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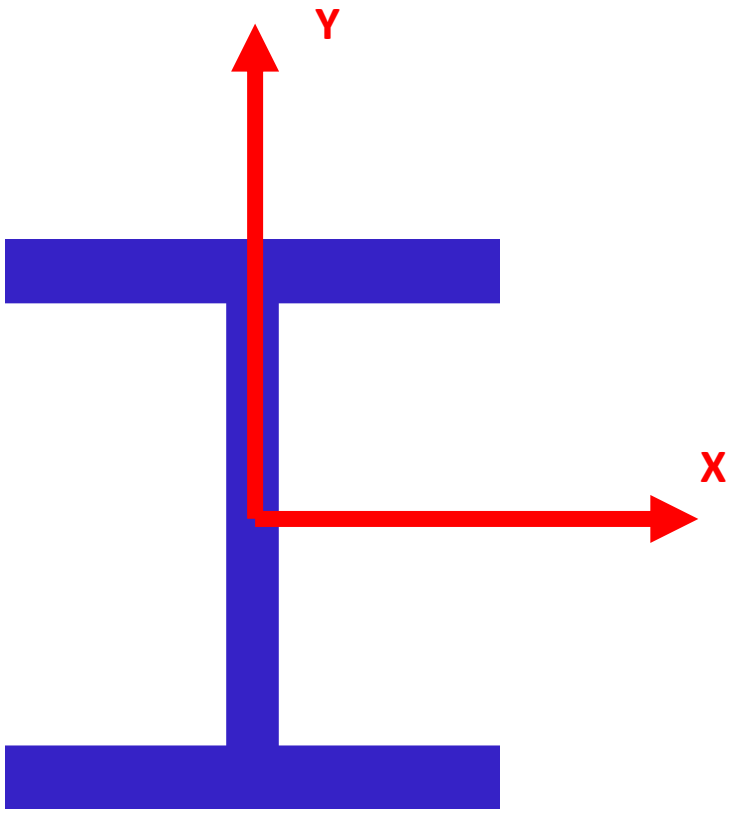
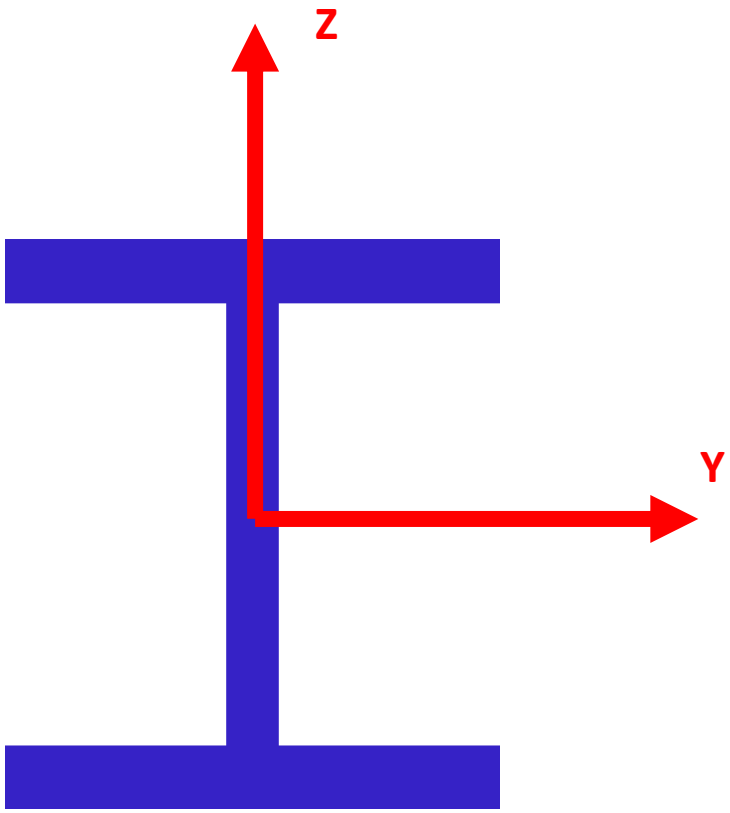
Teoría de Estructuras y Construcciones Industriales

