

722 - SIGN STRUCTURES AND BRIDGE MOUNTED SIGN ATTACHMENTS

SECTION 722

SIGN STRUCTURES AND BRIDGE MOUNTED SIGN ATTACHMENTS

722.1 DESCRIPTION

Fabricate and erect bridge mounted sign attachments and sign structures to support signs over or adjacent to highways and streets as designated in the Contract Documents. The structures consist of:

- footings, including electrical grounding and conduit sleeves, when applicable;
- vertical support poles;
- vertical end support units;
- overhead trusses;
- structural attachment assembly;
- truss type arm; and
- maintenance walkway.

Remove, modify and reset the existing sign structures as designated in the Contract Documents.

BID ITEMS

UNITS

Bridge Mounted Sign Attachment (*)(**)	Each
Butterfly Overhead Sign Structure (*)(**)	Each
Cantilever Sign Structure (*)(**)	Each
Overhead Sign Structure (*)(**)	Each
Overhead Sign Structure (Mast Arm Type) (*)(**)	Each
Overhead Sign Structure (Single Tapered Tube) (*)(**)	Each
Remove and Reset Sign Structure (***)	Each
Reset Sign Structure (***)	Each
Sign Structure Modification (***)	Each
* Size or Size Group	
** Type of Material	

722.2 MATERIALS

Provide materials that comply with the applicable requirements.

Grade 4.0 Concrete	SECTIONS 401 & 402
Aggregates for Concrete Not On Grade	SECTION 1102
Cementitious Grout	DIVISION 1700
Castings	DIVISION 1600
Structural Steel	DIVISION 1600
Reinforcing Steel	DIVISION 1600
Steel Fasteners	DIVISION 1600

a. General. Provide new, unweathered materials of the type, and complying with the sizes, dimensions and tolerances shown in the Contract Documents.

Submit shop drawings according **SECTION 105**. Include a "cutting list" or "shop bill" that provides the piece mark length, outside diameter and wall thickness of each piece used in the fabrication of the structure. Provide an erection sketch, detailing the location of each piece in the final assembly. Do not perform any fabrication until the approved shop drawings are in the hands of the Inspector and fabricator, and the Engineer has authorized fabrication. Any purchase of materials before fabrication authorization is at the Contractor's risk. Changes to approved shop drawings are subject to the approval of the Engineer. Submit revised sheets of the same size as those originally approved.

Mark each bundle or package of material with letters, numbers or a combination of letters and numbers that are identified in the test report for that material. Mark each piece of material with letters, numbers or a combination of letters and numbers that are identified in the shop drawings. The marking must be legible, but not noticeable after erection of the structure.

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b. Fabrication.

- (1) Shop Welding. Perform welding and repairs in accordance with **SECTION 744**.
- (2) Test Loading. Test loading of fabricated trusses is required only when inspection indicates the fabrication to be of doubtful or unacceptable quality requiring repairs before acceptance. Test load the structure to demonstrate the adequacy of the repair. The Contractor will bear the cost of test loading.

c. Electrical Equipment and Materials. Provide the electrical equipment and materials shown in the Contract Documents.

Submit to the Engineer for approval a schedule of electrical equipment and materials proposed for installation before beginning construction. Include catalog cuts, diagrams, drawings and other descriptive data required by the Engineer.

722.3 CONSTRUCTION REQUIREMENTS

a. General. Do not damage the existing cables and conduits. If necessary, relocate the existing cables and conduits to clear the footing locations. Repair or replace existing cables and conduits damaged during construction of the footings.

If temporary signs interfere with the erection of the permanent signs, relocate the temporary signs to the locations determined by the Engineer.

When "Contractor Construction Staking" is not shown as a bid item, the Engineer will stake the locations of sign structure footings. For each footing location, the Engineer will provide the Contractor with the vertical measurement from the crown grade of the pavement to the top of the footing.

Erect the bridge mounted sign attachments and sign structures according to the Contract Documents.

If removing, modifying or resetting sign structures, do not damage the existing sign structures. Repair or replace, as directed by the Engineer, sign structures damaged through the negligence of the Contractor.

b. Concrete Footings. Construct the concrete footings according to the Contract Documents. When placing the concrete, consolidate the concrete in the footings by rodding and vibrating. Allow the concrete footings to cure a minimum of 4 days before attaching the sign structures.

c. Sign Structures.

