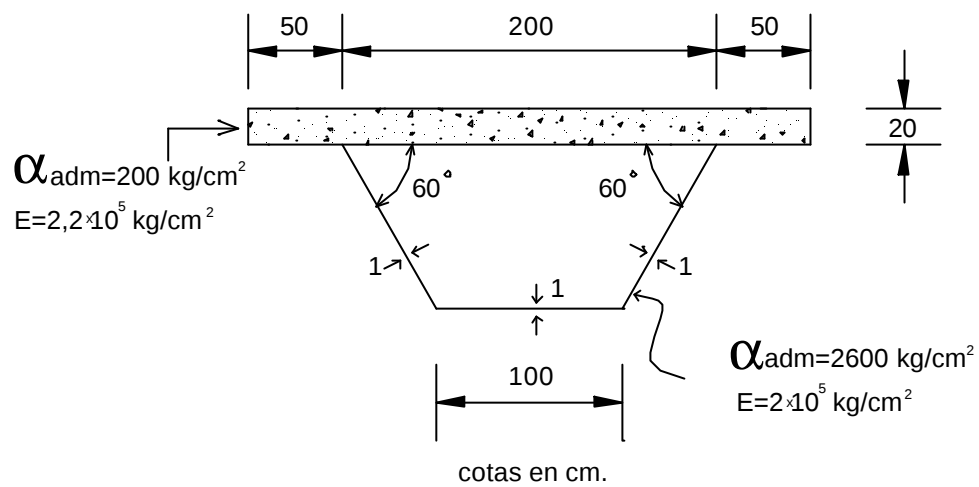


EJERCICIO N° 12 - G3

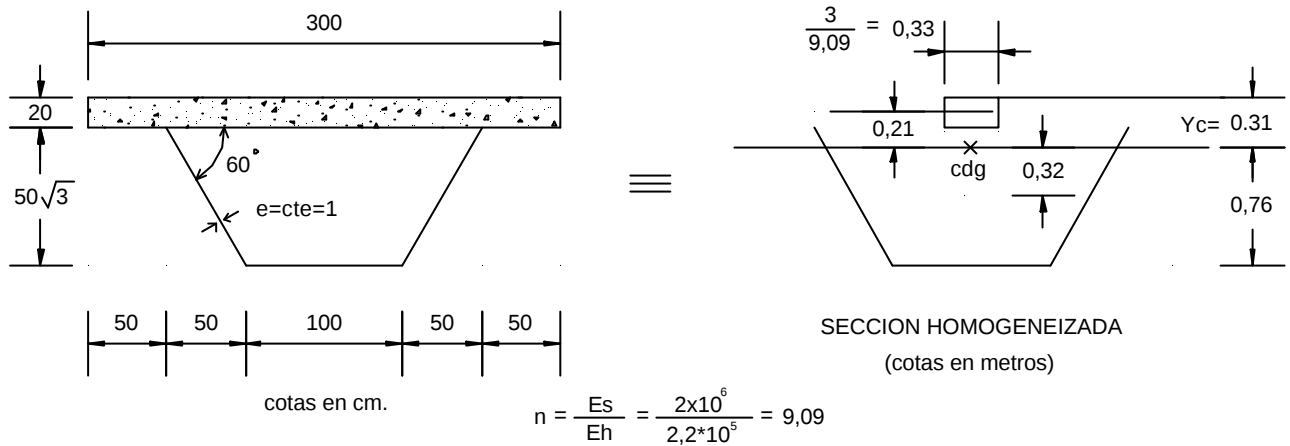
Para la sección mixta que se muestra, se pide:

- a) Momento flector positivo admisible
- b) Curvatura para el momento admisible



SOLUCION

a) Momento flector positivo admisible:



$$Y_c = \frac{(0.33 \times 0.2)0.10 + (1 \times 0.01)(0.25\sqrt{3} + 0.20)2 + (1 \times 0.01)(0.5\sqrt{3} + 0.2)}{0.33 \times 0.20 + (1 \times 0.01)3}$$

$$Y_c = 0.31 \text{ m}$$

$$I_c = \frac{1}{12}(0.33)(0.20)^3 + 0.33 \times 0.20(0.21)^2 + \left[\frac{1}{12}(0.01)(1)^3 \sin^2 60 + (0.01 \times 1)(0.32)^2 \right] 2 +$$

$$+ \frac{1}{12}(1)(0.01)^3 + (1 \times 0.01)80.76)^2$$

$$I_c = 1.22 \times 10^{-2} \text{ m}^4$$

$$s_c = \frac{M \times 0.31 \text{ m}}{1.22 \times 10^{-2} \text{ m}^4} \times \frac{1}{9.09} \leq 200 \frac{\text{ton}}{\text{m}^2} \Rightarrow M \leq 715.47 \text{ Ton-m}$$

$$s = \phi \times Y \times E = \frac{M}{E_1 I_1 + E_2 I_2} \times Y \times E \quad (2)$$

$$I_1 = \frac{1}{12} (300)(20)^3 + 300 \times 20(21)^2 = 2846.000 \text{ cm}^4$$

$$I_2 = \left[\frac{1}{12} \times 1(100)^3 \sin^2 60 + 1 \times 100(32,3)^2 \right] 2 + \frac{1}{12} \times 100 \times 10^3 + 100(75,6)^2 = 905202,33 \text{ cm}^4$$

$$s_c = \frac{M}{2,2 \times 10^5 \times 2846000 + 2 \times 10^6 \times 905202,33} \times 312,2 \times 10^5 \leq 200 \Rightarrow M \leq 714,52 \text{ ton-m}$$

$$s_s = \frac{M}{2,44 \times 10^{12}} \times 75,6 \times 2 \times 10^6 \leq 2600 \quad \Rightarrow \quad M \leq 418,98 \text{ Ton-m}$$

$$\therefore M = 418,98 \text{ ton-m}$$

b) Curvatura:

$$\phi = \frac{418,98 \times 10^5}{2,44 \times 10^{12}} = \frac{1,72 \times 10^{-5}}{\text{cm}} = \frac{1,72 \times 10^{-3}}{\text{m}}$$