INDEX FOR STEEL OVERHEAD SIGN TRUSS STANDARDS

ANCHOR-BOLT NUT TIGHTENING PROCEDURE:

1) THIS WORK SHALL BE PERFORMED ONLY ON DAYS WITH WINDS LESS THAN 15 MPH. ALL TIGHTENING OF THE NUTS IS TO BE DONE IN THE PRESENCE OF THE INSPECTOR. ONCE THE TIGHTENING PROCEDURE IS STARTED IT MUST BE COMPLETED ON ALL OF THE BASE PLATE NUTS WITHOUT PAUSE OR DELAY.

2) PROPERLY SIZED WRENCHES DESIGNED FOR TIGHTENING NUTS AND/OR BOLTS SHALL BE USED TO AVOID ROUNDING OR OTHER DAMAGE TO THE NUTS. ADJUSTABLE END WRENCHES OR PIPE WRENCHES SHALL NOT BE USED.

3) BASE PLATE, ANCHOR BOLTS AND NUTS ARE TO BE FREE OF ANY DIRT OR DEBRIS.

4) APPLY STICK WAX OR BEES WAX TO THE THREADS AND BEARING SURFACES OF THE ANCHOR BOLT, NUTS, AND WASHERS.

5) TIGHTEN TOP NUTS SO THEY FULLY CONTACT THE BASE PLATE. TIGHTEN LEVELING NUTS TO SNUG TIGHT CONDITION. SNUG TIGHT IS DEFINED AS THE FULL EFFORT OF ONE PERSON ON A WRENCH WITH A LENGTH EQUAL TO 14 TIMES THE BOLT DIAMETER BUT NOT LESS THAN 18 INCHES. APPLY FORCE AS CLOSE TO THE END OF THE WRENCH AS POSSIBLE. PULL FIRMLY BY LEANING BACK AND USING ENTIRE BODY WEIGHT ON THE END OF THE WRENCH UNTIL THE NUT STOPS ROTATING. USE A MINIMUM OF TWO SEPARATE PASSES OF TIGHTENING. SEQUENCE THE TIGHTENING IN EACH PASS SO THAT THE NUT ON THE OPPOSITE SIDE, TO THE EXTENT POSSIBLE, WILL BE SUBSEQUENTLY TIGHTENED UNTIL ALL OF THE NUTS IN THAT PASS HAVE BEEN TIGHTENED.

6) TIGHTEN TOP NUTS TO SNUG TIGHT AS DESCRIBED FOR THE LEVELING NUTS.

7) MATCH-MARK THE TOP NUTS AND BASE PLATE USING PAINT, CRAYON, OR OTHER APPROVED MEANS TO PROVIDE A REFERENCE FOR DETERMINING THE RELATIVE ROTATION OF THE NUT AND BASE PLATE DURING TIGHTENING. USING A STRIKING OR HYDRAULIC WRENCH, FURTHER TIGHTEN THE TOP NUTS IN TWO PASSES AS LISTED BELOW. USE A SEQUENCE OF TIGHTENING IN EACH PASS SO THAT THE NUT ON THE OPPOSITE SIDE, TO THE EXTENT POSSIBLE, WILL BE SUBSEQUENTLY TIGHTENED UNTIL ALL NUTS IN THAT PASS HAVE BEEN TURNED. DO NOT ROTATE THE LEVELING NUT DURING THE TOP NUT TIGHTENING.

ANCHOR-BOLT SIZE	FIRST PASS	SECOND PASS	TOTAL ROTATION
$1\frac{1}{2}$"Φ	1/6 TURN	1/6 TURN	1/3 TURN

8) LUBRICATE, PLACE AND TIGHTEN THE JAM NUTS TO SNUG TIGHT.

GALVANIZED STEEL NOTES:

ALL STEEL CHORDS, DIAGONALS AND STRUTS SHALL COMPLY WITH ASTM A53 GRADE B, TYPE E OR S; THE AMERICAN PETROLEUM INSTITUTE (API) 5L GRADE B; ASTM A500 GRADE B; OR API 5L GRADE X42. THESE MEMBERS DESIGNATED AS STEEL PIPE SHALL HAVE A MINIMUM YIELD STRENGTH OF 35 KSI.