(1) Bolted Joint Connections. Before assembling the sign structures, use a soft wire brush to clean the contact surfaces of the bolted connections. Remove all corrosion and coatings, except galvanizing. Wipe the cleaned contact surfaces with rags soaked with acetone, syol or toluol. Remove excess solvent from the contact surfaces using clean, dry rags.

Assemble the sign structures according to the Contract Documents. Seal all bolted joints immediately, using a sealant intended for this purpose, and applied according to the sealant manufacturer's recommendations.

(2) Attachment to Anchor Bolts. Place the sign structure with anchor plate on the anchor bolts. After all signs are mounted on the structure, and the sign pole (or bridge support) is plumb, proceed with anchor bolt tightening procedures. Fill the gap between the top of the footing and the bottom of the anchor plate with concrete grout according to the details in the Contract Documents.

(3) All Sign Structures.

- Do not use a pipe wrench to tighten nuts on Sign Structures;
- Use only a box end or socket wrench to snug tighten nuts;
- Maintain a minimum dimension of 6 inches from the top of foundation to finished grade;
- With approval of the Engineer, repair any marring of the galvanizing caused while lifting the structure into place;
- Submit specifications for the hydraulic wrench to the Construction Engineer (who will contact the Signing and Lighting Engineer) for approval; and
- If the four refusal maximum is exceeded on any DTI, discontinue tightening and contact the State Bridge Office;
- Grade the surrounding area to drain away from the structure.

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(4) Existing Sign Structures. Verify the existing anchors will extend a minimum of one thread above the top tightened nut in the final condition. Do not damage the existing anchors during the removal of the existing hardware. Clean the threads of all rust and lubricate with an approved wax, prior to placing the new hardware.

Install DTIs on each anchor. Install a hardened washer on each anchor, if required. Use new hardware galvanized according to **SECTION 1616**. Verify the assembly (leveling nut, hardened washer(s), tower base plate, DTI, top nut) is in a snug tight condition before final tightening begins. Using the approved hydraulic wrench, tighten each nut to achieve a minimum of three refusals of the 0.005 gauge. Do not exceed four refusals of the 0.005 gauge. After tightening, score the remaining threads.

(5) New Sign Structures. Construct the elements of the structure according to the Contract Documents. Threads of the anchors shall be plumb and free of any construction debris.

Install DTIs on each anchor. Install a hardened washer on each anchor, if required. Use hardware galvanized according to **SECTION 1616**. Verify the assembly (leveling nut, hardened washer(s), tower base plate, DTI, top nut) is in a snug tight condition before final tightening begins. Using the approved hydraulic wrench tighten each nut to achieve a minimum of three refusals of the 0.005 gauge. Do not exceed four refusals of the 0.005 gauge. After tightening, score the remaining threads.

(6) Overhead Truss. In erection of the truss, allow the dead load deflection to take place before fully tightening all the connectors. Fully tighten the vertical portion which clamps the column in all corners, but tighten only the top of 1 end of the horizontal portion of the truss-to-end-support connector while the truss is fully suspended from the crane. The rest of the truss-to-end supports shall be fully tightened after the dead load of the truss is being supported by the connectors, but still attached to the crane with a slack line. Erect the signs within 24 hours of erecting the truss.

(7) Dissimilar Materials. Whenever dissimilar materials are to be in permanent contact, provide an insulating barrier of alkali resistant asphalt paint or equivalent.

d. Electrical Work. Comply with all Local, State and Federal ordinances.

(1) Conduit. Install conduit entrances through the concrete footing as indicated in the Contract Documents. Place temporary screwed caps on the conduit ends.

(2) Grounding. Ground all structures and sign bridges as detailed in the Contract Documents. Measure the resistance of the installed grounding system; the Engineer will observe the testing. The grounding system must have less than 25 Ω resistance to ground.

722.4 MEASUREMENT AND PAYMENT

The Engineer will measure each sign structure, bridge mounted sign attachment, removal and resetting of a sign structure and modification of a sign structure.

Payment for each "Bridge Mounted Sign Attachment", "Butterfly Overhead Sign Structure", "Cantilever Sign Structure", "Overhead Sign Structure", "Overhead Sign Structure (Mast Arm Type)", "Overhead Sign Structure (Single Tapered Tube)", "Remove and Reset Sign Structure", "Reset Sign Structure" and "Sign Structure Modification" at the contract unit prices is full compensation for the specified work.