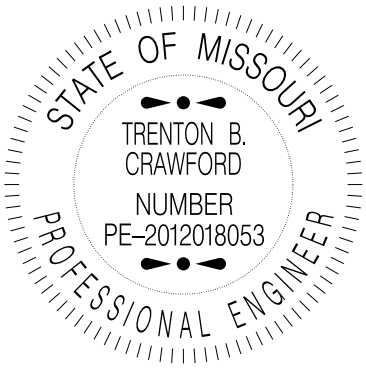
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THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

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. JSL0305
St. Charles County, MO
Date Prepared: 9/11/2026

Addendum Date:
8/31/2026_R002 *9/16/2026_R004*

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(s) 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 a lane closure is for the absolute minimum amount of time required to complete the work. A lane shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed lane 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 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.

2.5 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 The contractor shall provide steel plates over any unprotected open excavation in the bridge deck during non-working hours and in areas where work is not active. The plates shall be 3/4 inch thick. The plates shall extend 12 to 18 inches each side of the opening and cover the full width of work. The contractor shall bevel all edges to a slope no steeper than 3H:1V. The driving surface shall be treated for skid resistance either by surface deformation or direct application of a friction course and delineated as shown in the plans. The plates shall be securely affixed to the deck using concrete anchors or through bolts. The contractor may also secure the plate by attaching it to the superstructure or substructure. However, nothing shall be welded or bolted to these elements. The method of attachment shall be approved by the engineer. Any damage to the deck, superstructure, or substructure as a result of this work shall be repaired as approved by the engineer at the contractor's expense.

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

2.9 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 Existing Bridge Information. The informational plans may be used by bidders in determining the amount of steel to be cleaned and recoated or overcoated 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 an estimate of quantities involved before submitting a bid. Surface preparation and application of 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 L Recoat	System L Overcoat			
A3582	109	0	109	S over B	Yes
A3583	109	0	109	S over B	Yes

3.2 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

3.3 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

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. 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.

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 1/2 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 C 882/C 928 [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 C 531	n/a	n/a	4 – 8 X 10-6 in/in/deg F
Resistance to Rapid Freezing & Thawing[1]	AASHTO T 161 or ASTM C 666	80% min. using Procedure B[5] (300 Cycles)	80% min. using Procedure B[5] (300 Cycles)	n/a
Compressive Strength[1]	AASHTO T 22 or ASTM C 39	3200 psi @ 3 hr & 4000 psi @ 7 days	3200 psi @ 3 hr & 4000 psi @ 7 days	n/a
Rapid Chloride Permeability[1]	AASHTO T 277 or ASTM C 1202	Bridge Decks 1000 coulombs @ 28 days Roadway 2000 coulombs @ 28 days	Bridge Deck 1000 coulombs @ 28 days Roadway 2000 coulombs @ 28 days	Bridge Deck 1000 coulombs @ 28 days Roadway 2000 coulombs @ 28 days
Length Change[1, 4]	AASHTO T 160 or ASTM C 157	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] The 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.
[2] Not required for extended mixtures if the mortar passes this requirement.
[3] ASTM C 882 shall be performed on non-water based materials. ASTM C 928 shall be performed on water-based materials.
[4] As modified by ASTM C 928.
[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 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. <u>RAPID SET CONCRETE PATCHING MATERIAL – VERTICAL AND OVERHEAD REPAIRS</u>

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.

2.4.2.3 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.

3.1.2 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 C 882/C 928 [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 C 531	n/a	n/a	4 – 8 X 10-6 in/in/deg F

Resistance to Rapid Freezing & Thawing	AASHTO T 161 or ASTM C 666	80% min. using Procedure B[3] (300 Cycles)	80% min. using Procedure B[3] (300 Cycles)	n/a
Compressive Strength	AASHTO T 22 or ASTM C 39	1500 psi @ 3 hr & 3000 psi @ 24 hr	1500 psi @ 3 hr & 3000 psi @ 24 hr	n/a
Rapid Chloride Permeability	AASHTO T 277 or ASTM C 1202	1000 coulombs @ 28 days	1000 coulombs @ 28 days	1000 coulombs @ 28 days
Length Change	AASHTO T 160 or ASTM C 157	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 C 882 shall be performed on non-water based materials. ASTM C 928 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.

D. CONCRETE CRACK FILLER

1.0 Description. This work shall consist of preparing and treating the concrete bridge deck surface with a high molecular weight methacrylate (HMWM) or methyl methacrylate (MMA) crack filler material. This type of surface treatment shall be in accordance with this job special provision, the standard specifications and the manufacturer's recommendations. The objective of this treatment is to seal all concrete deck cracks to preserve and extend the life span of the deck.

2.0 Materials. The low viscosity concrete bridge deck crack filler shall be a high molecular weight methacrylate (HMWM) or methyl methacrylate (MMA) system in accordance with Sec 1053 and shall be on MoDOT's qualified product list.

3.0 Construction Requirements.

3.1 Equipment. Application equipment shall be as recommended by the manufacturer. The spray equipment, tanks, hoses, brooms, rollers, coaters, squeegees, etc. shall be thoroughly clean, dry, and free of foreign matter, oil residue and water prior to application of the treatment.

3.2 Cleaning, Surface Preparation and Sealing. The entire deck surface shall be shot blasted. The contractor may submit an alternate cleaning and surface preparation plan subject to review and approval by the engineer.

3.2.1 Surfaces which are to be treated shall meet the approved product's requirements for surface condition. The contractor shall furnish written instructions for the surface preparation requirements to the engineer for approval, and a representative of the manufacturer shall be present to ensure that the surface conditions meet the manufacturer's requirements.

3.2.2 At a minimum, the surface shall be thoroughly cleaned to remove dust, dirt, oil, wax, curing components, efflorescence, laitance, coatings and other foreign materials. The prepared surface shall have a visibly cleaner look across its entire area. The manufacturer or manufacturer's representative shall approve the use of chemicals and other cleaning compounds to facilitate the removal of these foreign materials before use. The treatment shall be applied within 48 hours following surface preparation.

3.2.3 Cleaning equipment shall be fitted with suitable traps, filters, drip pans and other devices to prevent oil and other foreign material from being deposited on the surface.

3.2.4 Before starting sealing operations, all cracks shall be blown out with dry high-pressure air, and the engineer will verify that the contractor has cleaned the entire deck surface to meet this job special provision and the manufacturer's requirements.

3.2.5 The contractor shall prevent sealer material from leaking through the deck at any cracks, construction joints or at precast panel joints on the bottom side of the deck that reflect through the slab. The contractor shall take measures to treat these areas to prevent loss of material intended to seal the deck.

3.2.6 The contractor shall follow the manufacturer's recommendations for a method and material resistant to effects of the deck sealer to prevent leakage of deck sealer through the bridge deck.

3.3 Application.

3.3.1 After leakage prevention measures are completed, a flood application shall be performed on the entire deck surface to fill all cracks. Flood application and broadcast aggregate shall be placed in accordance with the manufacturer's application rates. The crack filler material shall not be permitted to run into drains.

3.3.2 The broadcast aggregate shall be a crushed river sand that meets the following gradation requirements:

Sieve	Percent by Weight
Passing No. 8 sieve	100
Passing No. 16 sieve	45 – 90
Passing No. 30 sieve	15 – 65
Passing No. 50 sieve	5 – 30
Passing No. 100 sieve	0 – 10

3.4 Opening to Traffic. Traffic shall be allowed on the deck only after the treated area is visibly dry with acceptable aggregate coverage adhered to the driving surface to provide skid resistance. Dried coating shall not leave residue on glass, painted metal or automobiles.

4.0 Method of Measurement. Measurement will be made to the nearest square yard measured longitudinally from end of bridge approach slab to end of bridge approach slab and transversely from roadway face of curb to roadway face of curb. Additional areas to be sealed will be identified on the plans. No deduction will be made for gaps to avoid raised pavement markers, manholes or other obstructions. Final measurement will not be made except for authorized changes during construction or where appreciable 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 Concrete Crack Filler.

2 Revised 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 submit to the engineer and Bridge Division (Fabrication@modot.mo.gov) the following documentation for each individual performing non-destructive testing (NDT): their certifications, current eye exam and the NDT company written practice, including the Level III individual certification used for written practice. 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 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.~~

1.0 Description. This work shall consist of performing non-destructive testing on the diaphragm connection plates and welds to be re-used and any other welds/members as directed by the engineer. Steel surface preparation for recoating and straightening of the damaged beam shall be completed before this work is started.

2.0 Construction Requirements.

2.1 After the surface preparation, the steel that is to be tested will be inspected by the engineer. In addition to this inspection and if directed by the engineer, within the limits of heat straightening the adjacent base metal shall have non-destructive (magnetic particle) testing performed. Also, for length impacted by the heat straightening of the members, any appurtenances (stiffener/diaphragm connection plates) welded to the members shall be tested. The engineer will

also determine if there is a need for any additional testing of the diaphragm welds to the adjacent members in this area. 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 With the approval of the engineer one of the following methods may be used in lieu of magnetic-particle testing:

(a) Liquid penetrant examination as described in ASTM E165 (1994 or latest edition).

(b) Ultrasonic examination as described in section 6, part C of the ANSI/AASHTO/AWS Bridge Welding Code D1.5, American Welding Society (1996 or latest edition).

(c) Radiographic examination as described in section 6, part B of the ANSI/AASHTO/AWS Bridge Welding Code D1.5, American Welding Society (1996 or latest edition).

2.3 The length of weld to be tested and the adjacent base metal shall be cleaned of all rust prior to the testing.

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

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 Non-Destructive Testing.

4 Revised F. GRIND SURFACE DEFORMITIES

1.0 Description. This provision contains construction requirements for grinding surface deformities and repairing gouges as documented the contract plans.

2.0 Construction Requirements. Steel surface deformities in the region of the impact damage shall be ground smooth and repaired prior to application of heat straightening.

2.1 Gouges, nicks and similar surface deformities in the existing structural steel shall be repaired as shown on the contract plans~~; either a Gouge Repair Type 1 or Gouge Repair Type 2~~. Gouges, nicks, and similar surface deformities ~~and welds~~ included as part of the repair in the existing

structural steel shall be ground smooth and flush to the adjacent steel to remove potential points of stress risers where directed by, and to the satisfaction of, the engineer.

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 lump sum price for Grind Surface Deformities.

G. HEAT STRAIGHTENING

1.0 Description. This work shall consist of performing heat straightening of the damaged steel members as shown on the contract plans and in accordance with this job special provision.

2.0 Experience Requirements. The contractor shall meet the experience requirements of either Experience Option 1 or Experience Option 2.

2.1 Experience Option 1.

2.1.1 The contractor's organization shall have at least five years of experience in conducting heat straightening repairs for damaged steel structures. During the preceding three-year period, the contractor shall have conducted an average of at least two heat straightening projects per year. Experience documentation shall include the following: date of project, location, bridge owner, number and type of members straightened, and duration of project.

2.1.2 The contractor's field supervisor shall be a registered professional engineer qualified to practice in one of the following disciplines: structural, metallurgical, or welding engineering.

2.2 Experience Option 2.

2.2.1 The contractor shall have at least ten years of experience in conducting heat straightening repairs for damaged steel structures and shall have conducted an average of at least ten heat straightening projects per year during the preceding three-year period.

2.2.2 Technicians involved in the conduct of heat applications during heat straightening shall have at least three years of experience on a minimum of 15 projects.

2.2.3 Experience documentation for both contractor and technicians shall include: date of project, location, bridge owner, number and type of members straightened, and duration of project.

3.0 Equipment.

3.1 Heating shall be with an oxygen-fuel combination. The fuel may be propane, acetylene or other similar fuel as selected by the contractor, subject to the engineer's approval.

3.2 Heat application shall be by single or multiple orifice tips only. The size of the tip shall be proportional to the thickness of the heated material. No cutting torch heads shall be permitted.

3.3 Jacks, come-alongs or other force application devices shall be gauged and calibrated so that the force exerted by the device may be controlled and measured. No external force shall be applied to the structure by the contractor unless it is measured.

4.0 Construction Requirements.

4.1 Damage Assessment.

4.1.1 The contractor shall inspect areas to be straightened for cracking both before and after the heat straightening is performed. Any cracking detected shall be brought to the attention of the engineer. Methods of crack detection shall be one or more of those listed below as applicable. If cracking is found, the ends of the cracks shall be located by one of the below methods other than visual inspection.

(a) Visual inspection.

(b) Liquid penetrant testing (PT) in accordance with ASTM E 165.

(c) Magnetic particle testing (MT) in accordance with ASTM E 709.

(d) Radiographic testing (RT) in accordance with the Bridge Welding Code as specified in Sec 1080.3.3.4 and 1080.3.3.5.

(e) Ultrasonic testing (UT) in accordance with the Bridge Welding Code as specified in Sec 1080.3.3.4 and 1080.3.3.5.

4.1.2 If cracking exists, the contractor shall determine whether the cracks shall be repaired before or after straightening. All identified cracks in welds shall be repaired by a certified welder in accordance with Sec 712.6.

4.1.3 The contractor shall identify and document all yield zones, yield lines and associated damage and provide this information to the engineer prior to initiation of heat straightening by either visual inspection or measurements.

4.1.4 Steel with strains up to 100 times the yield strain may be repaired by heat straightening. For strains greater than this limit, the engineer shall determine if heat straightening may be used.

4.1.5 Cracks and/or strains exceeding 100 times the yield strain or other serious defects shall be called to the attention of the engineer.

4.1.6 The contractor shall prepare and submit a work plan to the engineer for approval 14 days prior to initiating repairs. The engineer's acceptance of the plan shall not relieve the contractor of the responsibility for obtaining satisfactory results.

4.1.7 Upon completion of straightening, the steel surfaces shall be carefully inspected for the presence of cracks or other signs of distress. 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.

4.2 Heat Application.

4.2.1 Prior to heat application, the determination of existing paint removal shall be made so as not to damage any of the surrounding existing paint that is to remain after the heating of the steel. See other contract documents to determine if existing paint is lead-based or non-lead based. The

heating of the steel shall not damage any of the paint that is to be used in place and shall not create an environmental air quality issue.

