

repairs shall have sketches which clearly show specific locations, lengths and depths of field cuts or damages repaired by field welding.

2. **Magnetic Particle Inspection of Welds.** All welding required in the fabrication of each beam or girder shall be completed and all visual defects shall be corrected prior to the examination by magnetic particle inspection. Dry powder magnetic particle inspection shall be made of at least 0.3 m (1 foot) of each 3.0 m (10 feet) or fraction thereof for each size of weld in the following:

- (a) Flange-to-web welds, including ends of girder after trimming.
- (b) Moment plate to flange welds
- (c) Bearing stiffener welds
- (d) Other welds designated by the Contract or AWS Bridge Welding Code.

Test sections shall be random locations selected by the QA inspector and/or the QCFS, and the examination shall be conducted with the QA inspector observing for C rated fabricators, unless waived by OSE. The Fabricator shall position the welds as necessary for the inspection with consideration of safety and convenience to the inspecting personnel.

Welds shall be inspected after they have been cleaned. When magnetic particle testing is used, the procedure and techniques shall be in accordance with the the dry powder magnetic-particle examination of welds using the prod or the yoke method per AWS 6.7.6. The prod test equipment shall have a functioning ammeter. The prod magnetizing current shall be 100 amperes per 25 mm (inch) of prod spacing but not less than 400 amperes. Only aluminum prods shall be permitted.

When unacceptable defects are found in a section, both adjacent 1.5 m (5 foot) segments or the full length of the weld if it is a lesser amount shall be tested. Welds requiring repair shall be retested after repairs are complete. Consideration will be given to performance of MPI inspections prior to complete welding, if the fabricator's quality control plan is acceptable to the Department and additional processing does not produce a potential for cracking.

Not all of the enumerated surface defects of Article 9.21 of the AASHTO/AWS Bridge Welding Code will be located by an inspection of this type. Welds shall be considered unacceptable if they produce such indications that are in excess of the above quality standards.

The Fabricator shall record the piece mark, the location on the member, the defect description and the proposed repairs for any defects found.

3. **Ultrasonic Testing of Welds.** Ultrasonic inspection shall be made of the following:

- (a) Complete joint penetration flange-to-web, T or corner joints, 25% for non FCM, 25% compression or shear FCM and 100%. Tension FCM.

- (b) Complete penetration butt welds 100% tension FCM and 25% compression FCM,

- (c) Other welds designated by the Contract or AWS Bridge Welding Code.

The QCFS shall provide a cover letter, specified certification, sketches and technician reports documenting QCFS acceptance that nondestructive testing has been performed per specification.

863.28 Shipping, Storage and Erection. Members damaged by improper handling, storing, transportation or erection shall be repaired or replaced, at the discretion of the OSE, at no expense to the Department.

During transportation, adequate blocking shall be in place between members to prevent movement and facilitate unloading. Field connection holes shall not be used for tie-down, unless they are reinforced by additional plates, angles or other material bolted in place. Bearing components shall be banded together.

Material to be stored either in the fabricating shop or in the field shall be placed on skids or blocks to prevent the metal from coming in contact with the ground. Girders and beams shall be placed and shored in an upright position for shipment, field storage and shop storage. Field splice plates shall be bolted in their final position or shifted laterally with respect to their final position. All material shall be kept clean and properly drained. Bearing devices and anchorages shall be installed according to 516. Bearing surfaces and surfaces to be in permanent contact shall be thoroughly cleaned before the members are assembled.

During erection, drifting will be permitted to draw the parts into position, but the holes shall not be enlarged nor the metal distorted. Erection (drift) pins shall be cylindrical and not more than 0.8 mm (1/32 inch) smaller than the hole diameter. Field splices and connections shall have not less than one-half of the holes filled with pins and snug tight bolts (preferably half bolts and half pins) before the member is released from the hoisting equipment. Field splices and connections commenced prior to erection of the connected parts shall be completed before erection. Splices and connections subject to construction loads during erection shall have not less than three-fourths of the holes so filled. Permanent fastening of steel truss tension chord members shall be completed before the falsework is removed, but compression chord members shall not be permanently fastened until the span is released sufficiently from the falsework to bring the compression chord joints into full bearing. Elevations of panel points and ends of floor beams shall be properly regulated and maintained until the falsework is removed.

Enlarging by any method the holes of splices and/or connections between segments or elements of main members is prohibited without approval by the OSE.

Structures shall be adjusted to correct alignment and camber before permanent fastening is begun. Cross frames and lateral bracing in continuous beam or girder spans shall not