Esfuerzos internos en viga Gerber

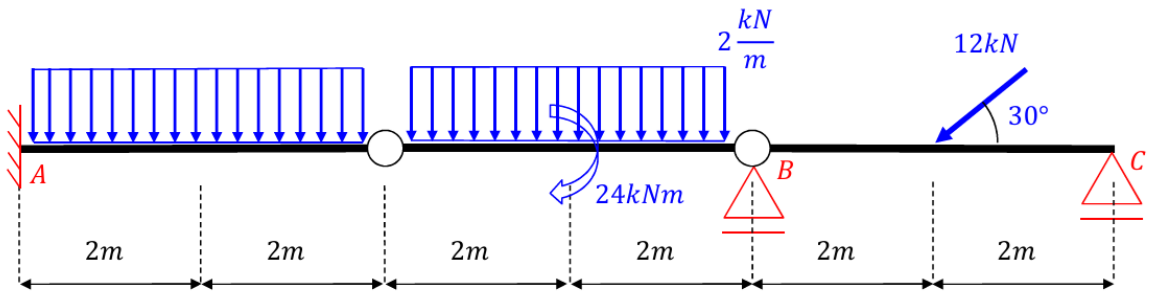
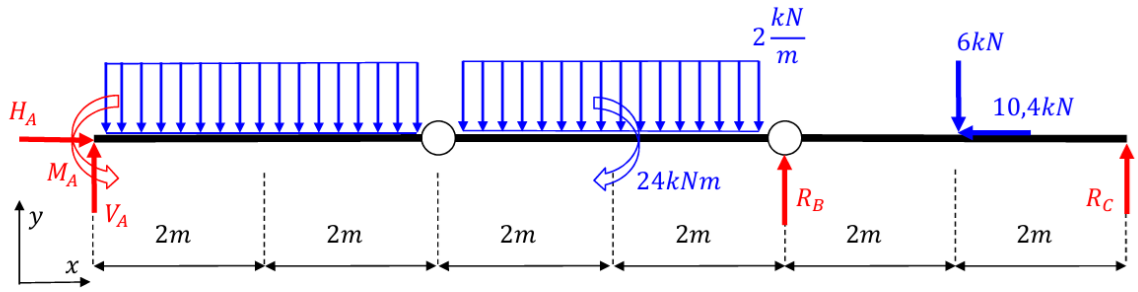


Diagrama de Cuerpo libre



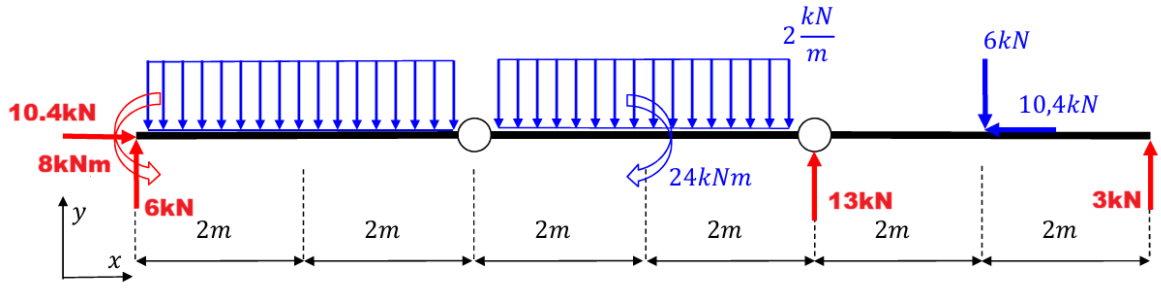
Reacciones de vínculos

$$\sum F_x = H_A - 10{,}4kN = 0 \rightarrow \boxed{H_A = 10{,}4kN} \qquad \sum M_{S_3}^{A_{23}} = R_C.4m - 6kN.2m = 0 \rightarrow \boxed{R_C = 3kN}$$

