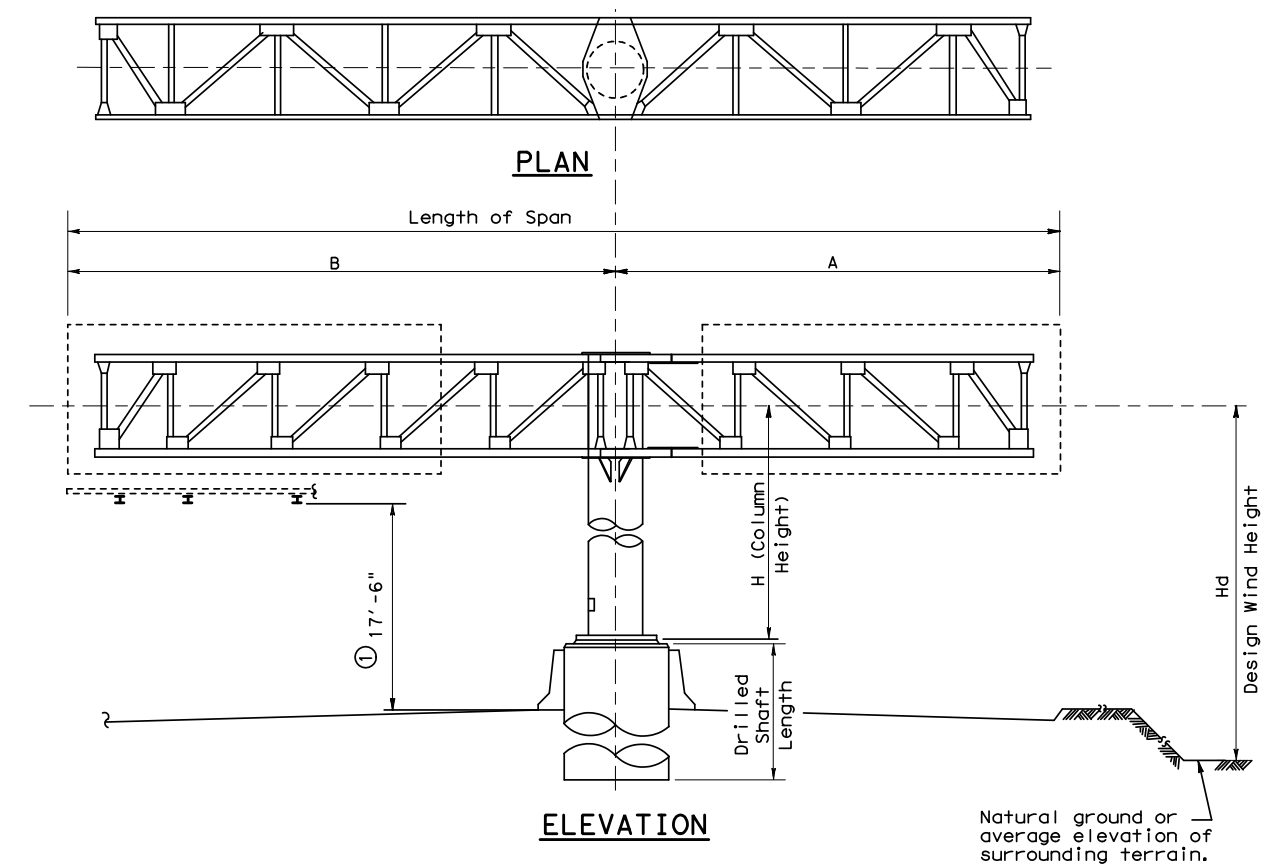
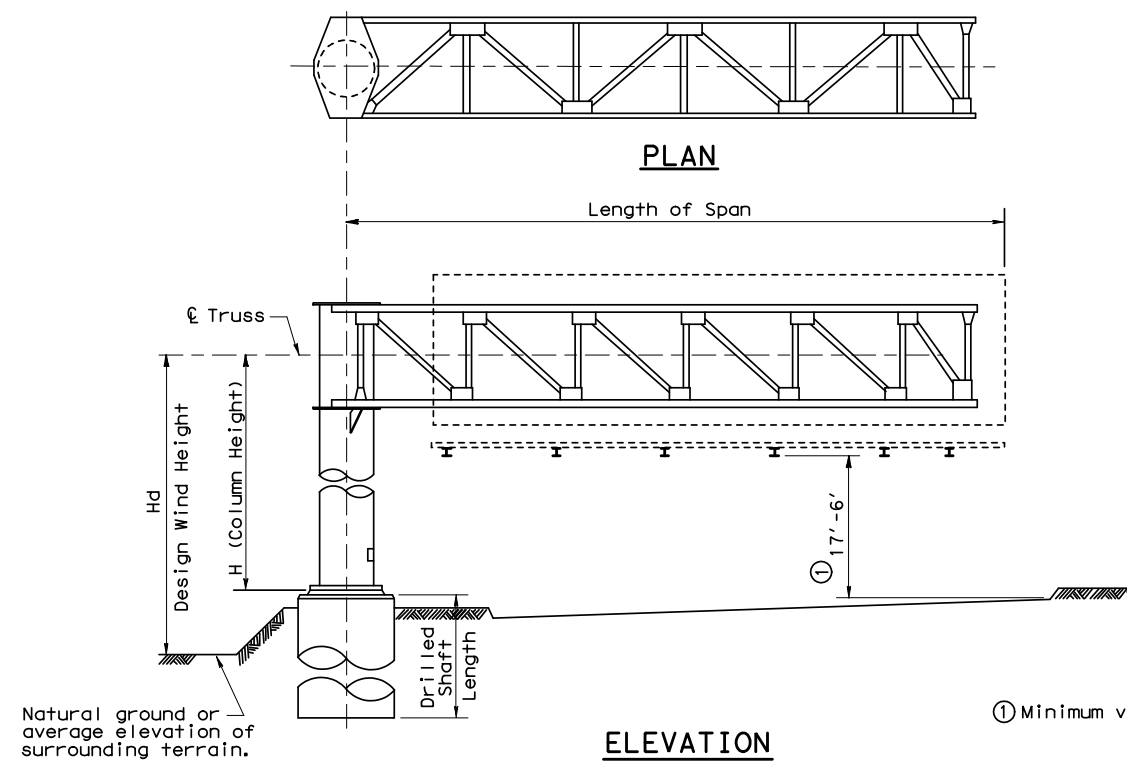


