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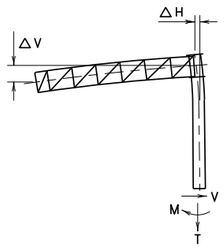
ZONE 2 WITH ICE 90 MPH WIND

TOWER HEIGHT (ft)	10′ SPAN													15′ SPAN														20′ SPAN													25′ SPAN													TOWER HEIGHT (ft)
	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS					TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS					TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS					TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS					
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)			O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)			O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)			O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)		
14′	16	0.250	0.108	1 ¼	6	20 ½"	24 x1¼	0.2	4.54	20.49	62.82			16	0.250	0.242	1 ⅜	8	20 ¾"	24½x1⅜	0.6	6.83	47.54	96.18			20	0.280	0.196	1 ½	8	25"	29 x1½	0.6	9.34	87.07	132.99			20	0.344	0.254	1 ¾	8	25 ⅜"	29¾x1⅝	1.1	11.57	136.28	167.72			14′
15′			0.124		6				4.56		67.33					0.278				24½x1½		6.85		102.92					0.225						0.7	9.36		142.12				0.344	0.292				29¾x1⅝	1.1	11.60		178.90			15′
16′			0.141		8				4.59		71.88					0.283				24½x1½		6.87		109.69					0.256						0.7	9.39		151.30				0.344	0.332				29¾x1¾	1.2	11.63		190.14			16′
17′			0.159						4.61		76.44					0.320				24½x1½		6.89		116.49					0.289						0.8	9.42		160.53				0.375	0.346				29¾x1¾	1.2	11.65		201.46			17′
18′			0.178						4.63		81.04					0.359	↓	↓	↓	24½x1½		6.91		123.32					0.324				29 x1½			9.44		169.80				0.375	0.378				29¾x1¾	1.2	11.68		212.83			18′
19′			0.198						4.65		85.65					0.362	1 ½		21"	25 x1⅝		6.94		130.18			0.280	0.361	1 ½		25"	29 x1⅝		9.47		179.12				0.375	0.432				29¾x 2	1.3	11.71		224.27			19′
20′			0.220				24 x1¼		4.67		90.29					0.402				25 x1⅝		6.96		137.07			0.310	0.361	1 ¾		25 ⅜"	29¾x1⅝		9.50		188.47				0.406	0.441	1 ¾		25 ⅜"	29¾x 2		11.73		235.69			20′
21′			0.242				24 x1⅜		4.69		94.96					0.404				25 x1¾		6.98		143.98			0.310	0.398				29¾x1¾	0.8	9.52		197.87				0.406	0.486	2		25 ¾"	30½x 2		11.76		247.23			21′
22′			0.266						4.71		99.64					0.444				25 x1¾		7.00		150.92			0.310	0.437					0.9	9.55		207.30				0.438	0.500				30½x 2		11.79		258.86			22′
23′			0.291						4.74		104.35					0.485	1 ½		21"	25 x1¾		7.02		157.89			0.310	0.478						9.58		216.77				0.438	0.546				30½x 2		11.82		270.49			23′
24′			0.316						4.76		109.09					0.488	1 ¾		21 ½"	26 x1⅞	0.6	7.04		164.88			0.340	0.475				29¾x1¾		9.60		226.27				0.469	0.574				30½x2⅛	1.3	11.84		282.35			24′
25′			0.343	1 ¼		20 ½"	24 x1⅜		4.78		113.84					0.529				26 x1⅞	0.7	7.06		171.90			0.340	0.515				29¾x 2		9.63		235.81				0.469	0.623				30½x2⅛	1.4	11.87		294.05			25′
26′			0.371	1 ⅜		20 ¾"	24½x1½		4.80		118.62					0.532				26 x 2		7.09		178.94			0.375	0.518						9.66		245.38				0.500	0.618				30½x2⅛		11.90		305.60			26′
27′		0.250	0.401						4.82		123.42					0.573				26 x 2		7.11		186.01			0.375	0.558						9.68		255.00				0.500	0.666				30½x2¼		11.92		317.37			27′
28′		0.281	0.386						4.84		128.24					0.574				26 x 2		7.13		193.09			0.375	0.600	1 ¾		25 ⅜"	29¾x 2		9.71		264.63				0.531	0.678				30½x2¼		11.95		329.19			28′
29′		0.281	0.414				24½x1½		4.86		133.09					0.616				26 x 2		7.15		200.21			0.410	0.593	2		25 ¾"	30½x 2		9.74		274.28				0.531	0.727				30½x2¼		11.98		341.04			29′
30′		0.281	0.443				24½x1⅝		4.89		137.95					0.617				26 x 2		7.17		207.34			0.410	0.635				30½x 2		9.76		283.97				0.562	0.733	2		25 ¾"	30½x2¼		12.00		352.88			30′
31′		0.312	0.429	1 ⅜		20 ¾"	24½x1⅝		4.91		142.84					0.659				26 x2⅛		7.19		214.50			0.410	0.678						9.79		293.70				0.562	0.783	2 ¼		26"	31 x2⅜		12.03		364.80			31′
32′	16	0.312	0.457	1 ½	8	21"	25 x1⅝	0.2	4.93	20.49	147.75			16	0.470	0.702	1 ¾	8	21 ½"	26 x2⅛	0.7	7.21	47.54	221.68			20	0.438	0.672	2	8	25 ¾"	30½x2⅛	0.9	9.82	87.07	303.45			20	0.562	0.835	2 ¼	8	26"	31 x2⅜	1.4	12.06	136.28	376.75			32′

