**Design Standards Letter**

**Letter Number: S-2020-04**

**Letter Date: 08/06/2020**

**Effective Date: 10/01/2020**

**Section: 613, 616, 703, 712, 733, 901, 902, 903, 1040, 1063, 1080**

**Subject: Revised Supplement to the 2020 Standard Specifications**

**TO:** All Central and District Offices

**FROM:** Sarah Kleinschmit

**DATE:** August 6, 2020

**SUBJECT:** Standard Specifications Letter No. 4, 2020

The Supplemental Revisions to the *2020 Missouri Standard Specifications for Highway Construction*, effective October 1, 2020 are now available on MoDOT’s website.

Questions regarding the Supplemental Revisions to the Missouri Standard Specification should be directed to Tim Oligschlaeger, Central Office, Engineering Policy Services, at 573-751-3813 or myself at 573-751-7412.

**MINOR REVISIONS:**

**SECTION 613 PAVEMENT REPAIR**

*Sec 613.30.1.1.* Modified the first sentence from “Class B partial depth pavement repair shall consist of removing areas of unsound concrete or bituminous material to a maximum depth of one half of the concrete pavement thickness and replacing the unsound material with an approved bituminous mixture” to “Class B partial depth pavement repair shall consist of removing areas of unsound concrete or bituminous patching material in a concrete pavement to a maximum depth of one half of the concrete pavement thickness and replacing the unsound material with an approved bituminous mixture.”

*Sec 613.35.3.1 Removal of Bituminous Material.* Added the following sentence after the first sentence in the paragraph.

For overlay projects that include cold milling the entire surface, the Class C removal and repair work shall be completed prior to the surface milling operation unless otherwise shown on the plans or approved by the engineer.

**SECTION 703 CONCRETE MASONRY CONSTRUCTION**

*Sec 703.3.5.9.* Removed “expansive type mortar” and replaced with “approved non-shirk grout” and made it in accordance with ASTM C1107 instead of Sec 1066.

**SECTION 712 STRUCTURAL STEEL CONSTRUCTION**

*Sec 712.6.3 Welding Procedures.* Modified the first sentence from, “Welding procedures shall be submitted for review prior to welding, at the engineer’s request.” to “All welding procedures shall be submitted electronically to [Bridge Division](mailto:Fabrication@modot.mo.gov) for acceptance prior to welding on bridges at major river crossings, bridges with structural steel with fy ≥ 70,000 psi (fs ≥ 38,000 psi), truss bridges, bridges with 2 girder systems and bridges containing fracture critical members (FCM). All other locations, the contractor shall have field welding procedures on file prior to welding and available, at the engineer’s request.”

*Sec 712.7.3 Bolt Tension.* In the table, changed the grades from “A 325” to “ASTM F3125 Grade A325” and “A 490” to “ASTM F3125 Grade A490”. Under ASTM F3125 Grade A325, changed the minimum bolt tension for the following bolt sizes, 1 1/8” from 56 to 64, 1 ¼” from 71 to 81, 1 3/8” from 85 to 97 and 1 ½” from 103 to 118.

*Sec 712.7.10 Rotational-Capacity Testing.* Added, “in accordance with Sec 1080.2.5.4” to the end of the first sentence.

*Sec 712.10.2 Bolts.* Added the following bolt sizes and weights to the table.

|  |  |  |
| --- | --- | --- |
| 1-1/8 |  | 180 |
| 1-1/4 |  | 245 |
| 1-3/8 |  | 352 |
| 1-1/2 |  | 400 |

**SECTION 733 PRECAST CONCRETE BOX CULVERTS**

*Sec 733.3.2.1.2* Changed filter cloth width from 2 feet to 3 feet.

**SECTION 901 HIGHWAY LIGHTING**

*Sec 901.3 Material.* Made the following changes to the table.

* Changed “Low Carbon Steel Bolts, Nuts and Washers” to “Carbon Steel Bolts, Nuts and Washers”.
* Changed “High-Strength Anchor Bolts” to “High-Strength Anchor Bolts and Nuts”.
* Added Grade 55 to the specification for High-Strength Anchor Bolts and Nuts.

