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	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65101 Phone (888) 275-6636
	If a seal is present on this sheet, JSP's has been electronically sealed and dated.
	JOB NO. J1S3215 Harrison County, MO Date Prepared: 8/10/2021
Only the following items of the Job Special Provisions (Bridge) are authenticated by this seal: All	

A. CONSTRUCTION REQUIREMENTS

1.0 Description. This provision contains general construction requirements for this project.

2.0 Construction Requirements. The plans and the asbestos and lead inspection report for the existing structure(s) are included in the contract in the bridge electronic deliverables zip file for informational purposes only.

2.1 In order to assure the least traffic interference, the work shall be scheduled so that the bridge closure is for the absolute minimum amount of time required to complete the work. The bridge shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed bridge is opened to traffic.

2.2 Bridge work by contractor forces, including erection, rehabilitation or demolition, shall not be allowed over traffic unless a bridge platform protection system is installed below the work area except for work performed above a deck that is intact. The protection system shall be capable of catching all falling objects such as tools, overhang brackets or materials. Lifting of objects that are heavier than the capacity of the bridge protection system shall not be permitted.

2.3 Qualified special mortar shall be a qualified rapid set concrete patching material in accordance with [Sec 704](#). A qualified rapid set concrete patching material will not be permitted for half-sole repair, deck repair with void tube replacement, full depth repair, modified deck repair and substructure repair (formed) unless a note on the bridge plans specifies that a qualified special mortar may be used.

2.4 The existing slab for the bridge(s) to be redecked was constructed as composite or non-composite as shown in the table below.

Bridge No.	Type of deck
A2516 Spans 1 & 4	Non-composite
A2516 Spans 2 & 3	Composite

2.5 Provisions shall be made to prevent any debris and material from falling onto the roadway. If determined necessary by the engineer, any debris and material that falls below the bridge outside the previously specified limits shall be removed as approved by the engineer at the contractor's expense. Traffic under the bridge shall be maintained in accordance with the contract documents.

2.7 Any damage sustained to the remaining structure as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

2.8 Provisions shall be made to prevent damage to any existing utilities. Any damage sustained to the utilities as a result of the contractor's operations shall be the responsibility of the contractor. All costs of repair and disruption of service shall be as determined by the utility owners and as approved by the engineer.

2.9 A washer shall be required under head and nut when any reaming is performed for bolt installation.

2.10 SSPC-SP2 and SSPC-SP3 surface preparation shall be in accordance with the environmental regulations in [Sec 1081](#) and collection of residue shall be in accordance with [Sec](#)

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1081 for collection of blast residue. SSPC-SP6, SSPC-SP10 and SSPC-SP11 surface preparation shall be in accordance with the approved blast media and environmental regulations in **Sec 1081** and collection of blast residue shall be in accordance with **Sec 1081**.

2.11 The contractor shall schedule the substructure repairs as one of the first orders of work so that the fiber reinforced polymer wrap for shear strengthening can be installed as required by job special provision Fiber Reinforced Polymer (FRP) Wrap for Concrete Beams.

3.0 Coating Information.

3.1 Straps Removal. Exposed portions of straps for stay-in-place forms shall be removed prior to surface preparation. Straps need not be removed in areas that are not being painted. Flame cutting will not be permitted. The contractor shall exercise care not to damage the existing structure during removal. Any damage sustained to the remaining structure as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

3.2 Slab Drains and Stay-In-Place Forms. The stay-in-place forms, slab drains and slab drain brackets shall not be recoated, overcoated or damaged during the painting operation. Any portion of the slab drain bracket that is blast cleaned shall be recoated with System G. Any damage sustained as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

3.3 Existing Bridge Information. The informational plans may be used by bidders in determining the amount of steel to be cleaned and painted/coated with the full understanding that the State accepts no responsibility for accuracy of the estimated tons of existing steel shown in the table below. The bidder's acceptance and use of the estimate shown below shall be no cause for claim for any final adjustment in the contract unit price for the work involved in repainting. Each bidder is expected to carefully examine the structure(s), investigate the condition of existing paint and prepare their own estimate of quantities involved before submitting a bid. Surface preparation and applying field coatings to the structural steel shall be based on the contract plan quantities. No final measurements will be made.

Bridge No.	Estimated Tons			Existing Paint System	Lead Based
	Coating System		Total		
	System G	Calcium Sulfonate			
A2516	98	0	98	A	Yes

3.4 Environmental Contact. Environmental Section may be contacted at the below address or phone number. The Missouri Department of Health may be contacted at (573) 751-6102.

MoDOT - Design Division - Environmental Section
P.O. Box 270
105 W. Capitol Ave., Jefferson City, MO 65102
Telephone: (573) 526-4778

3.5 Approved Smelter and Hazardous Waste Treatment, Storage and Disposal Facility. The following is the approved smelter and hazardous waste treatment, storage and disposal facility:

Doe Run Company - Resource Recycling Division - Buick Facility
Highway KK

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Boss, MO 65440

Telephone: (573) 626-4813

4.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

B. REMOVAL OF EXISTING BEARINGS

1.0 Description.

1.1 With the deck removed, this work shall consist of, but is not limited to, raising and supporting existing girders and/or beams at the locations specified on the plans, removing and disposing of the existing bearings and anchor bolts and performing all other required preparations prior to installing new bearings and anchor bolts as shown on plans.

1.2 The responsibility for the design and construction of falsework required to support the girders and/or beams during bearing removal and new bearing installation shall rest solely with the contractor. The design shall ensure that the falsework can support all applicable dead loads and any construction loads. The design shall also provide an adequate factor of safety when selecting the temporary support members. The falsework design and working plans including detailed computations shall be signed, sealed and stamped by a registered professional engineer in the State of Missouri in accordance with Authentication of Certain Documents in Sec 107.

1.3 Existing girders and/or beams shall be subject to minimal construction loading by performing this work with the existing deck removed.

2.0 Construction Requirements and Materials.

2.1 Raising and Supporting the Superstructure.

2.1.1 Before beginning operations, the contractor shall submit to the engineer for review the method and sequence of operation proposed to be used in performing this work. With the deck removed, the contractor shall exercise caution when supporting the structural steel and shall raise the girders and/or beams the minimum extent necessary to perform this work with a maximum raise of 1/4 inch. The lifting operation shall be performed only when authorized, but such authorization shall not relieve the contractor of responsibility for the safety of the operation or for damage to the structure. Any damage caused by the contractor's operations shall be repaired at the contractor's expense as approved by the engineer.

2.1.2 Temporary timber supports (bearing stiffeners) shall be placed between the girder and/or beam flanges at each jacking location to prevent flange rotation. Permanent steel stiffening angles shall be designed and attached to the beam web when the beam web thickness is not adequate to support the jacking load.

2.1.3 Raising the girders and/or beams shall be performed simultaneously and shall be performed in a manner to prevent any damage to the adjoining steel.

2.2 Bearing Removal.

2.2.1 After the structural members are supported, the contractor shall remove the existing bearings.

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2.2.2 The contractor shall remove the existing anchor bolts to one inch below the concrete surface or to the extent needed for installation of the new anchor bolts as required by the plans and as authorized by the engineer. The resultant holes shall be filled with a qualified special mortar in accordance with Sec 704.

3.0 Method of Measurement. Final measurement for removal of the existing bearings and preparation for the installation of the new bearings will be made per each.

4.0 Basis of Payment. Payment for furnishing and placing all temporary falsework (including stiffeners), materials, removals, disposal of all falsework, labor, tools, equipment and all incidentals necessary to complete this item will be considered completely covered by the contract unit price for Removal of Existing Bearings.

C. DEFLECTION AND HAUNCHING

1.0 Description. The contractor shall determine dead load deflections and haunching based on field measurements and/or existing bridge plans and these shall be adjusted based on the difference between the new and existing dead load weights.

2.0 Construction Requirements. In order to properly form the haunches for the new deck, the contractor shall survey top of deck elevations above each beam including centerline of roadway and along each beam line (top or bottom flange) prior to deck removal followed by surveying elevations of the beams (top or bottom flange) after deck removal.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

D. FIBER REINFORCED POLYMER (FRP) WRAP FOR CONCRETE BEAMS

1.0 Description. This work shall consist of designing, furnishing, and placing carbon or glass fiber reinforced polymer (FRP) composite wrap to shear strengthen the concrete beam at the locations as shown on bridge plans and as directed by the engineer.

