10-JAN-2025

TM607.dgn

GENERAL NOTES:

Standard Truss Type VMS Bridges are designed in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals 4th edition, 2001 and 2002 interim revisions.

Basic wind speed (3 second gust) used for sign bridge design is 110 mph. G = 1.14, I_r = 1.0 (50 year recurrence interval) and Exposure C were used for design. C_D= 1.7 was used for the VMS.

Material for square hollow structural sections (HSS) members shall be ASTM A500 Grade B, or ASTM A500 Grade C.

The design Type One VMS sign mass is 4250 lbs (not including W 6 x 15 support arms and walkway). The design sign is "XL" feet from the left End Truss and "XR" feet from the right End Truss. The bridge has been designed for all possible positioning of the sign on the span. The sign is to be positioned in coordination with Traffic/ITS designer. Chord end connection plates and truss field splice plates shall conform to ASTM A709, Grade 50 or ASTM A572, Grade 50.

Notch toughness of all structural steel members and plates greater than ½" thick shall conform to Zone 2 non-fracture critical requirements of ASTM A709.

All other structural steel shall conform to ASTM A36, or A992.

High strength bolts shall conform to ASTM A325, Type 1.

Nuts for high strength bolts shall be heavy hex and conform to ASTM A563 Grade DH, with supplementary requirements "S1" and "S2".

Bolts and rods connecting galvanized steel members to aluminum members shall meet the requirements of ASTM A193 Class 2 Grade B8M. Nuts used with A193 bolts shall be heavy hex, and shall meet the requirements of ASTM A194 Grade 8M with supplementary requirement "S1". Use a stainless steel flatwasher and double nut at each bolt.

Hardened steel washers shall conform to ASTM F436, Type 1. Use washers under turning element in tightening unless otherwise specified.

Final elevations shall be field verified prior to the fabrication of the end truss members and footing reinforcement.

All fasteners, except mechanically galvanized direct tension indicator (DTI) washers, shall be hot-dip galvanized (except stainless steel and non-ferrous fasteners).

All structural steel shall be hot-dip galvanized after fabrication, unless noted otherwise.

The silicon content of the base metal shall be in the ranges of 0.0% to 0.06% or 0.13% to 0.25% for all hot-dip galvanized steel, unless noted otherwise. The maximum carbon equivalent (CE) is 0.40% for the base metal. Use the AWS D1.1 CE formula. Preheat according to AWS D1.5 Annex F using the hydrogen control method and high degree of restraint when the carbon equivalent (CE) of the steel exceeds 0.40%.

All H.S. bolts shall be considered slip critical and tightened according to 00930.40(d)(2)a, unless noted otherwise. Design slip resistance for bolts shall conform to the Bolt Specifications for Class C slip coefficient = 0.33.

Selection of the End Truss Posts shall be based on the larger "HP" in the case of unequal post heights. All End Truss Posts shall be the same cross section. This Standard Truss Type VMS Bridge has been designed for both equal and unequal post heights.

This Standard Truss Type VMS Bridge has been designed for the stated loading only. No additional signs or additional loadings are permitted. Other uses and loadings shall be considered non-standard, and are outside the scope of this design.

Welded splices in posts or chords and welds connecting posts or chords to base connection plates shall be full penetration welds as shown on Dwgs.# TM608 and TM609.

Root gap for T-Y-K tubular connections welds shall not exceed 1/16".

Fabrication drawings shall show the weight of all parts.

Conduit diameters shown on plans are nominal or trade sizes.

Wherever possible truss member centerlines shall intersect at a common work point, unless shown otherwise on these standards. Where it is not possible to line up member centerlines at a common work point, the maximum allowable centerline eccentricity is 2 inches.

Verify that tops of pedestals are level and at correct elevations, prior to vertical end truss installation.

A preconstruction meeting is recommended to make sure the contractor understands ODOT requirements and that ODOT understands the contractor's plan.