*Sec 901.3.1.* Added anchor bolts and removed in accordance with AASHTO M 298 in the first sentence. In the third and fourth sentence, changed the grade requirement from ASTM A325 to ASTM F3125 Grade A325.

**SECTION 902 TRAFFIC SIGNALS**

*Sec 902.4 Material.* Made the following changes to the table.

* Changed “Low Carbon Steel Bolts, Nuts and Washers” to “Carbon Steel Bolts, Nuts and Washers”.
* Changed “High-Strength Anchor Bolts” to “High-Strength Anchor Bolts and Nuts”.
* Added Grade 55 to the specification for High-Strength Anchor Bolts and Nuts.
* Deleted Nuts for Anchor Bolts from the table.

*Sec 902.4.1.* Added anchor bolts and removed in accordance with AASHTO M 298 in the first sentence. Removed the third sentence, “Anchor bolts shall have a minimum yield strength of 55,000 psi and a minimum elongation of 14 percent in 2 inches or 12 percent in 8 inches”. In the fourth and fifth sentence, changed the grade requirement from ASTM A325 to ASTM F3125 Grade A325.

*Sec 902.16.7 External Conduit on Structure.* In the sixth sentence, changed shall be galvanized in accordance with ASTM A 153, B 695-91 Class 50 to AASHTO M 232 (ASTM A153), Class C, ASTM B695 Class 55.

**SECTION 903 HIGHWAY SIGNING**

*Sec 903.2 Material.* Made the following changes to the table.

* Changed “Low Carbon Steel Bolts, Nuts and Washers” to “Carbon Steel Bolts, Nuts and Washers”.
* Change the reference from Section 1080 to specification ASTM F1554, Grade 36 for Low-Carbon Steel Anchor Bolts.
* Changed “High-Strength Anchor Bolts” to “High-Strength Anchor Bolts and Nuts”.
* Added Grade 55 to the specification for High-Strength Anchor Bolts and Nuts.

*903.2.3 Hardware.* In the first sentence, added anchor bolts and changed shall be galvanized in accordance with Sec 1081 to AASHTO M 232 (ASTM A153), Class C or mechanically galvanized in accordance with ASTM B695, Class 55.

**SECTION 1040 GUARDRAIL, END TERMINALS, ONE-STRAND ACCESS RESTRAINT CABLE AND THREE-STRAND GUARD CABLE MATERIAL**

*Sec 1040.3.2 Steel Posts, Plates and Rails.* In the second sentence changed the specification for galvanized bolts, nuts and washers from AASHTO M 232 to AASHTO M 232 (ASTM A153), Class C. In the third sentence changed the specification for mechanically galvanized from AASHTO M 232, Class C to ASTM B695, Class 55.

**SECTION 1080 STRUCTURAL STEEL FABRICATION**

*Sec 1080.2 Material.* Made the following changes to the table.

* Changed “Low Carbon Steel Bolts, Nuts and Washers” to “Carbon Steel Bolts, Nuts and Washers”.
* For High Strength Bolts, Nuts and Washers change the reference to specifications from ASTM A 325, ASTM A 490, ASTM F 436, ASTM A 563, AASHTO M 292 to ASTM F3125 Grade A 325 Type-1, ASTM F3125 Grade A325 Type-3, ASTM F3125 Grade A 490 Type-1 (Plain only), ASTM F3125 Grade A490 Type-3, ASTM F 436, ASTM A 563, AASHTO M 292.

*Sec 1080.2.1 Galvanized Bolts.* In the first sentence added (ASTM A153) for bolts, nuts and washers shall be galvanized in accordance with.

*Sec 1080.2.5 High Strength Fastener Assemblies.* In the fourth sentence, deleted the following language, “used with unpainted weathering steel or” for when galvanization wasn’t required. In the fifth sentence, change the grade of bolts from ASTM A490 to ASTM F3125 Grade A490 and added they should be installed plain (also referred to as uncoated or black).

