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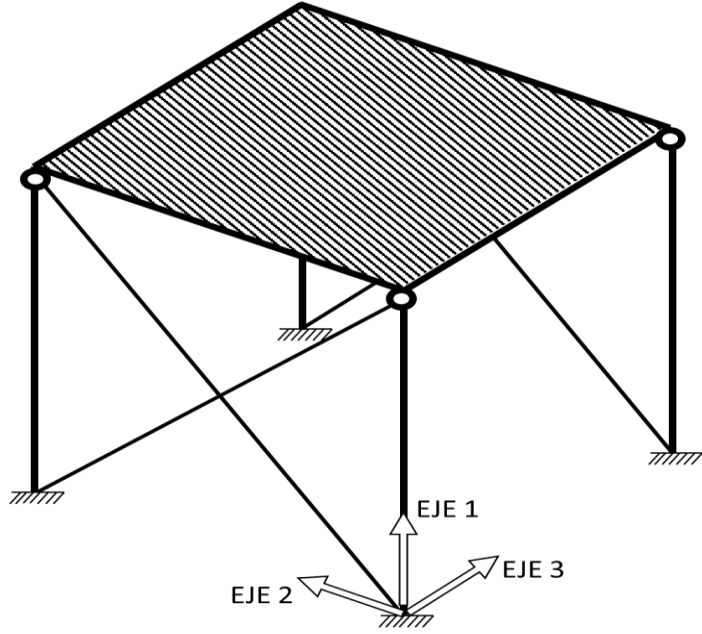
Teoría de Estructuras y Construcciones Industriales

Carlos Santiuste Romero, Sara Garzón Hernández, Liu Jiao Wang,
Manuel Cuadrado Sanguino, Luis Jiménez Girón, Daniel Herrero Adán

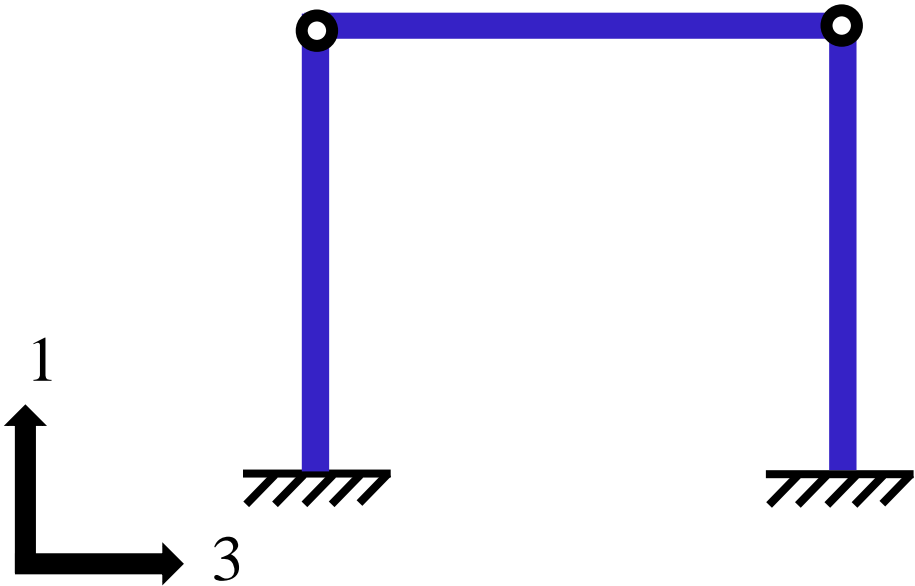
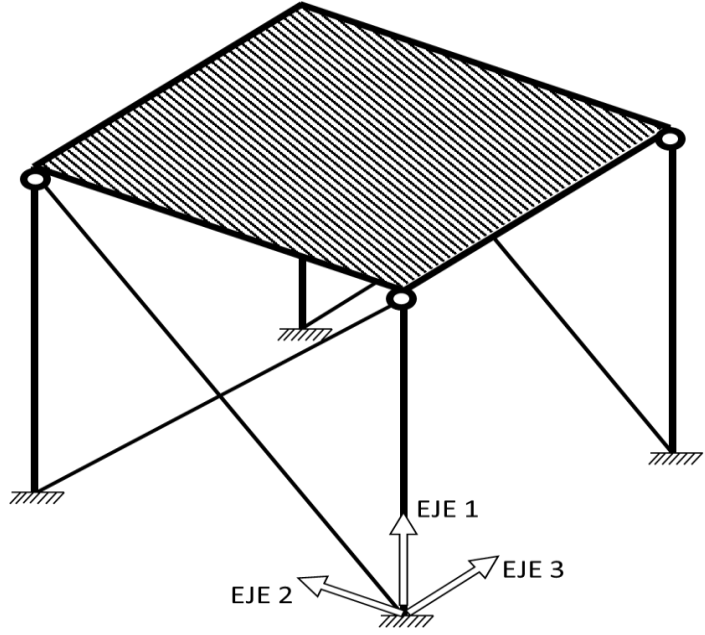
CTE: Ejemplo dimensionado barras a compresión



