

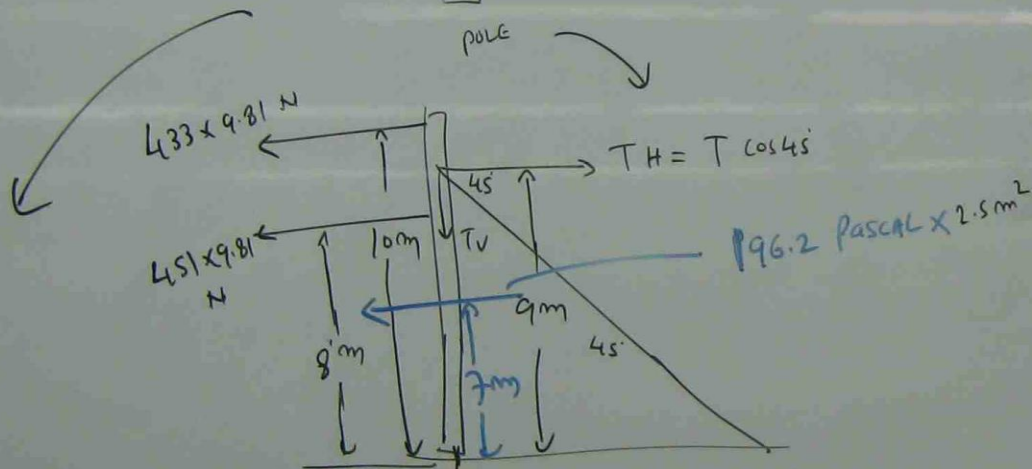
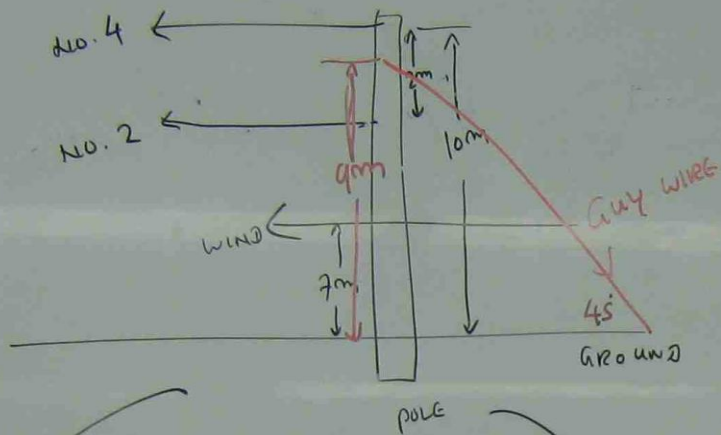
DESIGN OF GUY WIRE (STAY WIRE)

pb

THREE NO 4 MEDIUM HARD DRAWN COPPER PRIMARY CONDUCTOR IS ATTACHED AT 10m ABOVE THE GROUND ON POLE. FOUR NO 2 SOFT DRAWN COPPER CABLE IS ATTACHED AT 2m BELOW ON POLE. A POLE FACE AREA TO WIND IS 2.5 m^2 AND WIND PRESSURE IS 196.2 PASCAL AT 7m. THE GUY WIRE IS ATTACHED AT 9m ABOVE THE GROUND AT 45°. CALCULATE HORIZONTAL AND VERTICAL LOADINGS ON GUY WIRE

NO. 4 WIRE HAS 433 Kg WEIGHT FOR THE SPAN
NO. 2 WIRE HAS 451 Kg WEIGHT FOR THE SPAN

IF ALLOWABLE STRESS IN GUY WIRE IS $33.17 \times 10^6 \text{ N/m}^2$ CALCULATE THE DIAMETER OF GUY WIRE.



$$433 \times 9.81 \times 10 + 451 \times 9.81 \times 8 + 196.2 \times 2.5 \times 7 = T_H \times 9$$

$$433 \times 9.81 \times 10 + 451 \times 9.81 \times 8 + 196.2 \times 2.5 \times 7 = T \cos 45^\circ \times 9$$

$$T = \frac{433 \times 9.81 \times 10 + 451 \times 9.81 \times 8 + 196.2 \times 2.5 \times 7}{9 \times 0.707}$$

$$= 12776 \text{ N}$$

$$T_H = T \cos 45^\circ$$

$$= 12776 \times 0.707$$

$$= 9033 \text{ N}$$

$$T_V = T \sin 45^\circ$$

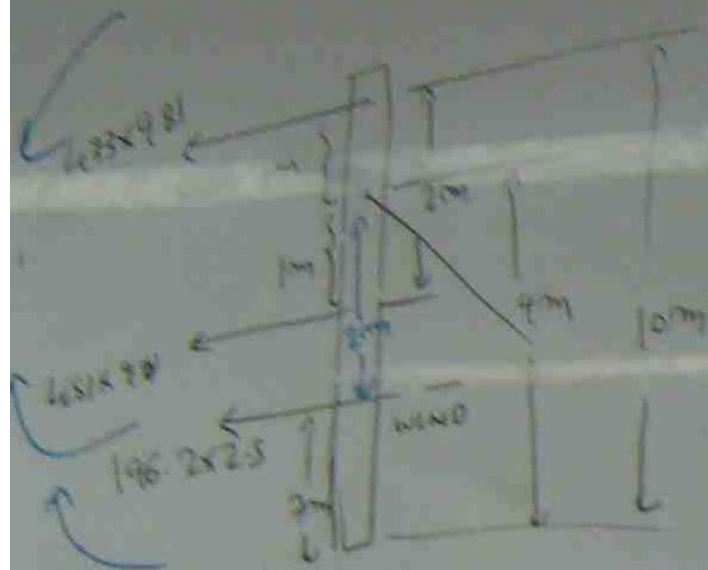
$$= 12776 \times 0.707$$

$$= 9033 \text{ N}$$

NO. 4 WIRE ANTI CLOCK WISE MOMENT & NO. 2 WIRE + WIND
CLOCK WISE MOMENT ARE TWISTING THE GUY WIRE.

TO WITHSTAND SUCH TWISTING MOMENT, SELECT THE
APPROPRIATE DIAMETER OF GUY WIRE.

TAKE MOMENT CENTRE AT GUY WIRE
ATTACHMENT POINT. ADD ALL MOMENTS.



$$\begin{aligned} & \left(433 \times 9.81 \times 1 \right) - \left(451 \times 9.81 \times 1 + 196.2 \times 25 \times 2 \right) = 8 \text{ m} \\ & \text{TOTAL} \\ & \text{AT} \\ & \text{GUY WIRE} \\ & \text{ATTACHMENT} \\ & \text{POINT} \end{aligned}$$

$$8 \text{ m TOTAL} = -1131 \text{ N-m}$$

GUY WIRE

ATTACHED

POINT

$$= 1131 \text{ N-m (TAKE MAGNITUDE)}$$

DIAMETER OF
GUY WIRE

= 3

TOTAL MOMENT AT
GUY WIRE ATTACHED POINT

STRESS \times 0.0982

$$= 3 \sqrt{\frac{1131}{33.17 \times 10^6 \times 0.0982}}$$

$$= 0.07 \text{ m}$$

$$= 7.02 \text{ cm}$$

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