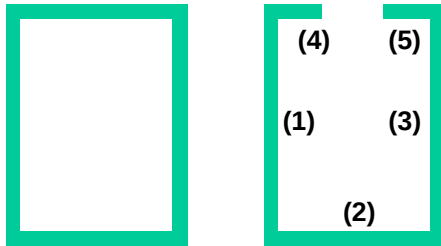


3.16 Effective Width



$$\sigma_{cr} = k \frac{E \pi^2}{12(1-\nu^2)} \frac{1}{(b/t)^2} = 4 \frac{\pi^2 (207 \times 10^3 \text{ N/mm}^2)}{12(1-0.3^2)(100\text{mm}/0.86\text{mm})^2} = 53.35 \text{ N/mm}^2$$

$$I = \frac{100(150)^3}{12} - \frac{98.28(148.28)^3}{12} = 1.4237 \times 10^6 \text{ mm}^4$$

$$\sigma_{cr} = \frac{M_{cr}(75\text{mm})}{I} \rightarrow M_{cr} = 1.0128 \times 10^6 \text{ Nmm}$$

$$w = \frac{1}{2} \left(1 + \frac{\sigma_{cr}}{\sigma_s} \right) b \rightarrow \begin{cases} \sigma_s = 1.1\sigma_{cr} : w = 95.5\text{mm} \\ \sigma_s = 1.5\sigma_{cr} : w = 83.3\text{mm} \\ \sigma_s = 2.0\sigma_{cr} : w = 75.0\text{mm} \end{cases}$$

(lx)nom
1.42E+06

b	100	mm
h	150	mm
t	0.86	mm
w	75	mm

part	width	height	x	y	area	x*area	y*area	lx'	d	lx
1	0.86	150.00	0.43	75.00	129.00	55.47	9675.00	2.42E+05	3.95	2.44E+05
2	98.28	0.86	50.00	0.43	84.52	4226.04	36.34	5.21E+00	-70.62	4.21E+05
3	0.86	150.00	99.57	75.00	129.00	12844.53	9675.00	2.42E+05	3.95	2.44E+05
4	36.64	0.86	19.18	149.57	31.51	604.37	4713.01	1.94E+00	78.52	1.94E+05
5	36.64	0.86	80.82	149.57	31.51	2546.67	4713.01	1.94E+00	78.52	1.94E+05
sum					405.54	20277.08	28812.37			1.30E+06
centroid			50.00	71.05				lx/(lx)nom		0.91

(σ)y	207	N/mm ²
y	78.95	mm
My	3.40E+06	Mmm