

SECTION 00930 - METAL SIGN SUPPORTS

(Follow all instructions and make all edits with "Track Changes" turned on. If there are no instructions [purple text] above a subsection, paragraph, sentence, or bullet, then include it in the Project. Delete all purple text before preparing the final document. All other modifications to this Section will require ODOT Technical Resource and State Specifications Engineer approval.)

Comply with Section 00930 of the Standard Specifications modified as follows:

00930.01 Definitions - Add the following definition at the end of this subsection:

Street Name Sign Mount - This group includes plates, brackets, and fasteners necessary to install a street name sign on a sign support.

00930.02 Working Drawings - Replace the paragraph that begins "Submit six copies..." with the following paragraph:

Submit six copies of unstamped Working Drawings according to 00150.35 for all structural metal Work. Submit six copies of stamped designs, details, Plans, and calculations according to 00150.35 for all engineered details and drawings that are not prepared by the Agency but are required by the Contract Documents and Specifications for the Project prior to fabrication. Include the Field Verification of Post Lengths form, available from the Engineer. Material ordered or Work performed before the Engineer finishes and returns the documents is at the Contractor's risk.

Replace the paragraph that begins "Working Drawings for these supports..." with the following paragraph:

Working Drawings for these supports are provided by the Engineer. Use the Field Verification of Post Lengths form, available from the Engineer, to provide the necessary site data for the engineer of record to use in producing Working Drawings. Work performed, or Materials ordered, before receiving Working Drawings from the Engineer is at the Contractor's risk.

Replace the paragraph that begins "Include the completed Field Verification..." with the following paragraph:

Include the completed Field Verification of Post Lengths forms that are available from the Engineer for these intelligent transportation systems supports. Material ordered or work performed before receiving approved Working Drawings from the Engineer is at the Contractor's risk.

00930.09 Identifying Tags - Replace this subsection, except for the subsection number and title, with the following:

Furnish stainless steel or brass identifying tags for overhead and butterfly sign support Structures, except structure mounts. Attach tags to all posts, arms, and truss sections. Furnish tags that are at least 1/16 inch thick with lettering at least 1/4 inch in height, and stamped into the tag. Attach the tags with stainless steel pop rivets of at least 3/16-inch nominal body diameter. Do not locate pop rivet holes within 6 inches of welds. Locate post tags approximately 5 feet above the baseplate. Drill holes for pop rivets prior to hot-dip galvanizing. Remove excess hot-dip galvanizing from holes and repair according to ASTM A780.

Include the following information on the tags:

- Structure number
- Manufacturer
- Month and year of manufacture
- Highway number and mile point

~~(Use the following subsection .10 when topcoat colors are required.)~~

00930.10 Materials - Replace the paragraph that begins “Except for Perforated Steel Square ...” with the following paragraph:

Except for Perforated Steel Square Tube Slip Base Sign Supports and for Perforated Steel Square Tube Anchor Sign Supports, galvanize according to the requirements of Section 02530. Galvanize Perforated Steel Square Tube Slip Base Sign Supports and Perforated Steel Square Tube Anchor Sign Supports according to ASTM A653 G90, zinc coat corner seam weld after scarfing, apply a conversion coating, and apply a final clear polymer coating.

~~(Use the following subsection .10 when topcoat colors are required.)~~

(Use the following two paragraphs to list topcoat colors when specifying 00930.48 coating. Fill in the blanks as instructed and obtain information from the Designer. Copy and repeat the paragraph as needed. Use only basic color names and numbers from the SAE AMS-STD-595 color index.

Example:

For Structure No. 12345A, furnish a topcoat color of Black that matches to SAE AMS-STD-595 color # 17038.)

Add the following to the end of this subsection:

For (Structure number or item description), furnish a topcoat color of (Color Name) that matches SAE AMS-STD-595 color # (Color Number).

00930.30 Fabricators - Replace this subsection, except for the subsection number and title, with the following:

Fabricators of metal sign supports are required to have either a current AISC Simple Steel Bridge Structures (Sbr) certification or a current AISC Major Steel Bridges (Cbr) certification.

00930.40(a) General - Replace the paragraph that begins “Except for Perforated Steel Square ...” with the following paragraph:

Where two or more posts are required to support a sign, orient and position both posts so that no twist or warp is imparted to the sign panels.