If a 20 minute rolling traffic stop is used to install the overhead sign support truss bridge, the rolling stop shall meet the following requirements:

a) Verify (prior to span truss lift) adequate crane capacity and boom length to perform complete installation from side of road.
b) Set crane(s) on side of road and do not re-set crane during lift.
c) Verify (prior to span truss lift) that lifting equipment and lifting points meet requirements of plans.
d) Verify (prior to span truss lift) that vertical end trusses are at the correct elevations, plumb, and that the (hole to hole) distance between the two end trusses matches the span truss (hole to hole) length.
e) Pre-assemble span truss within reach of crane(s).
f) Rig lift before beginning rolling stop.
g) Make sure all required tools and hardware are on site.
h) Do not resume traffic until span truss to saddle bolts are at least snug tight.
i) Rolling stops shall be at night and shall conform to the Special Provisions.
j) Follow all required safety procedures.

If required, installation of temporary guard rail or temporary barrier should preceed any other work involving the construction of the footing.

Use single self locking nuts or double nuts on non-high strength (H.S.) bolts, unless otherwise shown or specified.

See Dwg.# TM608 for typical high strength bolt connection.

At ends of square HSS, welding shall be carried continuously around corners, with corners fully built up and all weld starts and stops within flat faces. Perform magnetic particle testing of areas within 2 inches of welds prior to pickling, and report findings to ODOT. If cracks are found, do not galvanize until directed to do so. Perform a detailed 100% visual inspection of the entire structure after galvanizing.

Prior to galvanizing, the fabricator shall assemble the span truss and measure the camber and the horizontal span distance between the four centers of the outside slotted saddle holes, in the presence of the ODOT inspector. With the span truss resting on its side and the camber in the horizontal direction, a string line shall be used to check the camber. The allowable variation from required camber at shop assembly is -0% to +25%. The length between the saddle holes shall be measured using a steel tape or other approved measuring method and shall have an allowable variation of -1/8" to +1/8".

FOUNDATION NOTES:

Provide shoring for each footing if required.

Top surface of concrete pedestal (including area under base plate and around anchor bolts) shall be floated and troweled to a flat and level surface. This surface shall not vary more than 1/8" from a horizontal plane. Provide a ¾" chamfer on all exposed edges of the pedestal.

All concrete shall be Class 4000 - ¾" structural concrete.

Place bars 2 inches clear of the nearest face of concrete, unless shown otherwise.

Concrete shall be placed using a tremie when free fall exceeds 4'-0". Cold joints shall be cause for rejection of the foundation, except between footing and pedestal.

All reinforcing steel shall conform to ASTM A706 or A615 Gr. 60.

Anchor rods shall conform to ASTM F1554, Gr. 55, with supplementary requirements "S2" that includes grade and manufacturer's identification and "S4".

Anchor rod washers shall conform to ASTM F436.

Anchor rod nuts shall conform to ASTM A563 Grade DH with supplementary requirements "S1" and "S2".

Anchor rod template, temporary support members, and anchor plate shall conform to ASTM A36.

Anchor rods shall be hot-dip galvanized full length.

Where the footing of a Std. Truss Type VMS Bridge interferes with guard rail posts the depth of footing may be increased to the maximum shown on Dwg.# TM611, or concrete barrier may be used instead of guard rail, or guard rail posts may be attached to footing in accordance with Dwg.# BR266. All buried steel shall be coated for immersion exposure with an approved product from the qualified products for structural coatings. Prepare and coat surfaces according to Section 00594 of Oregon Standard Specifications.

The elevation and location of anchor rods is critical. Use survey techniques to verify the elevation, location, and orientation of anchor bolt groups prior to placement of foundation concrete.

CONSTRUCTION PROCEDURE AND SEQUENCE:

