# APPENDIX A. WEATHERING STEEL W-BEAM GUARDRAIL INSPECTION MANUAL AND FORMS

**Weathering Steel W-beam Guardrail Inspection**

**Instructions**

Weathering steel W-beam guardrail should be inspected periodically to ensure that the guardrail has not corroded significantly, and that the rail has the required structural integrity for containing and redirecting errant vehicles. This inspection is to be carried out by measuring the rail thickness without requiring disassembly of the rail. The procedures described herein is recommended for this inspection.

**NDT Device**

An ultrasonic corrosion thickness gauge, which is a non-destructive testing (NDT) device, can be used for the purposes of weathering steel guardrail inspection. Using an ultrasonic thickness gauge eliminates the need to disassemble the guardrail, especially in overlapping splice areas. Detailed instructions on using a specific make and model of an ultrasonic thickness gauge device are best obtained from the user’s manual. These devices have an approximate price range of $1,500 to $3,000.

|  |  |
| --- | --- |
| Olympus MG2 Series | Calibration Block |

**Device Calibration**

An ultrasonic thickness gauge (similar to the one show above left) must be calibrated using a certified calibration block (such as the one shown above right) according to the device manufacturer’s instructions. Calibration is usually performed by measuring two or more known thicknesses from the calibration block. Device calibration is a simple, but necessary step to ensure reliable thickness measurements and should never be ignored.

**Surface Preparation**

Before measuring the thickness of the rail, the surface should be cleaned of any dirt, residue, loose rust flakes, etc. The surface can generally be adequately cleaned by rubbing it with a cotton rag.

**Setting the Probe**

When taking a thickness measurement, it is important to set the tip of the probe in full contact with the metal surface. If the probe is not set properly on the metal surface, an erroneous reading is likely. Thus readings should be avoided on surfaces that are very irregular, or at locations of sharp changes in surface profile.

**Couplant Gel**

Ultrasonic thickness gauges require application of a small quantity of a couplant gel to the spot where the probe will be placed to take a thickness measurement. This gel provides a continuous medium for transmitting ultrasonic waves between the probe and the metal sheet. The couplant gel must be applied after cleaning the surface at any spot where thickness is measured.

**Fail Thickness Threshold**

Fail thickness threshold for the weathering steel W-beam guardrail is 0.096 inches. Thus if the measured thickness at a rail location is less than 0.096 inches, it would be marked as failed.

**Inspection Procedure**

Inspection of the weathering steel guardrail is to be conducted using a two-level approach. In the first-level inspection, fewer spots are checked along the length of the guardrail system. If, however, a spot fails in the first-level inspection, a second-level inspection is performed. In the second-level, more thorough inspection is performed upstream and downstream of the failed spot. In both levels, visual inspection is also performed. Visual inspection, first-level inspection, and second-level inspection procedures are described below. These inspections should be performed by using the inspection forms provided.

***Visual Inspection***

Visual inspection should be performed at all stages of the guardrail inspection. If at any time during the inspection (first or second-level), visible signs of advanced corrosion are observed with tears or holes in the rail, or other signs indicating excessive section loss, or imminent loss of the system's functionality, the effected parts should be identified as having inadequate structural integrity (see examples below).

|  |  |  |
| --- | --- | --- |
|  |  |  |

If significant visual signs of advanced corrosion exist, such as rust build up, pitting, rust flakes, etc., but a visible hole or tear is not present, several thickness measurements should be taken in the suspected region to verify integrity of the system.

***First-Level Inspection***

In conjunction with visual inspection, first-level inspection is to be performed by using the form provided (Form 1). The inspection starts by determining the appropriate inspection interval using the table below.