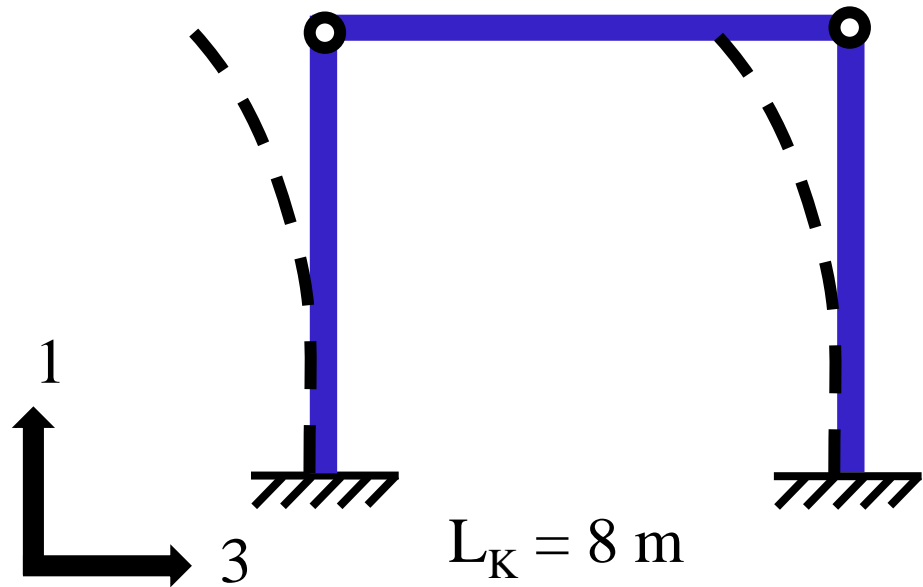
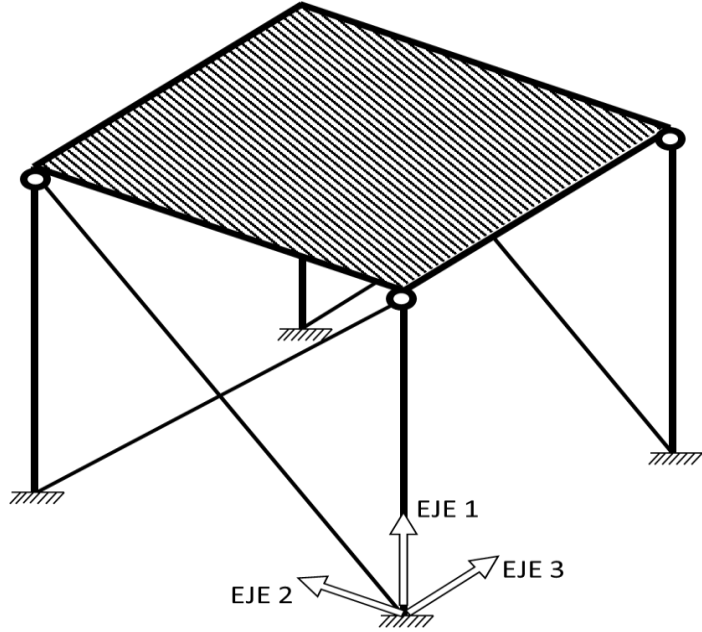
HEB, S275, $N_{ed} = 980 \text{ kN}$, $h = 4 \text{ m}$