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**SELECTION EXAMPLE CANTILEVER SPAN**

Given: Cantilever Span = 33'; Column Height, H = 23.3'; Design Wind Height, Hd = 27'; Avg. Penetrometer Value, N = 15 (clay type soil); Hill County

Step 1: Select applicable COSS standard. From Wind Velocity and Ice Zone sheet (WV & IZ-96) determine that Hill County is in Zone 4 (70 mph) and is above the ice line. Since Design Wind Height is less than 30', use standard COSS-Z4 & Z4I. If Design Wind Height is more than 30', use COSS-Z3 & Z3I. NOTE: In Zone 1 if Design Wind Height is greater than 30' use HCOSS-Z1.

Step 2: Determine tower details from COSS-Z4 & Z4I. Use column height to nearest tabulated value, i.e., 23'. Round span length up to the nearest tabulated value, i.e., 35'. Tower details are:  
 Tower pipe 24" Dia with min. wall thickness = 0.312"  
 Base plate 33 3/4" Dia x 1 3/4"  
 Anchor bolts 8-1 3/4" Dia on 29 3/8" bolt circle  
 Horizontal deflection of tower at C truss = 0.889". During installation, double nuts at base plate may be used to plumb tower to compensate for horizontal deflection.  
 Design Moment = 244 Kip-ft  
 Design Torsion = 162 Kip-ft

Step 3: Determine truss details from COSS-Z4 & Z4I. Read from small table at bottom of sheet for span = 35'. Truss design width, W and depth, D = 4.0' x 4.0'.  
 Chord L 3 x 3 x 3/8 (HYC) with 6 bolt connection at tower  
 D.L. Diag. L 2 x 2 x 3/8 (HYC) with 2 bolt connection  
 W. L. Diag. L 3 x 3 x 3/8 (HYC) with 2 bolt connection  
 D. L. Vert. L 2 x 2 x 3/8 (HYC) with 2 bolt connection  
 W. L. Strut. L 2 x 2 x 3/8 (HYC) with 1 bolt connection  
 Bolts are 5/8" Dia high strength with 5-3/4" Dia bolt alternate for chord connection at tower.  
 D.L. of truss = 50 lb/ft  
 Truss deflection at free end = 3.2". The fabricator shall compensate for this deflection by offsetting bolt holes between the upper and lower chords at the truss-to-tower connection.

Step 4: Determine foundation details. Use standard COSSF. From COSSF with 24" Dia pipe and 1 3/4" Dia anchor bolts:  
 Anchor Bolts 1 3/4" Dia x 3'-10"  
 Drilled Shaft Dia 42"  
 Vertical Reinforcing 12 ~ #10 bars  
 Spiral C = #4 at 6" pitch Grade 60.  
 Misc. handhole, base plate, anchor bolt, and foundation details are shown on COSSF.

Step 5: Determine drilled shaft length from COSS-FD. Enter the appropriate graph (for 42" Dia drilled shaft in clay soil) from the bottom with N = 15. Proceed upward interpolating moment curves (solid lines) to locate 244 Kip-ft. Project to the left side of the graph to determine the required embedment length, i.e., 12'. Repeat the procedure for torsion curves (dashed lines) to locate 162 Kip-ft. The embedment length required to satisfy torsion is 14'. Add 3'-0" to the longer length to obtain a required drilled shaft length of 17'.

① Minimum vertical clearance

**SELECTION EXAMPLE DOUBLE CANTILEVER SPAN**

Given: Short span, A = 9'; Long Span, B = 25'; Total Cantilever Span = 34'; Column Height, H = 24'; Design Wind Height, Hd = 26'; Avg. Penetrometer Value, N = 20 (clay type soil); Wheeler County.

Step 1: Select applicable COSS standard. From Wind Velocity and Ice Zone sheet determine that Wheeler County is in Zone 2 (90 mph) and is above the ice line. Since Design Wind Height is less than 30' use standard COSS-Z2I. If Design Wind Height is more than 30', use HCOSS-Z1.

Step 2: Determine tower details from COSS-Z2I. Use column height = 24'. Round total span length up to the next longer tabulated length span, i.e., 35'. If total span length is greater than 40', a special design would be required. Tower details are:  
 Tower pipe 30" Dia with min. wall thickness = 0.310"  
 Base Plate 40 1/2" Dia x 1 3/4"  
 Anchor bolts 8 ~ 2" Dia on 35 3/4" bolt circle  
 Horizontal deflection of tower at C truss = 0.574-0.316 = 0.26". During installation, double nuts at base plate may be used to plumb tower and compensate for horizontal deflection.  
 Design Moment = 403 Kip-ft (use total span = 35')  
 Design Torsion = 136 Kip-ft (use long span = 25')

Step 3: Determine truss details from COSS-Z2I. Read from small table at bottom of sheet 2 of 2 for Span A = 9' (use 10'):  
 Chord L 3 x 3 x 3/8 (HYC) with 3 bolt connection at splice  
 D.L. Diag. L 2 x 2 x 3/8 (HYC) with 2 bolt connection  
 W.L. Diag. L 3 x 3 x 3/8 (HYC) with 2 bolt connection  
 D.L. Vert. L 2 x 2 x 3/8 (HYC) with 2 bolt connection  
 W.L. Strut. L 2 x 2 x 3/8 (HYC) with 1 bolt connection  
 Bolts are 5/8" Dia high strength.  
 D.L. of truss = 42 lb/ft.  
 Span B = 25':  
 Chord L 3 x 3 x 1/4 (HYC) with 4 bolt connection at tower  
 D.L. Diag. L 2 x 2 x 3/8 (HYC) with 2 bolt connection  
 W.L. Diag. L 3 x 3 x 3/8 (HYC) with 2 bolt connection  
 D.L. Vert. L 2 x 2 x 3/8 (HYC) with 2 bolt connection  
 W.L. Strut. L 2 x 2 x 3/8 (HYC) with 1 bolt connection  
 Bolts are 5/8" Dia high strength with 3 ~ 3/4" Dia bolt alternate for chord connection at tower.  
 D.L. of truss = 47 lb/ft.  
 Truss defl. at free end = 0.2" for Span A, = 1.3" for Span B. The fabricator shall compensate for deflections by offsetting bolt holes between upper and lower chords at splice and at truss-to-tower connection. Top chord shall be shortened between the tower and the splice to achieve the required offset.

Step 4: Determine foundation details. Use standard COSSF. From COSSF with 30" Dia pipe and 2" Dia anchor bolts:  
 Anchor bolts 2" Dia x 4'-3"  
 Drilled shaft Dia 54"  
 Vertical Reinforcing 18 ~ #10 bars  
 Spiral C = #4 at 6" pitch Grade 60  
 Misc. handhole, base plate, anchor bolt, and foundation details are shown on COSSF.

Step 5: Determine drilled shaft length from COSS-FD. Enter the appropriate graph (for 54" Dia drilled shaft in clay type soil) from the bottom with N = 20. Proceed upward interpolating moment curves (solid lines) to locate 403 Kip-ft. Project to the left side of graph to determine required embedment length, i.e., 13'. Repeat the procedure for the torsion curves (dashed lines) to locate 136 Kip-ft. Embedment length required to satisfy torsion is 9'. Add 3' to the longer length to obtain required drilled shaft length of 16'.



**CANTILEVER OVERHEAD SIGN SUPPORTS SELECTION EXAMPLES**

**COSS-SE**

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