



# CERTIFICATION PROGRAMS

## Mock Exercise Instructions for Fabricators of Intermediate Bridges

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### 1. Scope

For applicability, refer to the *Supplemental Program Requirements for Fabricators of Steel Bridges*. Participants/Applicants seeking the Fracture Critical endorsement shall also comply with the *Supplemental Program Requirements for Fracture Critical Endorsement*.

This exercise will demonstrate fabrication knowledge, skills, and capability to produce fabricated steel to the quality required for Intermediate Bridges (IBR) or Intermediate Bridges with Fracture Critical Endorsement (FCE).

### 2. Document Requirements

In addition to the required documents listed in the Program Requirements, the fabricator shall have the following documents available for review during the site audit:

- a. Valid SAW Welding Procedure Specifications (WPS) with supporting Procedure Qualification Record (PQR) in compliance with AASHTO/AWS D1.5. WPSs which do not have the required supporting PQRs shall be considered invalid and unfit for use in this mock exercise.
- b. Valid Fracture Critical SAW WPS and PQR for Participants/Applicants seeking the Fracture Critical endorsement. The web-to-bottom flange CJP weld is considered Fracture Critical for this exercise.
- c. Fracture Critical WPSs which do not have the required supporting PQRs shall be considered invalid and unfit for use in the FCE portion of this mock exercise.
- d. Current Welder Performance Qualification Records for all processes and positions to be used in the exercise in compliance with AASHTO/AWS D1.5, Clause 5 and Clause 12, as applicable.
- e. Material Test Reports (MTRs) for materials used. (May be an example of an MTR.)
- f. Purchase orders for materials used. (May be an example of a P.O.)
- g. Drawings for the mock exercise (Applicants only)

### 3. Drawings

The development and submittal of drawings described below apply to IBR Applicants only. Participants renewing their IBR certification are not required to re-submit these drawings.



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## 3.1 Shop Assembly (Vertical Blocking) Diagram

- a. Create a shop assembly drawing of a straight two-span bridge. The length of each span is 90 feet. There is no support skew.
- b. The elevation of the left abutment is set at 0 feet. The elevation of the pier is +3 feet and the elevation of the right abutment is +2 feet.
- c. The bridge is five girder field sections (segments) long consisting of two abutment field sections, one pier field section, and a suspended field section in each span between the abutment field section and the pier field section. The mock exercise shall be one of the suspended girder field sections.
- d. The assembly diagram shall include information used to lay down the girders to check the fit-up of splices for field welding and for proper positioning before drilling the bolted field splices. Show dimensions along and perpendicular to the baseline at all field splices, and bearing points.
- e. Include girder and splice plate shipping marks and match-marking scheme on the assembly diagram.

## 3.2 Girder Detail Drawings

- a. Detailed shop fabrication drawings and a general note sheet shall be created for the mock exercise as described in the Assembly Instructions.
- b. The mock exercise shall be a girder field section of at least 10 feet in length and the web shall be a minimum of 40 inches in height.
- c. The top flange shall consist of a 1 to 1.5-inch thickness transition and shall be 12 inches in width. The bottom flange shall be no less than 1-inch thick and shall be 12 inches in width.
- d. The bottom flange and lower half of the web shall be considered in tension. For Participants/Applicants seeking the Fracture Critical endorsement, the web-to-bottom flange weld shall be considered Fracture Critical.
- e. The web plate and stiffeners shall be no less than 3/8-inch thick.
- f. All flanges, webs, stiffeners and splice plates shall be considered ASTM A709, Grade 50. The actual material used for the mock exercise may be any available weldable grade material.
- g. Regardless of the actual camber detailed on the assembly drawing, the mock exercise detail shall include a camber of 1-inch at the mid-point.
- h. On one end of the girder field section, prepare web and flanges for a CJP welded field splice.
- i. At the opposite end of the girder field section, a bolted field splice shall be prepared for either the top or bottom flange.
- j. The bolted field splice plates shall be a minimum of 1/2-inch thick and include both top and bottom plates.



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- k. The bolted field splice shall have a minimum of 12 holes in the flange for 7/8-inch high-strength bolts.

## 4. Assembly Instructions

The mock exercise shall be detailed and fabricated in compliance with the instructions and information listed below.

### 4.1 Girder Assembly:

- a. The top flange butt-joint weld splice and all web-to-flange welding shall utilize the SAW process.
- b. The top flange shall include a complete joint penetration (CJP) welded butt-joint splice, located 2'-0" from the girder field section mid-point.
- c. Web to top flange welds shall be 5/16-inch fillet welds regardless of the plate thicknesses chosen for this exercise.
- d. The web to bottom flange weld shall be a CJP groove weld. For Participants/Applicants seeking the Fracture Critical endorsement, the web-to-bottom flange weld shall be considered Fracture Critical.
- e. Two stiffeners shall be placed at the girder field section mid-point, one on each side of the web.
  - i. The near side stiffener shall be 90 degrees to the web and shall have a finish to bear condition at the bottom flange and a tight fit condition at the top flange.
  - ii. The far side stiffener shall be at 60 degrees to the web with a tight fit condition at the top and bottom flange.
- f. All stiffener-to-web welds shall be 1/4-inch minimum fillet welds. Do not weld stiffeners to the flanges. FCAW may be used for stiffener welding with valid AASHTO/AWS D1.5 WPS.
- g. ASTM F3125 Grade A325 bolt assemblies shall be installed at the bolted field splice.
- h. See Table 1 for a description of activities to be completed prior to site audit and those that are to be observed during the site audit.

