

Turbine Foundation Loads

Wind Thrust Overturning Moment

Proven Energy WT 6000 Wind Turbine TM1500

Revision			Prepared by	
Status	Date	No.	Author	Checked
Draft	18/05/05	0.1	NJH	



Calculate the Tower foundation loads due the wind loading on the turbine

Loads in accordance with international norm: IEC 61400-2

Assume that the tower wind loading is a uniformly distributed load, variations in wind speed with height will be neglected in this calculation.

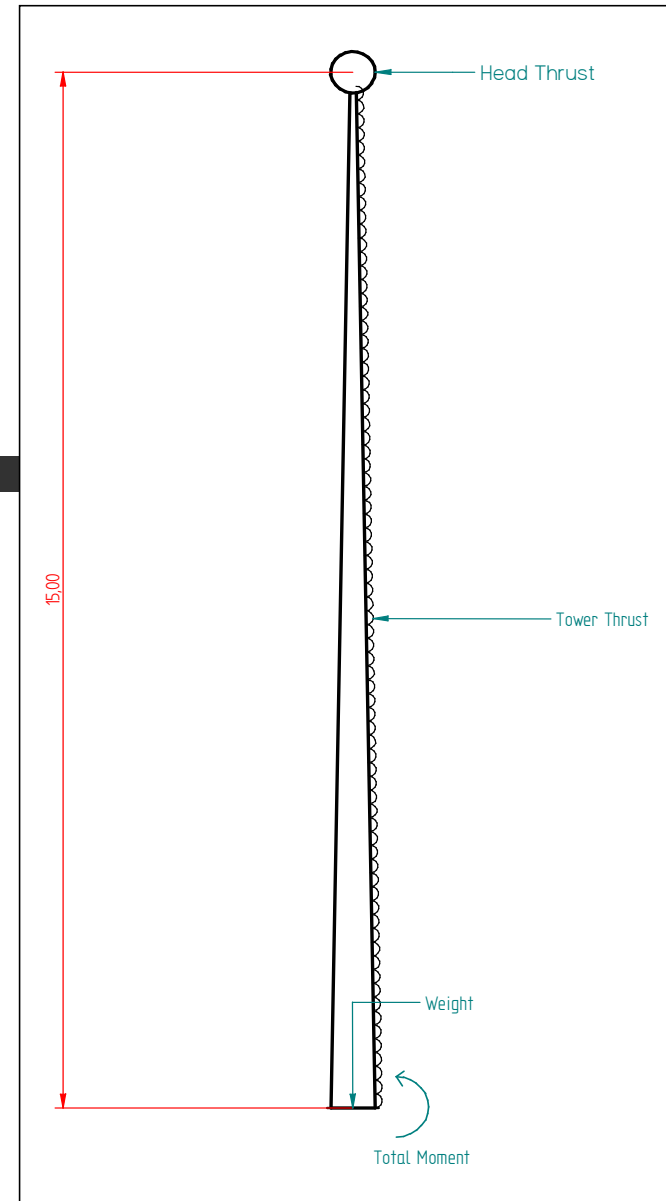
Input Parameters

Head Mass =	500 kg ⁱ
Mast Mass =	656 kg ⁱ
Mast Length =	15 m
Head Thrust =	10 kN ⁱ
Tower Thrust =	16.32 kN ⁱⁱⁱ

Total Moment =	252.6 kNm	
Total Horizontal Thrust =	26.3 kNm	
Turbine Weight =	11.3 kN	(excluding foundation)

References

- From Technical Specifications pdf on Proven Website
- From Tower wind loading calculations spreadsheet



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Anchor point loading during lifting of the turbine

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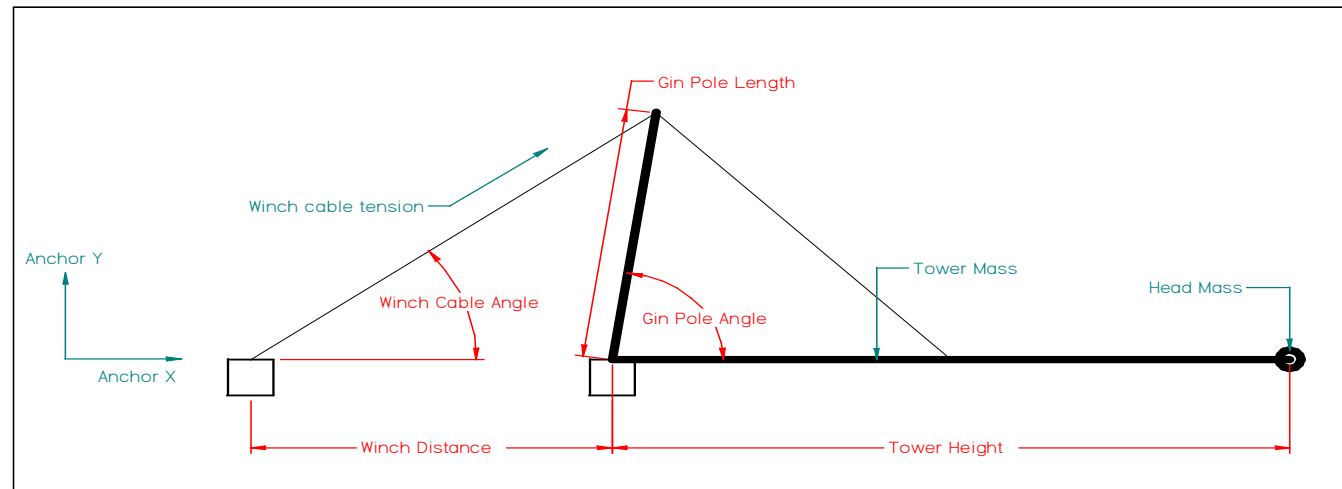
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Input Parameters

Head Mass = 500 kgⁱ
 Mast Mass = 656 kgⁱ
 Mast Length = 15 m
 Mast CoG = 5 m
 Gin pole length = 7 m
 Winching distance = 15 m

 Gin Pole angle = 80 deg
 1.40 rads
 Winch cable angle = 23.03 deg
 0.40 rads



Find the lifting moment required due to the head weight and tower weight

Assume highest loading is when the turbine is horizontal, and has just left the ground, this causes the greatest moment.

Total moment due to head and mast weight = 105.75 kNm
 Horizontal force at the end of the gin pole = 15.34 kN

Winch Cable tension = 16.67 kN

Winch Anchor X = 15.34 kN

Winch Anchor Y = 6.52 kN

References

i. From Technical Specifications pdf on Proven Website