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Métodos Energeticos

Análisis de Estructuras

Quinto Cuatrimestre

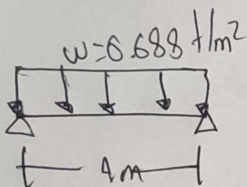
Comitán de Domínguez Chiapas a 11 de febrero de 2024

Peso de área

Carga w

$$P_1 = 682 \text{ kg/m}^2$$
$$P_2 = 5.888 \text{ kg/m}^2$$

$$w = 0.688 \text{ t/m}^2$$



Datos

$$h = 0.35 \text{ m} \quad F'c \ 200$$
$$b = 20 \text{ cm} \quad F'y \ 2400$$
$$l = 1 \text{ m} \quad F''c \ 136$$
$$d = 31 \text{ cm} \quad F_R = 0.9$$

$$\frac{w \cdot L^2}{8} = 1.376 \text{ t/m}$$

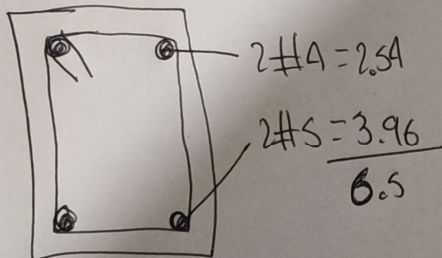
$$\phi_{\text{max}} = 0.01043$$
$$\phi_{\text{min}} = 0.002357$$

$$M_0 = 1.376 \text{ t/m} (1.3 \times 10^5) = 178899.43$$

$$q = \sqrt{-\frac{178899.43}{0.9 \cdot 10 \cdot 31^2 \cdot 136} \cdot 2 + 1} = 0.9208$$

$$\phi = \frac{(-0.9208 + 1)(136)}{2400} = 0.004488$$

$$A_s = 0.004488(20)(31) = 2.7825$$



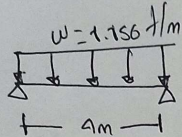
$$A_s \text{ max} = 7.0866$$
$$A_s \text{ min} = 1.4613$$

Peso de aera

$$P_1 = 647.337 \text{ kg/m}^2$$
$$P_2 = 508.036 \text{ kg/m}^2$$

Carga w

$$h = 35 \text{ cm}$$
$$b = 20 \text{ cm}$$
$$\text{Peso} = 7400 \text{ kg/m}^2$$
$$w = 1.156 \text{ t/m}$$



Datos

$$h = 35 \text{ cm}$$
$$b = 20 \text{ cm}$$
$$l = 4 \text{ m}$$
$$d = 31 \text{ cm}$$
$$f'c = 100 \text{ kg/cm}^2$$
$$f'y = 4200$$
$$f'c = 36$$
$$FR = 0.9$$

$$\rho_{\text{max}} = 0.81193$$
$$\rho_{\text{min}} = 0.002357$$

$$\frac{w \cdot L^2}{8} = 2.311 \text{ t/m}$$

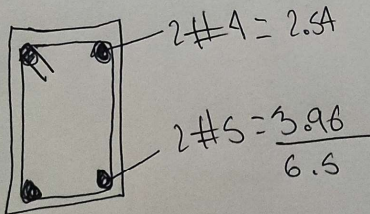
$$M = 2.311 (1.3 \times 10^3) = 300440.83$$

$$\eta = \sqrt{\frac{300440.83 \cdot 2.1}{0.9 \cdot 20 \cdot 31^2 \cdot 136}} = 0.8628$$

$$\rho = \frac{(-0.8628 + 1)(136)}{1200} = 0.00442$$

$$A_s \rho(b)(d) = 2.7540$$

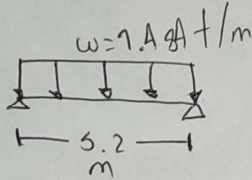
$$A_s \text{ max} = 7.0866$$
$$A_s \text{ min} = 1.4613$$



Peso de área

$$P_1 = 620.279 \text{ kg/m}^2$$

$$P_2 = 863.221 \text{ kg/m}^2$$



Carga w

$$h = 0.45$$

$$b = 0.20$$

$$P_{so} = 2.1 \text{ t/m}$$

$$w = 1.484 \text{ t/m}$$

Datos:

$$H = 0.45 \text{ cm} \quad F'c = 200 \text{ kg/cm}^2$$

$$b = 0.20 \text{ cm} \quad F'y = 4200 \text{ kg/cm}^2$$

$$L = 5.2 \text{ m} \quad F''c = 136 \text{ kg/cm}$$

$$d = 41 \text{ cm} \quad FR = 0.9$$

$$\rho_{max} = 0.01143$$

$$\rho_{min} = 0.002357$$

$$\frac{w \cdot L^2}{8} = 5.015 \text{ t/m}$$

$$M_0 = 5.015 \text{ t} / (1.3 \times 10^3) = 65194.88 \text{ kg/cm}$$

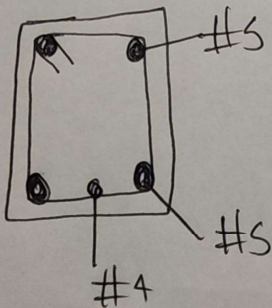
$$q = \sqrt{-\frac{65194.88}{0.9 \cdot 0.20 \cdot 41^2 \cdot 136} \cdot 2 + 1} = 0.8265$$

$$\rho = \frac{(-q + 1)(F''c)}{F'y} = \frac{(-0.8265 + 1)(136 \text{ kg/cm}^2)}{4200 \text{ kg/cm}^2} = 0.005618$$

$$A_s = \rho(b)d = 0.005618(20)(41) = 4.6067 \text{ cm}^2$$

$$A_{s \text{ max}} = \rho_{max}(b)(d) = 9.372$$

$$A_{s \text{ min}} = \rho_{min}(b)(d) = 1.932$$



$$2 \#5 + 1 \#4 = 5.23$$

$$2 \#5 = 3.96$$

$$9.19$$