Table: Inspection interval selection procedure

|  |
| --- |
| **For maximum exposure rate** (either/all) marine environment, deicing chemicals, high humidity   * + For installation age ≤ 5 years, inspection interval = 400 ft. (64 posts @ 6 ft.-3 in. spacing)   + For installation age > 5 years, inspection interval = 200 ft. (32 posts @ 6 ft.-3 in. spacing)   **For minimum exposure rate** dry/arid environment, no deicing chemicals, low humidity   * + Inspection interval for short run guardrail (i.e. ≤ 1000 ft.) = 400 ft. (64 posts @ 6 ft.-3 in. spacing)   + Inspection interval for long run guardrail (i.e. > 1000 ft.) = 1000ft. (160 posts @ 6 ft.-3 in. spacing) with the following restriction     - If noted visible damage to rail exists (i.e., deterioration or holes in rail, minor impact damage to post or rail, W-beam deformations, missing components, etc.), use:       * For installation age ≤ 5 years, inspection interval = 400 ft.       * For installation age > 5 years, inspection interval = 200 ft.   Note:  200 ft. is 32 posts @ 6 ft.-3 in. spacing  400 ft. is 64 posts @ 6 ft.-3 in. spacing  1000 ft. is 160 posts @ 6 ft.-3 in. spacing |

First-level inspections should be performed at the lapped splice nearest to the point determined from the inspection interval. At each splice, two bolt hole locations should be checked, one from the traffic side of rail, and other from the field side. The inspector should try to take the reading close to the bolt hole locations and mark them on the photos provided in the form. If there are other spots that show visual signs of deterioration, thickness should be measured in those areas in addition to the prescribed two spots per splice. Thickness in the mid span sections of guardrail are not checked during the first-level inspection, unless there are visual signs of advanced corrosion. The interval prescribed in the first-level inspection procedure should be reduced as needed in the transition and end-terminal regions so as not to skip a short-length guardrail section. It is estimated that first-level inspection should take approximately 5 minutes for each splice location checked.

***Second-Level Inspection***

In conjunction with visual inspection, second-level inspection is to be performed by using the forms provided. The inspection starts by determining the zone of inspection using the figure provided in the form.

In the lapped splices, thickness should be checked at four spots near bolt-hole locations from the traffic side of the rail, and four spots near bolt hole locations from the field-side of the rail. The measurements should be taken in a zigzag manner covering all splice bolts (i.e., by not using the same bolt-hole locations on the traffic and field sides), as shown in the following figure. The red markers in the figure show the bolt where the thickness should be measured. The thickness may be measured anywhere in close vicinity of the bolt. In addition to the eight bolt-hole locations of the splice, one additional thickness measurement should be taken around the middle post bolt slot provided for attaching the post to the rail.



Traffic side rail in splice area Field side rail in splice area

During the second-level inspection, if more than three (3) spots fail in a splice region, the splice should be considered to have inadequate structural integrity.

In addition to the splices, thickness of the guardrail should also be checked at the midpoint between splices where the rail attaches to a post. The measurement at the midpoint location should be taken from the traffic side of the rail, around the post bolt slot provided for bolting the rail to the post.

Some of the newer guardrail designs offset splices to mid-span between the posts. For these systems, second level inspection should be performed in a similar manner as described above for systems with splices at post locations. However, with splices offset between posts, there will be two post locations between each splice. Both post locations between splices should be inspected as described above.

Second level inspection can be performed using form 2A for systems with splices at post locations, and form 2B for systems with splices between posts. It is estimated that the second level inspection should take approximately 1 hour and 45 minutes to complete.

**First-Level Inspection - Form 1**

**Weathering Steel W-beam Guardrail Inspection**

Date: \_\_\_\_\_\_\_\_\_\_\_ Inspection Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Inspected by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Guardrail Location/Identifier: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­\_\_

* **STEP 1: Visual Inspection**

Always perform visual checks to identify signs of significant corrosion (see instructions under Visual Inspection for examples). If significant corrosion is visible, check rail thickness at several spots in the corroded region.

* **STEP 2: Determine Inspection Interval**

Determine the appropriate inspection interval using the table in the instructions section.