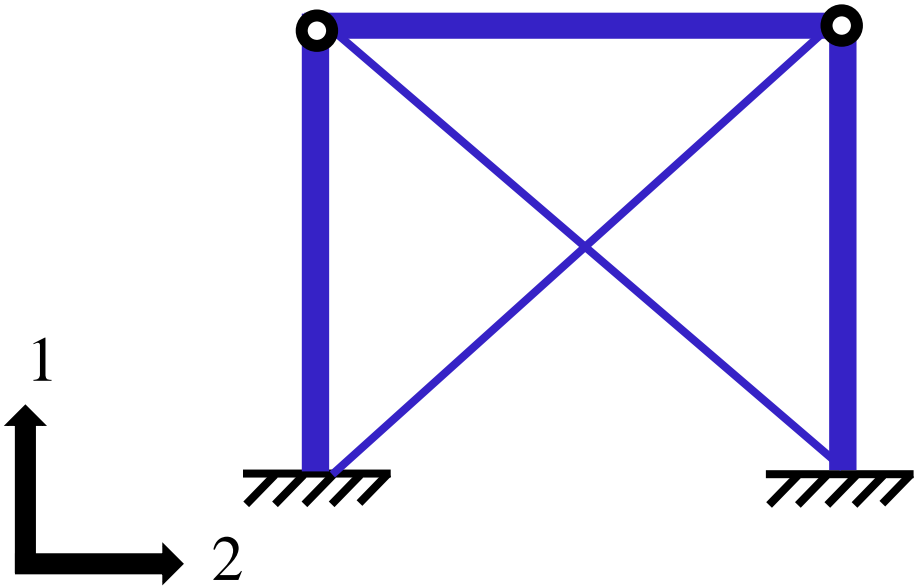
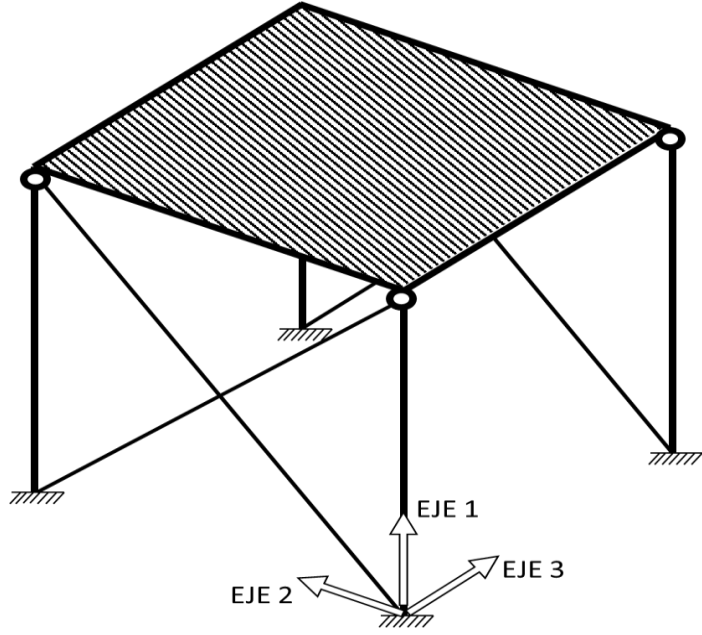
HEB, S275, $N_{ed} = 980 \text{ kN}$, $h = 4 \text{ m}$



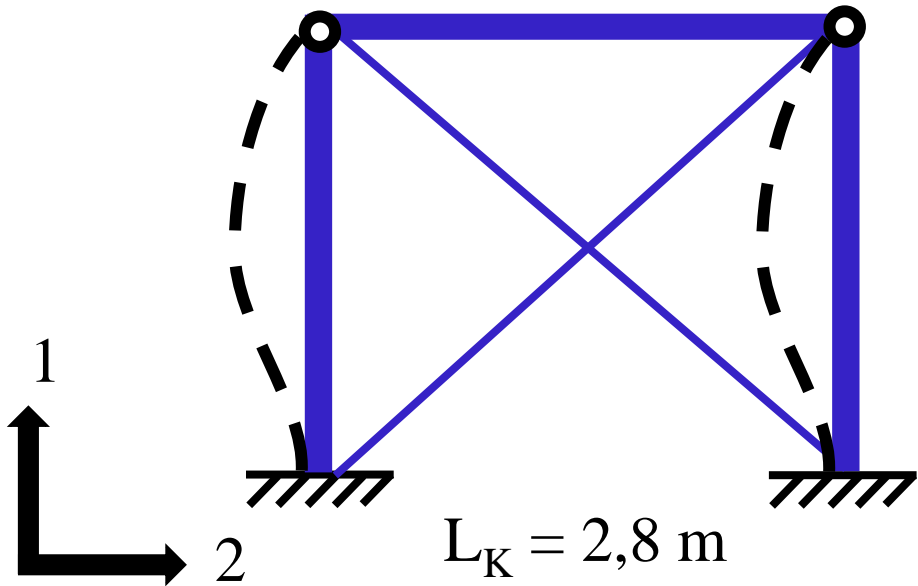
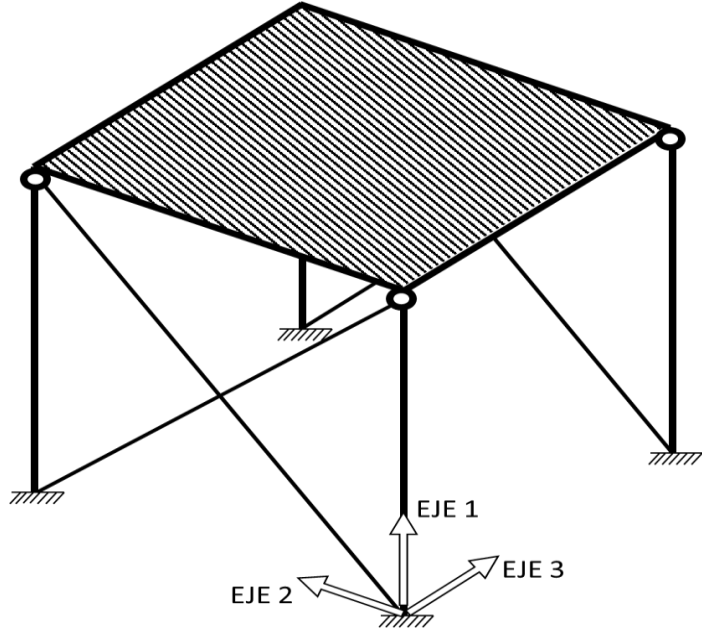
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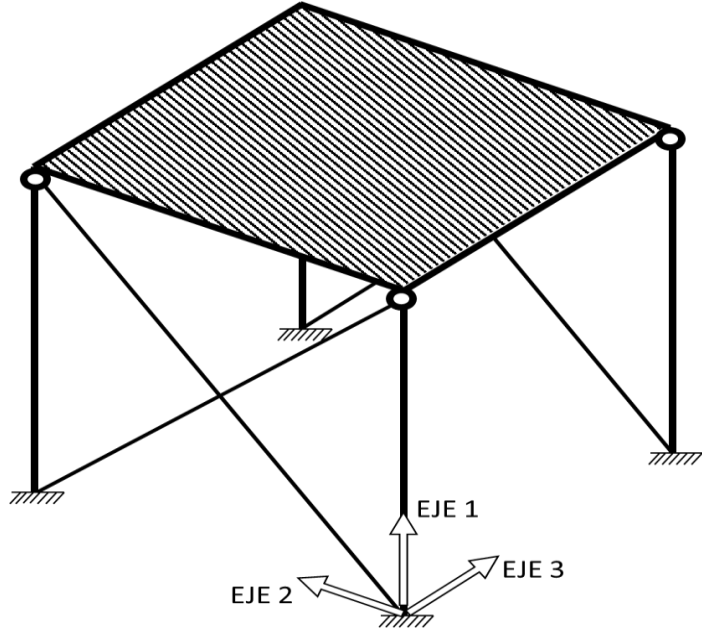
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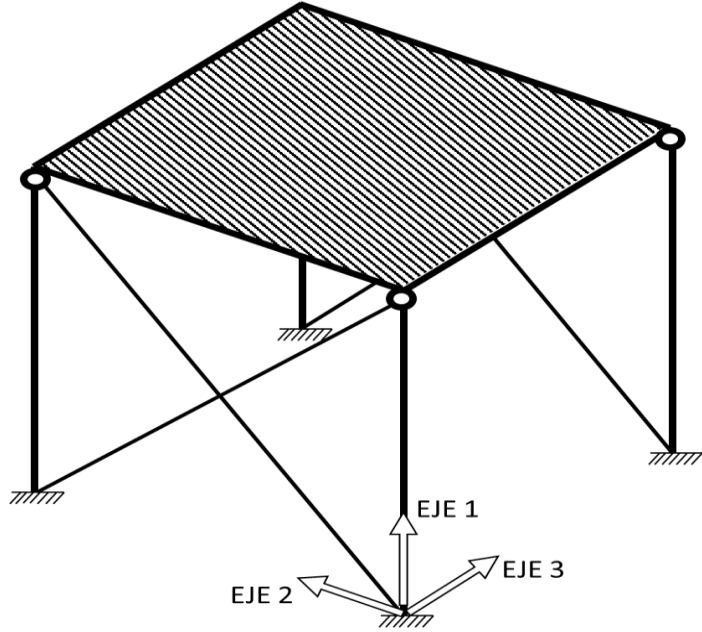
HEB, S275, $N_{ed} = 980 \text{ kN}$, $h = 4 \text{ m}$



$$L_{K,2} = 8 \text{ m}$$

$$L_{K,3} = 2,8 \text{ m}$$

HEB, S275, $N_{ed} = 980 \text{ kN}$, $h = 4 \text{ m}$



$$L_{K,2} = 8 \text{ m} = L_{K,y}$$

$$L_{K,3} = 2,8 \text{ m} = L_{K,z}$$

HEB, S275, $N_{Ed} = 980 \text{ kN}$, $h = 4 \text{ m}$

$$L_{K,y} = 8 \text{ m} \quad L_{K,z} = 2,8 \text{ m}$$

$$A_{min} = \frac{N_{Ed}}{f_{yd}} = 3742 \text{ mm}^2$$

$$HEB - 140 \quad A = 4300 \text{ mm}^2$$

$$I_y = 1509 \cdot 10^4 \text{ mm}^4$$

$$I_z = 549.7 \cdot 10^4 \text{ mm}^4$$

$$\bar{\lambda} = \sqrt{\frac{A \cdot f_y}{N_{cr}}}$$

$$N_{cr} = \left(\frac{\pi}{L_k} \right)^2 \cdot E \cdot I$$

HEB, S275, $N_{Ed} = 980 \text{ kN}$, $h = 4 \text{ m}$

$$L_{K,y} = 8 \text{ m} \quad L_{K,z} = 2,8 \text{ m}$$

$$A_{min} = \frac{N_{Ed}}{f_{yd}} = 3742 \text{ mm}^2$$

HEB – 140 $A = 4300 \text{ mm}^2$

$$I_y = 1509 \cdot 10^4 \text{ mm}^4$$

$$I_z = 549.7 \cdot 10^4 \text{ mm}^4$$

$$N_{cr,y} = 488.68 \text{ kN}$$

$$N_{cr,z} = 1453 \text{ kN}$$

$$\bar{\lambda} = \sqrt{\frac{A \cdot f_y}{N_{cr}}}$$

$$N_{cr} = \left(\frac{\pi}{L_k} \right)^2 \cdot E \cdot I$$

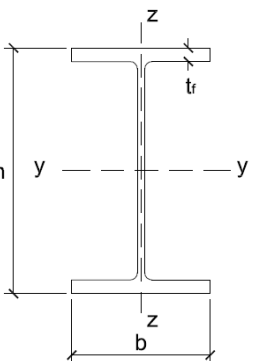
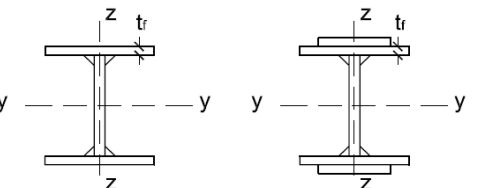
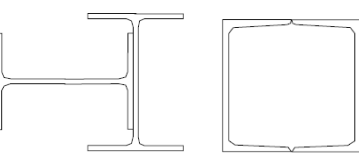
$$\bar{\lambda}_y = 1.52$$