ZONE 2 WITH ICE 90 MPH WIND

TOWER HEIGHT (ft)	30′ SPAN													35′ SPAN														40′ SPAN													TOWER HEIGHT (ft)
	TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS					TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS					TOWER PIPE			ANCHOR BOLTS			BASE PLATE	TRUSS	DESIGN LOADS					
	O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)			O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)			O.D. (in)	WALL THICK (in)	DEFL ΔH (in)	SIZE DIA (in)	NO.	BOLT CIR DIA	SIZE (in)	DEFL ΔV (in)	SHEAR V (Kips)	TORSION T (K-ft)	MOMENT M (K-ft)		
14′	24	0.312	0.240	1 ¾	8	29 ⅜"	33¾x1⅝	1.3	13.90	196.46	205.45	30	0.281	0.188	1 ¾	8	35 ⅜"	39¾x1½	1.3	16.29	267.78	245.60	30	0.312	0.239	2	8	35 ¾"	40½x1⅝	2.0	18.54	350.23	290.55	14′
15′		0.312	0.276					1.4	13.94		218.62					0.215					1.4	16.33		260.73			0.312	0.274					2.1	18.58		307.19	15′
16′		0.312	0.314					1.5	13.97		231.92					0.245					1.5	16.37		276.03			0.344	0.284					2.1	18.62		324.08	16′
17′		0.344	0.323	1 ¾		29 ⅜"	33¾x1⅝	1.5	14.00		245.32					0.277	1 ¾		35 ⅜"	39¾x1½	1.5	16.41		291.49				0.321			40½x1⅝	2.1	18.66		341.18	17′
18′		0.344	0.362	2		29 ¾"	34½x1¾	1.5	14.03		258.81		0.281	0.310	2		35 ¾"	40½x1⅝	1.6	16.45		307.08			0.359			40½x1¾	2.2	18.70		358.47	18′
19′		0.344	0.403				34½x1¾	1.6	14.06		272.38		0.310	0.312				40½x1⅝	1.6	16.49		322.79		0.344	0.400			40½x1¾	2.3	18.74		375.94	19′
20′		0.375	0.411				34½x1⅞		14.10		286.04					0.345				40½x1¾	1.6	16.53		338.62		0.375	0.408	2		35 ¾"	40½x1¾	2.3	18.78		393.55	20′
21′		0.375	0.454						14.13		299.76					0.381					1.7	16.57		354.54				0.450	2 ¼		36"	41 x1⅞	2.3	18.82		411.31	21′
22′		0.375	0.498						14.16		313.55					0.418					1.7	16.61		370.56				0.494				41 x1⅞	2.4	18.86		429.19	22′
23′		0.406	0.504				34½x1⅞	1.6	14.19		327.40					0.457					1.8	16.65		386.67				0.540				41 x 2	2.5	18.90		447.20	23′
24′		0.406	0.549				34½x 2	1.7	14.23		341.31					0.498					1.8	16.69		402.85		0.375	0.588					2.6	18.94		465.30	24′
25′		0.406	0.596						14.26		355.27		0.310	0.540	2		35 ¾"	40½x1¾	1.9	16.73		419.12		0.406	0.591						2.6	18.98		483.52	25′
26′		0.438	0.601						14.29		369.29		0.344	0.560	2 ¼		36"	41 x1⅞	1.9	16.77		436.53			0.639						2.6	19.02		501.82	26′
27′		0.438	0.648	2		29 ¾"	34½x 2	1.7	14.32		383.36			0.604				41 x1⅞	1.9	16.81		452.90			0.689						2.7	19.06		520.22	27′
28′		0.438	0.697	2 ¼		30"	35 x2⅛	1.8	14.35		397.48			0.650				41 x1⅞	2.0	16.85		469.33		0.406	0.741				41 x 2		19.10		538.69	28′
29′		0.469	0.700				35 x2⅛		14.39		411.64		0.344	0.697				41 x 2		16.89		485.84		0.438	0.739				41 x2⅛		19.14		557.25	29′
30′		0.469	0.749				35 x2¼		14.42		425.85		0.375	0.652						16.93		501.47			0.791	2 ¼		36"	41 x2⅛	2.7	19.18		575.89	30′
31′		0.469	0.800				35 x2¼	1.8	14.45		440.10		0.375	0.696						16.97		518.13			0.844	2 ½		36 ½"	42 x2⅛	2.8	19.23		594.59	31′
32′	24	0.469	0.852	2 ¼	8	30"	35 x2¼	1.9	14.48	196.46	454.40	30	0.375	0.740	2 ¼	8	36"	41 x 2	2.0	17.01	267.78	534.85	30	0.438	0.900	2 ½	8	36 ½"	42 x2⅛	2.9	19.27	350.23	613.37	32′