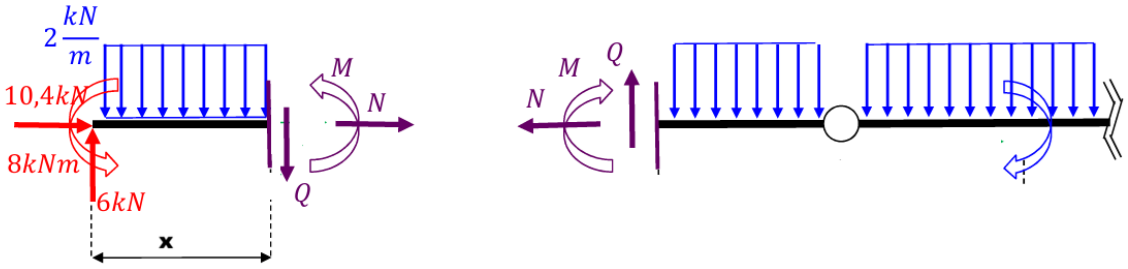
$$\sum M_{S_2+S_3}^{A_{12}} = R_C.8m - 6kN.6m - 24kNm - 2\frac{kN}{m}.4m.2m + R_B.4m = 0 \rightarrow \boxed{R_B = 13kN}$$

$$\sum F_y = V_A - 2\frac{kN}{m}.8m + R_B + R_C - 6kN = 0 \rightarrow \boxed{V_A = 6kN}$$

$$\sum M_{S_1}^{A_{12}} = -V_A.4m + 2\frac{kN}{m}.4m.2m + M_A = 0 \rightarrow \boxed{M_A = 8kNm}$$



Ley de variación de esfuerzos



$$N(x) = -10.4kN$$

$$Q(x) = 6kN - \frac{2kN}{m}.x$$

$$M(x) = -8kNm + 6kN.x - \frac{2kN}{m}.x.\frac{x}{2}$$

Planteo de equilibrio para x=2m

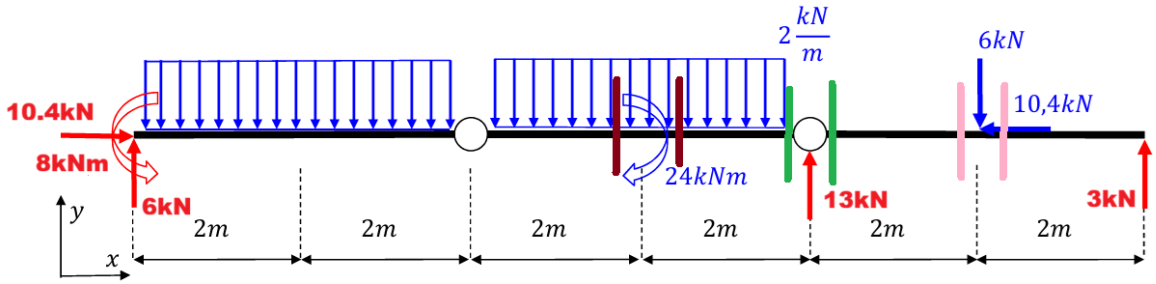
$$\sum F_x = 0 \quad 10.4kN + N = 0 \quad N = -10.4kN$$