00930.40(b) Assembly of Metal - Replace this subsection, except for the subsection number and title, with the following:

Accurately assemble the parts as shown and follow any match marks. Handle the material carefully so that no parts are bent, broken or otherwise damaged. Clean bearing surfaces and surfaces to be in permanent contact before the members are assembled. Roughen faying surfaces of slip-critical structural connections utilizing high strength bolts by means of hand wire brushing after galvanizing. Power wire brushing is not allowed.

Furnish faying surfaces of plates flat to within a tolerance of 1/32 inch in 12 inches and a tolerance of 1/16 inch overall. Furnish base plates with leveling nuts that are flat to within a tolerance of 1/8 inch in 12 inches and a tolerance of 3/16 inch overall.

00930.40(c) Welding - Replace the paragraph that begins “The fabricator shall ...” with the following paragraph:

Complete the welding inspection by the fabricator according to the details and requirements called out on the Contract Documents. This requirement overrides all appropriate weld inspection requirements called out in Section 5.15 WELDED CONNECTIONS in AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*. Submit all Procedure Qualification Records, Welding Procedure Specifications, and testing procedures for Engineer's review prior to starting manufacturing. Submit certified copies of inspection reports to the Engineer for review.

Replace the paragraph that begins “If requested by the Engineer ...” with the following paragraph:

If requested by the Engineer, additional weld inspection may be required upon arrival of the material at the Project Site. If defects are found by this additional inspection, the Contractor is responsible for the additional testing and repair costs. If no defects are found, the Engineer is responsible for the additional inspection costs.

00930.40(d) Bolt Installation - Replace the paragraph that begins “Provide all high ...” with the following paragraph:

Furnish all high strength bolts with hardened washers under the element (nut or bolt head) turned in tightening. If a high strength bolt is installed in an oversized or short slotted hole in an outer ply, use a hardened washer. If a high strength bolt is installed in a long slotted hole in an outer ply, use a plate washer or a continuous bar made of structural grade steel at least 5/16 inch thick with standard holes. Make the washer or bar sufficiently large to completely cover the slot after installation.

00930.40(d)(1) Bolt Installation for Slip Bases (Breakaway) - Replace the paragraph that begins “Furnish, at no additional ...” with the following paragraph:

Provide, at no additional cost to the Agency, a calibrated torque wrench of a capacity appropriate to the size of the high-strength bolts installed and tightened. Confirm the accuracy of the calibrated torque wrench through calibration by an approved testing agency at least once a year.

00930.40(e)(1) General - Replace this subsection, except for the subsection number and title, with the following:

Notify the Engineer in writing at least 24 hours before starting installation. The Engineer will observe the installation and tightening of bolts to determine that the selected tightening procedure is properly used and that all bolts are tightened, and in the case of direct tension indicators that the correct indication of tension has been achieved. Bolts may reach tensions substantially above the value given in Table 00560-1, but this will not be cause for rejection. The installation is rejected if the geometry does not satisfy the requirements of 02560.05.

00930.40(e)(2) Direct Tension Indicator Method - Replace this subsection, except for the subsection number and title, with the following:

Upon completion of a bolted joint, the Engineer will determine that all bolts have been tightened. A minimum of 10 percent, but not less than two bolts in each joint, are inspected. The joint is accepted as properly tightened when one open space allows entry of a 0.005-inch feeler gauge. If there is more than one space between the direct tension indicator protrusions that allow entry of a 0.005-inch feeler gauge, re-inspect all bolts, retighten bolts in the joint as required, and resubmit the joint for inspection. If no spaces exist between the direct tension indicator protrusions that allow entry of a 0.005-inch feeler gauge, replace bolt assembly, tighten bolts in the joint as required, and resubmit the joint for inspection. For connections with all bolts fully tightened, one bolt at a time may be replaced without providing crane support of the mast arm.

00930.40(e)(3) Turn-of-Nut Method - Replace the bullet that begins "In the presence ..." with the following bullet:

- In the presence of the Engineer, use an inspection wrench, that may be a calibrated torque wrench.

