501 STRUCTURAL STEEL CONSTRUCTION MANUAL

501.1 Introduction

The Utah Department of Transportation Structural Steel Construction Manual is part of the contract documents for the fabrication or rehabilitation of structural steel bridges and structures. This manual provides standard techniques and methods of inspection for structural steel items.

The contractor is responsible for the quality of work. Verification of the contractor’s quality control is the prerogative of UDOT. Verification inspection performed by UDOT does not relieve the contractor of the responsibility for quality materials and workmanship required by the contract specifications.

When materials are fabricated or supplied by sources outside of the State of Utah, costs associated with out-of-state verification inspection and testing will be reimbursed by the contractor.

501.2 References

American Welding Society AASHTO/AWS D1.5 Bridge Welding Code
AWS QC1 "Standard for Qualification and Certification of Welding Inspectors"
American Society for Nondestructive Testing (ASNT) SNT-TC-1A
ASTM E165 Standard Practice for Liquid Penetrant Examination
ASTM E709 Standard Guide for Magnetic Particle Testing
Utah Department of Transportation -Standard Specification for Road and Bridge Construction
Utah Department of Transportation – Structures Design and Detailing Manual

501.3 Definitions

Contractor - The contractor or any representatives including the fabricator and erector.

Quality Control (QC) - The Contractor is responsible for QC unless otherwise provided in the contract documents. Quality Control is performed during prefabrication, fabrication, post-fabrication and erection to ensure that materials and workmanship meet the requirements of the contract documents. Quality control includes all inspection and testing activities. The QC Inspector acts for and on behalf of the contractor on all inspection and quality matters within the scope of the contract documents.
Quality Assurance (QA) - Quality Assurance includes all verification inspection and testing performed by the Quality Assurance Inspector on behalf of the Department on all quality matters within the scope of the contract documents. Quality Assurance is performed in a timely manner to avoid delays in the work.

501.4 Inspector requirements, qualifications and authority

Quality Control and Quality Assurance inspectors must be one of the following:

- An AWS Certified Welding Inspector (CWI) who has been qualified and certified in accordance with the provisions of AWS QC1, "Standard for Qualification and Certification of Welding Inspectors"

- A UDOT Materials Engineer or Materials Technician

A Certified Welding Inspector must be present in the fabricator's shop or in the field during all fabrication activity including cutting, fit up, repair welding, painting, and destructive testing. Certified Associate Welding Inspectors who support the QA or QC Inspector may perform certain supervised inspection functions, monitored daily and under the direction of the CWI (AWS QC1.1). A CWI must complete all final inspections.

Personnel performing nondestructive tests (NDT) need not be qualified and certified under the above provisions. Personnel performing NDT shall be qualified in conformance with the American Society for Nondestructive Testing (ASNT) SNT-TC-1A or equivalent. The Materials Engineer or his representatives shall have the authority to verify the qualifications of QC Inspectors and NDT personnel to specified levels by retests or other means.

The QC inspector will perform QC functions only.

The QA Inspector is authorized to reject materials and workmanship that do not conform to the contract documents.

Quality Assurance inspection of materials and workmanship assigned by the Materials Engineer may be conducted before, during and after fabrication. "In process" inspections (during fabrication) that elicit defective materials or workmanship will be automatically rejected. The QA Inspector may perform at the Department's expense any nondestructive tests of materials and workmanship. The Materials Engineer may require a QA inspection at the mill or shop. Inspection by Department representatives is not a substitute for Quality Control by the Contractor.

When the contract documents require shop inspection, materials will not be accepted at the project without the Inspector's mark of acceptance. If materials are not acceptance-marked because they were not offered for shop inspection, or were shipped after rejection at the shop, they will be returned to the shop for inspection and correction, as necessary. The Department may, at its discretion, allow inspection to be performed at the project site.
by the Shop Inspector, the QA Inspector, or the Inspector's representatives. Field inspections are conducted at no additional cost to the Department.