$$\bar{\lambda}_z = 0.88$$

Apartado 6.3.2. Compresión barras. DB-SE-A

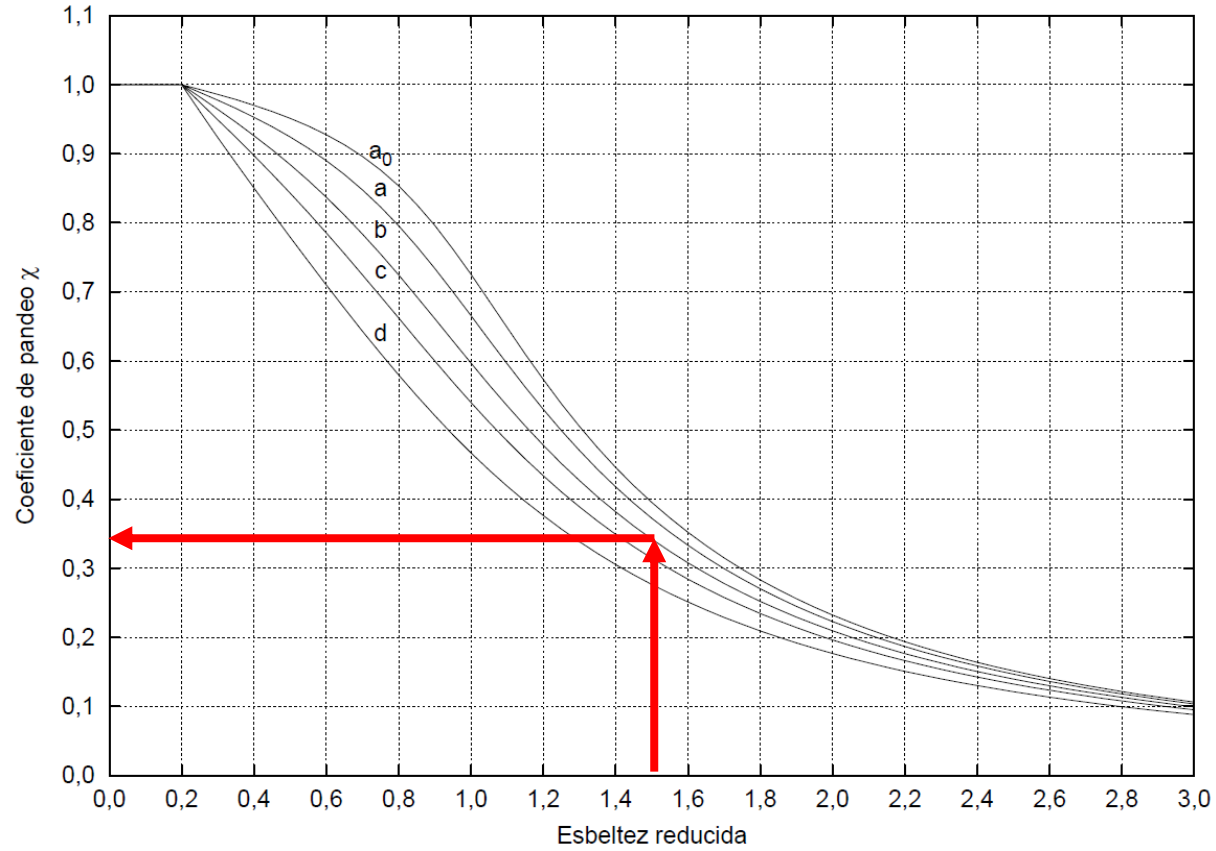
Tipo de curva: a_0, a, b, c, d

Tabla 6.2 Curva de pandeo en función de la sección transversal

Tipo de sección	Tipo de acero		S235 a S355		S450	
	Eje de pandeo ⁽¹⁾		y	z	y	z
Perfiles laminados en I 	$h/b > 1,2$	$t \leq 40 \text{ mm}$	a	b	a_0	a_0
		$40 \text{ mm} < t \leq 100 \text{ mm}$	b	c	a	a
	$h/b \leq 1,2$	$t \leq 100 \text{ mm}$	b	c	a	a
		$t > 100 \text{ mm}$	d	d	c	c
			HEB			
Perfiles armados en I 		$t \leq 40 \text{ mm}$	b	c	b	c
		$t > 40 \text{ mm}$	c	d	c	d
Agrupación de perfiles laminados soldados 			c	c	c	c

