

Sketch of Cast-In Channel + T Bolt + Plate



Cast in channels + T bolt

A) Bending Stress check

$$\begin{aligned} 1) \quad M_{\max} &= P/2 \times L/2 \\ &= PL/4 \\ &= 18 \times 0.15/4 \\ &= 0.675 \text{ kNm} \end{aligned}$$

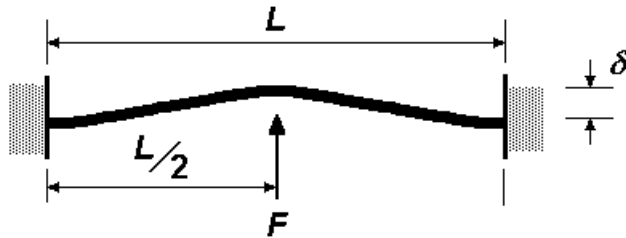
M_{\max} = Max moment applied
 P = Applied Load
 L = Spacing between 2 anchor bolts

$$\begin{aligned} 2) \quad M_c &= P_b \times S_x \\ &= 275 \text{ N/mm}^2 \quad \times \quad b \cdot h^2/6 \\ &= 275000 \text{ kN/m}^2 \quad \times \quad 0.1 \times 0.015^2/6 \\ &= 1.03 \text{ kNm} \end{aligned}$$

P_b = Bending stress
 S_x = Section modulus
 M_c = Moment capacity of plate

$$M_c \geq M_{\max} \quad \rightarrow \text{Ok!}$$

B) Deflection check (for centre load with 2 fixed supports)



$$\delta = FL^3/192EI$$

$$\begin{aligned} &= 18 \text{ kN} \times 0.15^3 \text{ m}^3/192 \times EI \\ &= 0.06075 \text{ kNm}^3/192 \times 5.766 \times 10^{-03} \text{ kNm}^2 \\ &= 0.06075/1.107 \\ &= 0.055 \text{ m} \end{aligned}$$

$$\begin{aligned} E &= \text{Young's modulus for Mild Steel} \\ &= 205 \text{ N/mm}^2 \\ &= (205/1000 \text{ kN})/(0.001 \text{ m} \times 0.001 \text{ m}) \\ &= 205,000 \text{ kN/m}^2 \end{aligned}$$

$$\begin{aligned} I &= \text{Moment of Inertia} \\ &= b \cdot h^3/12 \\ &= 0.1 \text{ m} \times 0.015^3 \text{ m}^3/12 \\ &= 2.8125 \times 10^{-08} \text{ m}^4 \end{aligned}$$

$$\begin{aligned} EI &= 205,000 \text{ kN/m}^2 \times 2.8 \times 10^{-08} \text{ m}^4 \\ &= 5.766 \times 10^{-03} \text{ kNm}^2 \end{aligned}$$