4.2.2 The heat application shall be in accordance with Sec 1080.3.3.14.

4.2.3 The contractor shall use one or more of the following methods for routine, ongoing, documented temperature verification during heat straightening:

(a) Temperature sensitive crayons.

(b) Pyrometer.

(c) Infrared non-contact thermometer.

4.2.4 The material shall be heated in a single pass following the specified pattern and allowed to cool to below 250°F prior to re-heating.

4.2.5 Heating patterns and sequences shall be selected to match the type of damage and cross section shape.

4.2.6 Vee heats shall be shifted over the yield zone on successive heating cycles.

4.2.7 Simultaneous vee heats may be used provided that the clear spacing between vees is greater than the width of the plate element.

4.2.8 Repair of previously heat straightened members in the same region of damage may be conducted once. Further repairs shall not be performed without the approval of the engineer.

4.3 Application of Jacking Forces.

4.3.1 Jacks shall be placed so that forces are relieved as straightening occurs during cooling.

4.3.2 Magnitude of Jacking Forces.

4.3.2.1 Jacking shall be limited so that the maximum bending moment in the heated zone shall be less than 50 percent of the plastic moment capacity of the member or major bending element. For local damage, the jacking force shall be limited to 50 percent of initial yield of the element.

4.3.2.2 The jacking force shall be adjusted so that the sum of jacking-induced moments and estimated residual moments shall be less than 50 percent of the plastic moment capacity of the member. As an alternative to considering residual moments, the moment due to jacking forces can be limited to 25 percent of the plastic moment capacity of the member during the first two heating cycles. For additional heating cycles, the limit of 50 percent may again be used.

4.3.3 The contractor shall determine and document the maximum jacking force for each damage location and the proposed sequence of jacking and heating. Copies of the documentation shall be submitted to the engineer for acceptance 14 days before initiating repairs. Modifications due to changing conditions shall be submitted to the engineer. The maximum jacking force may be controlled by measuring the deflection resulting from the jacking force.

4.3.4 The calibration of jacks and electronic temperature monitoring equipment shall be performed and documented monthly, and load cells used for calibration must be certified within a two-year period.

4.4 Field Supervision of Repairs.

4.4.1 Jacking forces shall be monitored to ensure that limits are not exceeded.

4.4.2 Heating temperatures shall be monitored to ensure compliance with specified limits.

4.5 Tolerances.

4.5.1 The dimensions of heat straightened structural members shall be in accordance with the following tolerances:

Member Type	Recommended Minimum Tolerance [1,2]
Girders/beams, truss members, or columns: Within 10 feet or less Overall sweep excluding impact point At impact point	 1/4 inch 1/2 inch 3/4 inch
Local web deviations	d/100 but not less than 1/4 inch
Local flange deviations	b/100 but not less than 1/4 inch
[1] Units of member depth, d, and flange width, b, are inches [2] Tolerances for curved or cambered members should account for the original shape of the member	

4.5.2 The above tolerance limits may be relaxed with approval from the engineer based on one or more or the following considerations:

(a) Type and location of damage in the member.

(b) Time considerations resulting from the nature of traffic congestion during the repair operation.

(c) Degree of restoration required to restore structural integrity.

4.6 Damage Due to Contractor's Operations.

4.6.1 Care shall be exercised in the straightening operations to prevent additional damage to the members.

4.6.2 If, in the judgement of the engineer, the contractor's operations damage the members or the remaining structure, the contractor shall be required to modify the method of operations and make all necessary repairs or material replacement as approved by the engineer at the contractor's expense.

4.6.3 The work shall be performed by methods not likely to produce fracture or other injury to the steel members being straightened.

5.0 Method of Measurement. No measurement will be made.

6.0 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 Heat Straightening.

H. REMOVAL OF STEEL DIAPHRAGM

1.0 Description. This provision contains construction requirements for the removal of diaphragm(s) as shown on the contract plans.

2.0 Construction Requirements. The existing diaphragm(s) shall be removed to the limits as shown on the contract plans.

2.1 The Contractor shall carefully remove the diaphragm(s) to avoid damage to any other components of the bridge.

2.2 Any diaphragm(s) to be reused and reinstalled shall be stored in a manner to not cause any damage to existing members.

2.3 Any diaphragm(s) to be reinstalled shall use new high strength bolts.

2.4 The connection plates as shown in the plans may be used in-place if the non-destructive test of the welded connection shows no defects and the member is not deformed. See Job Special Provision for Non-Destructive Testing.

2.5 Any damage sustained to the structure that is to remain in place, 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.

3.0 Method of Measurement. Measurement will be made per each diaphragm removed.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for Removal of Steel Diaphragm.