2.0 Materials. The storage and handling of materials for the FRP composite work shall be in accordance with the manufacturer's written recommendations in factory sealed containers with the FRP manufacturer's labels. Labels shall be intact and legible with date of manufacture and shelf life.

2.1 Material Properties.

2.1.1 The contractor shall provide a unidirectional, high-strength fiber fabric fully saturated with compatible epoxy resin per manufacturer's recommendations. FRP provided shall meet or exceed ASTM D3039 test procedure requirements (tensile modulus, stress and strain) as determined from independent laboratory testing.

2.1.2 The contractor shall provide a flexible, waterproofing, non-vapor barrier protective top coating compatible with the FRP manufacturer's recommendations to protect the FRP from ultraviolet radiation and heavy abrasion with a design life of 50 years. This protective top coating shall closely match the gray color appearance of the existing concrete color.

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2.2 Product Data. Manufacturer's product data including physical and chemical characteristics, material specifications for each component, limitations on use of the system, construction or application specifications, maintenance instructions and general manufacturer's recommendations regarding each system shall be provided. Product data on the proposed primer, putty, resin, saturant, and carbon or glass fiber shall be included. Testing information on the combination of the proposed carbon or glass fiber reinforcement and epoxy when used together as a system shall be provided. The contractor shall provide certifications by the producers of the materials that all materials supplied are in accordance with all the requirements and standards of the appropriate ASTM and other agencies. Manufacturer's Material Safety Data Sheets (MSDS) for all materials to be used shall be provided.

2.3 Contractor Submittals. The contractor shall submit the following documentations and obtain approval 30 days before work commences.

2.3.1 Contractor Qualifications. The contractor shall provide a manufacturer's certification of technical training, FRP system selected, project supervisor, and documentation showing the contractor has been certified or approved by the manufacturer of the FRP system. A contractor specializing in the supply and installation of FRP repair systems with minimum of 5 years of documented experience or 25 documented similar field applications with acceptable reference letters from respective owners in performing FRP composite retrofits shall perform the work. A trained project supervisor shall remain at the work site at all times to instruct the work crew in the FRP application procedures.

2.3.2 Shop Drawings. Shop drawings shall be submitted signed and sealed by a Missouri Professional Engineer in accordance with [Sec 107](#) for Authentication of Certain Documents. Shop drawings shall include the detail of types, locations, dimensions, number of layers and splice details and orientation of all FRP materials and coatings to be installed.

2.3.3 Calculations.

2.3.3.1 Concrete Beam Shear Strengthen. Signed and sealed calculations with the shop drawings shall be submitted indicating that the proposed system provides the additional design forces required at the locations indicated on the plans. The fiber reinforced polymer wrapping shall be designed in accordance with NCHRP Report 678, Design of FRP System for Strengthening Concrete Girders in Shear.

3.0 Construction Requirements.

3.1 FRP Wrapping. FRP shear reinforcement shall be by complete wrapping except where objects interfere, in those places U-wrap shall be used. FRP wrapping along the portion of the member length to be strengthened may be applied continuously or as discrete strips with a maximum of 12" spacing centerline to centerline. Fibers in the FRP in its final position on the concrete component shall be oriented in the direction that maximizes the effectiveness of the FRP reinforcement. Anchorage shall be required for U-wrap and overlap shall be required for complete wrap as per the manufacturer's recommendation. Additional horizontal strips of FRP shall not be used as anchorage for FRP shear reinforcement.

3.2 Concrete Moisture Requirement. The surfaces of the concrete to receive the FRP composite shall be reasonably dry based on the following test. A 3 x 3 foot polyethylene sheet shall be taped to the existing concrete surface and at any substructure repair area. If moisture collects on the underside of the polyethylene sheet before the epoxy would cure, the concrete shall be allowed to dry longer. The concrete surface shall pass this test before the FRP can be applied.

3.3 Surface Preparation. Spalled and loose concrete shall be removed and concrete surfaces restored to their original dimensions using substructure repair in accordance with [Sec 704](#). The new concrete in the substructure repair areas shall cure for a minimum of 28 days before the FRP is applied. Concrete surfaces of existing or patched concrete to receive an application of FRP material shall be prepared by abrasive blasting or grinding to remove existing laitance and expose aggregate to a minimum ICRI-CSP3 concrete surface profile. All FRP contact surfaces shall have all laitance, dust, dirt, oil, curing compound, existing coatings and any other foreign matter removed that could interfere with the bond between the FRP system and the concrete. Localized out-of-plane variations, including form lines, shall not exceed the smaller of 1/32 inch or the tolerances recommended by the FRP manufacturer's recommendation. Sharp and chamfered corners shall be rounded off to a minimum radius of 1/2 inch by grinding or forming with the system's thickened epoxy. Variations in the radius along the vertical edge shall not exceed 1/2 inch for each foot of length.

3.4 Installation of FRP. The concrete and atmospheric temperatures shall be between 40°F and rising and 90°F and falling during installation of the FRP. Tension adhesion testing shall be conducted using ASTM D7234 with the strengths reaching 200 psi. Any failure shall exhibit failure of the concrete substrate before failure of the adhesive. Tension adhesion testing shall cease when strengths reach 200 psi. Any failure of the concrete substrate and/or FRP adhesion shall be repaired at the contractor's expense and as directed by the engineer. Two adhesion tests shall be performed for each bent having FRP being applied. The FRP shall be installed in accordance with the manufacturer's written recommendations and as required by the job special provisions.

4.0 Method of Measurement. Fiber reinforced polymer wrap will be measured to the nearest square foot based on the member surface area as detailed on the contract plans. No additional compensation will be given for the use of multiple layers of material to achieve design strength. Final measurements will not be made except for authorized changes during construction or where significant errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity.

5.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary to complete this item, will be considered completely covered by the contract unit price for Fiber Reinforced Polymer Wrap.

E. RECONFIGURE EXISTING STRUCTURAL STEEL

1.0 Description. This work shall consist of furnishing the necessary materials, labor, and equipment for removal of the existing hinged beam connections and adjacent structural steel near Int. Bt. No. 2 and 5. The existing structural steel in the end spans adjacent to the removed steel may be temporarily supported-in-place or removed to be reinstalled. The ends of the existing structural steel in Span 2 and 4 that is to be used-in-place shall be temporarily supported or removed to the splice in span 2 and 4 and reinstalled. The installation of the new structural steel spliced to the existing structural steel will make the bridge superstructure continuous for its entire length. This work shall be done as specified herein and in accordance with Sec 712 and 1080 and the plans.

2.0 Supporting the Superstructure.

2.1 The existing bridge deck shall be removed before the existing structural steel is reconfigured. Before commencing operations, the contractor shall submit to the engineer complete working plans for the temporary support of the stringers, if required, for review. The

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method and sequence of operation proposed in performing this work shall be submitted to the engineer for review. The working plans, if required, shall be signed, sealed and stamped by a registered professional engineer in the State of Missouri in accordance with Authentication of Certain Documents in [Sec 107](#). The reconfiguration of existing structural steel shall be done only when authorized, but such authorization shall not relieve the contractor of responsibility for the safety of the operation or for damage to the structure.

2.2 The contractor shall exercise caution during the entire operation to protect the bridge from damage. Any damage to the existing structure as a result of this work shall be repaired to the satisfaction of the engineer at the contractor's expense.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work including all material, labor, tools, equipment, and all incidentals necessary to complete this item of work will be considered completely covered by the contract lump sum price for "Reconfigure Existing Structural Steel".

F. STRUCTURAL STEEL REQUIREMENTS

1.0 Description. This provision contains general structural steel requirements for this project.

2.0 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as shown below. The gray epoxy-mastic primer (non-aluminum) shall be compatible with concrete and produce a dry film thickness of no less than 3 mils (75 µm).