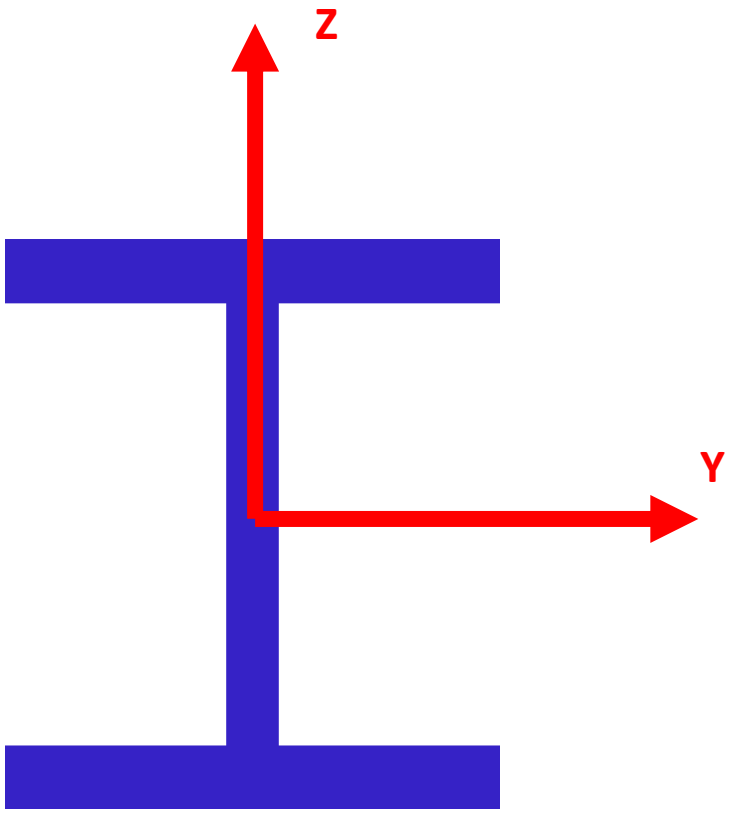
Carlos Santiuste Romero, Sara Garzón Hernández, Liu Jiao Wang,

Manuel Cuadrado Sanguino, Luis Jiménez Girón, Daniel Herrero Adán

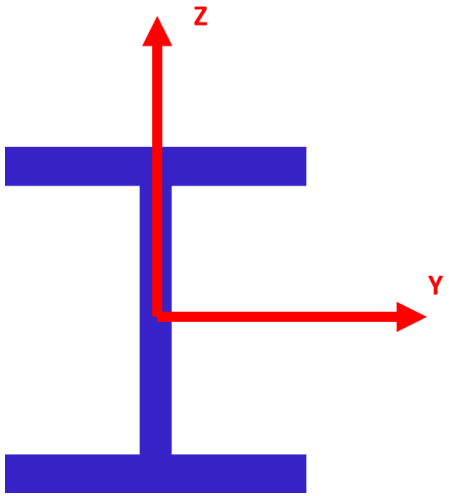
CTE: Ejes fuerte y débil de una sección


Y
X


Z
Y



$$I_Y > I_Z$$



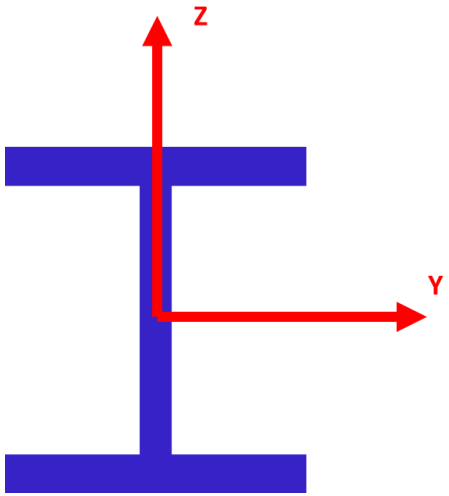
$Perfil\ IPE$

$Acero\ S275$

$N_{Ed} = 250\ kN$

$M_{Ed,1} = 65\ kN \cdot m$

$M_{Ed,2} = 30\ kN \cdot m$



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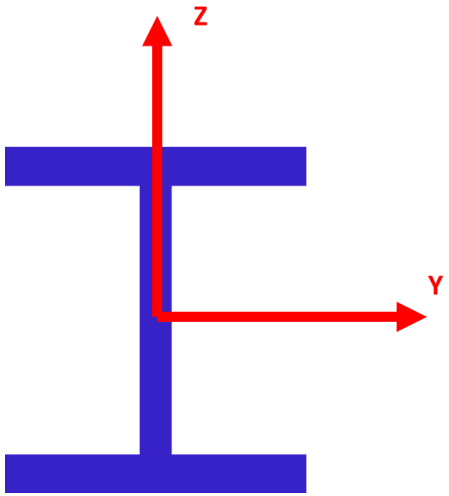

