MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
STRUCTURAL STEEL AND ALUMINUM CONSTRUCTION

STR:MJF 1 of 7 APPR:JSW:POJ:04-10-20
FHWA:APPR:04-13-20

a. Description. This special provision specifies the AWS Code year and associated revisions to the Code to be used for the project.

b. ***AASHTO/AWS D1.5M/D1.5:2015, Bridge Welding Code*** (hereafter called *AWS D1.5*). Ensure fabrication of structural steel bridge members is performed in accordance with *AWS D1.5* as modified herein:

2.8.8: Add the following sentence to the end of the existing paragraph:

An exception to this is for the case of a sole plate welded to the bottom flange of a beam or girder. In this case the welds must be continuous as shown on the contract drawings with corners ground to eliminate notches greater than 0.01 inch. Provide a smooth transition from the weld metal and base metal after grinding.

2.17.5.1: Change "….subject to tensile stress shall have a smooth transition…" to read "…subject to tensile and compressive stress must have a smooth transition…"

3.1.3: Change "...when the ambient temperature is lower than -20°C [0°F]..." to read "...when the ambient temperature is lower than 5 degrees C [40 degrees F]...".

3.2.1: Delete the existing paragraph in its entirety and replace with the following paragraph:

Surfaces and edges to be welded must be smooth, uniform, and free from fins, tears, cracks, all mill scale, and other discontinuities which would adversely affect the quality or strength of the weld. Surfaces to be welded and surfaces adjacent to a weld must also be free from loose or thick scale, slag, rust, moisture, grease, and other foreign material that would prevent proper welding or produce objectionable fumes.

All edges whether welded or not must be conditioned by very shallow grinding to remove the hardened layer left by resolidification.

3.13.3: Delete the existing paragraph in its entirety and replace with the following sentence:

Steel backing on welds must be removed and the joint must be ground smooth, unless otherwise directed by the Engineer.

3.13.6: Delete the word "copper" from the first sentence in the first paragraph and delete the second paragraph in its entirety.

4.1.4.1: Add the following sentence to the existing paragraph:

A filler metal log sheet must be available at all times for the Engineer to review.

4.2: Add the following sentence as a new paragraph:

Cooling welds using compressed air or water is not permitted.

4.2.5: Delete the word “-20°C [0°F]” in this subclause and replace with 5 degrees C [40 degrees F].

4.2.2: Add the following sentence:

For AASHTO M270 Grade 36, 50, 50W, and HPS 50W, the maximum preheat and interpass temperature must be 345 degrees C [650 degrees F].

4.6.8: The progression for all passes in the vertical position must be upward (including repairs).

4.13.1.7: The progression for all passes in the vertical position must be upward (including repairs).

Table 5.9: In the table under "1. Test on Plate" in the “Type of Weld” column, delete the “Fillet Option No. 2” and accompanying referenced Figure 5.22.

5.13: Delete the subclause in its entirety.

5.14: Delete the subclause in its entirety.

5.23.1.5: Delete the existing paragraph in its entirety and replace with the following paragraph:

Plug Weld Qualification Tests for Plug Welds Only. The joint must consist of a hole diameter the same size as that used in production in a plate the same thickness as that being welded. Backing must be of the same thickness and material as that to be used in production. In addition, Ultrasonic Testing (UT) inspection is required for plug weld qualification and must meet the requirements shown in Table 6.3. Conduct macroetch test according to subclause 5.27.6.2.

5.23.2.4(2)(b): Delete this subclause and accompanying referenced Figure 5.27.

5.27.1: In this subclause add the following requirements for visual inspection to the existing paragraph:

Discontinuities must not exceed 1/8 inch measured in any direction on the surface. Summation of all discontinuities exceeding 1/32 inch must not exceed 3/8 inch.

5.27.6.1: In this subclause add the following requirements to the existing requirements:

(7) Discontinuities must not exceed 1/8 inch measured in any direction on the surface.

(8) Summation of all discontinuities exceeding 1/32 inch must not exceed 3/8 inch.

5.27.6.2(3): Change "...in excess of 1/4 in [6 mm] total..." to read "... in excess of 1/8 inch [3 mm] total...".

