

$$A_e = UA_n$$

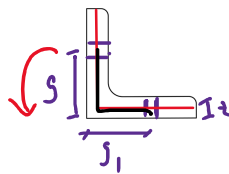
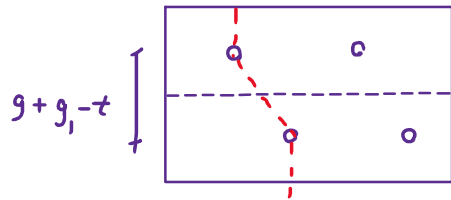
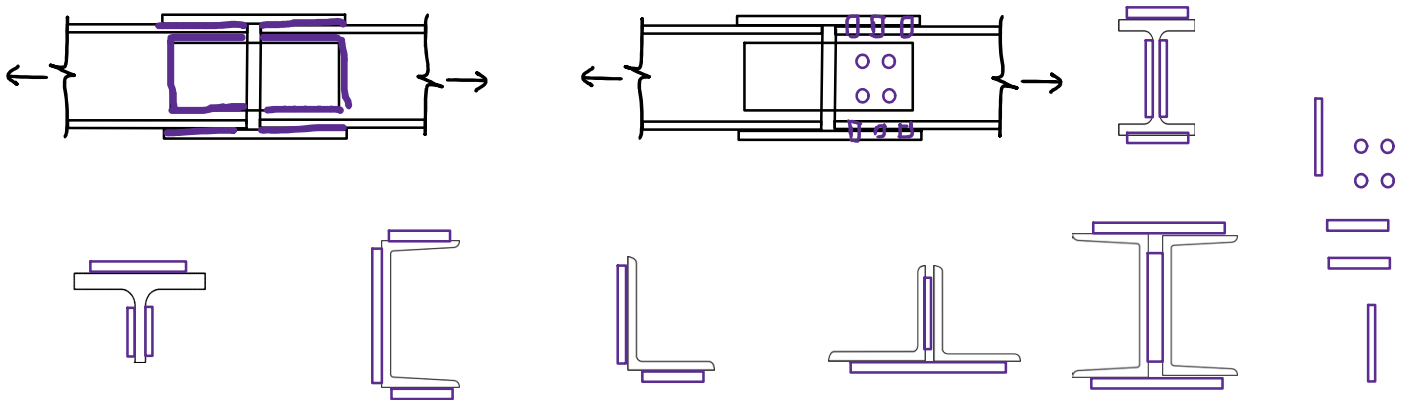
محاسبه ضریب تاخیر پرش U

ضوابط آیین نامه ای

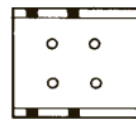
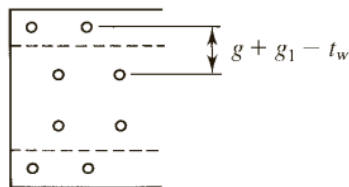
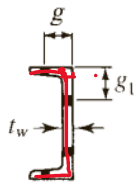
P33 مساحت مؤثر صاع

P34 جدول معامبه U صاع

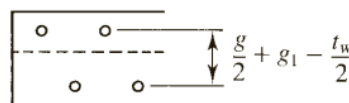
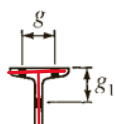
TABLE D3.1 Shear Lag Factors for Connections to Tension Members			
Case	Description of Element	Shear Lag Factor, U	Examples
1	All tension members where the tension load is transmitted directly to each of the cross-sectional elements by fasteners or welds (except as in Cases 4, 5, and 6).	$U = 1.0$	-

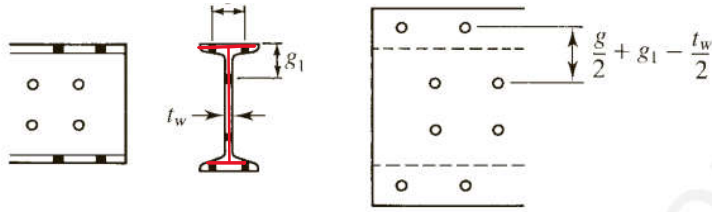


P24 ۵۸ Unfolding for angles

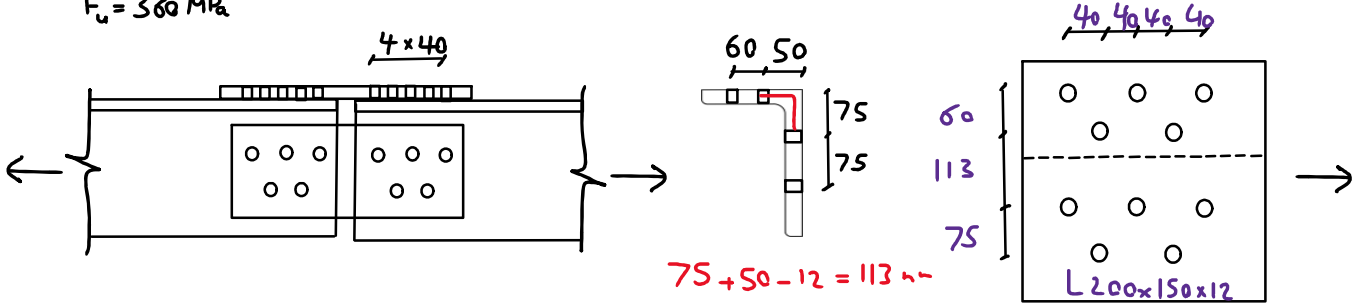


Unfolding for C, I





مثال: مطلوب است مقاومت موجود (ϕP_n) بر اساس شکل زیر با منقطع $L 200 \times 150 \times 12$
 Bolt M20 $\rightarrow d=24$
 S235 : $F_y = 235 \text{ MPa}$
 $F_u = 360 \text{ MPa}$

