

(107)

(10)

Design of flange plate:

→ APPROX. Design:

$$A_f = \frac{1968.58 \times 100}{250 \times 2.1} - \frac{250 \times 1.8}{6} = 288.53 \text{ cm}^2$$

$$b_f = (0.2 \sim 0.3) d = (50 \sim 75) \text{ cm}$$

$$\text{let } b_f = 70 \text{ cm}$$

$$t_f = \frac{288.53}{70} = 4.12 \text{ cm}$$

$$\text{let } t_f = 4.2 \text{ cm}$$

Check of local buckling:

$$c = \frac{70 - 1.8 - 2 \times 1}{2} = 33.1 \text{ cm}$$

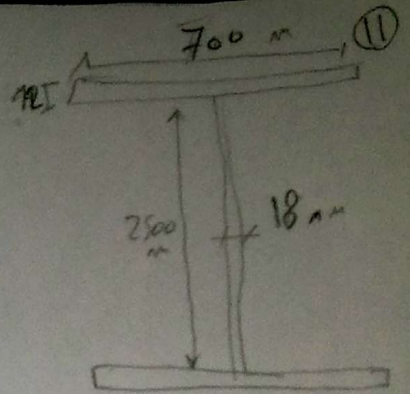
$$\frac{c}{t_f} = \frac{33.1}{4.2} = 7.88 < \frac{21}{\sqrt{1.6}} = 11.06$$

(b-1) non compact

$$I_x = \frac{1.8 \times 250^3}{12} + 2 \times \frac{70 \times 4.2^3}{12} + 2 \times 70 \times 4.2 \times (127.1)^2$$

$$= 11843407.49 \text{ cm}^4$$

$$Z_x = \frac{I_x}{129.2} = 91667.24 \text{ cm}^3$$



for sec ①

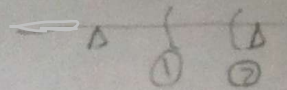
$$M_x = 1904.53 \text{ t.m}$$

$$L_u = 0 \quad (\text{R.C. slab})$$

$$P_{ad} = 0.58 \times 3.6 = 2.1 \text{ t/cm}^2$$

$$P_{act} = \frac{1904.53 \times 100}{91667.24} = 2.08 \text{ t/cm}^2 < 2.1 \text{ t/cm}^2$$

O.K (Safe)



for sec ②

$$M_x = 1590.43 \text{ t.m}$$

$$Q_y = 236.83 \text{ t}$$

$$L_u = 1.25 \times 3 = 3.75 \text{ m} \quad \text{[use bracket at each x.9]}$$

$$L_{u1} = \frac{20 \times 70}{\sqrt{3.6}} = 737.9 \text{ cm} > L_u$$

O.K

$$L_{u2} = \frac{1380 \times 70 \times 4.2 \times 1}{250 \times 3.6} = 1450.8 \text{ cm} > L_u$$

L.T.B is safe

$$P_{act} = \frac{1590.43 \times 100}{91667.24} = 1.74 \text{ t/cm}^2$$

$$P_{ad} = \frac{236.83}{250 \times 1.2} = 0.53 \text{ t/cm}^2$$

$$q_{all} = 0.703 \text{ t/cm}^2$$

$$\frac{q_{all}}{q_{all}} = \frac{0.53}{0.703} = 0.754 > 0.6$$

$$f_{all} = (0.8 - 0.36 \times 0.754) \times 3.6 = 1.9 \text{ t/cm}^2$$

OK fact
safe

check deflection [as simple beam] conservative sel.

$$M_{u+T} = 982.7 \text{ t.m}$$

assumed $M_u \approx 0.8 M_{u+T} = 786.16 \text{ t.m}$

$$W_{eq} = \frac{8 \times 786.16}{36^2} = 4.85 \text{ t/m}^2$$

$$D = \frac{S \times 4.85 \times 3600^4}{384 \times 2100 \times 11843407.49 \times 100} = 4.27 \text{ cm}$$

$$D_{all} = \frac{3600}{600} = 6 \text{ cm}$$