



Determine effective length factors (K) of AB, BC, DE and EF columns.

AB, BC, DE ve EF kolonlarının burulma boyu katsayılarını (K) hesaplayınız.

IPN 380

$$\begin{aligned} I_x &= 24010 \text{ cm}^4 \\ I_y &= 975 \text{ cm}^4 \\ A &= 107 \text{ cm}^2 \end{aligned}$$

IPN450

$$\begin{aligned} I_x &= 45850 \text{ cm}^4 \\ I_y &= 1730 \text{ cm}^4 \\ A &= 147 \text{ cm}^2 \end{aligned}$$

IPN550

$$\begin{aligned} I_x &= 99180 \text{ cm}^4 \\ I_y &= 3490 \text{ cm}^4 \\ A &= 212 \text{ cm}^2 \end{aligned}$$

IPN600

$$\begin{aligned} I_x &= 138800 \text{ cm}^4 \\ I_y &= 4674 \text{ cm}^4 \\ A &= 254 \text{ cm}^2 \end{aligned}$$

AB column

(Sidesway allowed) (Yanal hareket önlenmemis)

$$G_A = \frac{\frac{99180}{365} + \frac{138800}{365}}{\frac{24010}{610} + \frac{45850}{550}} = 5,313$$

$$G_B = \frac{\frac{138800}{365} + \frac{138800}{365}}{\frac{24010}{610} + \frac{45850}{550}} = 6,197$$

$$K = \sqrt{\frac{5,313 \cdot (1,6 \cdot 6,197 + 4) + (4 \cdot 6,197 + 7,5)}{5,313 + 6,197 + 7,5}} = 2,36$$

(1)

BC column (Sidesway prevented) (Yanal hareket önlenmiş)

$$G_B = 6,197$$

$G_c = 10$ (simply supported) (6.4.3 (a))
(basit mesnetli)

$$K = \frac{3 \cdot 6,197 \cdot 10 + 1,4 \cdot (6,197 + 10) + 0,64}{3 \cdot 6,197 \cdot 10 + 2 \cdot (6,197 + 10) + 1,28} = 0,953$$

DE column (Sidesway allowed) (Yanal hareket önlenmemiş)

$$G_D = \frac{3490/365 + 3490/365}{24010/610} = 0,486$$

$$G_E = \frac{\frac{2}{3} \cdot (45850/700) + 24010/610}{3490/365 + 4674/365} = 0,269$$

→ (6.4.3. (c))

$$K = \sqrt{\frac{0,486 \cdot (1,6 \cdot 0,269 + 1) + (4 \cdot 0,269 + 7,5)}{0,486 + 0,269 + 7,5}} = 1,14$$

EF column (Sidesway prevented) (Yanal hareket önlenmiş)

$$G_E = \frac{3490/365 + 4674/365}{2 \cdot (45850/700) + 24010/610} = 0,131$$

→ (6.4.3. (b))

$G_F = 1$ (fixed support)
(ankastre mesnet)

$$K = \frac{3 \cdot 0,131 \cdot 1 + 1,4 \cdot (0,131 + 1) + 0,64}{3 \cdot 0,131 \cdot 1 + 2 \cdot (0,131 + 1) + 1,28} = 0,665$$