*Sec 1080.2.5.1 Bolts.* In the first sentence, changed the references to ASTM A325 to ASTM F3125 Grade A325 and ASTM A490 to ASTM F3125 Grade A490.

*Sec 1080.2.5.1.1 Proof Load Tests.* In the last sentence, changed the reference to ASTM A325 to ASTM F3125 Grade A325.

*Sec 1080.2.5.1.2 Wedge Tests.* In the last sentence, changed the reference to ASTM A325 to ASTM F3125 Grade A325.

*Sec 1080.2.5.4.1 Test Methods.* Changed the reference to ASTM A325 to ASTM F3125 Grade A325.

*Sec 1080.2.5.4.4 Minimum Rotation.* Change the table from

|  |  |
| --- | --- |
| **Minimum Bolt Rotation** | |
| **Bolt Length** | **Rotation** |
| ≤ 4 Diameters | 240° (2/3 turn) |
| > 4 Diameters and ≤ 8 Diameters | 360° (1 turn) |
| > 8 Diameters | 480° (1 1/3 turn) |

to

|  |  |  |  |
| --- | --- | --- | --- |
| **Minimum Bolt Rotation** | | | |
| **Bolt Length** | **Rotation** | | |
| **ASTM F3125**  **Grade A325** | **ASTM F3125**  **Grade A490** | |
| ≤ 4 Diameters | 240° (2/3 turn) | | 240° (2/3 turn) |
| > 4 Diameters and ≤ 8 Diameters | 360° (1 turn) | | 300° (5/6 turn) |
| > 8 Diameters | 420° (1 1/6 turn) | | 360° (1 turn) |

*Sec 1080.2.5.4.5 Required Tension.* In the last sentence and in the table, changed the references to ASTM A325 to ASTM F3125 Grade A325 and ASTM A490 to ASTM F3125 Grade A490. In the table under ASTM F3125 Grade A325, changed the minimum bolt tension for Req. Installation Tension, kips for the following bolt sizes, 1 1/8” from 56 to 64, 1 ¼” from 71 to 81, 1 3/8” from 85 to 97 and 1 ½” from 103 to 118 and for Turn Test Tension, kips for the following bolt sizes, 1 1/8” from 64 to 74, 1 ¼” from 82 to 94, 1 3/8” from 98 to 112 and 1 ½” from 118 to 136.

*Sec 1080.3.1.2 Notification of Inspection.* Added electronically as how the engineer shall be notified.

*Sec 1080.3.2 Shop Drawings.* In the fifth sentence, change that only one set of shop drawings are required for railroad structures and other structures and that they shall be submitted electronically to Bridge for approval. In the sixth sentence, deleted the reference that the prints should be suitable for microfilming.

*Sec 1080.3.2.2 Weld Procedures.* In the second sentence, changed that only one (from two) copy of welding procedures is required and that they shall be electronically submitted for approval.

*Sec 1080.3.3.5.16 AWS Sec 6.7 Paragraphs 6.7.1, 6.7.1.1 and 6.7.1.2* In the last sentence, added that T and corner joints shall be 100 percent tested by ultrasonic testing and added the following: except as follows. L shaped plate connection brackets, with complete joint penetration welds at the corner, are not required to be ultrasonically tested. On fabricating expansion joints only (does not apply to finger, flat and modular expansion devices), 25 percent of each joint subject to compression or shear, or, at the contractor’s option, 25 percent of the total joints subject to compression or shear. When the latter is selected, the tested joints shall be distributed throughout the work and shall total at least 25 percent of the compression or shear weld length.

a. If unacceptable discontinuities are found in spot testing, the entire length shall be tested.

b. If unacceptable discontinuities are found in 20 percent or more of the compression or shear joints in that "lot'', all compression and shear joints in that "lot" shall be tested for their full length. A "lot'' is defined as those tension or compression/shear joints, or both, which were welded in accordance with the same approved WPS and non-destructively tested-as a group.

c. Ultrasonic testing acceptance or rejection criteria will be in accordance with Table 6.4 Compressive Stress, AWS D1.5, 2002.

