to the top. The grooves shall be in accordance with 504.03. The grooves shall be terminated approximately 18 in. from vertical faces such as curbs and concrete railing.

310 All areas of hardened grooved overlay which do not conform to these requirements due to either a deficiency in the grooving or a rough open textured surface shall be corrected with no additional payment. Corrections shall be made by cutting transverse grooves in the hardened overlay with an approved cutting machine or by sealing with an approved mixture and retexturing to a satisfactory finish as directed.

722.11 Curing

320 When fly ash is used, the requirement for additional wet or dry curing time will be determined based on the relative initial, and final time of set and a comparison of strength versus age using control concrete strengths at conventional cure period ages as the reference. Unless otherwise directed, 702.22 shall apply except that the membrane forming curing compound shall not be used to cure the bridge deck overlay.

The minimum curing shall be 24 h of wet cure followed by 72 h of dry cure. An overlaid bridge deck may be opened to traffic during the minimum curing duration when the compressive strength of test cylinders is 4,000 psi or greater. The strength requirements, and the making and curing of the cylinders, shall be in accordance with 702.24. After texturing, the plastic film which forms on the surface of the overlay shall be protected from shrinkage cracking with a single layer of well drained wet burlap. This layer of wet burlap shall be placed as soon as the overlay surface will support it without deformation. Approximately 1 h after placing the first layer of wet burlap, a second layer shall be placed and the entire covering shall be maintained in a wet condition for a minimum of 24 h. Polyethylene film may be used in lieu of the second layer of wet burlap. If the polyethylene film is used for the second covering, then the burlap already in place shall be wetted just before placing the polyethylene film and shall be maintained in a wet condition. After the 24 h elapse, all layers of covering material shall be removed.

If the ambient temperature falls below 50°F during either the wet or dry curing periods, the time that the temperature is below 50°F shall not be considered as part of the total 96 h curing period. If there is sufficient rain to wet the surface of the overlay for 1 h or more during the dry cure period, this number of hours shall not be considered as part of the 72 h dry cure period.

Immediately upon the start of the dry cure period, the surface shall be checked for cracks. If cracks exist, a thorough investigation will be conducted prior to sealing cracks. Cores may be required to determine the actual crack depth. Surface cracks not exceeding 3/8 in. in depth shall be sealed with an epoxy penetrating sealer followed by an application of an approved sand. The sealing and sand application shall be repeated as needed to ensure that the voids remain completely filled. Alternate methods of surface crack sealing may be used if approved. Cracks exceeding 3/8 in. in depth shall not be sealed at this time. Corrective procedures for repairing cracks exceeding 3/8 in. in depth will be determined after further investigation which may include additional cores. The method of repair shall be as directed in writing and may include removal and replacement or complete filling with an approved sealer/healer and a sand application on the surface. The Department will maintain a list of approved Sealer/Healers.

If it is determined by sounding or coring that adequate bonding between the overlay and the bridge deck has not been attained, the deficient areas shall be removed and replaced as directed.

722.12 Calibration of Continuous Mixers

(a) Frequency

A complete calibration shall be performed for each mixer prior to each pour unless the initial calibration was made within the previous 10 calendar days. A mixer that has been calibrated within the previous 10 calendar days may be approved for

370 use providing that the mixer operator is in possession of the completed, signed, certified and dated Department calibration form for that mixer. A complete calibration of a mixer may be required at any time as directed. All mixers which are calibrated within the 10 day limit but are changing aggregate sources shall have an aggregate blend test performed.

(b) Equipment

380 All special equipment required for calibration shall be furnished. It shall include but not be limited to suitable material containers, buckets, stop watches and a set of balance beam platform scales graduated in at least 1/4 lb intervals with a minimum capacity of 500 lbs. Samples shall be obtained and handled by the Contractor. Normal testing equipment such as aggregate sieves and containers shall also be furnished.

(c) Pre-calibration

390 The aggregate bin shall be clean and the bin vibrators shall be in good working order. The mixer shall be equipped with a grounding strap. The cement meter feeder, the fins and all pockets shall be clean and free of any accumulated cement. The aeration system shall be equipped with a gauge or indicator to verify that the system is operating. The main belts and the latex strainer shall be clean and free of any accumulated material.

(d) Calibration

1. Cement Meter

The mixer manufacturer's mix setting chart shall determine the specified operating revolutions per minute and the approximate number of counts required on the cement meter to deliver 94 lbs of cement. At least 3,760 lbs of cement shall be placed in the cement bin.

400 The mixing unit shall rest on a level surface. The engine throttle shall be adjusted to obtain the required revolutions per minute. The unit discharging the cement shall be operated until the belt has made one complete revolution. It shall then be stopped and the cement meter shall be reset to zero.