1. Construct foundation according to plans. Verify elevation, location and orientation of anchor bolts. Steel templates shall be used to accurately locate and hold the anchor rods plumb and in proper alignment. Hole diameter in template shall be the nominal bolt diameter plus 1/16". This template shall be in place during concrete placement and shall remain in place for a minimum of 24 hours after the concrete placement has been complete. Out of position anchor rods and anchor rods greater than 1:40 out of plumb are cause for rejection of the foundation. Bending of anchor rods to straighten or move them into position, or alterations of the base plate shall not be permitted and are cause for rejection of the foundation and/or post weldment. See Template Detail on Dwg.#TM610.
2. After 7 days min. of spread footing concrete cure time (excluding days when the surrounding temperature is below 40° Fahrenheit for over 4 hours) and when tests indicate that the concrete has reached full design strength (100%), the pedestal pour may begin. The post erection may begin after 7 days of concrete cure time of the pedestal and when test indicate that the concrete pedestal has reached full design strength (100%).
3. Install bearing nuts on anchor rods. Level the bearing nuts. Install hardened flat washers above bearing nuts.
4. Use crane to lift end truss onto anchor rods. Maintain crane connection as a safety measure until post installation is 100% complete. No grout shall be used under the base plate. Install hardened flat washers above base plate.
5. Generously apply approved bolting lubricant (Castrol Stick Wax or approved equal) to the top nut bearing surface and internal threads, and install nut on anchor rods to snug tight condition. Snug tight is defined as the condition when all plies are in firm contact and can usually be obtained by the full effort of a worker on a 12 inch long wrench or a few impacts of an impact wrench. Several passes may be required to obtain uniform tightness.
6. Tighten bearing nuts upward against base plate in a similar manner, to assure a uniform snug tight condition. Assure that the hole to hole span distance between saddles at opposite ends of the sign bridge matches the hole to hole span distance between opposite ends of the span truss. The end trusses may be up to ½" out of plumb to help accommodate construction tolerances and temperature effects. Adjust bearing nut as required and repeat snug tightening.
7. Mark position of each anchor rod and top nut with a felt tip pen so subsequent nut rotation can be verified. Rotate all top nuts an additional 1/6 turn in two passes (1/12 turn per pass).
8. Assemble VMS bridge span truss field splices and fully tighten high strength connection bolts according to Section 00930.40(d)(2)(a) of the Standard Specifications and Special Provisions.
9. Verify positions of saddles relative to VMS bridge chord end connections.
10. Assemble vertical VMS mounts, VMS, and span together. Provide adequate time for engineer to inspect the bolt tightening on the assembly in accordance with 00930.40(e) and tighten or replace bolts as required prior to lifting assembly.
11. Verify VMS, mounts, and span truss total weight before lifting. Lift the VMS and span truss using one or two cranes as required to meet the following conditions. A qualified person shall be in charge of the lifting operation. VMS and span truss shall be lifted at four equally loaded lift points, see TM606. Extreme care must be used when lifting the assembly the first time to make sure that it does not rotate from the eccentric VMS load.
12. Lift the VMS and span truss assembly into position on the saddles.
13. Install H.S. saddle bolts and tighten according to Section 00930.40(d)(2)(a).

WALKWAY NOTES:

Grating shall be welded steel grating with 1½" x 1/8" bearing bars spaced at 1 3/16" centers and ¼" x ¼" nominal square cross bars (or equivalent) spaced at 4" centers.
Steel plates and bars including grating elements shall conform to ASTM A36 or approved equal.

Rail members and post brackets shall be structural steel tubing conforming to ASTM Specification A500, Grade A or B.

Grating may be spliced at an interior support by welding 1/8" x 1½" bars to ends of bearing bars across full width of grating and bolting bars together with ¼" dia. bolts at 12 inch maximum centers.

Top of walkway grating shall not be more than 6 inches below the threshold into the VMS cabinet.

Walkway contractor to verify prior to fabrication that walkway, grating and rails do not interfere with VMS door or VMS housing. No gaps greater than 1 inch between walkway rails, grating and toe board, and VMS housing are allowed.

All bolts, including U-bolts, shall conform to ASTM Specification A307, unless otherwise noted.

Accompanied by dwgs. TM606, TM608, TM610, TM611, TM612

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

STANDARD TRUSS TYPE VMS BRIDGE 50' TO 167' SPAN RANGE NOTES

2024

DATE	REVISION DESCRIPTION
01-2022	UPDATED SILICON CONTENT RANGES AND AWS D1.5 ANNEX G TO ANNEX F
01-2025	CONCRETE WAS CLASS 3600 - ¾" CLASSIFIED AS A STRUCTURAL ITEM

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