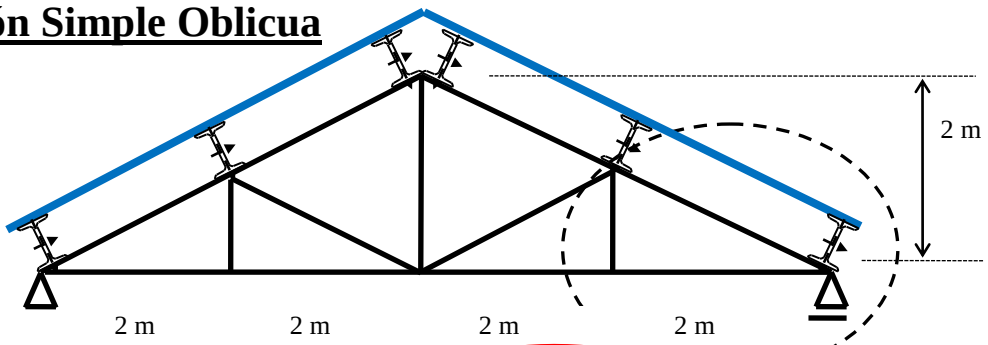
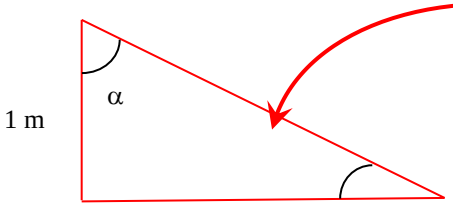
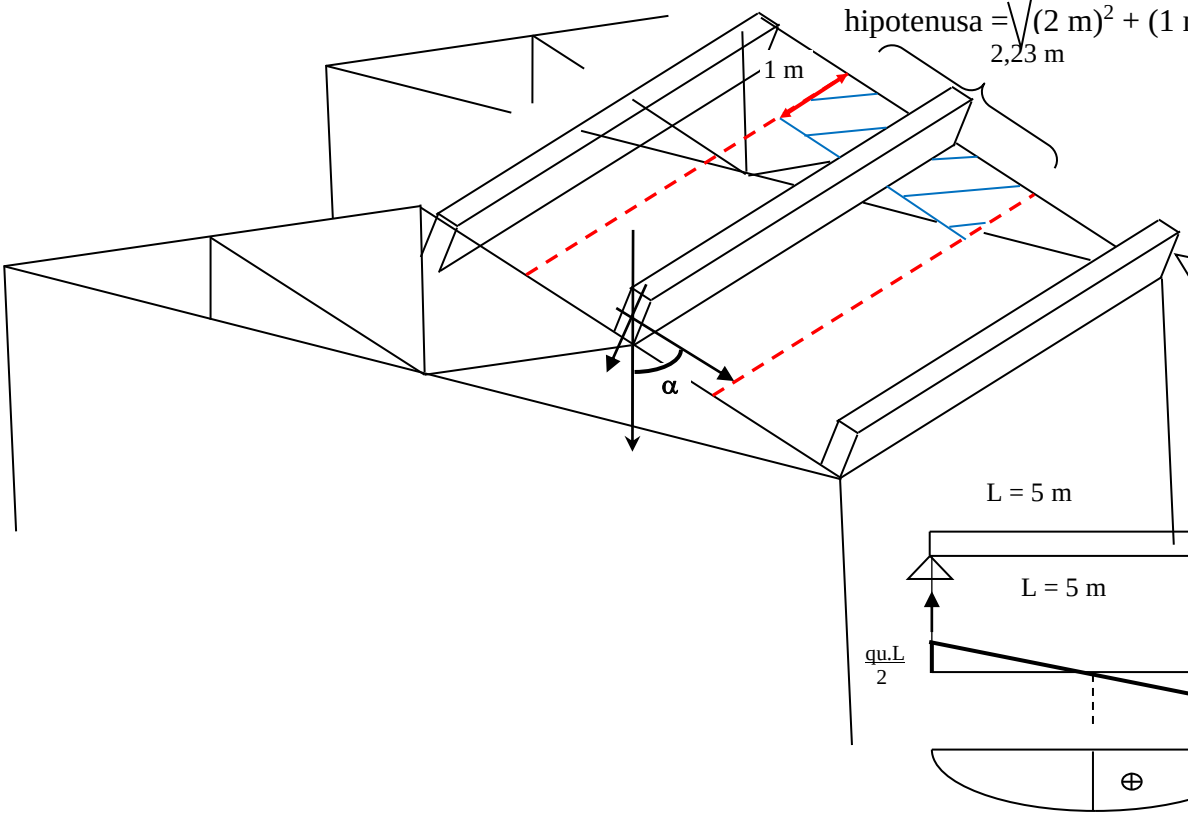
Flexión Simple Oblicua





$\tan \alpha = \frac{\text{opuesto}}{\text{adyacente}} = \frac{2\ m}{1\ m} = 2 \qquad \alpha = 63{,}43$

hipotenusa $= \sqrt{(2\ m)^2 + (1\ m)^2} = 2{,}23\ m$



Cubierta (D) = 90 kg/m^2 Sobrecarga (L) = 100 kg/m^2

M mix. $= \frac{qu.L^2}{8} = 18{,}75$ KNm

Carga última = D . 1,2 + L . 1,6 = 90 kg/m^2 x 1,2 + 100 kg/m^2 x 1,6 = 268 kg/m^2
por metro de correa: qu = 268 kg/m^2 x 2,23 m = 597 kg/m adopto qu = 600 kg/m = 6 KN/m

$M_{máx} = \frac{qu\ .\ L^2}{8} = \frac{600\ kg/\ m\ .\ (5\ m)^2}{8} = 1875$ kgm = 18,75 KNm = 1875 KNcm

1) Dimensionado. Adopto Zx/Zy = 5,8

$Zx = \frac{Mu\ .(\ sen\ \alpha + \cos \alpha.Zx/Zy)}{\phi_b\ .fb} = \frac{1875\ KNcm\ .\ (sen\ 63{,}43 + \cos 63{,}43 \times 5{,}8)}{21{,}15\ KN/cm^2} = 309\ cm^3$ IPN 220

2) Verificación (porque Zx/Zy fue un valor arbitrariamente adoptado).

$\sigma máx = Mu.\ (\ sen\ \alpha\ /\ Zx + \cos \alpha\ /\ Zy) = 1875\ KNcm\left(\frac{sen\ 63{,}43}{324\ cm^3} + \frac{\cos 63{,}43}{55\ cm^3}\right) = 20{,}42 \leq 21{,}15\ KN/cm^2$ verifica