501.5 Contractor requirements

The Contractor is responsible for product acceptability. Inspectors make all necessary visual inspections (prefabrication, fabrication, and post-fabrication) to ensure that materials and workmanship meet the requirements of the contract documents. The Contractor must comply with all requests of the QA Inspector (whether the Inspector is an employee or the Department's representative) to correct deficiencies in materials and workmanship as provided in the contract documents.

The Contractor provides the facilities for QA inspection of materials and workmanship at the producing mill and the fabricating shop. The contractor will provide and maintain office facilities for QA Inspectors that ensure a reasonable amount of privacy and that are clean, properly illuminated, heated or air-conditioned as necessary, and reasonably free of shop noise, dust and odors. Locate the office reasonably close to the work and provide access to all parts of the premises that are used in the work. If the QA Inspector is denied access, any work performed during this time period will be rejected. Provide adequate work areas for each inspector including a desk, chair, and secure storage (e.g., locking file cabinet).

The Contractor must give the Materials Engineer or his representative written notice 7 days prior to any fabrication. Out-of-state inspections require 30 days notice prior to fabrication. 501.6 General inspection requirements

The Contractor must submit a QC plan to the Materials Engineer for approval before any project operations.

The Contractor provides shop drawings and copies of correspondence pertaining to materials or workmanship.

The Contractor will keep a permanent, bound diary of Daily Fabrication & Inspection QC Reports performed by each shift.

The Contractor will submit daily Fabrication & Inspection Reports to the QA inspector at the end of each work week. Provide NDT reports at the time of inspection. Review the approved shop drawings, pertinent correspondence, the Steel Construction Manual, applicable provisions of the Standard Specifications and special provisions.

Obtain tools required to perform Quality Control Inspections such as steel measuring tapes (100 ft.), steel wire, a straight edge, calipers, weld gauges, a pit depth gauge, welding shields, temperature-indicating crayons, dry film thickness gauges and a portable Rockwell C Hardness tester.

Quality Control Inspectors will verify Buy America requirements for all applicable projects.

The QC inspector will review the "Status of Fabrication Report" every week and sign and submit the following reports or drawings at the time of inspection:
• Radiographic Reports
• Magnetic Particle Test Reports
• Dye Penetrant Test Reports
• Ultrasonic Reports

The UDOT Quality Assurance Inspector or representative will randomly monitor the Contractor’s inspection techniques and test procedures to ensure compliance with the contract documents. Quality Assurance may be ordered for any inspection or test as determined by the Materials Engineer or representative. QA inspection does not supplement or replace any inspection that is the responsibility of the Contractor. Defects in materials or workmanship discovered after Department acceptance are the responsibility of the Contractor.

501.7 Steel Construction

501.7.1 Before steel construction begins the contractor will:

- Ensure that the fabricator meets the UDOT minimum criteria for structural steel fabrication and painting.
- Verify that the shop facilities provide sufficient lifting capacity, an adequate physical plant, and acceptable equipment.
- Provide proof of AISC, Major Steel Bridge (CBR) Certification.
- Provide each work area with cranes that have a combined rated capacity equal to the weight of the heaviest fabricated assembly for shipment.
- Ensure that alternate lifting and turning facilities are approved by the Materials Engineer.
- Supply lifting chains with softeners to prevent damage to material corners during lifting and turning.
- Ensure sufficient jaw and throat width if hooks are used for lifting to prevent damage to flanges or web-to-flange welds.
- Prevent overstress and distortion when lifting long slender members by providing spreader beams or multiple cranes.
- Ensure that any fabrication, welding and painting done outside the shop is thoroughly protected from weather or other conditions and approved by the Materials Engineer. Cut, fit, weld and paint in dry, dust free areas.
- Conduct welding in areas kept above a minimum temperature of 0 °F.
- In painting areas, maintain the steel above a minimum temperature of 40 °F during application of paint and until the paint is dry.
- Provide fully automated welding equipment subject to modification by other provisions of the contract documents for:
  • Making flange-to-web welds
  • Attaching all stiffener to the webs of the welded plate girders when accessible
  • Making web-to-flange welds in box girders, arches, towers and truss web and chord members
- Use semi-automatic (hand-guided) or fully automated welding equipment for all other principal welds.