Item	Section
Structural Steel Construction	712
Gray Epoxy-Mastic Primer (non-aluminum)	1045
Structural Steel Fabrication	1080
Coating of Structural Steel	1081

3.0 Construction Requirements.

3.1 Before fabrication of new metalwork, the contractor shall make the necessary measurements in the field to verify dimensions of the existing structure where new members are affected. Any deviation of the dimensions shown on the plans shall be called to the engineer's attention. The contractor shall be responsible for developing all required dimensional adjustments and coordinating the implementation of the dimensional adjustments with all involved fabricators and subcontractors.

3.2 Prior to erection of the new structural steel, the steel that is to remain shall be carefully inspected for irregularities. If such irregularities are found, the irregularities shall be brought to the attention of the engineer.

3.3 Holes in the new diaphragm or cross frame connection plates and angles may be used as a template for drilling the holes in the existing material.

3.4 A minimum edge distance shall be maintained for all field drilled holes. The minimum edge distance for bolts shall be as shown in table below measured from the centerline of holes.

Bolt Diameter	Minimum Edge Distance
inch (mm)	inch (mm)

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Bolt Diameter	Minimum Edge Distance
inch (mm)	inch (mm)
3/4 (19.0)	1-1/4 (32)
7/8 (22.2)	1-1/2 (38)
1 (25.4)	1-3/4 (45)

3.5 The surfaces of existing steel that will become faying surfaces for non-slip critical new connections, typically secondary members, shall be cleaned according to the manufacturer's recommendation and with a minimum of SSPC-SP-3 surface preparation and coated with one prime coat of Gray Epoxy-Mastic Primer (non-aluminum) in accordance with [Sec 1081](#). The surfaces of existing steel that will become faying surfaces for slip critical new connections, typically primary members, shall be in accordance with contact surfaces in [Sec 1081](#). Primary member connections include girder/beam splices, end diaphragms and intermediate diaphragms in curved structures.

3.6 Exposed girder/beam areas that are not faying surfaces or not covered by concrete that are scratched, damaged by the contractor or by field welding operations shall be touched up with Gray Epoxy-Mastic Primer (non-aluminum) in accordance with [Sec 1081](#). The areas shall receive the coating system as shown on the plans.

4.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for the structural steel items included in the contract. No payments or adjustments will be made where new members are affected due to any deviation of the dimensions shown on plans or shop drawings.

G. RAPID SET CONCRETE PATCHING MATERIAL – HORIZONTAL REPAIRS

1.0 Description. This specification covers cementitious concrete, polymer-modified concrete and polymer concrete that are suitable for repairing concrete surfaces on bridges or roadways, particularly under fast setting or special conditions. The repairs would involve horizontal applications. The work shall consist of removing, furnishing, preparing, and placing materials at locations as shown on the plans or as directed by the engineer.

2.0 Material. All materials shall be in accordance with MoDOT specifications and as noted herein.

2.1 Aggregate For Extending Commercial Mixture. Coarse and fine aggregates shall be in accordance with [Sec 1005](#), except the requirements for gradation and percent passing the No. 200 sieve shall not apply. Coarse aggregate meeting Gradation E requirements shall be used for repairs greater than one inch (25 mm) in depth. Fine aggregate will be allowed for repairs less than one inch (25 mm). Aggregate specified, bagged, labeled and furnished by the rapid set concrete patching material manufacturer may also be used for mortar extension.

2.2 Material Applications. The contractor shall select and use the product most suitable for the work and field conditions in accordance with these specifications.

2.3 Curing. Rapid set concrete patching material shall be cured until the minimum compressive strength 3200 psi is attained using standard curing specifications, unless otherwise specified by the manufacturer.

2.4 Qualification and Project Acceptance.

2.4.1 Inspection. All materials shall be subject to inspection and sampling by MoDOT at the source of manufacture, intermediate shipping terminal or destination. MoDOT will be allowed free access to all facilities and records as required to conduct inspection and sampling.

2.4.2 Qualification. Prior to use, rapid set concrete patching material shall be qualified. In order to become qualified, a material shall have completed testing through AASHTO's National Transportation Product Evaluation Program (NTPEP). The manufacturer shall contact the AASHTO/NTPEP coordinator to obtain the testing location for the rapid setting concrete patching material.

2.4.2.1 Requested Information. The manufacturer shall submit with samples of the materials, a written request to Construction and Materials with the following information:

- (a) Brand name of the product.
- (b) Certification that the material meets this specification.
- (c) NTPEP test results showing compliance with this special provision.
- (d) Specific mixing, handling and curing instructions.
- (e) Application type (i.e., bridge or roadway).

2.4.2.2 Qualified List. Upon approval by the engineer, the brand name and manufacturer will be placed on a qualified list of rapid set concrete patching materials. The listing of qualified materials is available from Construction and Materials or on MoDOT's web site. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed. The material will be subject to removal from the qualified list if there is evidence of unsatisfactory performance or a change in manufacturing process or formulation, or when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

2.4.3 Provisional Approval. Provisional approval may be granted provided the following requirements have been met:

- (a) New Products Evaluation Form
- (b) Certified test results from an independent laboratory showing compliance with this special provision.
- (c) Documentation prepared by MoDOT covering two years of field performance on MoDOT's system. MoDOT will need to approve the location of the test site. Documentation will contain the placement date, field observations (semi annual), description of field performance and photographs of in-place material.
- (d) During placement the manufacturer's representative shall be present on the project to provide technical expertise.

2.4.3.1 Disqualification. If during the two year observation period the repair area(s) fails provisional approval will not be granted. Repair area(s) experiencing any cracking, debonding or spalling will be considered a failure.

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2.4.3.2 Length of Provisional Approval. Provisional approval will be granted for three years or until NTPEP testing is completed.

2.5 Certification. The contractor shall supply a manufacturer's certification to the engineer for each lot of material furnished. The certification shall include the name of the manufacturer, a manufacturer certification statement that the material supplied is the same as that qualified and listing the date of qualification.

2.6 Acceptance. Acceptance of the material will be based on the use of a qualified or provisionally approved material, the manufacturer's certification that the material supplied is the same as that approved and upon the results of such tests as may be performed by the engineer.

3.0 Mixture. Unless otherwise specified, rapid set concrete patching material shall be approved commercial mixtures meeting [Sections 3.1 – 3.1.3](#) or deck repair cementitious mortar meeting [Section 3.2](#). Rapid set concrete patching materials shall be specifically designed for the application needed.

3.1 Commercial Mixtures. Rapid set concrete patching material in its sacked form and mixtures when properly prepared in accordance with the manufacturer's specifications, shall meet the minimum test requirements given in Table 1. Mixtures may be supplied, as required, as a patching mortar or as a patching mortar with aggregate extension. If the material is to be supplied with extender aggregate, this shall also pass the required tests in Table 1 using the maximum allowed amount of extender aggregate.

3.1.1 Mixture Requirements. Rapid set concrete patching material shall be single packaged dry mix requiring the addition of water or other liquid component just prior to mixing. The material shall be capable of ½ inch (13 mm) to full depth repair and require no bonding agent. The material shall not contain soluble chlorides as an ingredient of manufacture. The material shall be placed in accordance to the manufacturer's recommendations.

Table 1 (English Unit)				
Physical Test Property	Specification	Requirement for cementitious concrete	Requirement for polymer-modified concrete	Requirement for polymer concrete
Bond Strength by Slant Shear ¹	ASTM C882/C928 ³	min. 1000 psi @ 24hrs. & min. 1500 psi @ 7 days	n/a	min. 1000 psi @ 24hrs. & min. 1500 psi @ 7 days
Linear Coefficient of Thermal Expansion ^{1, 2} (for bagged mortar only, without extension aggregate)	ASTM C531	n/a	n/a	4 – 8 X 10-6 in/in/deg F
Resistance to Rapid Freezing & Thawing ¹	AASHTO T161 or ASTM C666	80% min. using Procedure B ⁵ (300 Cycles)	80% min. using Procedure B ⁵ (300 Cycles)	n/a
Compressive Strength ¹	AASHTO T22 or ASTM C39	3200 psi @ 3 hr &	3200 psi @ 3 hr &	n/a

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		4000 psi @ 7 days	4000 psi @ 7 days	
Rapid Chloride Permeability ¹	AASHTO T277 or ASTM C1202	<u>Bridge Decks</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days	<u>Bridge Deck</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days	<u>Bridge Deck</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days
Length Change ^{1, 4}	AASHTO T 160 or ASTM C157	In water Storage (+0.15) In air storage (-0.15)	In water storage (+0.15) In air storage (-0.15)	n/a
Color		gray	gray	gray

¹The commercial mix test values can be located in the AASHTO's National Transportation Product Evaluation Program (NTPEP) reports for Laboratory Evaluations of Rapid Set Concrete Patching Materials. Data for provisionally approved materials is located at the Construction and Materials Division.

