RFQ NUMBER	
FILE	URBAN POLE 22M rev6
REVISION	
FOR	

STRUCTURE DESCRIPTION

SHAFTS LIST (Diameters are outside diameters)

Name	Material	Nb sides	ØBot/Flat (mm)	ØTop/Flat (mm)	ØBot/Pnt (mm)	ØTop/Pnt (mm)	Length (m)	Level (m)
Utility box 4m + D324 L8000	Steel	-	406.4	323.9	406.4	323.9	12.000	12.000
Middle part D273	Steel	-	273.0	273.0	273.0	273.0	5.000	17.000
Top part	Steel	-	121.0	121.0	121.0	121.0	3.640	20.640
Suojapelti	Steel	-	640.0	640.0	640.0	640.0	3.000	20.140

HAND HOLE LIST

- 650x300, Ground Level: 0.28 m, angle: 0.0 deg
- 650x300, Ground Level: 1.01 m, angle: 0.0 deg
- 650x300, Ground Level: 1.74 m, angle: 0.0 deg
- 650x300, Ground Level: 2.47 m, angle: 0.0 deg
- 650x300, Ground Level: 3.20 m, angle: 0.0 deg
- 150 * 40 without reinforcement, Ground Level: 17.10 m, angle: 0.0 deg
- 150 * 40 without reinforcement, Ground Level: 18.60 m, angle: 0.0 deg

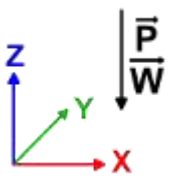
CALCULATION HYPOTHESIS

STANDARD USED

EUROCODE 1 - PN EN 1991-1-4, European standard with Polish national application

Material	Safety coefficient γm
Steel	1.1

SYSTEM OF COORDINATES



LOAD CASES COMBINATION LIST

Combination	Weight coefficient	Wind coefficient
Survival wind (ULS)	1.35	1.5
Käyttörajatila	1	1

COMBINATION : Survival wind (ULS)

LOAD CASE

Name	Pressure (daN/m2)	Speed (m/s)	Direction (X; Y; Z)	Additional parameters for wind load		
				Name	Value	Unit
Wind1	30	21.9089	(0;1;0)	Site altitude	0	m
				Bridge height	0	m
				Probability coefficient	1	
				Orography coefficient	1	
				Input of orography coefficient	Yes	
				Direction coefficient	1	
				Exposant for return period	0.5	
				Ground factor	0.19	
				Obstacle height	0	m
				Length of the slope side under wind	0	m
				Length of the slope side	0	m
				Base value of reference wind pressure	0.0003	
				Base value of reference wind speed	22	m/s
				Region	1	
				Return period	50	
				Air density	0.00125	kg/dm3
				Season coefficient	1	
				Shape factor	0.2	
				Site	0	
				Terrain	Class II	
				Horiz. distance between the site and the top of the obstacle	0	m
				Rugosity length	0.05	m
				Minimal height	2	m

Name	Weight (kg or kg/m)	Area (EPA) (m2 or m2/m)	Load (daN or daN/m)	Moment (daN.m or daN)	Start point (m)	End point (m)
Suojapeltien ja Moduulin paino	380.000				(0.000; 0.000; 18.640)	
Radiokapasiteetti		0.300			(0.000; 0.000; 20.240)	
Tyven kalusteet	200.000				(0.000; 0.000; 2.500)	

RESULTS

Stress ratio, deflection, twist and sway

Maximums on the structure	Shaft	Level (m)	Value	Unit
Stress Ratio	Top part	17.1	0.749	-
Deflection	Top part	20.64	615.47	mm
Twist and sway	Top part	20.64	3.122	deg

The mast meets the design hypothesis

On the main shaft	Level (m)	Value	Unit
Maximum stress ratio	0.28	0.719	-
Maximum deflection	12	240.58	mm
Maximum twist and sway	12	1.880	deg

Moments and loads at ground level

At ground level	X	Y	Z	Unit
Moments	-9268.988	0.000	0.000	daN.m
Loads	0.000	730.138	-2012.622	daN

- Pole weight: 994.7 kg
- Fully equipped pole weight: 1574.7 kg
- Gravity center of the pole: 10.414 m

COMBINATION : Käyttörajatila

LOAD CASE

Name	Pressure (daN/m2)	Speed (m/s)	Direction (X; Y; Z)	Additional parameters for wind load		
				Name	**Value**	**Unit**
Wind2	28	21.166	(0;1;0)	Site altitude	0	m
				Bridge height	0	m
				Probability coefficient	1	
				Orography coefficient	1	
				Input of orography coefficient	Yes	
				Direction coefficient	1	
				Exposant for return period	0.5	
				Ground factor	0.19	
				Obstacle height	0	m
				Length of the slope side under wind	0	m
				Length of the slope side	0	m
				Base value of reference wind pressure	0.00028	
				Base value of reference wind speed	21	m/s
				Region	Manual input	
				Return period	50	
				Air density	0.00125	kg/dm3
				Season coefficient	1	
				Shape factor	0.2	
				Site	0	
				Terrain	Class II	
				Horiz. distance between the site and the top of the obstacle	0	m
				Rugosity length	0.05	m
				Minimal height	2	m

Name	Weight (kg or kg/m)	Area (EPA) (m2 or m2/m)	Load (daN or daN/m)	Moment (daN.m or daN)	Start point (m)	End point (m)
Suojapeltien ja Moduulin paino	380.000				(0.000; 0.000; 18.640)	
Radiokapasiteetti		0.300			(0.000; 0.000; 20.240)	
Tyven kalusteet	200.000				(0.000; 0.000; 2.500)	

RESULTS

Stress ratio, deflection, twist and sway

Maximums on the structure	Shaft	Level (m)	Value	Unit
Stress Ratio	Utility box 4m + D324 L8000	0.28	0.389	-
Deflection	Top part	20.64	320.95	mm
Twist and sway	Top part	20.64	1.602	deg

The mast meets the design hypothesis

On the main shaft	Level (m)	Value	Unit
Maximum stress ratio	0.28	0.389	-
Maximum deflection	12	47.2	

On the main shaft	Level (m)	Value	Unit
Maximum twist and sway	12	0.954	deg

Moments and loads at ground level

At ground level	X	Y	Z	Unit
Moments	-4989.857	0.000	0.000	daN.m
Loads	0.000	417.060	-1490.831	daN

- Pole weight: 994.7 kg
- Fully equipped pole weight: 1574.7 kg
- Gravity center of the pole: 10.414 m

ABOUT THE USE OF THIS DOCUMENT

Made by ja.aalto with Paul Standard version 3.7.3.0