Limit the use of Manual-Shielded Metal Arc Welding (SMAW) process to:
  • Welding connection plates to rolled beams
  • Welding bearing assemblies
  • Making minor detail attachments
- Repair welding

Restrict welding applications that do not employ automatic or semi-automatic welding equipment to areas where access is limited or the weld length is shorter than 24 inches.

Shop assembly of field connections for trusses, girders and arches may be performed outside the shop building.

Damages that result from ordering materials prior to the shop drawing approval are at no additional cost to the Department unless changes are made in the principal controlling dimensions and material properties after the opening bids.

Do not begin shop work prior to shop drawing approval.

Do not use stock steel purchased from a warehouse for use in a main member, girder flanges and webs without conducting mill inspection unless prior approval is given by the Materials Engineer.

The fabricator must have a quality control program approved by the Materials Engineer and supervised by an American Welding Society QC-1 certified welding inspector.

No welding on or removal of fabrication errors or misfits shall be performed without written approval of the Engineer.

501.7.2 The Quality Assurance Inspector may inspect and test all materials by visual, destructive, or nondestructive methods to evaluate that the materials meet the specified properties. The Department accepts products from approved mills based upon a certified Mill Test Report of the plates, shapes, castings, and forgings as appropriate.

The Materials Engineer will inspect and approve all producing mills, fabricators and foundries outside the United States and Canada prior to beginning the work at no additional cost to the Department.

The Quality Assurance Inspector will:

- Obtain a copy of the Fabricator's QC plan and procedures and determine a contact person to represent the Fabricator.
- Obtain a copy of the contract plans and special provisions immediately after the contract is finalized.
- Review for changes from the standard specifications, unusual design details or items unique to the project.
- Schedule a prefabrication conference to clarify:
  - Specification and inspection requirements (if required because of project size)
  - Fabricator's past performance
  - Unusual design requirements and/or specification changes
- Before fabrication, obtain the following:
  - AISC Category Major Steel Bridge (CBR)
  - Complete set of approved shop drawings
  - Approved Weld Procedure Specifications and Procedure Qualification Records.
  - All welder certifications will be witnessed by a CWI.
  - A letter from the Fabricator that states the certified welders have been using the processes without an interruption of more than six months since being certified
  - Three copies of all steel mill test reports and purchase orders
  - Three copies of certifications of welding wire, fluxes, or shielding gases
  - Three copies of certifications and purchase orders of studs, bearing pads, and other sundry materials
  - UDOT test reports on paint
- Schedule a UDOT representative to witness testing at the mill to verify steel heats, if ordered by UDOT.
- Inspect the Fabricator's shop equipment and physical plant.
- Inspect welding equipment condition and ensure that meters are calibrated for amps, volts, etc. semi-annually.
- Check the location and holding area of the rod oven. Verify the holding temp is 250°F minimum
- Ensure that the storage area for wire, flux, and rod is warm and dry.
- Verify that the low hydrogen rod is stored in sealed metal cans before it is placed in the rod oven.
- Evaluate material handling equipment for steel plate to ensure that no damage will occur during handling including storing plate above ground on skids and proper use of softeners to prevent chain gouges.
- Verify that the Fabricator uses an approved identification transfer procedure that assures each piece of steel incorporated into a main member maintains its identity as the plate is cut into smaller pieces. All remnant material will have the heat number permanently die stamped into the plate at the time of originally cutting with low stress stamps to maintain traceability and direction of roll. Any plate in which the heat number or traceability is not verifiable will automatically be rejected.
- Inspect the steel plate prior to fabrication for dimension, mill rolling defects, scabs, rough surfaces, mill repairs and plate edges for possible lamination.
- Compile a portfolio containing all Girder Inspection Report (G.I.R.), Daily Fabrication & Inspection Reports, material certification papers, weld procedure specifications, welder's test reports, correspondence and nondestructive testing reports.
- Ensure each girder has a separate I.D. number.
501.7.3 During fabrication welding the Quality Control Inspector will use visual inspection and nondestructive testing techniques to ensure the proper preparation, procedure, workmanship and documentation of all fillet and groove welds. The Quality Control Inspector will:

- Regularly observe welding operations to evaluate workmanship (size of pass, cleanliness between joints) and order recertification whenever quality is questionable.
- Complete one Girder Inspection Report (G.I.R.) for each girder fabricated using approved shop drawings.
- At the beginning of each project and upon request throughout the project, provide documentation that confirms specified process variables (including volts, amps, wire type, flux, travel speed, and position) are maintained.
- Random project documentation requests will be used to confirm weld quality or when a welding machine has been moved or repaired. Provide specified documentation by the end of the shift. Maintain a permanent log of all WPS verifications.
- Before welding check the joint alignment and verify joint dimension, cleanliness and absence of parent metal defects. Ensure that proper pre-heat procedures have been used.
- Verify that all welders assigned to the project are properly certified.
- Inspect the size of each fillet weld using a weld gauge.
- Ensure that all welds made correspond to those indicated on the approved shop drawing.
- Visually inspect all finished fillet welds for porosity, uneven legs, cold lap, undercut, size and cracking. Ensure that any defective weld is repaired. Order nondestructive magnetic particle or dye penetrant testing when any weld's general quality is suspect.
- Visually inspect all final groove welds for surface roughness, slope of transition, underfill, over-grinding and mismatching.
- Conduct ultrasonic tests to inspect groove welds in main members (in accordance with AWS D1.5). Use radiographic tests on five percent of all tension or reversal groove welds. Do not conduct nondestructive testing on butt welds in flanges and webs until they are cut to their full width.
- Record all inspection results on the Girder Inspection Report.
- Record all ultrasonic inspection results on the Ultrasonic Inspection Form. Use the letters R, R2 and R3 after each weld number to indicate the number of repairs made. No more than three repairs shall be made on any weld joint.

501.8 Welding

501.8.1 Before welding the quality control inspector will:

- Verify that steel pieces, when assembled will be stressed parallel to the rolling direction
- Review welding procedure specifications and verify Department approval
- All cutting and stripping operations will maintain, for inspection, a daily cutting log with heat numbers, size and mark numbers cut.
- Determine how welds will be identified and where heat and weld identification will be placed on the girders.
- Observe the layout to determine if the Contractor can achieve the required accuracy.
- Confirm that all welding procedure specifications have amps & voltage range listed on the WPS as a numerical value.
- Verify the condition of electrodes and flux and ensure that they are properly stored.
- Verify that only approved welding consumables are used.
- Verify the heat identity of random plates and shapes and all fracture-critical materials.
- Visually inspect surfaces and machined ends.
- Visually inspect flame-cut surfaces.
- Inspect welding equipment to ensure that it functions properly.
- Maintain a record of WPS verifications on all welding machines being used in the fabrication process. Each machine must have a weekly check.
- Check for proper weld joint fit-up and groove weld preparation.
- Verify proper use of run-off plates and backing bars, when required.
- Examine joint for cleanliness and mill scale removal. Avoid materials that may be sources of hydrogen and other gases.
- Check preheat temperatures before welding is initiated to verify that a soaking (thru-thickness) preheat has been established.
- Verify and record all electrode lot and heat numbers.
- **Follow D1.5 Preheat & inter-pass temps.**

501.8.2 During welding the quality control inspector will:

- Verify that operating parameters (amps, volts, travel speed, etc.) conform to the approved welding procedure specification. Ensure that all weld repairs are done in accordance with approved welding procedures.
- Verify the preheat, size, shape and appearance of weld beads.
- Ensure proper weld cleaning between passes.
- Ensure that the weld joint consists of sound weld metal.
- Confirm that no welding is done over visible base metal defects or weld defects.
- Visually inspect welds as they are completed for conformance with the contract documents.