²Not required for extended mixtures if the mortar passes this requirement.

³ ASTM C882 shall be performed on non-water based materials. ASTM C928 shall be performed on water-based materials.

⁴ As modified by ASTM C928.

⁵ Procedure A may be used in lieu of Procedure B

3.1.2 Construction Requirements. The manufacturer shall provide with the bagged mixture, specifications for the mixing procedure, amount and kind of liquid to be added, and the amount of aggregate extension allowed, if any. All mixing, handling and curing practices recommended by the manufacturer shall be followed and will be considered a part of these specifications.

3.1.3 Removal from Qualified List. All mixtures shall be approved before use. Reoccurring failures of any mixture for any reason will be cause for removal from the qualified list.

3.2 Deck Repair Concrete. A qualified rapid set concrete patching material indicated for horizontal use and intended for patching concrete bridge decks may be used when specified on the plans and as approved by the engineer. If this option is selected, the contractor shall provide a trial mix to determine the total cure time needed to achieve a compressive strength of 3200 psi (22 MPa). Compressive specimens shall be prepared in accordance with current MoDOT test methods and cured to simulate actual field conditions. Testing of compressive specimens shall be performed by methods and at facilities acceptable to the engineer. The repaired deck shall not be opened to traffic until at least 4 hours after the last placement of deck repair concrete, the established cure time has elapsed and until such concrete has achieved a compressive strength of 3200 psi (22 MPa). A new trial mix may be required if the engineer determines the field conditions vary substantially from trial mix conditions. The engineer will make field cylinders to verify the 3200 psi (22 MPa) minimum strength.

4.0 Construction Requirements.

4.1 Mixing. Rapid set concrete patching material shall be mixed and finished according to the manufacturer's recommendation.

4.2 Preparation of Repair Area. Deteriorated, damaged or defective concrete as shown on the plans, required by the specifications or as directed by the engineer, shall be removed. All exposed reinforcement shall be thoroughly cleaned as shown on the plans, required by the specifications or as directed by the engineer. Unless otherwise specified by the commercial

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mixture manufacturer, the existing surface shall be damp and all free water shall be removed prior to placement of the required material.

4.3 Bonding Agent. A bonding agent may be used if recommended by the rapid set concrete patching material manufacturer.

5.0 Method of Measurement. No measurement will be made for rapid set concrete patching material.

6.0 Basis of Payment. Rapid set concrete patching material will be paid for at the contract unit price for other items and will be considered full compensation for all labor, equipment and material to complete the described work.

H. **RAPID SET CONCRETE PATCHING MATERIAL – VERTICAL AND OVERHEAD REPAIRS**

1.0 Description. This specification covers cementitious concrete, polymer-modified concrete and polymer concrete that are suitable for repairing concrete surfaces on bridges or concrete structures, particularly under fast setting or special conditions. The repairs would involve vertical or overhead applications. The work shall consist of removing, furnishing, preparing, and placing materials at locations as shown on the plans or as directed by the engineer.

2.0 Material. All materials shall be in accordance with MoDOT specifications and as noted herein.

2.1 Aggregate. For Extending Commercial Mixture. Coarse and fine aggregates shall be in accordance with [Sec 1005](#), except the requirements for gradation and percent passing the No. 200 sieve shall not apply. Coarse aggregate meeting Gradation E requirements shall be used for repairs greater than one inch (25 mm) in depth. Fine aggregate will be allowed for repairs less than one inch (25 mm). Aggregate specified, bagged, labeled and furnished by the rapid set concrete patching material manufacturer may also be used for mortar extension.

2.2 Material Applications. The contractor shall select and use the product most suitable for the work and field conditions in accordance with these specifications.

2.3 Curing. Rapid set concrete patching material shall be cured until the minimum compressive strength 1500 psi is attained using standard curing specifications, unless otherwise specified by the manufacturer.

2.4 Qualification and Project Acceptance.

2.4.1 Inspection. All materials shall be subject to inspection and sampling by MoDOT at the source of manufacture, intermediate shipping terminal or destination. MoDOT will be allowed free access to all facilities and records as required to conduct inspection and sampling.

2.4.2 Qualification. Prior to use, rapid set concrete patching materials need to be qualified.

2.4.2.1 Requested Information. The manufacturer shall submit with samples of the materials, a written request to Construction and Materials with the following information:

- (a) New Products Evaluation Form
- (b) Brand name of the product.

- (c) Certification that the material meets this specification.
- (d) Certified test results from an independent laboratory showing compliance with this specification.
- (e) Specific preparation instructions of repair area.
- (f) Specific mixing, handling and curing instructions.
- (g) Application type (i.e., vertical or overhead).

2.4.2.2 Field Evaluation. Final approval will be granted when the following requirements are met:

- (e) MoDOT report documenting two years of field performance on MoDOT system. The report will contain the placement date, field observations (semi annual), description of field performance and photographs of in-place material.
- (f) A manufacturer's representative shall be present during placement of the material to provide technical expertise.

2.4.2.2.3 Disqualification. If during the two year observation period the repair area(s) fails the product will not be added to the qualified list.

2.5 Qualified List. The listing of qualified products are available from Construction and Materials or on MoDOT's web site. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed. The material will be subject to removal from the qualified list if there is evidence of unsatisfactory performance or a change in manufacturing process or formulation, or when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

2.6 Certification. The contractor shall supply a manufacturer's certification to the engineer for each lot of material furnished. The certification shall include the name of the manufacturer, a manufacturer certification statement that the material supplied is the same as that qualified and listing the date of qualification.

2.7 Acceptance. Acceptance of the material will be based on the use of a qualified product, the manufacturer's certification that the material supplied is the same as that approved and upon the results of such tests as may be performed by the engineer.

3.0 Mixture. Unless otherwise specified, rapid set concrete patching material shall be approved commercial mixtures meeting [Sections 3.1 – 3.1.3](#). Rapid set concrete patching materials shall be specifically designed for the application needed.

3.1 Commercial Mixtures. Rapid set concrete patching material in its sacked form and mixtures when properly prepared in accordance with the manufacturer's specifications, shall meet the minimum test requirements given in Table 1. Mixtures may be supplied, as required, as a patching mortar or as a patching mortar with aggregate extension. If the material is to be supplied with extender aggregate, this shall also pass the required tests in Table 1 using the maximum allowed amount of extender aggregate.

JOB SPECIAL PROVISIONS (BRIDGE)

3.1.2 Mixture Requirements. Rapid set concrete patching material shall be single packaged dry mix requiring the addition of water or other liquid component just prior to mixing. The material shall not contain soluble chlorides as an ingredient of manufacture. The material shall be placed in accordance to the manufacturer's recommendations.

Table 1 (English Unit)				
Physical Test Property	Specification	Requirement for cementitious concrete	Requirement for polymer-modified concrete	Requirement for polymer concrete
Bond Strength by Slant Shear	ASTM C882/C928 ²	min. 1000 psi @ 24hrs.& min. 1500 psi @ 7 days	n/a	min. 1000 psi @ 24hrs.& min. 1500 psi @ 7 days
Linear Coefficient of Thermal Expansion ¹ (for bagged mortar only, without extension aggregate)	ASTM C531	n/a	n/a	4 – 8 X 10-6 in/in/deg F
Resistance to Rapid Freezing & Thawing	AASHTO T161 or ASTM C666	80% min. using Procedure B ³ (300 Cycles)	80% min. using Procedure B ³ (300 Cycles)	n/a
Compressive Strength	AASHTO T22 or ASTM C39	1500 psi @ 3 hr & 3000 psi @ 24 hr	1500 psi @ 3 hr & 3000 psi @ 24 hr	n/a
Rapid Chloride Permeability	AASHTO T277 or ASTM C1202	1000 coulombs @ 28 days	1000 coulombs @ 28 days	1000 coulombs @ 28 days
Length Change	AASHTO T 160 or ASTM C157	In water Storage (+0.15) In air storage (-0.15)	In water storage (+0.15) In air storage (-0.15)	n/a
Color		gray	gray	gray

¹ Not required for extended mixtures if the mortar passes this requirement.

² ASTM C882 shall be performed on non-water based materials. ASTM C928 shall be performed on water-based materials.

³ Procedure A may be used in lieu of Procedure B

3.1.2 Construction Requirements. The manufacturer shall provide with the bagged mixture, specifications for the mixing procedure, amount and kind of liquid to be added, and the amount of aggregate extension allowed, if any. All mixing, handling and curing practices recommended by the manufacturer shall be followed and will be considered a part of these specifications.

3.1.3 Removal from Qualified List. All mixtures shall be approved before use. Reoccurring failures of any mixture for any reason will be cause for removal from the qualified list.

3.2 Vertical Repair. A qualified rapid set concrete patching material approved for vertical use may be used when specified on the plans and as approved by the engineer. The engineer will make field cylinders to verify the 1500 psi (10 MPa) minimum strength. The material shall adhere to the concrete surface without sagging.

3.3 Overhead Repair. A qualified rapid set concrete patching material approved for overhead use may be used when specified on the plans and as approved by the engineer. The material shall be placeable in layers of at least 1 inch on overhead applications without the use of formwork or anchoring devices. The material shall adhere to the concrete surface without sagging. The engineer will make field cylinders to verify the 1500 psi (10 MPa) minimum strength.

4.0 Construction Requirements.

4.1 Mixing. Rapid set concrete patching material shall be mixed and finished according to the manufacturer's recommendation.

4.2 Preparation of Repair Area. Deteriorated, damaged or defective concrete as shown on the plans, required by the specifications or as directed by the engineer, shall be removed. All exposed reinforcement shall be thoroughly cleaned as shown on the plans, required by the specifications or as directed by the engineer. Unless otherwise specified by the commercial mixture manufacturer, the existing surface shall be damp and all free water shall be removed prior to placement of the required material.

4.3 Bonding Agent. A bonding agent may be used if recommended by the rapid set concrete patching material manufacturer.

5.0 Method of Measurement. No measurement will be made for rapid set concrete patching material.

6.0 Basis of Payment. Rapid set concrete patching material will be paid for at the contract unit price for other items and will be considered full compensation for all labor, equipment and material to complete the described work.

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- C. Cleaning and Coating Existing Bearings
- D. Strengthening Existing Beams
- E. Non-Destructive Testing

	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65101 Phone (888) 275-6636
	If a seal is present on this sheet, JSP's has been electronically sealed and dated.
	JOB NO. J1S3230 Daviess County, MO Date Prepared: 7/22/2021
Only the following items of the Job Special Provisions (Bridge) are authenticated by this seal: ALL	

A. CONSTRUCTION REQUIREMENTS

1.0 Description. This provision contains general construction requirements for this project.

2.0 Construction Requirements. The plans and the asbestos and lead inspection report for the existing structure(s) are included in the contract in the bridge electronic deliverables zip file for informational purposes only.

2.1 In order to assure the least traffic interference, the work shall be scheduled so that the bridge closure is for the absolute minimum amount of time required to complete the work. The bridge shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed bridge is opened to traffic.

2.2 Bridge work by contractor forces, including erection, rehabilitation or demolition, shall not be allowed over traffic unless a bridge platform protection system is installed below the work area except for work performed above a deck that is intact. The protection system shall be capable of catching all falling objects such as tools, overhang brackets or materials. Lifting of objects that are heavier than the capacity of the bridge protection system shall not be permitted.

2.3 The existing slab for the bridge(s) to be redecked was constructed as composite or non-composite as shown in the table below.

Bridge No.	Type of deck
A0876	Composite

2.4 Provisions shall be made to prevent any debris and material from falling into the waterway. If determined necessary by the engineer, any debris and material that falls below the bridge outside the previously specified limits shall be removed as approved by the engineer at the contractor's expense.

2.5 Any damage sustained to the remaining structure as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

2.6 Provisions shall be made to prevent damage to any existing utilities. Any damage sustained to the utilities as a result of the contractor's operations shall be the responsibility of the contractor. All costs of repair and disruption of service shall be as determined by the utility owners and as approved by the engineer.

2.7 A washer shall be required under head and nut when any reaming is performed for bolt installation.

2.8 SSPC-SP2 and SSPC-SP3 surface preparation shall be in accordance with the environmental regulations in [Sec 1081](#) and collection of residue shall be in accordance with [Sec 1081](#) for collection of blast residue. SSPC-SP6, SSPC-SP10 and SSPC-SP11 surface preparation shall be in accordance with the approved blast media and environmental regulations in [Sec 1081](#) and collection of blast residue shall be in accordance with [Sec 1081](#).

3.0 Coating Information.

3.1 Straps Removal. Exposed portions of straps for stay-in-place forms shall be removed prior to surface preparation. Straps need not be removed in areas that are not being painted. Flame

cutting will not be permitted. The contractor shall exercise care not to damage the existing structure during removal. Any damage sustained to the remaining structure as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

3.2 Slab Drains and Stay-In-Place Forms. The stay-in-place forms, slab drains and slab drain brackets shall not be recoated, overcoated or damaged during the painting operation. Any portion of the slab drain bracket that is blast cleaned shall be recoated with System G. Any damage sustained as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

3.3 Existing Bridge Information. The informational plans may be used by bidders in determining the amount of steel to be cleaned and painted/coated. The existing paint system for bridge A0876 is System A done in 1963.

3.4 Environmental Contact. Environmental Section may be contacted at the below address or phone number. The Missouri Department of Health may be contacted at (573) 751-6102.

MoDOT - Design Division - Environmental Section
P.O. Box 270
105 W. Capitol Ave., Jefferson City, MO 65102
Telephone: (573) 526-4778

3.5 Approved Smelter and Hazardous Waste Treatment, Storage and Disposal Facility. The following is the approved smelter and hazardous waste treatment, storage and disposal facility:

Doe Run Company - Resource Recycling Division - Buick Facility
Highway KK
Boss, MO 65440
Telephone: (573) 626-4813

5.0 Method of Measurement. No measurement will be made.

6.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

B. DEFLECTION AND HAUNCHING

1.0 Description. The contractor shall determine dead load deflections and haunching based on field measurements and/or existing bridge plans and these shall be adjusted based on the difference between the new and existing dead load weights.

2.0 Construction Requirements. In order to properly form the haunches for the new deck, the contractor shall survey top of deck elevations above each beam including centerline of roadway and along each beam line (top or bottom flange) prior to deck removal followed by surveying elevations of the beams (top or bottom flange) after deck removal.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

C. CLEANING AND COATING EXISTING BEARINGS

1.0 Description. This work shall consist of cleaning and coating existing bearings as specified on the plans and as directed by the engineer.

2.0 Construction Requirements.

2.1 Cleaning and Coating. Bearings shall be cleaned and coated with a 3 coat System G in accordance with [Sec 1081](#). Coating of bearings shall be as indicated in the plans for the bearings at the intermediate bents on bridge A0876.

3.0 Method of Measurement. Measurement for cleaning and coating existing bearings will be made per each.

4.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary to complete this item, will be considered completely covered by the contract unit price for "Cleaning and Coating Existing Bearings".

D. STRENGTHENING EXISTING BEAMS

1.0 Description. This work shall consist of strengthening existing beams as shown on the plans after the deck has been removed.

2.0 Materials. No shop drawings will be required.

3.0 Construction Requirements. Structural steel construction shall be in accordance with [Sec 712](#). Prior to installation of the new structural steel, the existing steel shall be carefully inspected for irregularities. Any irregularities shall be brought to the attention of the engineer.

3.2 Supporting and Raising Existing Beams. When the plans required supporting and raising the existing beams, the following shall be required.

- (a) The safe load per beam indicated on the plans for the temporary supports does not include a factor of safety. The contractor shall provide an adequate factor of safety when selecting the temporary support members.
- (b) Temporary timber supports shall be placed at each jacking point as shown on the plans. All beams within a span shall be jacked and supported simultaneously to prevent damage to the slab. The beams shall be raised prior to completing the welding with the flange plates in place. All welding shall be completed prior to removing the temporary supports.

3.3 Contact Surfaces. The surface of the existing flanges that will come in contact with the new steel plates shall be cleaned to a SSPC-SP2 degree of cleanliness. The surfaces of new steel shall be cleaned to SSPC-SP6 degree of cleanliness. The existing and new plates contact surfaces shall be coated with one coat of gray epoxy-mastic primer (non-aluminum) in accordance with [Sec 1081](#).

3.4 Welding Requirements. The areas to be welded shall be cleaned to an SSPC-SP11 degree of cleanliness. All welding shall be performed by a certified welder in accordance with [Sec 712](#). All welding shall be in accordance with [Sec 712](#). E7018 welding electrode or self shielded welding process from the MoDOT approved electrode list shall be used.

3.5 Gray Epoxy-Mastic Primer. Any surrounding touch up areas and any existing paint damaged by the repair work shall be cleaned and coated with one coat of gray epoxy-mastic primer (non-aluminum) in accordance with [Sec 1081](#).

4.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work needed to complete this item, will be considered completely covered by the contract lump sum price for "Strengthening Existing Beams".

E. NON-DESTRUCTIVE TESTING

1.0 Description. This work shall consist of performing non-destructive testing on the welds of all existing top flange cover plates.

2.0 Construction Requirements.

2.1 After the concrete deck is removed, the steel that is to remain will be inspected by the engineer. In addition to this inspection, the welds and adjacent base metal at the ends of the top cover plates shall have non-destructive (magnetic particle) testing performed. Non-destructive testing shall be performed by an acceptable testing agency. The contractor shall provide the engineer with documentation of the testing agency and the qualifications of personnel performing the testing. The documentation and qualifications shall be submitted to the State Bridge Engineer for acceptance. Personnel performing the tests shall be qualified for SNT-TC-1A Level II.

2.2 The length of weld to be tested and the base metal, one inch either side of the weld, shall be cleaned of all rust prior to the testing. On cover plates with square ends, the weld shall be tested one inch from each corner along the ends of the cover plate plus 6 inches back along the side from each corner of the plate. On cover plates with tapered ends, the weld shall be tested along the end of the cover plate, along tapered edges and 6 inches back along the cover plate from end of taper.

2.3 If fatigue cracks are found, the cracks are expected to be very small and may be located in the base metal at the toe of the welds. Any cracks discovered by testing, regardless of length, shall be marked and reported to the engineer. All repairs shall be made by a certified welder in accordance with [Sec 712.6](#). Any repair work and retesting of the repair work required, as a result of this inspection, will be paid for in accordance with [Sec 109](#). This shall not relieve the contractor from responsibility to repair any damage caused by this work at the contractor's expense. Any delay or inconvenience caused by this inspection requirement will be non-compensable and effect on time of performance non-excusable.

3.0 Method of Measurement. Measurement of non-destructive testing will be to the nearest linear foot. The extent of non-destructive testing may vary from the estimated quantities, but the contract unit price shall prevail regardless of the variation. Final measurements will not be made except for authorized changes during construction, or where appreciable errors are found in the

JOB SPECIAL PROVISIONS (BRIDGE)

contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity.

4.0 Basis of Payment. Accepted quantities of non-destructive testing will be paid for at the contract unit price. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary to complete this item, will be considered completely covered by the contract unit price for Non-Destructive Testing.

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	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65101 Phone (888) 275-6636
	If a seal is present on this sheet, JSP's has been electronically sealed and dated.
	JOB NO. J1S3278 Putnam County, MO Date Prepared: 7/22/2021
Only the following items of the Job Special Provisions (Bridge) are authenticated by this seal: ALL	

A. CONSTRUCTION REQUIREMENTS

1.0 Description. This provision contains general construction requirements for this project.

2.0 Construction Requirements. The plans and the asbestos and lead inspection report for the existing structure(s) are included in the contract in the bridge electronic deliverables zip file for informational purposes only.

2.1 In order to assure the least traffic interference, the work shall be scheduled so that the bridge closure is for the absolute minimum amount of time required to complete the work. The bridge shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed bridge is opened to traffic.

2.2 The existing slab for the bridge(s) to be redecked was constructed as composite or non-composite as shown in the table below.

Bridge No.	Type of deck
N0133	Non-composite

2.3 Provisions shall be made to prevent any debris and material from falling into the waterway. If determined necessary by the engineer, any debris and material that falls below the bridge outside the previously specified limits shall be removed as approved by the engineer at the contractor's expense.

2.4 Any damage sustained to the remaining structure as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

2.5 Provisions shall be made to prevent damage to any existing utilities. Any damage sustained to the utilities as a result of the contractor's operations shall be the responsibility of the contractor. All costs of repair and disruption of service shall be as determined by the utility owners and as approved by the engineer.

2.6 A washer shall be required under head and nut when any reaming is performed for bolt installation.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

B. RAPID SET CONCRETE PATCHING MATERIAL – VERTICAL AND OVERHEAD REPAIRS

1.0 Description. This specification covers cementitious concrete, polymer-modified concrete and polymer concrete that are suitable for repairing concrete surfaces on bridges or concrete structures, particularly under fast setting or special conditions. The repairs would involve vertical or overhead applications. The work shall consist of removing, furnishing, preparing, and placing materials at locations as shown on the plans or as directed by the engineer.

JOB SPECIAL PROVISIONS (BRIDGE)

2.0 Material. All materials shall be in accordance with MoDOT specifications and as noted herein.

2.1 Aggregate. For Extending Commercial Mixture. Coarse and fine aggregates shall be in accordance with [Sec 1005](#), except the requirements for gradation and percent passing the No. 200 sieve shall not apply. Coarse aggregate meeting Gradation E requirements shall be used for repairs greater than one inch (25 mm) in depth. Fine aggregate will be allowed for repairs less than one inch (25 mm). Aggregate specified, bagged, labeled and furnished by the rapid set concrete patching material manufacturer may also be used for mortar extension.

2.2 Material Applications. The contractor shall select and use the product most suitable for the work and field conditions in accordance with these specifications.

2.3 Curing. Rapid set concrete patching material shall be cured until the minimum compressive strength 1500 psi is attained using standard curing specifications, unless otherwise specified by the manufacturer.

2.4 Qualification and Project Acceptance.

2.4.1 Inspection. All materials shall be subject to inspection and sampling by MoDOT at the source of manufacture, intermediate shipping terminal or destination. MoDOT will be allowed free access to all facilities and records as required to conduct inspection and sampling.

2.4.2 Qualification. Prior to use, rapid set concrete patching materials need to be qualified.

2.4.2.1 Requested Information. The manufacturer shall submit with samples of the materials, a written request to Construction and Materials with the following information:

- (a) New Products Evaluation Form
- (b) Brand name of the product.
- (c) Certification that the material meets this specification.
- (d) Certified test results from an independent laboratory showing compliance with this specification.
- (e) Specific preparation instructions of repair area.
- (f) Specific mixing, handling and curing instructions.
- (g) Application type (i.e., vertical or overhead).

2.4.2.2 Field Evaluation. Final approval will be granted when the following requirements are met:

- (a) MoDOT report documenting two years of field performance on MoDOT system. The report will contain the placement date, field observations (semi annual), description of field performance and photographs of in-place material.
- (b) A manufacturer's representative shall be present during placement of the material to provide technical expertise.

2.4.2.2.3 Disqualification. If during the two year observation period the repair area(s) fails the product will not be added to the qualified list.

2.5 Qualified List. The listing of qualified products are available from Construction and Materials or on MoDOT's web site. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed. The material will be subject to removal from the qualified list if there is evidence of unsatisfactory performance or a change in manufacturing process or formulation, or when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

2.6 Certification. The contractor shall supply a manufacturer's certification to the engineer for each lot of material furnished. The certification shall include the name of the manufacturer, a manufacturer certification statement that the material supplied is the same as that qualified and listing the date of qualification.