Apartado 6.3.2. Compresión barras. DB-SE-A

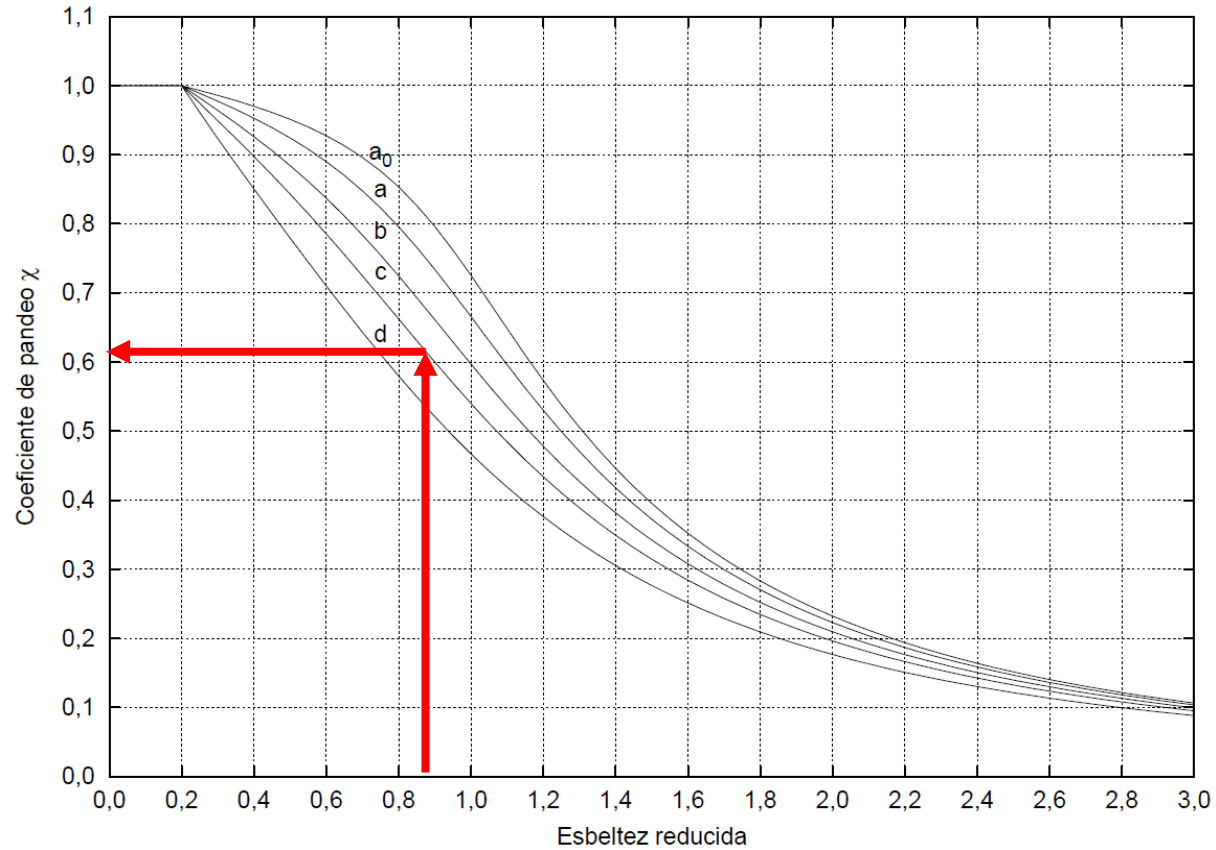
Coeficiente de pandeo – Figura 6.3



0,34

Apartado 6.3.2. Compresión barras. DB-SE-A

Coeficiente de pandeo – Figura 6.3



0,61

HEB, S275, $N_{Ed} = 980 \text{ kN}$, $h = 4 \text{ m}$

$$L_{K,y} = 8 \text{ m} \quad L_{K,z} = 2,8 \text{ m}$$

$$A_{min} = \frac{N_{Ed}}{f_{yd}} = 3742 \text{ mm}^2$$

$$HEB - 140 \quad A = 4300 \text{ mm}^2$$

$$\chi_y = 0.34 \quad I_y = 1509 \cdot 10^4 \text{ mm}^4$$

$$\chi_z = 0.61 \quad I_z = 549.7 \cdot 10^4 \text{ mm}^4$$

$$N_{b,Rd} = \chi \cdot A \cdot f_{yd}$$

$$N_{b,Rd,y} = 382.9 \text{ kN} \quad C.A. = 0.39$$

$$N_{b,Rd,z} = 687 \text{ kN} \quad C.A. = 0.70$$

HEB, S275, $N_{Ed} = 980 \text{ kN}$, $h = 4 \text{ m}$

$$L_{K,y} = 8 \text{ m} \quad L_{K,z} = 2,8 \text{ m}$$

$$A_{min} = \frac{N_{Ed}}{f_{yd}} = 3742 \text{ mm}^2$$

HEB – 140 $A = 4300 \text{ mm}^2$

$$I_y = 1509 \cdot 10^4 \text{ mm}^4$$

$$I_z = 549.7 \cdot 10^4 \text{ mm}^4$$

$$N_{cr,y} = 488.68 \text{ kN}$$

$$N_{cr,z} = 1453 \text{ kN}$$

$$\bar{\lambda} = \sqrt{\frac{A \cdot f_y}{N_{cr}}}$$

$$N_{cr} = \left(\frac{\pi}{L_k}\right)^2 \cdot E \cdot I$$

$$\bar{\lambda}_y = 1.52$$

$$\bar{\lambda}_z = 0.88$$

HEB, S275, $N_{Ed} = 980 \text{ kN}$, $h = 4 \text{ m}$