501.8.3 After welding the quality control inspector will:

- Determine that surface and edge grinding conform to the specifications and do not reduce weld and base metal thickness below acceptable limits.
- Determine that post-heat, when required, is initiated immediately upon completion of welding. Ensure that post-heat, when required, is maintained at the required temperature for the specified minimum amount of time.
- Observe removal of run-off plates and weld backing to ensure that destructive procedures are not employed.
- Check radiographic preparation and technique. Review all radiographs and reports.
- Check ultrasonic, magnetic particle, and dye penetrant tests when required by the contract documents or ordered by the Materials Engineer. Review reports.
- Inspect preparation for repair welding and pre-heat and post-heat, when required.
- Observe heat curving, cambering, or straightening. Verify conformance to specifications.
- Examine component holes before assembly.
- Check the shop assembly, and examine fastener holes in the assembled or the template-reamed pieces.
- Verify camber and curvature measurements and record results on Girder Inspection Report.
- Check cleaning of weathering steel and cleaning and painting of painted steel.
- Check storage condition of finished members.

501.8.4 The quality assurance inspector may verify any welding operations and will examine welder, welding operator, and tacker qualifications and witness qualification tests. The QA inspector will check mill test reports to verify that the mechanical properties, chemical analysis, and Buy America provisions (when required) conform to the requirements of the contract documents.

501.9 General Girder Inspection Procedures

The Quality Control Inspector conducts girder inspection procedures throughout the fabrication process. When base metal is judged as damaged by the Department because of faulty welding or removal for re-welding, the Contractor must either remove and replace the damaged base metal or compensate for the deficiency as approved by the Engineer.

The Girder Inspection Report (G.I.R.) functions as a project control document throughout general inspection procedures. The Quality Control Inspector will:

- Document material and weld locations on the G.I.R.
- Check all rod oven temperatures at least once a day.
- Twice daily, check the shop to ensure that old welding electrodes are not used past their recommended atmospheric exposure time.
- Prevent damage during handling of materials.
- Locate each piece of steel in the main member (by heat number) on the G.I.R.
- Record the heat numbers.
- Indicate compliance on each G.I.R. heat number with a check mark.
- Measure the plates in the girder to verify correct placement.
- Record the location of all groove welds. Ensure that no water, oil or other contaminants gets into the weld grooves.
- Cross-check the G.I.R. to verify that all welds have been properly inspected. The Contractor is responsible for ensuring that all welds comply with the quality requirements of any specified nondestructive testing (other than visual testing.)
- Indicate verification with a check mark.
- Check the flux, wire-storage area.
- Verify that a mechanical guide is used for all flame cutting, and that the specified surface roughness is obtained.

501.10 Non-destructive Testing (NDT)

Perform NDT tests only when the steel is between 40 and 110 °F. Quality Assurance performed by the Department may include verification of any or all steps.

501.10.1 Ultrasonic Inspection (UT): Follow these procedures and standards for all ultrasonic inspection to meet the requirements of the contract documents, the AWS D1.5 Bridge Welding Code and the Engineer. Any variation in test procedure or equipment requires approval by the Materials Engineer. The Quality Control Inspector will:

- Inspect full-penetration groove welds ultrasonically at a frequency of 25% compression and 100% tension or reversal.
- Inspect Transverse Flange and Web Splices. The tension portion of each transverse groove weld on flanges and the tension portion of web splices shall be given 100% UT Inspection.
- Inspect other Weldments. Each full-penetration groove weld in other weldments shall be given a 25% UT inspection unless contract documents state otherwise.
- Inspect and test full-penetration welds in T and corner joints at a frequency of 25% compression and 100% tension
- Inspect and ultrasonically test T and corner joints from face A&B.