6.3.1: Add the following sentence to the existing paragraph:

All WPSs are required to be approved by the Engineer prior to welding.

6.5.8: Add the following at the end of the existing paragraph:

Inspection and NDT records must contain at least the content and information shown in the sample forms of Annex O.

6.6.5: Add the following at the end of the existing paragraph:

Similarly, if such testing should disclose any deficiencies which require repair work, all costs associated with the original NDT and in addition to subsequent NDT for the repairs must be paid for by the Contractor.

6.7.7: Add the following at the end of the existing paragraph:

PT inspection must be performed at the ends of all CJP (butt, corner, and T) weld terminations for primary members.

6.7.8: Delete the existing paragraph in its entirety and replace with the following sentence:

Phased-array UT (PAUT) in accordance with the current MDOT PAUT Program document may be substituted for RT of complete joint penetration groove welds in butt joints.

6.19.8: Remove reference to Table 6.4.

6.20.1: Add the following at the end of the existing paragraph:

All discontinuities found by UT must be recorded on the NDT report.

6.26.2.1: In the first sentence, change "For welds subject to tensile stress under any condition of loading..." to read "For all welds under any condition of loading...".

6.26.2.2: Delete the subclause in its entirety.

6.26.3.1(1): Change "Welds subject to tensile stress under any condition of loading..." to read "Welds under any condition of loading...".

6.26.3.1(2): Delete this subclause in its entirety.

6.26.3.3: Change “Table 6.4” to “Table 6.3”.

6.26.3.3(2): Delete this subclause in its entirety.

12.6.4.1: Add the following to the paragraph:

Electrodes for SMAW must be E7018, E8018, E9018, E10018, and E11018.

12.7.5: Add the following to the end of the paragraph:

Evidence must include third-party CWI witnessing the test and RT film available for the Engineer's review. If this evidence cannot be provided all costs associated with the procedure qualification must be at the Contractor's expense.

12.16.5.1: Add the following sentence to the existing paragraph:

Inspection and NDT records must contain at least the content and information shown in the sample forms of Annex O.

12.18: Add this subclause to the code:

The Contractor must provide documentation of all visual and NDT for timely review and confirmation by the Engineer prior to the weldment being covered.

Table 12.2: Delete Note a.

c. ***AWS D1.1/D1.1M:2015, Structural Welding Code - Steel*** (hereafter called *AWS D1.1*). Fabrication of structural steel elements (e.g. steel sign support structures, tower lighting units, Closed-Circuit Television (CCTV) towers, traffic signal mast arms and poles, drainage components, expansion dams, curb plates, bearings, bridge railings, and other miscellaneous structural steel members as determined by the Engineer) must be performed in accordance *AWS D1.1* as modified herein.

Tubular fracture critical members must follow clause 12 of AWS D1.5 and specific provisions stipulated in the *AASHTO LRFD Guide Specification for Design of Pedestrian Bridges*.

3.5.2: Delete this subclause in its entirety and eliminate all references within *AWS D1.1* to alternate methods for establishing minimum preheat and interpass temperatures.

3.7.1: Delete the existing subclause in its entirety and replace with the following paragraph:

The progression for all passes in the vertical position must be upward including repairs.

4.2.1.3: Delete the existing subclause in its entirety and replace with the following paragraph:

Charpy impact tests and all weld metal tensile tests are required for all groove weld procedure test plates. Additional plate lengths are required for these tests. This requirement is for all steels greater than ½ inch in thickness, used for structural supports for highway signs, luminaires, and traffic signals, that are main load carrying tension members. Specimens tested for impact values must have a minimum value of 20 ft-lb at -20 degrees C [0 degrees F]. All weld tensile specimens must have values not less than those shown in Table 3.1 with elongation in 2 inch gage length not less than 22 percent.

Table 4.11: In the table under the Type of Test Weld column, delete the Fillet Option 2 and accompanying referenced Figure 4.22.

4.9.4.1(4): In this subclause add the following requirements to the existing requirements:

(e) Discontinuities must not exceed 1/8 inch measured in any direction on the surface.

(f) Summation of all discontinuities exceeding 1/32 inch must not exceed to 1/8 inch.

4.21.3: Delete this subclause in its entirety and replace with subclause 5.23.1.5 of *AWS D1.5* and as modified in section b herein.

