

$$A_{IPE} = 33.4 \text{ cm}^2$$

$$I_x = 2770 \text{ cm}^4$$

$$I_y = 205 \text{ cm}^4$$

$$A_{PL120 \times 10} = 12 \text{ cm}^2$$

$$A_{PL80 \times 8} = 6.4 \text{ cm}^2$$

$\bar{x} = \frac{\sum A_i \bar{x}_i}{\sum A_i} \rightarrow \frac{(33.4 \times 0) + (12 \times 0.795) + (6.4 \times 0)}{(33.4 + 12 + 6.4)} = 0.184 \text{ cm}$ $\bar{y} = \frac{\sum A_i \bar{y}_i}{\sum A_i} \rightarrow \frac{(33.4 \times 11) + (12 \times 11) + (6.4 \times 22.4)}{(33.4 + 12 + 6.4)} = 12.408 \text{ cm}$	۱-تار خشی
$I_x = \frac{bh^3}{12} + Ad^2 \rightarrow (2770 + (33.4 \times 1.408^2)) + \left(\frac{1 \times 12^3}{12} + (12 \times 1.408^2) \right) + \left(\frac{8 \times 0.8^3}{12} + (6.4 \times 9.992^2) \right) = 3643.32 \text{ cm}^4$ $I_y = \frac{hb^3}{12} + Ad^2 \rightarrow (205) + \left(\frac{12 \times 1^3}{12} + (12 \times 0.795^2) \right) + \left(\frac{0.8 \times 8^3}{12} \right) = 246.72 \text{ cm}^4$	۲-ممان اینرسی
$S_{xt} = \frac{I_x}{C_{xt}} \rightarrow \frac{3643.32}{10.392} = 350.59 \text{ cm}^3$ $S_{yb} = \frac{I_y}{C_{yb}} \rightarrow \frac{246.72}{12.408} = 19.87 \text{ cm}^3$ $S_{yL} = \frac{I_y}{C_{yL}} \rightarrow \frac{246.72}{5.684} = 43.41 \text{ cm}^3$ $S_{yR} = \frac{I_y}{C_{yR}} \rightarrow \frac{246.72}{5.316} = 46.41 \text{ cm}^3$	۳-اساس مقطع
$r_x = \sqrt{\frac{I_x}{A}} \rightarrow \sqrt{\frac{3643.32}{51.80}} = 8.38 \text{ cm}$ $r_y = \sqrt{\frac{I_y}{A}} \rightarrow \sqrt{\frac{246.72}{51.80}} = 2.18 \text{ cm}$	۴-شعاع ژیراسیون
$\lambda = \frac{L}{r_{min}}$	۵-لاغری