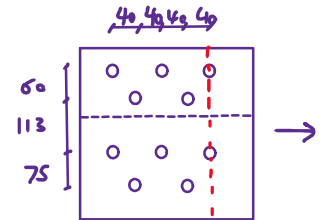


$$A_g = 40.8 \times 10^2 \text{ mm}^2$$

$$\phi P_n = 0.9 F_y A_g = 0.9 \times 235 \times 40.8 \times 10^2 = \underline{863 \text{ kN}}$$

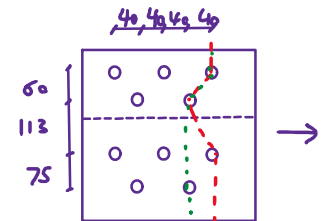
$$\phi P_n = 0.75 F_u A_e \quad A_e = A_n$$

$$A_n = 40.8 \times 10^2 - 2(24 \times 12) = \underline{35 \times 10^2 \text{ mm}^2}$$

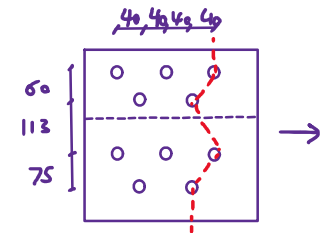


$$A_n = 40.8 \times 10^2 - 3(24 \times 12) + \frac{40^2}{4 \times 60} \times 12 + \frac{40^2}{4 \times 113} \times 12 = \underline{33.4 \times 10^2}$$

$$A_n = \frac{10}{9} \left[40.8 \times 10^2 - 3(24 \times 12) + \frac{40^2}{4 \times 60} \times 12 \right] = 36.6 \times 10^2 \quad \text{سربزرگ}$$



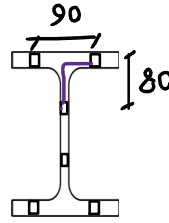
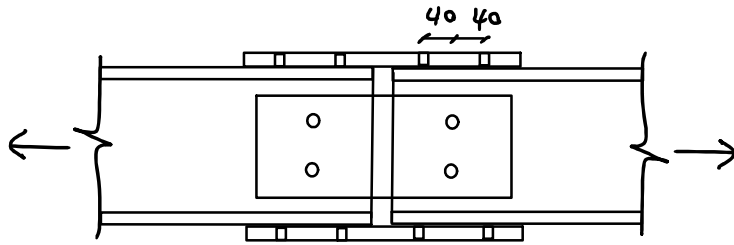
$$A_n = 40.8 \times 10^2 - 4(24 \times 12) + \frac{40^2}{4 \times 60} \times 12 + \frac{40^2}{4 \times 113} \times 12 + \frac{40^2}{4 \times 75} \times 12 = \underline{31.1 \times 10^2}$$



$$\phi P_n = 0.75 F_u A_e \quad A_e = A_n = 0.75 \times 360 \times 31.1 = \underline{840 \text{ kN}} \rightarrow \text{Controls}$$

$$\phi P_n = 840 \text{ kN}$$

مثال: مطلوب است منادست طراحی (ϕP_n) براساس فولتنی شکل زیر با منطع IPE 360.



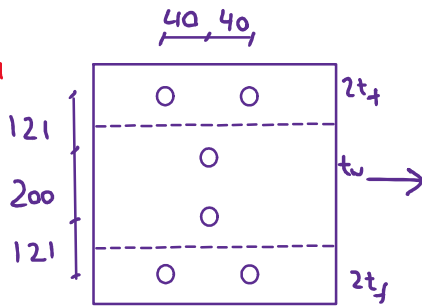
Bolt M16 $\rightarrow d = 20$
 S235 : $F_y = 235 \text{ MPa}$
 $F_u = 360 \text{ MPa}$

IPE 360 : $A_g = 72.7 \times 10^2$

$t_w = 8$

$t_f = 12.7$

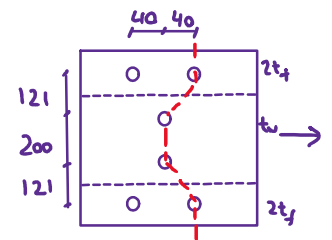
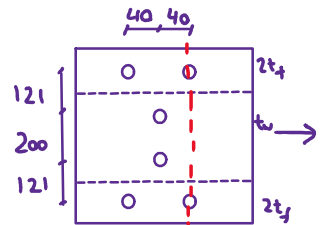
$$45 + 80 - \frac{8}{2} = 121$$



$$\phi P_n = 0.9 F_y A_g = 0.9 \times 235 \times 72.7 \times 10^2 = \underline{1538} \text{ kN} \rightarrow \text{Controls}$$

$$A_n = 72.7 \times 10^2 - 2(20 \times 2 \times 12.7) = \underline{62.5} \times 10^2$$

$$A_n = 72.7 \times 10^2 - 2(20 \times 2 \times 12.7) - 2(20 \times 8) + \frac{40^2}{4 \times 121} \times 8 + \frac{40^2}{4 \times 121} \times 2 \times 12.7 = \underline{60.4} \times 10^2$$



$$\phi P_n = 0.75 F_u A_e = 0.75 \times 360 \times 60.4 \times 10^2 = \underline{1631} \text{ kN}$$

$$\phi P_n = 1538 \text{ kN}$$