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$N_{Ed} = 250\ kN$

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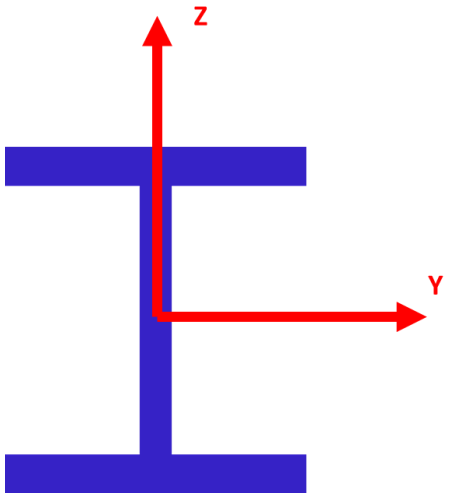
$$A > \frac{250 \cdot 10^3}{275/1.05} = 954\ mm^2 \qquad IPE - 100$$



$Perfil\ IPE$

$Acero\ S275$

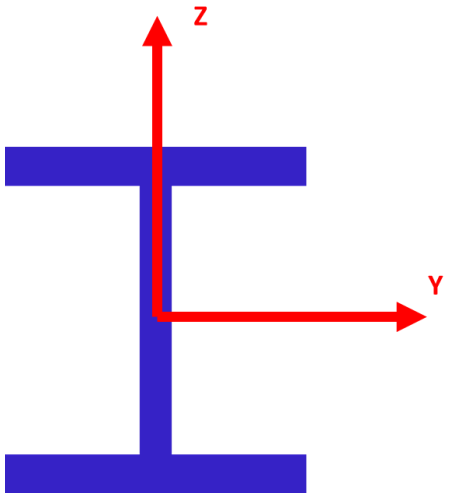
$N_{Ed} = 250\ kN$

$M_{Ed,1} = 65\ kN \cdot m$

$M_{Ed,2} = 30\ kN \cdot m$

$$A > \frac{250 \cdot 10^3}{275/1.05} = 954\ mm^2 \Rightarrow IPE - 100$$

$$w_{pl,y} > \frac{65 \cdot 10^6}{275/1.05} = 248 \cdot 10^3 mm^3 \Rightarrow IPE - 270$$



$Perfil\ IPE$

$Acero\ S275$

$N_{Ed} = 250\ kN$

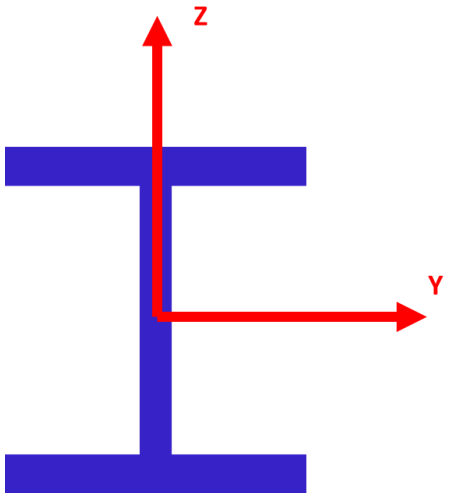
$M_{Ed,1} = 65\ kN \cdot m$

$M_{Ed,2} = 30\ kN \cdot m$

$$A > \frac{250 \cdot 10^3}{275/1.05} = 954\ mm^2 \Rightarrow IPE - 100$$

$$w_{pl,y} > \frac{65 \cdot 10^6}{275/1.05} = 248 \cdot 10^3 mm^3 \Rightarrow IPE - 270$$

$$w_{pl,y} > \frac{30 \cdot 10^6}{275/1.05} = 114 \cdot 10^3 mm^3 \Rightarrow IPE - 300$$