ELEVATION

(SHOWING DESIGN LOADS AND DEAD LOAD DEFLECTIONS)

TRUSS DETAILS

SPAN	10′, 15′, & 20′	25′	30′	35′	40′
W x D = WIDTH x DEPTH	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5	4.5 x 4.5
CHORD-①, Unless Otherwise Shown	L 3 x 3 x 3/16 ② [3]	L 3 x 3 x ¼ ② [4]	L 3 x 3 x ¼ [6]	L 3 ½x3 ½x 5/16 [9]	L 3 ½x3 ½x 5/16 [7]
DEAD LOAD DIAGONAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 3 x 2 x 3/16 [2]
WIND LOAD DIAGONAL-②	L 3 x 3 x 3/16 [2]	L 3 x 3 x 3/16 [2]	L 3 x2 ½x ¼ [3]	L 3 x2 ½x ¼ [3]	L 3 x 3 x ¼ [2]
DEAD LOAD VERTICAL-②	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L 2 x 2 x 3/16 [2]	L2 ½x2 ½x 3/16 [2]	L 3 x 2 x 3/16 [2]
WIND LOAD STRUT-②	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L 2 x 2 x 3/16 [1]	L2 ½x2 ½x 3/16 [1]
TRUSS DEAD LOAD	42 lb/ft	47 lb/ft	49 lb/ft	60 lb/ft	64 lb/ft
SIZE H. S. BOLTS IN CONNECTION	5/8" DIA	5/8" DIA	5/8" DIA	5/8" DIA	¾" DIA
NO. & SIZE OF H. S. BOLTS IN CHORD ANGLE TO TOWER CONNECTION PLATE	3 ~ 5/8" DIA ea	4 ~ 5/8" DIA or 3 ~ ¾" DIA ea	6 ~ 5/8" DIA or 5 ~ ¾" DIA ea	9 ~ 5/8" DIA or 7 ~ ¾" DIA ea	7 ~ ¾" DIA ea

① "Low-Alloy Steel" for non-bridge structures per Item 442, "Metal For Structures".

② "Carbon Steel" for non-bridge structures per Item 442, "Metal For Structures".

GENERAL NOTES :

Design conforms to AASHTO 1994 Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto.

Steel for tower pipe shall conform to ASTM A53 Grade B or to ASTM A501. Tower pipe wall thickness shown is the minimum allowable. Fabricator may use the wall thickness shown or pipe of the same diameter with greater wall thickness.

All connection bolts shall conform to Item 447, "Structural Bolting". All structural steel, connection bolts, nuts and washers shall be galvanized in accordance with the Specifications.

Compensate for truss deflection at free end by offsetting upper and lower bolt holes at truss-to-tower connection.

For truss details see standard drawing COSSD.

For base and foundation details see standard drawing COSSF.

For cantilever truss lengths falling between those shown use sizes called for in the next longer span.

Truss and towers for cantilever sign supports are designed for the equivalent area of a 10′-0" deep sign panel over 100% of the span length. Design includes 3 pounds per foot squared for sign panel and 20 pounds per foot for lights and 50 pounds per foot for walkways all placed as specified for the design sign panel.

Details called for hereon are applicable for Design Wind Heights up to 30′ inclusive.

Number of High Strength bolts required in truss connection or splice are indicated in brackets, e.g. [3], after the member size.

Deflections shown include the design loads for Truss, Sign Panel, Lights and Walkways.

Texas Department of Transportation
Traffic Operations Division

CANTILEVER OVERHEAD SIGN SUPPORTS

COSS-Z2I-10

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
4-10				
	DIST	COUNTY		SHEET NO.

DATE:
FILE: