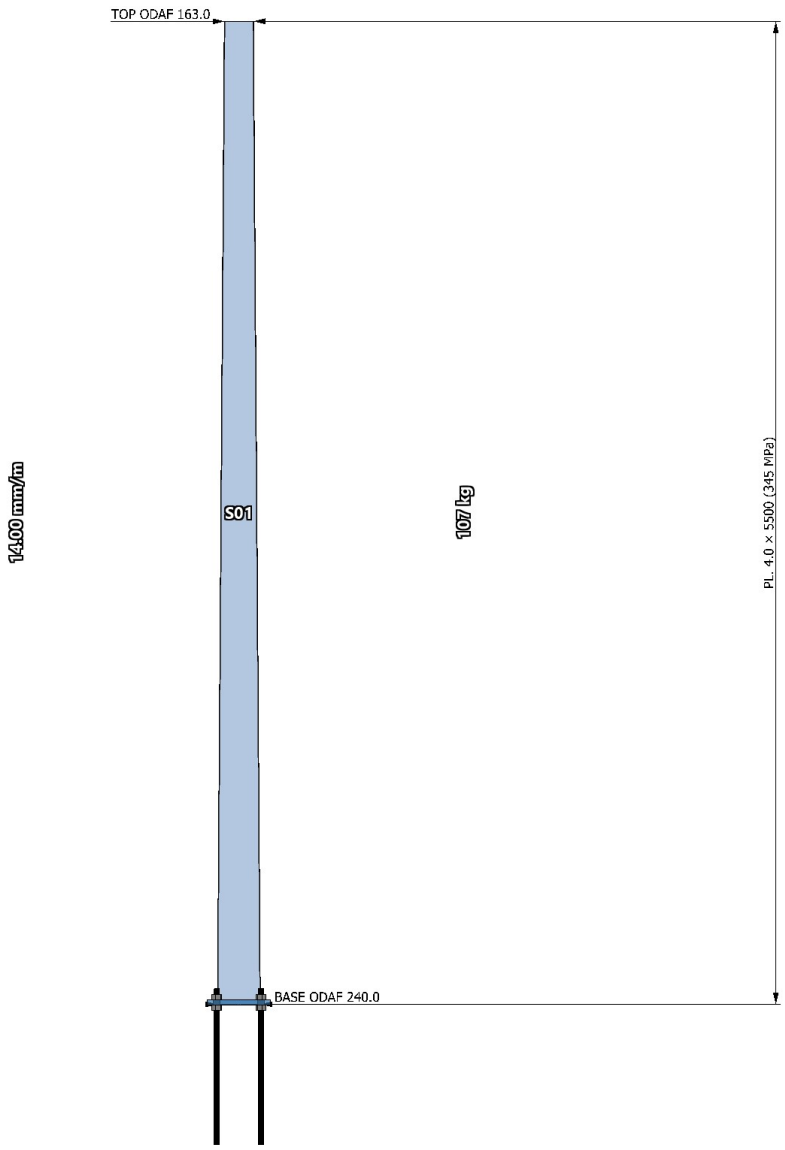
TOP ODAF 163.0
14400 mm/m
S01
107 kg
PL 4.0 × 5500 (345 MPa)
BASE ODAF 240.0

----- MONOPOLE DATA -----

MATERIAL: STEEL
SHAPE: CIRCULAR
SEGMENTS: 1
SURFACE: GALVANIZED
ASSEMBLED LENGTH: 5500 mm (TIP RL @ 5534 mm)
ELASTIC MODULUS: 200000 MPa
DENSITY (ρs): 7850 kg/m³
SHAFT MASS: 107 kg

SHAFT

ID	LENGTH	TOP OD	BASE OD	t	fy	TAPER	MASS
01	5500 mm	163.0 mm	240.0 mm	4.0 mm	345 MPa	14.00 mm/m	107 kg

< STRUCTURE BASE @ RL 0 mm (GROUND) >

CONNECTION #01: BASE

ANCHOR BOLTS

PATTERN: SINGLE RING
DIAMETER: M30
QUANTITY: 4
RING DIAMETER: 350 mm
EMBEDMENT: 750 mm
YIELD STRESS (fya): 360 MPa
ULTIMATE STRESS (fua): 600 MPa

BASE PLATE

SHAPE: SQUARE
VOID: SOCKETED
WELD: FILLET
WIDTH (Wp): 350 mm
THICKNESS (tp): 30 mm
YIELD STRESS (fyp): 345 MPa
MASS: 17 kg

GUSSETS

QUANTITY: 0

BEARING

TYPE: LEVELLING NUTS
GAP: 30 mm

----- SITE DATA -----

DESIGN

REFERENCE: AS/NZS 1170.2-2011
IMPORTANCE LEVEL: 2
LIFE: 50 YEARS

WIND

REGION: D
ULTIMATE ARI: 500 YEARS

REGIONAL WIND SPEED (VR)

• Calculated as per AS/NZS 1170.2-2011 Section 3.2.

ULTIMATE: 88 m/s
ICE: 43 m/s
SERVICEABILITY: 53 m/s

DIRECTION MULTIPLIER (Md)

• Calculated for Region D as per AS/NZS 1170.2-2011 Section 3.3.

WIND	Md
N	0.95
NE	0.95
E	0.95
SE	0.95
S	0.95
SW	0.95
W	0.95
NW	0.95

TERRAIN/HEIGHT MULTIPLIER (Mz,cat)

• Calculated using averaging as per AS/NZS 1170.2-2011 Section 4.2.3 and varies with height.

NORTH WIND: Mz,cat = 1.0591 (TC 1.0)

ZONE 1: TC 1 to 613.00 m

NORTH EAST WIND: Mz,cat = 1.0591 (TC 1.0)

ZONE 1: TC 1 to 613.00 m

EAST WIND: Mz,cat = 1.0591 (TC 1.0)

ZONE 1: TC 1 to 613.00 m

SOUTH EAST WIND: Mz,cat = 1.0591 (TC 1.0)

ZONE 1: TC 1 to 613.00 m

SOUTH WIND: Mz,cat = 1.0591 (TC 1.0)

ZONE 1: TC 1 to 613.00 m

SOUTH WEST WIND: Mz,cat = 1.0591 (TC 1.0)

ZONE 1: TC 1 to 613.00 m

WEST WIND: Mz,cat = 1.0591 (TC 1.0)

ZONE 1: TC 1 to 613.00 m

NORTH WEST WIND: Mz,cat = 1.0591 (TC 1.0)

ZONE 1: TC 1 to 613.00 m

SHIELDING MULTIPLIER (Ms)

• Shielding Multiplier (Ms) can be determined automatically by specifying the site coordinates under the "SITE" tab.

NORTH WIND: Ms = 1.0

NORTH EAST WIND: Ms = 1.0

EAST WIND: Ms = 1.0

SOUTH EAST WIND: Ms = 1.0

SOUTH WIND: Ms = 1.0

SOUTH WEST WIND: Ms = 1.0

WEST WIND: Ms = 1.0

NORTH WEST WIND: Ms = 1.0

TOPOGRAPHIC MULTIPLIER (Mt)

• The Topographic Multiplier (Mt) can be determined automatically by specifying the site coordinates under the "SITE" tab.

WIND	CRITICAL	TOPOGRAPHY	H	Lu	x	Mh	Mt
N	-	Flat	-	-	-	1.0	1.0
NE	-	Flat	-	-	-	1.0	1.0
E	-	Flat	-	-	-	1.0	1.0
SE	-	Flat	-	-	-	1.0	1.0
S	-	Flat	-	-	-	1.0	1.0
SW	-	Flat	-	-	-	1.0	1.0
W	-	Flat	-	-	-	1.0	1.0
NW	-	Flat	-	-	-	1.0	1.0

ICE

REGION: N/A

----- SHAFT DRAG -----

• Monopole Shaft Drag Factor (Cd) has been calculated as per AS/NZS 1170.2 Table E3, accounting for variations in wind speed and monopole width with height and the presence of access systems and linear loads as per Note 3.

----- AREA LOADS -----

AREA LOAD #01: Aeromax (Twin Arm)

℄ RL: 5.65 m
EPA: 1.20 m²
MASS: 155.00 kg
OFFSET: 0 mm

DESIGN LOADS

WIND	Wu	Ws
N	5.64 kN	2.05 kN
NE	5.64 kN	2.05 kN
E	5.64 kN	2.05 kN
SE	5.64 kN	2.05 kN
S	5.64 kN	2.05 kN
SW	5.64 kN	2.05 kN
W	5.64 kN	2.05 kN
NW	5.64 kN	2.05 kN

----- ANALYSIS -----

• The following load cases have been considered in the analysis:

01: 1.2 G + Wu
02: 0.9 G + Wu
03: 1.2 G + 1.5 Q
04: G + Ws
05: Wf

• Elastic Critical Buckling Load (Ncr) is 236.79 kN.

• Minimum First Mode Natural Frequency (n1) is 3.7746 Hz for Load Case 1.2 G + Wu.

• Maximum Ultimate Moment (M*) is 42.20 kN·m @ RL 26.0 mm under North Wind for Load Case 1.2 G + Wu.

• Maximum Ultimate Torsion (T*) is 0.00 kN·m @ RL 5500.0 mm under North Wind for Load Case 1.2 G + Wu.

• Maximum Ultimate Shear (V*) is 9.60 kN @ RL 26.0 mm under North Wind for Load Case 1.2 G + Wu.

• Maximum Ultimate Axial (N*) is 3.08 kN @ RL 26.0 mm for Load Case 1.2 G + Wu.

• Maximum Serviceability Rotation (θ*) is 0.7353° @ RL 5500.0 mm under North Wind for Load Case G + Ws.

• Maximum Serviceability Deflection (δ*) is 42 mm @ RL 5500.0 mm under North Wind for Load Case G + Ws.

• Ratio of attachment area to shaft area in top third exceeds 10% (420.00%), such that cross-wind response can be ignored as per CSA S37-18 Annex N.2.1.

• Maximum Equivalent Tip Load for foundation design is 7.67 kN.

----- SHAFT DESIGN (AS 4100) ----------

• Monopole PASSES with a maximum utilisation of [69.61%] @ RL 26.0 mm under North Wind for Load Case 1.2 G + Wu.

----- CONNECTION DESIGN (AS 4100) ----------

BASE

- Anchor Bolts PASS with a maximum utilisation of [44.95%] @ 315° under North Wind for Load Case 1.2 G + Wu.
- Base Plate PASSES with a maximum utilisation of [86.62%] @ 315° under North Wind for Load Case 1.2 G + Wu.

----- FATIGUE DESIGN (LRFD LTS-1) ----------

MEAN WIND SPEED: 4.0 m/s
IMPORTANCE CATEGORY: II
DAILY STRESS CYCLES: 9500 (AASHTO LRFD LTS-1 Table 17.5.2.5)

• AASHTO LRFD LTS-1 Section 11.7.2 does not require monopoles shorter than 16.76 m to be designed for fatigue, such that these results are informative only.

• Fatigue PASSES with a maximum utilisation of [51.71%] @ RL 26 mm (FILLET WELDED PLATE) under North Wind for Load Case Wf.

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