

PANME
+

a) G

$$\begin{array}{r} 0,50 \\ 0,15 \\ 0,08 \\ \hline 0,73 \text{ kN/m}^2 \end{array} \quad \left(\text{poids des chevrons, } (0,075 \times 0,1 \times 5) / 0,5 = 0,08 \text{ kN/m}^2 \right)$$

$$0,73 \times 2,1 \text{ (entraxe)} = 1,55 \text{ kN/m}$$

b) S

$$0,36 \times \cos 30^\circ = 0,32 \text{ kN/m}^2$$

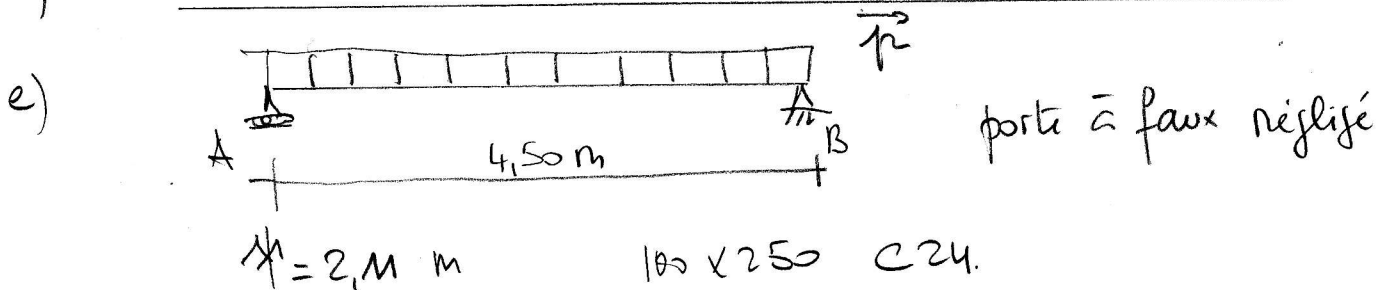
$$0,32 \times 2,1 \text{ (entraxe)} = 0,68 \text{ kN/m}$$

c) ELU

$$1,35(1,55) + 1,5(0,68) = 3,12 \text{ kN/m}$$

d) ELS

$$1,8(1,55) + 0,68 = 3,47 \text{ kN/m}$$



f)

action aux appuis $A = B = 3,12 \times 4,5 / 2 = 7,02 \text{ kN}$

g)

$$T = \frac{p \cdot l}{2} = 7,02 \text{ kN}$$

$$MF = \frac{p \cdot l^2}{8} = \frac{3,12 \times 4,5^2}{8} = 7,9 \text{ kN.m}$$

h)

$$\sigma = \frac{1,5 \cdot 7020}{0,67 \cdot 100 \cdot 250} = 0,62 \text{ N/mm}^2$$

$$f_{vk} = \frac{4 \cdot 0,9}{1,3} \cdot 1 = 2,76 \text{ N/mm}^2$$

} 23%

i)

$$\sigma_m = \frac{7,9 \cdot 10^6 \cdot 6}{100 \cdot 250^2} = 7,6 \text{ N/mm}^2$$

$$f_{mk} = \frac{24 \cdot 0,9}{1,3} = 16,6 \text{ N/mm}^2$$

} 46%

$$j) f = \frac{5 \cdot 3,47 \cdot 4500^4 \cdot 12}{384 \cdot 11000 \cdot 100 \cdot 250^3} = 13 \text{ mm} \quad \left. \vphantom{\frac{5 \cdot 3,47 \cdot 4500^4 \cdot 12}{384 \cdot 11000 \cdot 100 \cdot 250^3}} \right\} 58\%$$

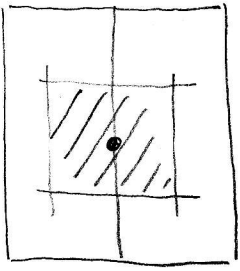
$$f_{\text{limite}} = 4500/200 = 23 \text{ mm}$$

POTEAU

a) (\rightarrow Surface chargée) \rightarrow

$G = 0,50 \text{ kN/m}^2$
 $0,15 \text{ kN/m}^2$
 $0,08 \text{ kN/m}^2 \text{ (chevrons)}$
 $0,06 \text{ kN/m}^2 \text{ (pannes) (*1)}$

 $0,79 \text{ kN/m}^2$



$9\text{m}/2 = 4,5\text{m}$

$\frac{7,50}{\cos 30} / 2 = 4,3\text{m}$

$\left. \vphantom{\frac{7,50}{\cos 30} / 2} \right\} 19,3\text{m}^2$

$$0,79 \times 19,3\text{m}^2 = 15,3 \text{ kN}$$

+ poids de l'arba sur le poteau (*2) = $0,4 \text{ kN}$

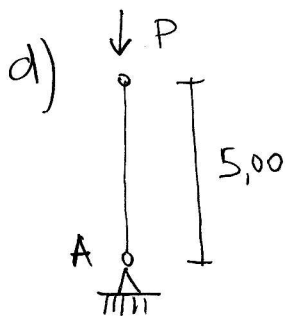
(*1) poids des pannes $(0,1 \times 0,25 \times 5)/2,11$
 $\rightarrow = 0,06 \text{ kN/m}^2$

(*2) poids de l'arba: $0,08 \times 0,25 \times 5 \times 4,2 = 0,4 \text{ kN}$

$$G = 15,7 \text{ kN}$$

$$b) S = 0,36 \times \cos 30^\circ \times 19,3 = 6 \text{ kN}$$

$$c) P = 1,35(15,7) + 1,5(6) = 30,2 \text{ kN}$$



180x180 C24

$$e) A = 30,2 \text{ kN}$$

$$f) N = 30,2 \text{ kN}$$

$$g) \sigma_c = \frac{30200}{130 \times 130} = 0,9 \text{ N/mm}^2$$

$$f_{cd} = \frac{21,0 \times 0,9}{1,3} \times 0,33 \text{ (kay)} = 4,8 \text{ N/mm}^2$$

C24EN

$$\left. \vphantom{\frac{21,0 \times 0,9}{1,3}} \right\} \frac{0,9}{4,8} = 19\%$$