ALL STEEL POSTS SHALL COMPLY WITH ASTM A500 GRADE B OR API 5L GRADE X42. THESE MEMBERS DESIGNATED AS HOLLOW STRUCTURAL SECTIONS (HSS) SHALL HAVE A MINIMUM YIELD STRENGTH OF 42 KSI.

ALL STEEL SHAPES, BARS, AND PLATES SHALL COMPLY WITH ASTM A36 OR ASTM A572. ALL STEEL BAR GRATING SECTIONS INCLUDING BEARING BARS, CROSS BARS, AND BANDING BARS SHALL COMPLY WITH ASTM A1011 TYPE 2.

STEEL WELDING SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE AWS SPECIFICATIONS D1.1, STRUCTURAL WELDING CODE—STEEL.

ULTRASONIC TESTING SHALL BE PERFORMED ON THE POST-TO-BASE-PLATE WELDS.

ALL STEEL SECTIONS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. PROVIDE VENT HOLES FOR GALVANIZING. SHOW LOCATION AND SIZE OF VENT HOLES ON SHOP DRAWINGS.

GALVANIZED STEEL FASTENER NOTES:

GALVANIZED STEEL FASTENERS SHALL BE IN ACCORDANCE WITH ARTICLE 2408.03, S AND ARTICLE 4187.01, C, 2 OF THE STANDARD SPECIFICATIONS. REGULAR NUTS AND JAM NUTS SHALL BE ASTM A563 GRADE DH HEAVY HEX. REGULAR NUTS MAY BE SUBSTITUTED FOR JAM NUTS. LOCK WASHERS SHALL NOT BE SUBSTITUTED FOR JAM NUTS. ASTM A449 TYPE 1 BOLTS MAY BE SUBSTITUTED FOR ASTM A325 TYPE 1 BOLTS WHERE NECESSARY TO ASSURE PROPER BOLT LENGTH AND THREAD LENGTH.

UNLESS OTHERWISE NOTED ON THE PLANS, GALVANIZED STEEL FASTENERS SHALL BE TENSIONED BY TURN-OF-NUT METHOD.

U-BOLT NOTES:

U-BOLTS MAY BE MADE OF GALVANIZED STEEL OR STAINLESS STEEL AND SHALL BE IN ACCORDANCE WITH ARTICLE 4187.01, C, 2 OF THE STANDARD SPECIFICATIONS. WASHERS, REGULAR NUTS, AND JAM NUTS SHALL USE THE SAME ALLOY PROPERTIES AS THOSE OF THE U-BOLTS SPECIFIED. REGULAR NUTS MAY BE SUBSTITUTED FOR JAM NUTS. LOCK WASHERS SHALL NOT BE SUBSTITUTED FOR JAM NUTS.

ANCHOR BOLT NOTES:

ALL ANCHOR BOLT MATERIALS AND GALVANIZING SHALL BE IN ACCORDANCE WITH ARTICLE 4187.01, C, 3 OF THE STANDARD SPECIFICATIONS.

BENDING OR WELDING OF ANCHOR BOLTS SHALL NOT BE ALLOWED.

SPECIFICATIONS:

DESIGN: AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2009 WITH INTERIMS.

CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2012, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

DESIGN STRESSES:

DESIGN STRESSES FOR MATERIALS ARE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2009 WITH INTERIMS.

REINFORCING STEEL IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2002, SECTION 8, GRADE 60.

CONCRETE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2002, SECTION 8, $f'c$ = 4.0 KSI.

GENERAL NOTES:

ALL STEEL OVERHEAD TRUSS BRIDGE SIGN SUPPORTS ARE DESIGNED FOR 30 LB/FT^2 WIND PRESSURE ON SUPPORT MEMBERS, 30 LB/FT^2 ON SIGNS, AND 40 LB/FT^2 ON DYNAMIC MESSAGE SIGNS (DMS). EACH DMS IS LIMITED TO A WEIGHT OF 4500 LBS., A WIDTH OF 32'-0, A HEIGHT OF 9'-0, AND A DEPTH OF 4'-0. A MAXIMUM OF ONE DMS SHALL BE MOUNTED TO EACH OVERHEAD TRUSS BRIDGE. NO ADDITIONAL SIGNS SHALL BE MOUNTED TO A TRUSS BRIDGE SUPPORTING A DMS.

