

Q.6) $d_w = (0.25 \text{ to } 0.3) \times \sqrt[3]{\frac{M}{\rho_b}} = (0.25 \text{ to } 0.3) \sqrt[3]{\frac{4081.4}{2.1}} = 3.12 \text{ to } 3.74 \text{ m}$
 use $d_w = 3.5 \text{ m}$

$t_w = \sqrt{\frac{Q}{41.65 \sqrt{f_y}}} = \sqrt{\frac{416.03}{41.65 \sqrt{3.6}}} = 2.29 \text{ cm} > 1.6 \text{ cm}$

∴ use OL stiff. & $t_w = 1.8 \text{ cm}$

Let $d_1 = 2.5$

∴ $\alpha = \frac{d_1}{d_o} = \frac{2.5}{3.5} = 0.71 < 1$

$k_2 = 4 + \frac{5.34}{\alpha^2} = 14.47$

$\lambda_2 = \sqrt{\frac{f_y / \sqrt{3}}{k_2 (1898) + (\frac{t}{d})^2}} = \sqrt{\frac{3.6 / \sqrt{3}}{14.47 (1898) + (\frac{1.8}{3500})^2}} = 11.69 > 1.2$

$q_{all} = \frac{0.9}{\lambda_2} \times 0.35 f_y = \frac{0.9}{11.69} \times 0.35 \times 3.6 = 0.67 \text{ t/cm}^2$

$q_{act} = \frac{Q}{d_w t_w} = \frac{416.03}{350 \times 1.8} = 0.66 \text{ t/cm}^2 < q_{all}$ ∴ OK

→ check buckling due to Moment (web):

from compression flange

$\frac{d_w}{t_w} = \frac{350}{1.8} = 194.4 > \frac{370}{\sqrt{f_y}} = \frac{370}{\sqrt{168.7}}$

∴ use 1 stiff at $\frac{d}{5} = 0.7 \text{ m}$
 & 1 stiff at $\frac{d}{2} = 1.75 \text{ m}$