$$L_{K,y} = 8 \text{ m} \quad L_{K,z} = 2,8 \text{ m}$$

$$A_{min} = \frac{N_{Ed}}{f_{yd}} = 3742 \text{ mm}^2$$

HEB – 140 $A = 4300 \text{ mm}^2$

$$I_y = 1509 \cdot 10^4 \text{ mm}^4$$

$$I_z = 549.7 \cdot 10^4 \text{ mm}^4$$

$$N_{cr,y} = 488.68 \text{ kN}$$

$$N_{cr,z} = 1453 \text{ kN}$$

$$\bar{\lambda} = \sqrt{\frac{A \cdot f_y}{N_{cr}}}$$

$$N_{cr} = \left(\frac{\pi}{L_k} \right)^2 \cdot E \cdot I$$

$$I_{y,min} = 3026 \cdot 10^4 \text{ mm}^4$$

HEB – 180

HEB, S275, $N_{Ed} = 980 \text{ kN}$, $h = 4\text{m}$

$$L_{K,y} = 8 \text{ m} \quad L_{K,z} = 2,8 \text{ m}$$

$$A_{min} = \frac{N_{Ed}}{f_{yd}} = 3742 \text{ mm}^2$$

HEB – 180

$$\chi_y = 0.5$$

$$\chi_z = 0.72$$

$$N_{b,Rd} = \chi \cdot A \cdot f_{yd}$$

$$N_{b,Rd,y} = 855 \text{ kN} \quad C.A. = 0.87$$

$$N_{b,Rd,z} = 1231 \text{ kN} \quad C.A. = 1.26$$

HEB, S275, $N_{Ed} = 980 \text{ kN}$, $h = 4 \text{ m}$

$$L_{K,y} = 8 \text{ m} \quad L_{K,z} = 2,8 \text{ m}$$

$$A_{min} = \frac{N_{Ed}}{f_{yd}} = 3742 \text{ mm}^2$$

HEB – 200

$$\chi_y = 0.57$$

$$\chi_z = 0.78$$

$$N_{b,Rd} = \chi \cdot A \cdot f_{yd}$$

$$N_{b,Rd,y} = 1166 \text{ kN} \quad C.A. = 1.19$$

$$N_{b,Rd,z} = 1595 \text{ kN} \quad C.A. = 1.63$$

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