$Perfil\ IPE$

$Acero\ S275$

$N_{Ed} = 250\ kN$

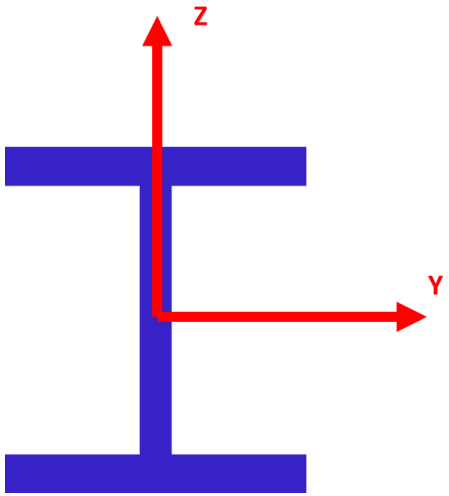
$M_{Ed,1} = 65\ kN \cdot m$

$M_{Ed,2} = 30\ kN \cdot m$

$$\frac{N_{Ed}}{N_{pl,Rd}} + \frac{M_{y,Ed}}{M_{pl,Rdy}} + \frac{M_{zEd}}{M_{pl,Rdz}} \leq 1 \qquad HEB - 300$$

$$\frac{250 \cdot 10^3}{53.8 \cdot 10^2 \cdot \frac{275}{1.05}} + \frac{65 \cdot 10^6}{628.4 \cdot 10^3 \cdot \frac{275}{1.05}} + \frac{30 \cdot 10^6}{125.2 \cdot 10^3 \cdot \frac{275}{1.05}}$$

$$0.18 + 0.39 + 0.91 = 1.49$$



$Perfil\ IPE$

$Acero\ S275$

$N_{Ed} = 250\ kN$

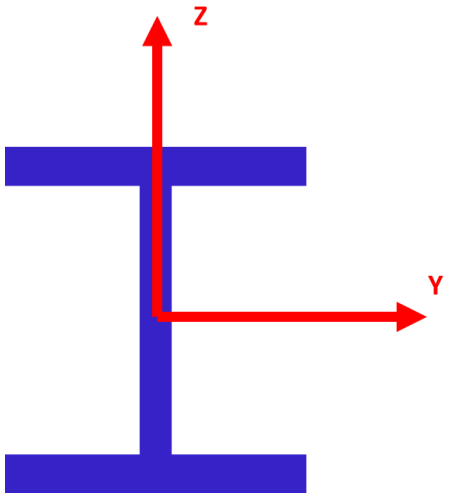
$M_{Ed,1} = 65\ kN \cdot m$

$M_{Ed,2} = 30\ kN \cdot m$

$$\frac{N_{Ed}}{N_{pl,Rd}} + \frac{M_{y,Ed}}{M_{pl,Rdy}} + \frac{M_{zEd}}{M_{pl,Rdz}} \leq 1 \qquad HEB - 330$$

$$\frac{250 \cdot 10^3}{62.6 \cdot 10^2 \cdot \frac{275}{1.05}} + \frac{65 \cdot 10^6}{804.3 \cdot 10^3 \cdot \frac{275}{1.05}} + \frac{30 \cdot 10^6}{153.7 \cdot 10^3 \cdot \frac{275}{1.05}}$$

$$0.15 + 0.31 + 0.75 = 1.21$$



$Perfil\ IPE$

$Acero\ S275$

$N_{Ed} = 250\ kN$

$M_{Ed,1} = 65\ kN \cdot m$

$M_{Ed,2} = 30\ kN \cdot m$

$$\frac{N_{Ed}}{N_{pl,Rd}} + \frac{M_{y,Ed}}{M_{pl,Rdy}} + \frac{M_{zEd}}{M_{pl,Rdz}} \leq 1 \qquad HEB - 360$$

$$\frac{250 \cdot 10^3}{72.7 \cdot 10^2 \cdot \frac{275}{1.05}} + \frac{65 \cdot 10^6}{1019 \cdot 10^3 \cdot \frac{275}{1.05}} + \frac{30 \cdot 10^6}{191.1 \cdot 10^3 \cdot \frac{275}{1.05}}$$

$$0.13 + 0.24 + 0.60 = 0.97$$

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