FOR PRIMARY PROJECTS, SHOP DRAWINGS SHALL BE SUBMITTED BY THE CONTRACTOR DIRECTLY TO THE IOWA DOT OFFICE OF BRIDGES AND STRUCTURES FOR REVIEW. COPIES OF SHOP DRAWINGS SHALL ALSO BE SENT BY THE CONTRACTOR TO THE IOWA DOT RESIDENT CONSTRUCTION ENGINEER AND DISTRICT MATERIALS ENGINEER. FOR NON-PRIMARY PROJECTS (E.G. SECONDARY ROAD SYSTEM), SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER UNLESS NOTED OTHERWISE IN THE CONTRACT DOCUMENTS.

SHOP DRAWINGS SHALL INDICATE LEFT AND RIGHT TRUSS SUPPORTS.

CLEAR DISTANCE FROM FACE OF CONCRETE TO THE NEAREST REINFORCING BAR SHALL BE 2" UNLESS OTHERWISE SHOWN.

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

STEEL OVERHEAD SIGN TRUSSES SHALL NOT BE USED ON BRIDGES WITHOUT THE APPROVAL OF THE OFFICE OF BRIDGES AND STRUCTURES.

STRUCTURAL ALIGNMENT/TOLERANCE NOTES:

THE PRECISE ALIGNING AND ERECTING OF ALL COMPONENTS OF THE OVERHEAD SIGN TRUSS AND ITS SUPPORTS SHALL BE CONSIDERED ESSENTIAL. THE CONTRACTOR SHALL SUBMIT DOCUMENTATION TO THE ENGINEER SHOWING THAT THE VARIOUS COMPONENTS HAVE BEEN MEASURED AND ARE LOCATED WITHIN THE TOLERANCES LISTED BELOW.

EACH FOUNDATION SHALL BE ACCURATELY LOCATED, WITH THE CENTER OF THE TWO ANCHOR BOLT GROUPS NOT MORE THAN 1 INCH FROM THE PLAN LOCATION IN THE DIRECTION PARALLEL WITH AND PERPENDICULAR TO THE OVERHEAD TRUSS.

THE TWO FOUNDATIONS SHALL BE PARALLEL, WITH THE DISTANCES ALONG THE OVERHEAD TRUSS BETWEEN CENTERS OF FRONT AND REAR ANCHOR BOLT GROUPS DIFFERING BY NOT MORE THAN 1 INCH.

ANCHOR BOLT GROUPS SHALL BE LOCATED ACCURATELY WITH CENTERS OF ADJACENT GROUPS IN EACH FOUNDATION WITHIN $\frac{3}{16}$ INCH OF THE PLAN DISTANCE APART.

ANCHOR BOLTS SHALL BE PLUMB WITHIN $\frac{1}{4}$ INCH PER FOOT FROM VERTICAL.

ANCHOR BOLTS SHALL PROJECT ABOVE TOP OF FOUNDATION WITHIN $\frac{1}{4}$ INCH OF THE PLAN DIMENSION.

EACH TRUSS SUPPORT POST SHALL BE PLUMB WITHIN $\frac{1}{16}$ INCH PER FOOT OF VERTICAL IN TWO PERPENDICULAR DIRECTIONS.

STICK-OUT OF EACH TRUSS LOWER CHORD SHALL BE WITHIN 3 AND 5$\frac{1}{2}$ INCHES MEASURED FROM OUTER U-BOLT TO INSIDE OF CHORD STOP RING.

THE OVERHEAD TRUSS SHALL BE SQUARE WITHIN SUPPORT POSTS. THE HORIZONTAL LINES BETWEEN CHORDS SHALL BE LEVEL WITHIN $\frac{1}{16}$ INCH PER FOOT OF HORIZONTAL, AND THE VERTICAL LINES BETWEEN CHORDS SHALL BE PLUMB WITHIN $\frac{1}{16}$ INCH PER FOOT OF VERTICAL.

09-14
LATEST REVISION DATE

Marcus K. McDonald
APPROVED BY BRIDGE ENGINEER

IOWADOT Highway Division

STANDARD DESIGN

STEEL OVERHEAD SIGN TRUSS

SEPTEMBER, 2011

INDEX AND NOTES
50'-130' SPANS

SOST-01-11

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