Replace the bullet that begins "Tighten each bolt specified ..." with the following bullet:

- Tighten each bolt specified in the paragraph above in the calibration device by any convenient means to an initial condition equal to 20 percent of the required tension, and then to a tension not less than 5 percent greater than specified for its size in Table 00560-1 in Section 00560. Do not produce greater nut rotation than 1.5 times that allowed in Table 00560-3 in Section 00560 when tightening beyond the initial condition. Then apply the inspecting wrench to the tightened bolt and determine the torque necessary to turn the nut or head 5 degrees, approximately 1 inch at 12 inches radius, in the tightening direction. Take the average torque measured in the tests of three bolts as the job inspecting torque to be used in the manner specified in the next paragraph.

Replace the bullet that begins "Test bolts that have been ..." with the following bullet:

Test bolts that have been tightened in the Structure and are represented by the sample prescribed above with the inspecting wrench. Apply the job inspecting torque to 10 percent of the bolts, but not less than two bolts selected at random. If no nut or bolt head is turned by this application of the job inspecting torque, the connection is accepted as properly tightened. If any nut or bolt head is turned by the application of the job inspecting torque, test all bolts in the connections. Retighten all bolts whose nut or head is turned by the job inspecting torque, and re-inspect. Retighten all of the bolts in the connection and then resubmit the connection for the specified inspection.

00930.40(f) Tube Bending - Replace this subsection, except for the subsection number and title, with the following:

For Major sign supports, bend tube using induction heating methods according to TPA-IBS-98 *Recommended Standards for Induction Bending of Pipe and Tube*. Provide written bend qualifications that include bending procedures, essential variables, material group, and destructive testing results. Destructive testing results includes yield strength, tensile strength, and elongation at locations indicated in Table 2-1 of the TPA-IBS-98.

00930.41 Adjustable Sign Mounts - Replace this subsection, except for the subsection number and title, with the following:

Furnish adjustable sign mounts that allow vertical adjustment for positioning the sign and allow rotation to plumb the sign. Use galvanized or stainless steel nuts, bolts and washers for fasteners.

(Use the following lead-in paragraph and subsection .48 to specify coating of steel sign supports.)

Add the following subsection:

00930.48 Coating - Prepare and powder coat supports according to the applicable portions of Section 00593 or prepare and coat supports according to the applicable portions of Section 00594. Furnish coating materials for field application, repairing damaged coatings, and coating hardware after installation, according to Section 00593 or 00594. Do not coat:

- Slip plate or arm connection surfaces.
- Slip base bolting hardware.
- Anchor rods, anchor rod washers, and anchor rod nuts.

(Use the following subsection .80 to list the estimated quantities of steel. Fill in the blank with the quantity. For major sign supports, replace “(Structure Number)” with the Structure number. Obtain information from the Designer. Delete rows for support types not used on the Project. Delete a heading if all entries under that heading have been deleted.)

00930.80 Measurement - Add the following to the end of this subsection:

The estimated quantities of structural steel are as follows:

Item

Quantity

(Pound)

Major Sign Supports

Truss Sign Bridge, Str. No. (Structure Number)	___
Monotube Sign Bridge, Str. No. (Structure Number)	___
Butterfly Sign Structure, Str. No. (Structure Number)	___
Monotube Cantilever Sign Structure, Str. No. (Structure Number)	___

Mounts

Bridge Structure Mounts	___
Exit Number Mounts	___
Signal Pole Mounts	___
Adjustable Sign Mounts	___
Vertical Sign Mounts on Existing Structures	___
Secondary Sign Mounts	___

Minor Sign Supports

Multi-Post Breakaway Sign Supports	___
Triangular Base Breakaway Sign Supports	___
Pipe Breakaway Sign Supports	___
Perforated Steel Square Tube Slip Base Sign Supports	___
90 Degree Rotational Sign Supports	___
Pipe Sign Supports	___
Perforated Steel Square Tube Anchor Sign Supports	___

00930.90 Payment - Replace the paragraph that begins "Payment will be payment ..." with the following paragraph:

Payment will be payment in full for furnishing and placing all Materials, and for providing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

Replace the paragraph that begins "No separate or additional payment will..." with the following paragraph:

No separate or additional payment will be made for:

- Coating steel sign supports
- Route marker frames
- Wind bracing
- Pole clamps
- Stainless steel clamps
- Mast Arm Street Name Sign Mounts
- Street Name Sign Mounts
- Special sign brackets.