

REVIEW QUESTIONS

(1) PER CENTAGE OF ULTIMATE STRENGTH OF VARIOUS PARTS OF OVER HEAD LINE

STEEL 50% % WOOD 25 % STAY WIRE / INSULATOR 40 %

(2) ILLUSTRATE BY MEAN OF A SKETCH, THE METHOD OF TERMINATING THE LINE GIVING DIMENSIONS WHERE POSSIBLE.

(3) THE CONDUCTOR TO BE ERECTED OVER A 160 m SPAN HAS EQUIVALENT WEIGHT 4 N/m DIAMETER 12 mm AND ULTIMATE TENSILE STRENGTH 33 kN. DETERMINE THE SAG IF WIND LOADING IS 500 PA AND SAFETY FACTOR 3.5

|| — NEXT WEEK

(PRACTICAL AFTER TEST)

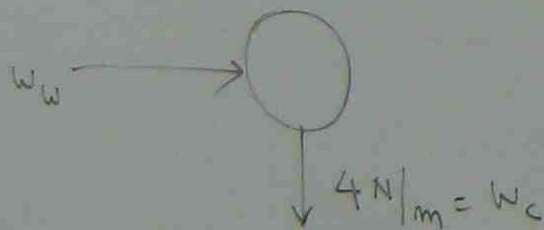
$$(3) \quad SAG = \frac{W L^2}{8 T}$$

$$L = \text{SPAN} = 160 \text{ m}$$

$$T = \frac{\text{ULTIMATE STRENGTH}}{\text{SAFETY FACTOR}}$$

$$= \frac{33000}{3.5}$$

$$= 9428.57 \text{ N}$$



$$W_w = \text{DIAMETER} \times 1 \text{ cm LENGTH} \times \text{W.D. PRESSURE}$$

$$= \frac{12}{1000} \times 1 \times 500$$

$$= 6 \text{ N/cm}$$

$$W = \sqrt{W_c^2 + W_w^2}$$

$$= \sqrt{4^2 + 6^2}$$

$$= 7.2 \text{ N/cm}$$

$$SAG = \frac{W L^2}{8 T}$$

$$= \frac{7.2 \times 160^2}{8 \times 9428.57}$$

$$= 2.44 \text{ m}$$

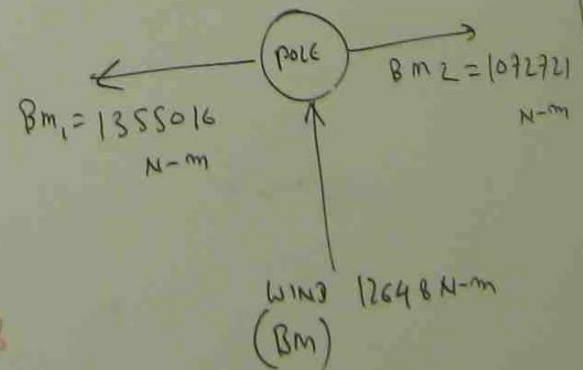
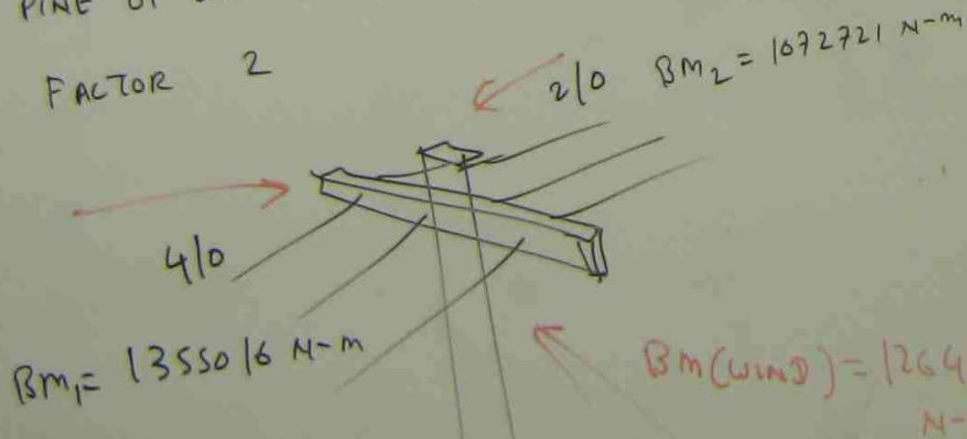
TOWER DESIGN. (CONTINUE)

pb 12 m pole is installed with THREE NO 4/0 BARE CONDUCTORS IN ONE DIRECTION AND THREE NO 2/0 BARE STRANDED COPPER CONDUCTORS IN OPPOSITE DIRECTION. THREE NO 4/0 CONDUCTORS CAUSE 1355016 N-m BENDING MOMENT AND THREE NO 2/0 CONDUCTORS CAUSE 1072721 N-m BENDING MOMENT.

WIND LOAD ON POLE IS 12648 N-m

CALCULATE TOWER CIRCUMSTANCE TO WITHSTAND THE LOAD IF LONGLEAF YELLOW PINE OF ULTIMATE STRESS $51.3 \times 10^6 \text{ N/m}^2$ IS USED. TAKE SAFETY

FACTOR 2



BENDING MOMENT
CAUSED BY CONDUCTORS

TOTAL BENDING
MOMENT

$$\begin{aligned}
 \text{BENDING moment} &= BM_1 - BM_2 \\
 \text{CAUSED BY CONDUCTOR} &= 1355016 - 1072721 \\
 &= 282295 \\
 &\quad \text{N-m}
 \end{aligned}$$

$$\begin{aligned}
 \text{TOTAL BENDING} & \\
 \text{moment} &= \sqrt{282295^2 + 12548^2} \\
 &= 282578 \text{ N-m}
 \end{aligned}$$

$$\begin{aligned}
 \rightarrow BM_2 &= 1072721 \\
 &\quad \text{N-m}
 \end{aligned}$$

$$\begin{aligned}
 \text{CIRCUM FERENCE} &= 3 \sqrt{\frac{730 \times \text{SAFETY FACTOR} \times \text{TOTAL BENDING moment}}{\text{ULTIMATE STRESS OF WOOD}}} \\
 &\quad \text{mm}
 \end{aligned}$$

$$\begin{aligned}
 &= 3 \sqrt{\frac{730 \times 2 \times 282578}{51.3 \times 10^6}} \\
 &= 2 \text{ cm}
 \end{aligned}$$

$$\begin{aligned}
 \text{DIAMETER} &= \frac{\text{CIRCUM FERENCE}}{3.1416} \\
 &= 0.633 \text{ cm}
 \end{aligned}$$