Inspection Interval: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Fail Thickness:**

**Less than 0.096 inch**

* **STEP 3: Measure thickness at nearest splice**

🞎 Mark splice bolt locations at which rail thickness was measured in the figures below. Do not select same bolt for traffic and field sides)

|  |  |
| --- | --- |
| Mark spot 1: Traffic side splice blot  Thickness spot 1 = \_\_\_\_\_\_\_\_ inches; 🞎 Pass 🞎 Fail | Mark spot 2: Field side splice bolt (post not shown)  Thickness spot 2 = \_\_\_\_\_\_\_\_\_ inches; 🞎 Pass 🞎 Fail |

Thickness at additional spots if measured (optional):

Spot 3: Location Description: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Thickness = \_\_\_\_\_\_\_ inches 🞎 Pass 🞎 Fail

Spot 4: Location Description: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Thickness = \_\_\_\_\_\_\_ inches 🞎 Pass 🞎 Fail

Spot 5: Location Description: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Thickness = \_\_\_\_\_\_\_ inches 🞎 Pass 🞎 Fail

Spot 6: Location Description: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Thickness = \_\_\_\_\_\_\_ inches 🞎 Pass 🞎 Fail

**FINAL DETERMINATION**

🞎 **PASS** 🞎 **FAIL**

**If first-level inspection failed, note following:**

Failed spot location: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Second-Level Inspection No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Second-Level Inspection Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Second-Level Inspection - Form 2A (Splices at Posts)**

**Weathering Steel W-beam Guardrail Inspection**

Date: \_\_\_\_\_\_\_\_\_ Inspection No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Inspected by: \_\_\_\_\_\_\_\_\_\_\_\_\_

Location/Identifier: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

First-level inspection number triggering this inspection: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* **STEP 1: Identify Zone of Inspection**

Inspection zone comprises three splices left and right of the splice or spot that failed in first-level inspection. Thickness readings are taken in regions marked as Area 1, Area 2L through Area 7L, and Area 2R through Area 7R in the figure on right.

* **STEP 2: Visual Inspection**

Always perform visual checks to identify signs of significant corrosion (see instructions under Visual Inspection for examples). If significant corrosion is visible, check rail thickness at several spots in the corroded region.

* **STEP 3: Measure Thicknesses**

Measure and note thickness of rail in all regions marked in the figure (Area 1, Area 2L through Area 7L, and Area 2R through Area 7R). Nine (9) thickness measurements are taken at each splice location, and one (1) measurement is taken at each post attachment location. See Instructions section for pattern to follow in measuring thickness around splice bolts.

**First-Level Failed Splice**

**Inspection Zone Corresponding to Failed Splice at Center**

**Area 1**

**Area 2R**

**Area 3R**

**Area 4R**

**Area 5R**

**Area 6R**

**Area 7R**

**Area 7L**

**Area 6L**

**Area 5L**

**Area 4L**

**Area 3L**

**Area 2L**

**Fail Thickness:**

**Less than 0.096 inch**

**Area 1 thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around post attachment holes on traffic-side

Spot 9: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 2R thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 3R thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around post attachment holes on traffic-side

Spot 9: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Fail Thickness:**

**Less than 0.096 inch**

**Area 4R thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 5R thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around post attachment holes on traffic-side

Spot 9: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 6R thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 7R thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**First-Level Failed Splice**

**Inspection Zone Corresponding to Failed Splice at Center**

**Area 1**

**Area 2R**

**Area 3R**

**Area 4R**

**Area 5R**

**Area 6R**

**Area 7R**

**Area 7L**

**Area 6L**

**Area 5L**

**Area 4L**

**Area 3L**

**Area 2L**

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around post attachment holes on traffic-side

Spot 9: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 2L thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 3L thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around post attachment holes on traffic-side

Spot 9: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 4L thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Fail Thickness:**

**Less than 0.096 inch**

**Area 5L thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around post attachment holes on traffic-side

Spot 9: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 6L thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 7L thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around post attachment holes on traffic-side