410 A suitable container shall be positioned to catch the cement and at least 90 lbs of cement shall be discharged. The time required to discharge the cement shall be measured with a stop watch, the number of counts on the cement meter shall be recorded, and the weight of the discharged cement shall be determined. This process shall be repeated a total of three times. The cement counter shall be reset to zero before each repetition.

The following formulas shall be used to calculate the number of counts per 94 lbs of cement and the time required to discharge 94 lbs of cement.

$$94 \div \frac{A}{B} = \text{Counts per 94 lbs of cement}$$

$$94 \div \frac{A}{C} = \text{Time in seconds per 94 lbs of cement}$$

A = Total weight of cement in pounds for three trials

B = Total number of counts on the cement meter for three trials

C = Total time in seconds for three trials.

2. Water Flow Meter

The accuracy of the water flow meter shall be verified by adjusting the flow to 2 gal. per minute. With the equipment operating at the required revolutions per minute, the water discharged during a one minute interval shall be collected and weighed. The weight in pounds of the discharged water shall be divided by 8.33 to determine the number of gallons. This procedure shall be repeated with the flow meter adjusted to 3 gal. per minute.

3. Aggregate Bin Gates

The gate opening shall be adjusted to provide the required amount of aggregate to produce a cubic yard of the designated mix. The ratio of fine aggregate to total aggregate shall be verified by stopping the cement discharge and collecting the aggregate discharged in a container. A representative sample of the discharged aggregate shall be selected and separated on a No. 4 (4.75 mm) sieve. The fine aggregate will be considered as the amount passing the No. 4 (4.75 mm) sieve. The percentage shall be computed on a dry weight basis.

4. Latex Throttling Valve

The latex strainer shall be unobstructed. The latex throttling valve shall be adjusted to deliver the required amount of latex emulsion admixture for each 94 lbs of cement. With the unit operating at the required revolutions per minute for the calculated time in seconds per 94 lbs of cement, the latex shall be discharged into a container. The weight of the latex shall be determined and, if necessary, the valve shall be adjusted such that the amount of latex discharged is within 1/2 lb of the amount required for each 94 lbs of cement. One verification shall be performed to check the accuracy of the valve setting.

5. Admixture Dispensers

This equipment shall be calibrated in accordance with the manufacturer's instructions for the specific materials and quantities involved.

722.13 Patching an Existing Bridge Deck Overlay

(a) Materials

Materials shall be in accordance with 722.02.

(b) Storage and Handling of Materials

Storage and handling of materials shall be in accordance with 722.03.

(c) Proportioning

Proportioning shall be in accordance with 722.04.

(d) Preparation of the Bridge Floor

470 Preparation of the bridge floor shall be in accordance with the applicable provisions of 722.05.

(e) Patching

Patching shall be in accordance with 722.06 except as modified herein. If no new overlay is planned, bridge deck patching concrete used in patching the bridge floor shall be placed to the level of the original deck. The remainder of each cavity shall be patched with the same material as the existing overlay.

(f) Mixing

480 Mixing shall be in accordance with the applicable provisions of 722.08.

(g) Placing and Finishing

Placing and finishing shall be in accordance with the applicable provisions of 722.09. Machine finishing shall be required when directed.

(h) Texturing

Texturing shall be in accordance with 722.10. In addition, the surface texturing shall match the pattern of the adjacent overlay.

(i) Curing

490 Curing shall be in accordance with 722.11.

(j) Calibration of Continuous Mixers

Calibration shall be in accordance with 722.12.

722.14 Method of Measurement

500 Surface milling will be measured by the square yard for the initial 1/4 in. depth. Additional surface removal required below the initial 1/4 in. depth will be measured by the square yard for each required 1/4 in. depth. Only the portion of the bridge deck which is to remain in place will be measured for payment. The undefined areas requiring full depth deck removal will be measured for payment. The areas of the bridge floor which are shown on the plans to be removed will not be measured for payment.

Full depth patching will be measured by the square foot. The patching material used in full depth patching will not be measured for payment.

Partial depth patching will be measured by the square foot. The measurement of bridge deck patching concrete used in partial depth patching will be based on a theoretical quantity determined by multiplying the area of the appropriate partial depth patches by an assumed average depth of 2 in. and converting the resulting volume into cubic yards. Overlay material used in partial depth patching will be measured by the cubic yard. The quantities of patching material used in partial depth patching will be included in the measurement of additional bridge deck overlay.

Overlay material used to fill surface irregularities will be measured by the cubic yard. Such quantity will be included in the measurement of additional bridge deck overlay.

Bridge deck overlay will be measured by the square yard for the specified thickness. If there is no specified thickness shown on the plans, the specified thickness shall be 1 3/4 in.

Overlay dams and patching an existing overlay will be measured by the square foot.