Shop complete joint penetration splicing of flat bar, beam, or support angle under the expansion joint is only by approval and shown on the shop drawings, this type of splicing will require 25 percent ultrasonic testing as stated.

*Sec 1080.3.3.16 Shop Measurement of Curvature and Camber.* Added (except shear connectors) after welding in the first sentence.

*Sec 1080.3.5 Shipping.* In the first sentence, removed “the engineer” and replaced with “MoDOT’s fabrication inspector to the fabricator and engineer by email”. After the first sentence, added the following as a new sentence, “The fabricator shall email this release to the contractor prior to shipping fabricated parts”. Deleted the last sentence, “The "Fabrication Inspection Shipment Release" shall be delivered by the contractor to the engineer at destination prior to erection of steel.”

*Sec 1080.4.5 Bolting and Fasteners.* In the first sentence, removed “with atmospheric corrosion resistance and weathering characteristics comparable with the A 709 weathering steel”. In the second sentence, changed the reference to ASTM A325 to ASTM F3125 Grade A325.

*Sec 1080.4.7 Bearings and Anchor Bolts.* Removed anchor bolts from the section title and from the section. Deleted the second sentence, “Anchor bolt nuts shall be heavy hexagon nuts in accordance with ASTM A 563, Grades C3 or DH3”.

**MAJOR REVISIONS:**

**SECTION 616 TEMPORARY TRAFFIC CONTROL**

*Sec 616.7.2* Renumbered the existing section to 616.7.3 and made a new section 616.7.2 from the following, “When a CMS with Communication Interface is specified in the plans, the contractor shall operate and maintain the CMS, including setting up initial communications and paying all monthly communications fees. The contractor shall furnish the telephone number and contact information for the contractor’s work zone specialist who will promptly program the CMS board remotely under the direction of the engineer.”

**SECTION 1063 TEMPORARY TRAFFIC CONTROL DEVICES**

*Sec 1063.7 Changeable Message Sign.* Added portable in front of Changeable Message Sign in the first sentence. Added the following to the section.

The unit shall be assembled to form a complete self-contained CMS that can be delivered to the job site and placed into immediate operation. The sign unit shall be capable of operating at an ambient air temperature of -20 to 120 degrees F. and shall not be affected by two-way radio transmissions other than those required to control the CMS.

A CMS shall be permanently mounted on a trailer, truck bed, or truck cab per manufacturer’s recommendations. The CMS must be securely mounted on the support vehicle such that it should remain attached during an impact to the vehicle. If it is mounted on a trailer, the trailer must be capable of being leveled and plumbed.

CMS trailers should be delineated on a permanent basis by affixing retroreflective material, per Sec 1042.2.7 in a continuous line on the face of the trailer as to be seen by oncoming road users.

*Sec 1063.7.1 Message Board.* Deleted the last sentence, “The CMS shall be legible up to a distance of 650 feet for both day and night operation” and replaced with, “CMS used on roadways with speed limits of 55 mph or higher should be visible from ½ mile under both day and night conditions. The message should be designed to be legible from a minimum of 600 ft. for nighttime conditions and 800 ft. for normal daylight conditions. When environmental conditions that reduce visibility and legibility are present, or when the legibility distances stated in the previous sentences in this paragraph cannot be practically achieved, messages composed of fewer units of information should be used and consideration should be given to limiting the message to a single phase.”

*Sec 1063.7.1.1* In the first sentence, removed without connection. Added, “and a variable display rate that allows the operator to match the information display to the speed of the approaching traffic” to the second sentence. Added, “that allows the operator to generate an unlimited number of additional messages in addition to the preprogrammed stored messages. The keyboard must be equipped with a security lockout feature to prevent unauthorized use of the controller” to the third sentence.

*Sec 1063.7.1.2* Deleted the entire section.

*Sec 1063.7.2 Communication Interface.* Changed section title to Changeable Message Sign with Communication Interface. In the first sentence changed, “If specified, the CMS shall have” to “The CMS with communication interface shall have”.

SKK/TMO