Use the ultrasonic acceptance/rejection criteria illustrated in (AWS D1.5) Table 6.3 & 6.4. Ensure that UT inspection performed by the contractor is witnessed by a representative of the Department, unless otherwise waived.
Grind web and flange splices flush and smooth to a minimum 250 μm finish on both sides before any NDT testing.

501.10.2 Radiographic Inspection (RT): Full-penetration groove welds subject to tension or reversal shall be given a five percent RT inspection. These welds include those tension areas of webs, where inspection shall cover the greater of these two distances: 15 inches from the tension flange, or 1/6 of the web depth from the tension flange.

If inspection results deviate from specification requirements, testing frequencies may be increased and an evaluation of inspection and welding practices will begin as determined by the UDOT Materials Engineer.

Quality Assurance may order back-up radiographs as determined by the Materials Engineer.
501.10.3 Magnetic Particle Inspection: Conduct magnetic particle inspection according to the following procedures and standards. Any variation in testing procedure or equipment requires approval by the Engineer.

Perform all testing as specified in the Standard Method for Dry Powder Magnetic Particle Inspection (ASTM E-709) except that the part to be inspected must be magnetized by the yoke technique. The Yoke Technique places the poles in contact with the part and energizes the coil of the electromagnet, establishing a longitudinal magnetic field. Only ferromagnetic materials can be tested by these techniques.

Discontinuities are best detected when their major axis is normal to the magnetic lines of force. Grinding may be required to remove surface irregularities that interfere with test interpretation. Reports must list the test method, contract number, project identification number (PIN), Structure number, county, test date, Fabricator's shop order number and the erection mark.

- Use the yoke technique to check for discontinuities with a major axis normal to a line drawn between poles.
- Ensure compliance with these yoke technique provisions:
  • The electromagnet operates on a 110-VAC, 60- cycle power supply and produces a pulsed DC- magnetic field.
  • The magnetic field strength produces a minimum 40-pound lifting force at the maximum pole spacing used.
  • An AC-magnetic field produces a minimum 10-pound lifting force at the maximum pole spacing used.
- Orient the poles in two directions, approximately 90 degrees apart at each inspection point, to detect both longitudinal and transverse discontinuities.
- Ensure 100 percent inspection of the areas to be tested by overlapping the pole positions.
- Ensure that the inspected surface is clean, dry and free of oil, rust, loose mill scale, paint and other coatings.
- Ensure that welds subject to magnetic particle inspection have no cracks.
- Evaluate porosity and fusion-type defects as specified in the procedure standard (AWS D1.5).
- Verify that the test technician prepares and signs a test report for each erection piece subject to inspection
- The test report must identify the extent of the weld or base metal inspected, the name of the technician, the name of the Department representative witnessing the work, and all indications of discontinuities.
- Deliver a complete set of test reports to the Engineer upon completion of the work.

501.10.4 Dye Penetrant Inspection: Ensure that all dye penetrant inspection conforms to the following procedures and standards when required by the Contract documents or ordered by the Engineer. Limit the use of this inspection method to detecting discontinuities that are opened to the surface.
- Perform all testing as specified in Method B, Visible Solvent, Removable Penetrant, ASTM E-165.
- Clean the surface being inspected as specified. ASTM E-165.
- Remove surface irregularities that interfere with the interpreting test results by grinding.
- Smooth all welds by grinding prior to testing.
- Ensure that all dye penetrant inspection not performed by Department employees is witnessed by a representative of the Department.
- Prepare a report for each erection piece subject to inspection. Ensure that the report identifies the extent of the weld or base metal inspected, the name of the technician (printed and signed), the name of the Department representative witnessing the work and all indications of discontinuities.
- Ensure that each report lists the project number, project authority number, project name, county, date of test, Fabricator's shop order number and erection mark.
- Deliver a complete set of test reports to the Materials Engineer upon completion of the work.
- Ensure that welds subject to dye penetrant inspection have no cracks.
- Evaluate porosity- and fusion-type defects as specified in the procedure standard (AWS D1.5).

