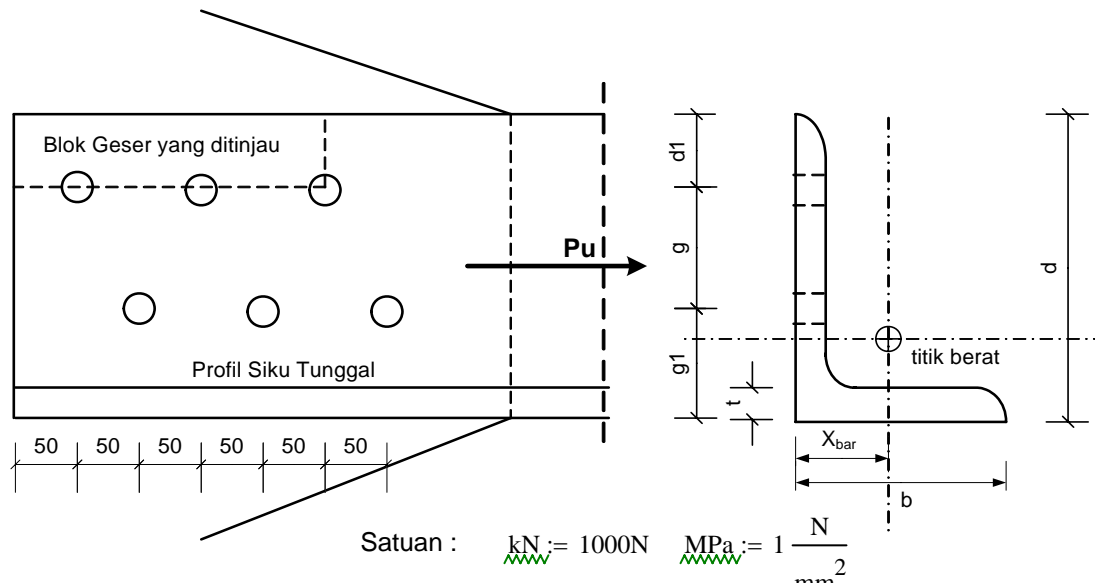


BATANG TARIK PROFIL L DISAMBUNG KE PELAT BUHUL, TERMASUK PERHITUNGAN BLOK GESER (SESUAI AISC - LRFD)



Data Penampang Profil siku L 90.150.10

Tinggi penampang $d := 150\text{mm}$ Luas Bruto Penampang $A := 23.2\text{cm}^2$
 Lebar flens $b := 90\text{mm}$ Tebal Profil $t := 10\text{mm}$
 Lokasi titik berat $x_{\text{bar}} := 2.03\text{cm}$

Data bahan : Profil L dan Pelat Buhul menggunakan mutu baja BJ.37

$F_y := 240\text{MPa}$ $F_u := 370\text{MPa}$

Data Sambungan Diameter baut: $d_b := \frac{3}{4}\text{in}$ Banyak baut $n_{\text{baut}} := 6$

Data Jarak dipasang berseling pada sisi panjang (150 mm) dengan jarak seragam
 $g_1 := 55\text{mm}$ $s := 50\text{mm}$ $g := 65\text{mm}$ $d_1 := d - g_1 - g$ $d_1 = 30\text{mm}$

Mencari Luas Netto Effektiv

Diameter lubang (anggap lubang standar) $d_{\text{hole}} := d_b + \frac{1}{8}\text{in}$ $d_{\text{hole}} = 0.022\text{m}$

$L := (n_{\text{baut}} - 1) \cdot s$ $L = 250\text{mm}$

$U := \min\left[\left(1 - \frac{x_{\text{bar}}}{L}\right), 0.9\right]$ $U = 0.9$

Jalur lurus melalui 1 lubang baut: $A_{n1} := A - (d_{\text{hole}}) \cdot t$ $A_{n1} = 20.98\text{cm}^2$

Jalur belok melalui 2 lubang baut berseling: $A_{n2} := A - 2(d_{\text{hole}}) \cdot t + \frac{s^2 \cdot t}{4 \cdot g}$ $A_{n2} = 19.72\text{cm}^2$

$A_e := U \cdot \min(A_{n1}, A_{n2})$ $A_e = 17.74\text{cm}^2$

Fraktur pada penampang netto $\phi_t := 0.75$ $P_{u1} := \phi_t \cdot F_u \cdot A_e$ $P_{u1} = 492.421\text{kN}$

Leleh pada penampang bruto $\phi_t := 0.90$ $P_{u2} := \phi_t \cdot F_y \cdot A$ $P_{u2} = 501.12\text{kN}$

Geser blok (diperiksa blok yang lebarnya = $d1 = 30 \text{ mm}$)

$$A_{gv} := 5 \cdot s \cdot t$$

$$A_{gv} = 25 \text{ cm}^2$$

$$A_{gt} := d1 \cdot t$$

$$A_{gt} = 3 \text{ cm}^2$$

$$A_{nv} := A_{gv} - 2.5 \cdot d_{\text{hole}} \cdot t$$

$$A_{nv} = 19.444 \text{ cm}^2$$

$$A_{nt} := A_{gt} - 0.5 \cdot d_{\text{hole}} \cdot t$$

$$A_{nt} = 1.889 \text{ cm}^2$$

$$\phi := 0.75 \quad 0.6 F_u \cdot A_{nv} = 431.651 \text{ kN} \quad F_u \cdot A_{nt} = 69.884 \text{ kN}$$

$$R_n := \begin{cases} \phi \cdot (0.6 \cdot F_u \cdot A_{nv} + F_y \cdot A_{gt}) & \text{if } 0.6 F_u \cdot A_{nv} > F_u \cdot A_{nt} \\ \phi \cdot (0.6 \cdot F_y \cdot A_{gv} + F_u \cdot A_{nt}) & \text{otherwise} \end{cases}$$

(leleh tarik dan fraktur geser)

(leleh geser dan fraktur tarik)

$$R_n = 377.738 \text{ kN}$$

Kuat tarik batang profil siku adalah $P_{n1} := \min(P_{u1}, P_{u2}, R_n) \quad P_{n1} = 377.738 \text{ kN}$

Jumlah baut dan tebal pelat buhul sudah memadai sehingga tidak menentukan kekuatan batang ini

$$U_{bs} := 1$$

$$\phi R_n = \phi \min((0.6 F_u A_{nv} + U_{bs} F_u A_{nt}) \text{ dan } (0.6 F_y A_{gv} + U_{bs} F_u A_{nt}))$$

Batas atas: fraktur tarik dan
fraktur geser

Leleh geser dan
fraktur tarik

$$0.6 \cdot F_u \cdot A_{nv} + U_{bs} \cdot F_u \cdot A_{nt} = 501.535 \text{ kN}$$

$$0.6 \cdot F_y \cdot A_{gv} + U_{bs} \cdot F_u \cdot A_{nt} = 429.884 \text{ kN}$$

$$\phi_{gb} := 0.75$$

$$R_{n_{gb}} := \phi_{gb} \cdot \min(0.6 \cdot F_u \cdot A_{nv} + U_{bs} \cdot F_u \cdot A_{nt}, 0.6 \cdot F_y \cdot A_{gv} + U_{bs} \cdot F_u \cdot A_{nt}) = 322.413 \text{ kN}$$

