Von Karman effective width and/or average stress for STEEL

$E := 200000 \cdot MPa$ $\quad k := 0.5$ $\quad F_y := 260 \cdot MPa$ $\quad \sigma := 1 \cdot F_y$ $\quad b := 40 \cdot cm$ $\quad t := 0.5 \cdot cm$

k equals
4 for supported-supported at sides
5.42 for clamped-supported
6.97 for clamped-clamped
0.425 for supported-free
1.277 for fixed-free
only the free sides are assumed able to displace normally to the plate

k equals
4 for end and lateral sides supported
5.4 for end sides supported, and one lateral fixed and the other supported
7 for ends supported and sides fixed
1.33 for ends supported, 1 side fixed and the other free
$0.456 + \left(\frac{b}{a}\right)^2$ if supported at ends, 1 side supported an the other free.
where a is the length of plate between supports or stiffeners along load direction

k for cases when there's bending or shear can be taken from Galambos 88 p. 103 or 105 to 107

The improved 4.15 eq. in Galambos 88 gives

$$\lambda_e(\lambda,\sigma) := 0.95 \cdot \sqrt{\frac{k \cdot E}{\sigma}} \cdot \left(1 - 0.209 \cdot \frac{\sqrt{\frac{k \cdot E}{\sigma}}}{\lambda}\right)$$

where λ and $\lambda_e(\lambda,\sigma)$ are the real and effective slendernesses and σ the maximum stresss applied to the plate (see fig 4.5 in p.97 Galambos 88).

The effective slenderness gives upon the real thickness what effective width we can consider be taking the maximum input stress σ

Alternatively, $\sigma \cdot \frac{b_e}{b}$ gives the average stress we can consider be acting over the full width

$\lambda := \frac{b}{t}$ $\qquad \lambda = 80$ $\qquad b_e(\lambda,\sigma) := t \cdot \lambda_e(\lambda,\sigma)$ $\quad \sigma_{average\_on\_full\_b}(\lambda,\sigma) := \sigma \cdot \frac{b_e(\lambda,\sigma)}{b}$

$\lambda_e(\lambda, \sigma) = 17.68$

So we can consider the plate either

$b_e(\lambda, \sigma) = 8.84\,\text{cm}$ wide (half of this width to each side of its axis of symmetry) at $\sigma = 260\,\text{MPa}$

or

$b = 40\,\text{cm}$ wide at $\sigma_{\text{average\_on\_full\_b}}(\lambda, \sigma) = 57.45\,\text{MPa}$

Note by changing input σ how the maximum compressive use of the plate is obtained anyway when $\sigma := F_y$