Epoxy resin adhesive and bond coat will not be measured for payment. Blasting, cleaning, finishing, texturing, and curing will not be measured for payment.

722.15 Basis of Payment

Milling of the initial 1/4 in. depth of surface will be paid for at the contract unit price per square yard for surface milling. Additional surface removal below the initial 1/4 in. depth will be paid for at the contract unit price per square yard for surface milling for each required 1/4 in. depth.

Full depth patching will be paid for at the contract unit price per square foot for bridge deck patching, full depth.

Partial depth patching will be paid for at the contract unit price per square foot for bridge deck patching, partial depth.

Prepared partial depth cavities exceeding 2 in. in average depth, which are subsequently directed to be made full depth, will be paid for at the contract unit price per square foot for bridge deck patching, partial depth. Additional payment will be made at 80% of the contract unit price per square foot for bridge deck patching, full depth.

Prepared partial depth cavities of 2 in. or less in average depth, which are subsequently directed to be made full depth, will be paid for at the contract unit price per square foot for bridge deck patching, full depth.

Patching material used for partial depth patching will be paid for at the contract unit price of \$550 per cubic yard for bridge deck overlay, additional.

Overlay material used to fill surface irregularities will be paid for at the contract unit price of \$550 per cubic yard for bridge deck overlay, additional.

Bridge deck overlay will be paid for at the contract unit price per square yard.

560 Patching an existing bridge deck overlay will be paid for at the contract unit price per square foot for bridge deck overlay patching.

Overlay dam will be paid for at the contract unit price per square foot, complete in place.

Payment will be made under:

	Pay Item	Pay Unit Symbol
570	Bridge Deck Overlay	SYS
	Bridge Deck Overlay, Additional	CYS
	Bridge Deck Overlay, Patching	SFT
	Bridge Deck Patching, Full Depth.....	SFT
	Bridge Deck Patching, Partial Depth.....	SFT
	Overlay Dam	SFT
	Surface Milling.....	SYS

The cost of milling, handchipping, removing debris and water, and necessary incidentals shall be included in the cost of surface milling.

580 The cost of removal of unsound concrete, preparation of cavity surfaces, furnishing and applying bond coat or epoxy resin adhesive as required, furnishing and placing patching material, and necessary incidentals shall be included in the cost of bridge deck patching, full depth, or bridge deck patching, partial depth.

The cost of patching material used for full depth patching shall be included in the cost of bridge deck patching, full depth.

590 The cost of furnishing and placing patching material and necessary incidentals shall be included in the cost of bridge deck overlay, additional.

The cost of removing the existing concrete; furnishing, hauling, and placing all materials including the epoxy; preparing the surface; and all necessary incidentals shall be included in the cost of overlay dam.

The cost of blasting, cleaning, furnishing, and applying epoxy resin adhesive or bond coat shall be included in the cost of other pay items.

Coring of the bridge deck, patching core holes, and all corrective measures required in accordance with 722.11 shall be performed with no additional payment.

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The cost of bond coat, furnishing and placing the overlay material, and necessary incidentals shall be included in the cost of bridge deck overlay or bridge deck overlay patching.

SECTION 723 – REINFORCED CONCRETE THREE-SIDED STRUCTURES

723.01 Description

This work shall consist of constructing a reinforced concrete three-sided arch-topped structure or structure extension with headwalls and wingwalls, a reinforced concrete three-sided flat-topped structure or structure extension with headwalls and wingwalls, or a reinforced concrete true arch shape structure or structure extension with spandrel walls and wingwalls in accordance with 105.03. The reinforced concrete three-sided structure, structure extension, headwalls, wingwalls, footings, and spandrel walls may be precast or cast-in-place.

The Contractor will be allowed to substitute a box structure in accordance with 714. The box structure shall be of equivalent hydraulic capacity to that of the three-sided structure shown on the plans. The structure shall be sumped as shown on the plans.

MATERIALS

723.02 Materials

Materials shall be in accordance with the following:

	Chemical Anchor System	901.05
	Coarse Aggregates, Class A or Higher, Size No. 91	904
	Concrete	702
	Epoxy Coated Reinforcing Bars	910.01(b)9
	Flowable Backfill	213
	Geotextile	918.02
	Hydrated Lime	913.04(a)
	Masonry Cement	901.01(c)
30	Mortar Sand	904.02(e)
	Natural Sand	904.02(a)
	Pipe Joint Sealant	907.11
	Portland Cement	901.01(b)
	Precast Reinforced Concrete Headwalls, Wingwalls, Footings, and Spandrel Walls	907.06
	Precast Reinforced Concrete Structure Sections	907.05
	Reinforcing Bars	910.01
	Riprap	904
	Sealer	909.09 or 909.10
40	WWR, Smooth and Deformed	910.01
	Structure Backfill	904