2.7 Acceptance. Acceptance of the material will be based on the use of a qualified product, the manufacturer's certification that the material supplied is the same as that approved and upon the results of such tests as may be performed by the engineer.

3.0 Mixture. Unless otherwise specified, rapid set concrete patching material shall be approved commercial mixtures meeting [Sections 3.1 – 3.1.3.](#) Rapid set concrete patching materials shall be specifically designed for the application needed.

3.1 Commercial Mixtures. Rapid set concrete patching material in its sacked form and mixtures when properly prepared in accordance with the manufacturer's specifications, shall meet the minimum test requirements given in Table 1. Mixtures may be supplied, as required, as a patching mortar or as a patching mortar with aggregate extension. If the material is to be supplied with extender aggregate, this shall also pass the required tests in Table 1 using the maximum allowed amount of extender aggregate.

3.1.1 Mixture Requirements. Rapid set concrete patching material shall be single packaged dry mix requiring the addition of water or other liquid component just prior to mixing. The material shall not contain soluble chlorides as an ingredient of manufacture. The material shall be placed in accordance to the manufacturer's recommendations.

Table 1 (English Unit)				
Physical Test Property	Specification	Requirement for cementitious concrete	Requirement for polymer-modified concrete	Requirement for polymer concrete
Bond Strength by Slant Shear	ASTM C882/C928 ²	min. 1000 psi @ 24hrs. & min. 1500 psi @ 7 days	n/a	min. 1000 psi @ 24hrs. & min. 1500 psi @ 7 days
Linear Coefficient of Thermal Expansion ¹ (for bagged mortar only, without extension aggregate)	ASTM C531	n/a	n/a	4 – 8 X 10 ⁻⁶ in/in/deg F
Resistance to Rapid Freezing & Thawing	AASHTO T161 or ASTM C666	80% min. using Procedure B ³ (300 Cycles)	80% min. using Procedure B ³ (300 Cycles)	n/a
Compressive Strength	AASHTO T22 or ASTM C39	1500 psi @ 3 hr & 3000 psi @ 24 hr	1500 psi @ 3 hr & 3000 psi @ 24 hr	n/a
Rapid Chloride Permeability	AASHTO T277 or ASTM C1202	1000 coulombs @ 28 days	1000 coulombs @ 28 days	1000 coulombs @ 28 days
Length Change	AASHTO T 160 or ASTM C157	In water Storage (+0.15) In air storage (-0.15)	In water storage (+0.15) In air storage (-0.15)	n/a
Color		gray	gray	gray

¹ Not required for extended mixtures if the mortar passes this requirement.

² ASTM C882 shall be performed on non-water based materials. ASTM C928 shall be performed on water-based materials.

³ Procedure A may be used in lieu of Procedure B

3.1.2 Construction Requirements. The manufacturer shall provide with the bagged mixture, specifications for the mixing procedure, amount and kind of liquid to be added, and the amount of aggregate extension allowed, if any. All mixing, handling and curing practices recommended by the manufacturer shall be followed and will be considered a part of these specifications.

3.1.3 Removal from Qualified List. All mixtures shall be approved before use. Reoccurring failures of any mixture for any reason will be cause for removal from the qualified list.

3.2 Vertical Repair. A qualified rapid set concrete patching material approved for vertical use may be used when specified on the plans and as approved by the engineer. The engineer will make field cylinders to verify the 1500 psi (10 MPa) minimum strength. The material shall adhere to the concrete surface without sagging.

3.3 Overhead Repair. A qualified rapid set concrete patching material approved for overhead use may be used when specified on the plans and as approved by the engineer. The material

shall be placeable in layers of at least 1 inch on overhead applications without the use of formwork or anchoring devices. The material shall adhere to the concrete surface without sagging. The engineer will make field cylinders to verify the 1500 psi (10 MPa) minimum strength.

4.0 Construction Requirements.

4.1 Mixing. Rapid set concrete patching material shall be mixed and finished according to the manufacturer's recommendation.

4.2 Preparation of Repair Area. Deteriorated, damaged or defective concrete as shown on the plans, required by the specifications or as directed by the engineer, shall be removed. All exposed reinforcement shall be thoroughly cleaned as shown on the plans, required by the specifications or as directed by the engineer. Unless otherwise specified by the commercial mixture manufacturer, the existing surface shall be damp and all free water shall be removed prior to placement of the required material.

4.3 Bonding Agent. A bonding agent may be used if recommended by the rapid set concrete patching material manufacturer.

5.0 Method of Measurement. No measurement will be made for rapid set concrete patching material.

6.0 Basis of Payment. Rapid set concrete patching material will be paid for at the contract unit price for other items and will be considered full compensation for all labor, equipment and material to complete the described work.

C. RAPID SET CONCRETE PATCHING MATERIAL – HORIZONTAL REPAIRS

1.0 Description. This specification covers cementitious concrete, polymer-modified concrete and polymer concrete that are suitable for repairing concrete surfaces on bridges or roadways, particularly under fast setting or special conditions. The repairs would involve horizontal applications. The work shall consist of removing, furnishing, preparing, and placing materials at locations as shown on the plans or as directed by the engineer.

2.0 Material. All materials shall be in accordance with MoDOT specifications and as noted herein.

2.1 Aggregate For Extending Commercial Mixture. Coarse and fine aggregates shall be in accordance with [Sec 1005](#), except the requirements for gradation and percent passing the No. 200 sieve shall not apply. Coarse aggregate meeting Gradation E requirements shall be used for repairs greater than one inch (25 mm) in depth. Fine aggregate will be allowed for repairs less than one inch (25 mm). Aggregate specified, bagged, labeled and furnished by the rapid set concrete patching material manufacturer may also be used for mortar extension.

2.2 Material Applications. The contractor shall select and use the product most suitable for the work and field conditions in accordance with these specifications.

2.3 Curing. Rapid set concrete patching material shall be cured until the minimum compressive strength 3200 psi is attained using standard curing specifications, unless otherwise specified by the manufacturer.

2.4 Qualification and Project Acceptance.

2.4.1 Inspection. All materials shall be subject to inspection and sampling by MoDOT at the source of manufacture, intermediate shipping terminal or destination. MoDOT will be allowed free access to all facilities and records as required to conduct inspection and sampling.

2.4.2 Qualification. Prior to use, rapid set concrete patching material shall be qualified. In order to become qualified, a material shall have completed testing through AASHTO's National Transportation Product Evaluation Program (NTPEP). The manufacturer shall contact the AASHTO/NTPEP coordinator to obtain the testing location for the rapid setting concrete patching material.

2.4.2.1 Requested Information. The manufacturer shall submit with samples of the materials, a written request to Construction and Materials with the following information:

- (a) Brand name of the product.
- (b) Certification that the material meets this specification.
- (c) NTPEP test results showing compliance with this special provision.
- (d) Specific mixing, handling and curing instructions.
- (e) Application type (i.e., bridge or roadway).

2.4.2.2 Qualified List. Upon approval by the engineer, the brand name and manufacturer will be placed on a qualified list of rapid set concrete patching materials. The listing of qualified materials is available from Construction and Materials or on MoDOT's web site. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed. The material will be subject to removal from the qualified list if there is evidence of unsatisfactory performance or a change in manufacturing process or formulation, or when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

2.4.3 Provisional Approval. Provisional approval may be granted provided the following requirements have been met:

- (c) New Products Evaluation Form
- (d) Certified test results from an independent laboratory showing compliance with this special provision.
- (e) Documentation prepared by MoDOT covering two years of field performance on MoDOT's system. MoDOT will need to approve the location of the test site. Documentation will contain the placement date, field observations (semi annual), description of field performance and photographs of in-place material.
- (f) During placement the manufacturer's representative shall be present on the project to provide technical expertise.

2.4.3.1 Disqualification. If during the two year observation period the repair area(s) fails provisional approval will not be granted. Repair area(s) experiencing any cracking, debonding or spalling will be considered a failure.

2.4.3.2 Length of Provisional Approval. Provisional approval will be granted for three years or until NTPEP testing is completed.

2.5 Certification. The contractor shall supply a manufacturer's certification to the engineer for each lot of material furnished. The certification shall include the name of the manufacturer, a manufacturer certification statement that the material supplied is the same as that qualified and listing the date of qualification.