501.11 Shop Assembly

The Contractor will conduct shop assembly according to the following procedures. Quality Assurance performed by the Department may include verification of any or all steps.

- Record data and inspections on the G.I.R.
- Check the true camber in the girder to verify compliance within the specification tolerance.
  • Girders are to be placed in the no-load position, webs are to be in the horizontal position
  • Line up girder with pre-drilled splice plates and bearing stiffeners at right angles to the horizontal work line.
  • Stretch a wire from bearing stiffener to bearing stiffener.
  • Place the wire on the designed camber at bearing stiffeners.
  • Check the true camber at location noted on approved shop drawing (¼ point min.)
  • Record the true camber on the G.I.R. (in parenthesis)
- Check the overall distance between bearing stiffeners and the location of diaphragm stiffeners with a steel tape placed along the horizontal work line record actual and required dimensions on the G.I.R
- Check the roundness and location of the holes at the splice plates.
- Match-mark the splice plates and girder to ensure ease of erection.
- If done in the shop, verify stud welding quality operation by evaluating the sound made when each stud is tapped with a hammer.
  • If the sound is flat, bend the stud approximately 15 degrees by striking with a hammer.
• Bend the stud in the opposite direction of any void that occurs due to incomplete welds around the base.
• Bend all studs that have been repaired.

501.12 Final Inspection Before Painting

The Quality Control Inspector will conduct final inspection before the girder is painted, complete and route required documentation and monitor loading for shipment. Record all items on the Girder Inspection Record (G.I.R.).

- Inspect the girders with the web in the vertical position as follows:
  • Look down the length of the member for sweep. If there are any apparent problems with the sweep, run a line along the inside of the girder and measure the sweep.
  • Re-inspect the welds for visual defects.
  • Check the bearing seats for flatness and protection from rust by an approved coating system.
- Check the ends of the bearing stiffeners for fit, check the flanges to ensure that no tip exceeds the specifications and check the centering of the web to the flange (¼ tilt or 100th of the total flange width whichever is greater).
- Verify that web plate warping does not exceed the specification. AWS D1.5 or project Special Provisions.
- Verify the sizes of the fillet welds.
- Check the blasting grit for size and dryness, and check the total blasting job to verify compliance with cleanliness requirements. (See Special Provisions for painting specifications.)
- Inspect all welds to ensure that required repairs have been made after blasting and prior to painting re-blast any repaired area to ensure proper profile is maintained
- Examine flange edges for chain gouges.
- Check all plates for surface defects.
- Forward copies of all material certifications to the QA Inspector.

501.13 Painting

The Quality Control Inspector will ensure the structure is ready to be painted, the proper paint is used and all required areas are painted. Ensure that the girder is not painted until all repairs are completed and approved.

Record all batch numbers being used. Record environmental conditions including time, date and field MK# being painted. Verify that the proper paint is used, that environmental requirements are met and that the paint is applied according to the manufacturer’s recommendations. Check paint thickness at various locations with a magnetic gauge. Check hard-to-paint areas, such as underneath the top flange to ensure the specified paint thickness.

501.14 Shipping
The Quality Control Inspector will witness the loading and blocking of all structural members being shipped. Girders will be shipped according to UDOT’s Structural Steel Standard Specification and UDOT Structures Design and Detailing Manual limitations. Shipping of all items require 24-hour written notification.

- Provide an opportunity for inspection in a safe and reasonable manner.
- Make a final visual inspection to all material, welds and paint to ensure no damage has occurred during loading. Make repairs as needed.

The Quality Assurance Inspector will identify all acceptable members with an orange sticker and issue a test report stating that the member meets the specification.