$$\sum F_y = 0 \quad 6kN - \frac{2kN}{m}.2m - Q = 0 \quad Q = 2kN$$

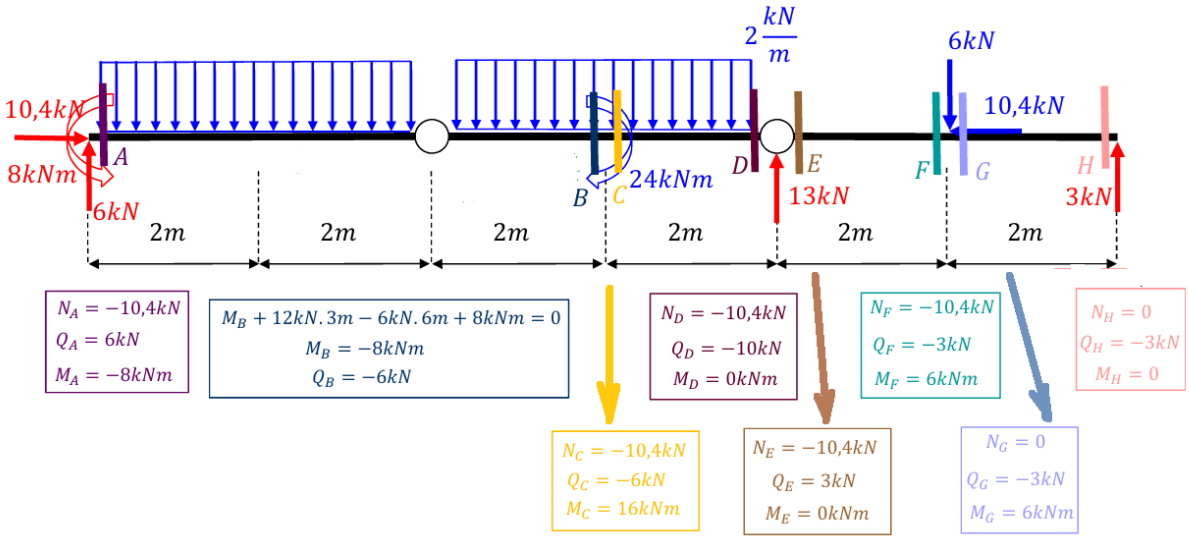
$$\sum M(2m) = 0 \quad -8kNm + 6kN.2m - \frac{2kN}{m}.2m.1m + M = 0$$

$$M = 0kNm$$

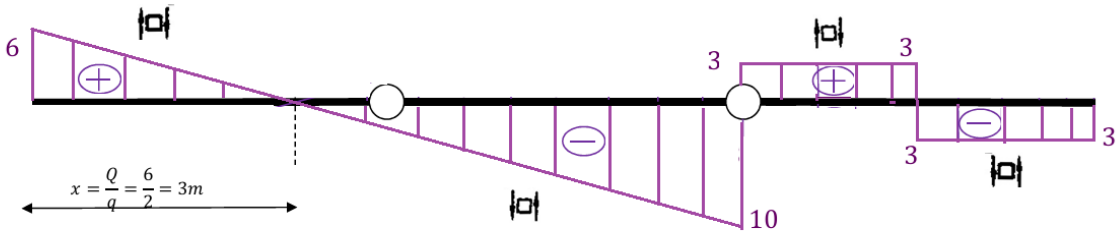
¿Qué produce una discontinuidad en los diagramas de esfuerzos?



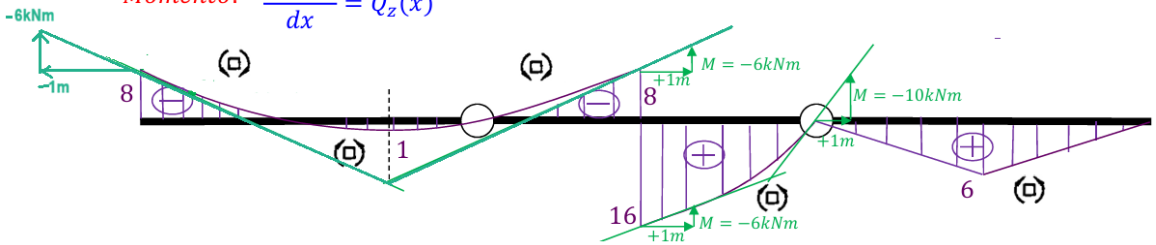
- Cargas puntuales (Fuerzas y Momentos)
- Cambio en la dirección del eje de la estructura



Corte: $\frac{dQ_z(x)}{dx} = -q_z(x)$



Momento: $\frac{dM(x)}{dx} = Q_z(x)$



Normal: $\frac{dN(x)}{dx} = -q_x(x)$