2.6 Acceptance. Acceptance of the material will be based on the use of a qualified or provisionally approved material, the manufacturer's certification that the material supplied is the same as that approved and upon the results of such tests as may be performed by the engineer.

3.0 Mixture. Unless otherwise specified, rapid set concrete patching material shall be approved commercial mixtures meeting [Sections 3.1 – 3.1.3](#) or deck repair cementitious mortar meeting [Section 3.2](#). Rapid set concrete patching materials shall be specifically designed for the application needed.

3.1 Commercial Mixtures. Rapid set concrete patching material in its sacked form and mixtures when properly prepared in accordance with the manufacturer's specifications, shall meet the minimum test requirements given in Table 1. Mixtures may be supplied, as required, as a patching mortar or as a patching mortar with aggregate extension. If the material is to be supplied with extender aggregate, this shall also pass the required tests in Table 1 using the maximum allowed amount of extender aggregate.

3.1.2 Mixture Requirements. Rapid set concrete patching material shall be single packaged dry mix requiring the addition of water or other liquid component just prior to mixing. The material shall be capable of ½ inch (13 mm) to full depth repair and require no bonding agent. The material shall not contain soluble chlorides as an ingredient of manufacture. The material shall be placed in accordance to the manufacturer's recommendations.

Table 1 (English Unit)				
Physical Test Property	Specification	Requirement for cementitious concrete	Requirement for polymer-modified concrete	Requirement for polymer concrete
Bond Strength by Slant Shear ¹	ASTM C882/C928 ³	min. 1000 psi @ 24hrs. & min. 1500 psi @ 7 days	n/a	min. 1000 psi @ 24hrs. & min. 1500 psi @ 7 days
Linear Coefficient of Thermal Expansion ^{1, 2} (for bagged mortar only, without extension aggregate)	ASTM C531	n/a	n/a	4 – 8 X 10 ⁻⁶ in/in/deg F

JOB SPECIAL PROVISIONS (BRIDGE)

Resistance to Rapid Freezing & Thawing ¹	AASHTO T161 or ASTM C666	80% min. using Procedure B ⁵ (300 Cycles)	80% min. using Procedure B ⁵ (300 Cycles)	n/a
Compressive Strength ¹	AASHTO T22 or ASTM C39	3200 psi @ 3 hr & 4000 psi @ 7 days	3200 psi @ 3 hr & 4000 psi @ 7 days	n/a
Rapid Chloride Permeability ¹	AASHTO T277 or ASTM C1202	<u>Bridge Decks</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days	<u>Bridge Deck</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days	<u>Bridge Deck</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days
Length Change ^{1,4}	AASHTO T 160 or ASTM C157	In water Storage (+0.15) In air storage (-0.15)	In water storage (+0.15) In air storage (-0.15)	n/a
Color		gray	gray	gray

¹The commercial mix test values can be located in the AASHTO's National Transportation Product Evaluation Program (NTPEP) reports for Laboratory Evaluations of Rapid Set Concrete Patching Materials. Data for provisionally approved materials is located at the Construction and Materials Division.

²Not required for extended mixtures if the mortar passes this requirement.

³ ASTM C882 shall be performed on non-water based materials. ASTM C928 shall be performed on water-based materials.

⁴ As modified by ASTM C928.

⁵ Procedure A may be used in lieu of Procedure B

3.1.2 Construction Requirements. The manufacturer shall provide with the bagged mixture, specifications for the mixing procedure, amount and kind of liquid to be added, and the amount of aggregate extension allowed, if any. All mixing, handling and curing practices recommended by the manufacturer shall be followed and will be considered a part of these specifications.

3.1.3 Removal from Qualified List. All mixtures shall be approved before use. Reoccurring failures of any mixture for any reason will be cause for removal from the qualified list.

3.2 Deck Repair Concrete. A qualified rapid set concrete patching material indicated for horizontal use and intended for patching concrete bridge decks may be used when specified on the plans and as approved by the engineer. If this option is selected, the contractor shall provide a trial mix to determine the total cure time needed to achieve a compressive strength of 3200 psi (22 MPa). Compressive specimens shall be prepared in accordance with current MoDOT test methods and cured to simulate actual field conditions. Testing of compressive specimens shall be performed by methods and at facilities acceptable to the engineer. The repaired deck shall not be opened to traffic until at least 4 hours after the last placement of deck repair concrete, the established cure time has elapsed and until such concrete has achieved a compressive strength of 3200 psi (22 MPa). A new trial mix may be required if the engineer determines the field conditions vary substantially from trial mix conditions. The engineer will make field cylinders to verify the 3200 psi (22 MPa) minimum strength.

4.0 Construction Requirements.

JOB SPECIAL PROVISIONS (BRIDGE)

4.1 Mixing. Rapid set concrete patching material shall be mixed and finished according to the manufacturer's recommendation.

4.2 Preparation of Repair Area. Deteriorated, damaged or defective concrete as shown on the plans, required by the specifications or as directed by the engineer, shall be removed. All exposed reinforcement shall be thoroughly cleaned as shown on the plans, required by the specifications or as directed by the engineer. Unless otherwise specified by the commercial mixture manufacturer, the existing surface shall be damp and all free water shall be removed prior to placement of the required material.

4.3 Bonding Agent. A bonding agent may be used if recommended by the rapid set concrete patching material manufacturer.

5.0 Method of Measurement. No measurement will be made for rapid set concrete patching material.

6.0 Basis of Payment. Rapid set concrete patching material will be paid for at the contract unit price for other items and will be considered full compensation for all labor, equipment and material to complete the described work.

D. DEFLECTION AND HAUNCHING

1.0 Description. The contractor shall determine dead load deflections and haunching based on field measurements and/or existing bridge plans and these shall be adjusted based on the difference between the new and existing dead load weights.

2.0 Construction Requirements. In order to properly form the haunches for the new deck, the contractor shall survey top of deck elevations above each beam including centerline of roadway and along each beam line (top or bottom flange) prior to deck removal followed by surveying elevations of the beams (top or bottom flange) after deck removal.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

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	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65101 Phone (888) 275-6636
	If a seal is present on this sheet, JSP's has been electronically sealed and dated.
	JOB NO. J1S3279 Mercer County, MO Date Prepared: 7/22/2021
Only the following items of the Job Special Provisions (Bridge) are authenticated by this seal: ALL	

JOB SPECIAL PROVISIONS (BRIDGE)

A. CONSTRUCTION REQUIREMENTS

1.0 Description. This provision contains general construction requirements for this project.

2.0 Construction Requirements. The plans and the asbestos and lead inspection report for the existing structure(s) are included in the contract in the bridge electronic deliverables zip file for informational purposes only.

2.1 In order to assure the least traffic interference, the work shall be scheduled so that the bridge closure is for the absolute minimum amount of time required to complete the work. The bridge shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed bridge is opened to traffic.

2.2 The existing slab for the bridge(s) to be redecked was constructed as composite or non-composite as shown in the table below.

Bridge No.	Type of deck
N0561	Non-composite

2.3 Provisions shall be made to prevent any debris and material from falling into the waterway. If determined necessary by the engineer, any debris and material that falls below the bridge outside the previously specified limits shall be removed as approved by the engineer at the contractor's expense.

2.4 Any damage sustained to the remaining structure as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

2.5 Provisions shall be made to prevent damage to any existing utilities. Any damage sustained to the utilities as a result of the contractor's operations shall be the responsibility of the contractor. All costs of repair and disruption of service shall be as determined by the utility owners and as approved by the engineer.

2.6 A washer shall be required under head and nut when any reaming is performed for bolt installation.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

B. DEFLECTION AND HAUNCHING

1.0 Description. The contractor shall determine dead load deflections and haunching based on field measurements and/or existing bridge plans and these shall be adjusted based on the difference between the new and existing dead load weights.

2.0 Construction Requirements. In order to properly form the haunches for the new deck, the contractor shall survey top of deck elevations above each beam including centerline of roadway

and along each beam line (top or bottom flange) prior to deck removal followed by surveying elevations of the beams (top or bottom flange) after deck removal.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.