4.22.2.1: Delete this subclause in its entirety and replace with subclause 5.23.1.5 of *AWS D1.5* and as modified in section b herein.

4.22.2.2: In this subclause add the following requirements to the existing requirements:

(4) Discontinuities must not exceed 1/8 inch measured in any direction on the surface.

(5) For discontinuities 1/32 inch or larger, accumulated discontinuity must not exceed 3/8 inch.

4.22.2.2(3)(c): Change "...in excess of 1/4 in [6 mm] total..." to read "...in excess of 1/8 inch [3 mm] total...".

Table 5.1: Delete and replace with Table 4.6 of *AWS D1.5*.

5.3.2.2: Delete the last sentence of this subclause and replace with subclause 4.5.2.2 of *AWS D1.5*.

5.3.2.3: Delete this subclause in its entirety and replace with subclause 4.5.2.1 of *AWS D1.5*.

5.11.2(1): In this subclause change "...when the ambient temperature is lower than 0°F [-20°C]..." to read "...when the ambient temperature is lower than 40 degrees F [5 degrees C]...".

5.13 Delete this subclause in its entirety and replace it with the last paragraph in subsection 707.03.C.2.a of the Standard Specifications for Construction.

5.25: Add the following sentences to the end of the existing paragraph:

Written weld repair procedures must be approved by the Engineer prior to any weld repairs.

6.1: Delete this subclause in its entirety and replace with subclause 6.1 of *AWS D1.5*.

6.3.3: Add the following sentence to the end of the existing paragraph:

Approved weld procedures are to be posted where work and welding are being performed.

6.5.4: Add the following sentence to the end of the existing paragraph:

Inspection and NDT records must contain at least the content and information shown in the sample forms of Annex M.

6.6.5: Delete this subclause in its entirety and replace with subclause 6.6.5 of *AWS D1.5* and as modified in section b herein.

6.9: In this subclause add the following requirements to the existing requirements:

No discontinuities exceeding 1/8 inch measured in any direction on the surface.

No discontinuities exceeding 3/8 inch - Sum of the greatest dimensions of all discontinuities exceeding 1/32 inch, but less than or equal to 1/8 inch.

6.12.2.1: In the title of this subclause, change "Cyclically Loaded Nontubular Connections in Tension" to read "Cyclically Loaded Nontubular Connections".

6.12.2.2 & Figure 6.3: Delete this subclause in its entirety and referenced Figure 6.3. See subclause 6.12.2.1 as modified herein.

6.13.2(1): Change "Welds subject to tensile stress under any condition of loading..." to read "All welds under any condition of loading...".

6.13.2(2) & Table 6.2: Delete this subclause in its entirety and referenced Table 6.2. See subclause 6.13.2(1) as modified herein.

6.19.2: In the third sentence of the paragraph, replace the word “painted” with the word “coated”.

6.25.3: Replace the word “paint” with “coatings”.

9.15.4.1(3)(f): Change "exceed 1/4 in [6 mm]" to read "exceed 1/8 inch [3 mm]".

9.15.4.1(3): In this subclause add the following requirements to the existing requirements:

(g) Discontinuities must not exceed 1/8 inch measured in any direction on the surface.

(h) Summation of all discontinuities exceeding 1/32 inch must not exceed to 1/8 inch.

d. ***AWS D1.2/D1.2M:2014, Structural Welding Code – Aluminum*** (hereafter referred to as *AWS D1.2*). Fabrication of structural aluminum must be performed in accordance with *AWS D1.2*.

3.5.3: Delete this subsection in its entirety.

3.6.3: Add the following requirements to the existing requirements:

(8) No discontinuities exceeding 1/8 inch measured in any direction on the surface.

(9) No discontinuities exceeding 3/8 inch - Sum of the greatest dimensions of all discontinuities exceeding 1/32 inch, but less than or equal to 1/8 inch.

3.11: Delete this subsection in its entirety.

3.21.6.3: Delete this subsection in its entirety and replace with the sentence:

RT must not be used in lieu of the bend test for qualification testing of welders or welding operators.

5.6.5: Delete this subsection in its entirety and replace it with subclause 6.6.5 of *AWS D1.5*

and as modified in section b herein.