**First-Level Failed Splice**

**Inspection Zone Corresponding to Failed Splice at Center**

**Area 1**

**Area 2R**

**Area 3R**

**Area 4R**

**Area 5R**

**Area 6R**

**Area 7R**

**Area 7L**

**Area 6L**

**Area 5L**

**Area 4L**

**Area 3L**

**Area 2L**

Spot 9: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**FINAL DETERMINATION**

🞎 **PASS** 🞎 **FAIL**

**Comments:**

**Second-Level Inspection - Form 2B (Splices Between Posts)**

**Weathering Steel W-beam Guardrail Inspection**

Date: \_\_\_\_\_\_\_\_\_ Inspection No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Inspected by: \_\_\_\_\_\_\_\_\_\_\_\_\_

Location/Identifier: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

First-level inspection number triggering this inspection: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* **STEP 1: Identify Zone of Inspection**

Inspection zone comprises three splices left and right of the splice or spot that failed in first-level inspection. Thickness readings are taken in regions marked as Area 1, Area 2L through Area 10L, and Area 2R through Area 10R in the figure on right.

* **STEP 2: Visual Inspection**

Always perform visual checks to identify signs of significant corrosion (see instructions under Visual Inspection for examples). If significant corrosion is visible, check rail thickness at several spots in the corroded region.

* **STEP 3: Measure Thicknesses**

Measure and note thickness of rail in all regions marked in the figure (Area 1, Area 2L through Area 10L, and Area 2R through Area 10R). Eight (8) thickness measurements are taken at each splice location, and one (1) measurement is taken at each post attachment location. See Instructions section for pattern to follow in measuring thickness around splice bolts.

**First-Level Failed Splice**

**Inspection Zone Corresponding to Failed Splice at Center**

**Area 1**

**Area 2R**

**Area 3R**

**Area 4R**

**Area 6R**

**Area 7R**

**Area 9R**

**Area 10R**

**Area 5L**

**Area 4L**

**Area 8L**

**Area 7L**

**Area 10L**

**Area 9L**

**Area 6L**

**Area 3L**

**Area 2L**

**Area 5R**

**Area 8R**

**Fail Thickness:**

**Less than 0.096 inch**

**Area 1 thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 2R thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 3R thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 4R thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 5R thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Fail Thickness:**

**Less than 0.096 inch**

**Area 6R thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 7R thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 8R thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 9R thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 10R thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**First-Level Failed Splice**

**Inspection Zone Corresponding to Failed Splice at Center**

**Area 1**

**Area 2R**

**Area 3R**

**Area 4R**

**Area 6R**

**Area 7R**

**Area 9R**

**Area 10R**

**Area 5L**

**Area 4L**

**Area 8L**

**Area 7L**

**Area 10L**

**Area 9L**

**Area 6L**

**Area 3L**

**Area 2L**

**Area 5R**

**Area 8R**

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 2L thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 3L thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 4L thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 5L thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 6L thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Fail Thickness:**

**Less than 0.096 inch**

**Area 7L thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 8L thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 9L thicknesses:**

Around bolt-holes on traffic-side Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**Area 10L thicknesses:**

Around bolt-holes on traffic-side

Spot 1: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 2: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 3: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 4: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Around bolt-holes on field-side

Spot 5: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 6: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

Spot 7: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail Spot 8: \_\_\_\_\_\_\_\_\_\_\_\_ 🞎 Pass 🞎 Fail

**First-Level Failed Splice**

**Inspection Zone Corresponding to Failed Splice at Center**

**Area 1**

**Area 2R**

**Area 3R**

**Area 4R**

**Area 6R**

**Area 7R**

**Area 9R**

**Area 10R**

**Area 5L**

**Area 4L**

**Area 8L**

**Area 7L**

**Area 10L**

**Area 9L**

**Area 6L**

**Area 3L**

**Area 2L**

**Area 5R**

**Area 8R**

**FINAL DETERMINATION**

🞎 **PASS** 🞎 **FAIL**

**Comments:**