## 5. Dimensional Tolerances

Dimensional tolerances shall be in compliance with AASHTO/AWS D1.5.

## 6. Inspection and NDT

- a. Visual inspection and NDT may begin immediately after welds have cooled to ambient temperature. Additional cooling periods for NDT shall not be required for Fracture Critical welds.



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- b. For inspection and NDT, the web-to-bottom flange weld shall be considered in tension. For Participants/Applicants seeking the Fracture Critical endorsement, the web-to-bottom flange weld shall be considered Fracture Critical.
- c. See Table 1 for a description of activities to be completed prior to site audit and those that are to be observed during the site audit.

## 7. General Requirements

- a. During the site audit, the personnel responsible for and performing the work shall demonstrate understanding necessary for effective implementation of the requirements of the latest editions of the applicable codes and standards.
- b. The Auditor shall not perform any inspections, direct any work, or provide instruction. The auditor may request alternate sequences in agreement with the auditee to meet unforeseen on-site conditions.
- c. The Auditor is present to observe the process and the application of the requirements by the auditee.
- d. All fabrication of the mock exercise shall be performed by the fabricator.
- e. All welding shall be in compliance with valid AASHTO/AWS D1.5 WPSs accompanied by supporting PQRs for the weld joints used in this mock exercise. PQRs (complete with test results) must be performed by the fabricator in compliance with AASHTO/AWS D1.5.

**TABLE 1 - Sequencing of Fabrication, Inspection, and Audit activities**

#	Fabrication Activity	Inspection Instructions	Audit Activities
1	Top Flange shop transition splice - CJP groove weld	<p>The top flange butt-joint weld must be completed prior to the start of the on-site audit.</p> <p>Visual inspection and NDT shall be performed in compliance with the current AASHTO/AWS D1.5, Bridge Welding Code.</p>	<p>The on-site auditor shall observe the completed butt-joint weld. Witness of NDT is not required.</p> <p>Fabricator's QC and NDT inspection records shall be made available for the on-site auditor to review.</p>



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2	Web to Top Flange - SAW Fillet weld	<p>Web to top flange welding must be completed prior to the site audit.</p> <p>Visual inspection and NDT shall be performed in compliance with AASHTO/AWS D1.5.</p>	<p>The on-site auditor shall observe the completed web-to-flange weld. Witness of NDT is not required.</p> <p>Fabricator's QC and NDT inspection records shall be made available for the on-site auditor to review.</p>
3	Web to Bottom Flange - SAW CJP groove weld	<p>Web to bottom flange welding must be completed prior to the site audit.</p> <p>Visual inspection and NDT shall be performed in compliance with AASHTO/AWS D1.5.</p>	<p>The on-site auditor shall observe the completed CJP weld. Witness of NDT is not required.</p> <p>Fabricator's QC and NDT inspection records shall be made available for the on-site auditor to review.</p>
4	Stiffener Fitting and Welding	<p>Stiffeners may be fit and tack welded prior to the site audit.</p> <p>Visual inspection and NDT shall be performed in compliance with AASHTO/AWS D1.5.</p>	<p>The on-site auditor shall observe fit-up and preparation of stiffener to web welds. Witness of NDT is not required.</p> <p>Fabricator's QC and NDT inspection records shall be made available for the on-site auditor to review.</p>
5	Camber Verification	<p>QC personnel shall verify and record required camber measurements.</p>	<p>The on-site auditor shall observe camber measurements.</p> <p>Fabricator's QC and inspection records shall be made available for the on-site auditor to review.</p>



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6	CJP welded field splice – (Joint Preparation)	<p>Field weld joint preparation shall be completed prior to the site audit.</p> <p>Visual inspection shall be performed in compliance with AASHTO/AWS D1.5.</p>	<p>The on-site auditor shall observe the completed joint preparation.</p> <p>Fabricator’s QC and NDT inspection records shall be made available for the on-site auditor to review.</p>
7	Bolted field splice (Splice Plates)	<p>Field splice connection shall be drilled prior to the on-site audit.</p> <p>Verify that splice plates are tied to their specific location in the bolted connection by the use of the match-marking procedure.</p>	<p>The on-site auditor shall confirm match-marking and placement of the splice plates.</p>
8	Pre-installation verification (PIV)	<p>PIV demonstration shall be performed in compliance with RCSC and the fabricator’s documented procedure.</p>	<p>The on-site auditor shall observe the pre-installation verification demonstration. Records shall be made available for the on-site auditor to review.</p>
9	Rotational Capacity (Rocap) Testing	<p>Rocap Testing shall be performed in compliance with ASTM F3125 and the fabricator’s documented procedure.</p>	<p>The on-site auditor shall observe Rocap Testing. Records shall be made available for the on-site auditor to review.</p>
10	Bolt installation	<p>Pretensioned bolt installation using the turn of the nut method in compliance with RCSC shall be done at the time of the audit.</p>	<p>The on-site auditor shall observe bolt installation.</p> <p>Fabricator’s QC and inspection records shall be made available for the on-site auditor to review.</p>



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11	Final Inspection	All required inspections shall be performed in compliance with the fabricator's QMS and the current AASHTO/AWS D1.5 Bridge Welding Code.	<p>The Fabricator's QC and inspection records, including NDT reports, shall be made available for the on-site auditor to review.</p> <p>Some NDT inspections may not be able to be completed prior to the site audit. All incomplete NDT will be written as a Corrective Action Request(CAR) and completed test records will be submitted as evidence to complete the CAR</p>
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