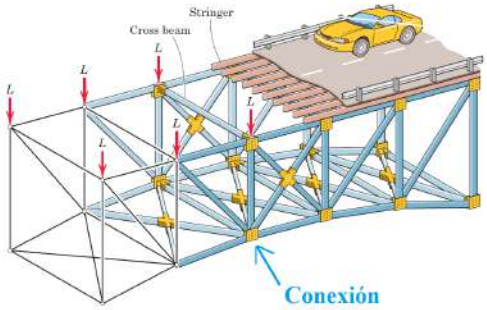
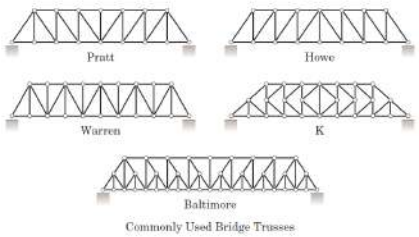
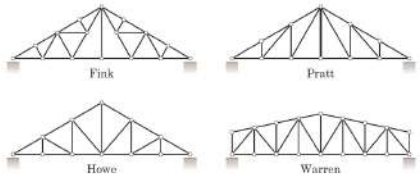
Estructuras



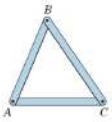


Commonly Used Bridge Trusses

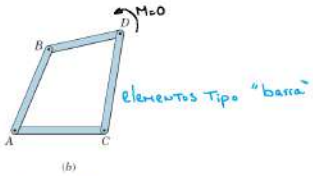


Commonly Used Roof Trusses

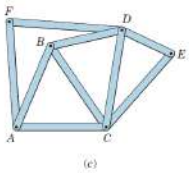
Estructuras planas



Estable

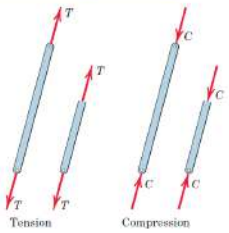


Inestable



Estable

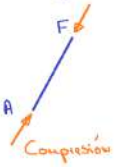
Elemento tipo barra



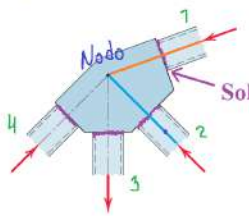
Two-Force Members

Los elementos estructurales de este capítulo sólo soportan cargas a tracción y compresión

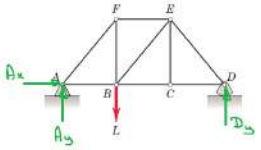
Barra AF { Tracción ✗ / Compresión ✓

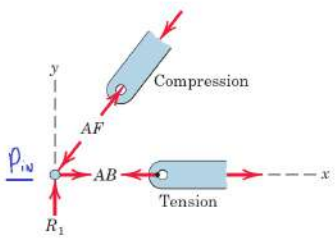


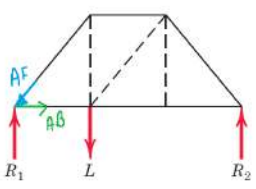
Utilizo soldadura para la conexión



Para conexiones con soldadura, se restringe la rotación, por lo tanto existe un momento.

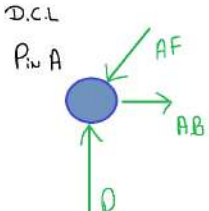


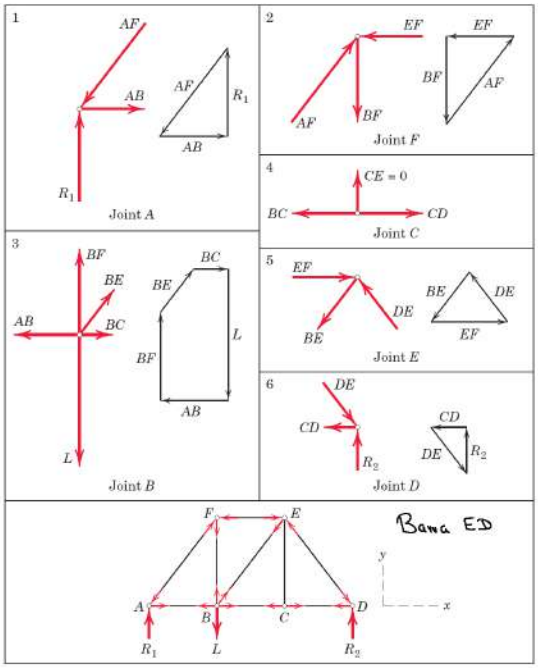




Las fuerzas sobre el pin

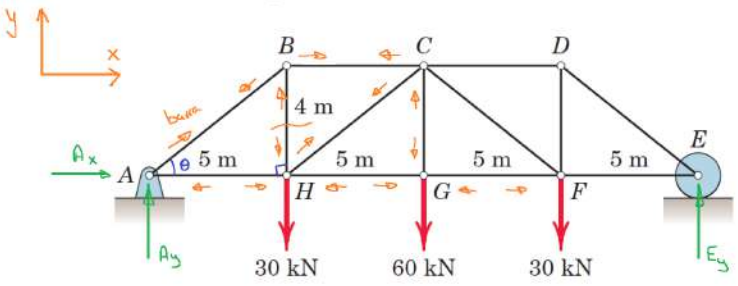
D.C.L





Problema 39

Determine the force in each member of the loaded truss. Make use of the symmetry of the truss and of the loading.



$\theta = \arctan \frac{4}{5} = 38,66°$

equilibrio:

$\Sigma F = 0$

$\Sigma M = 0$

Para la estructura:

$\Sigma F_y = 0$

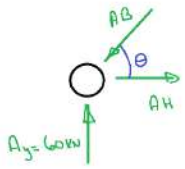
$A_y - 120\,kN + E_y = 0$

$A_y + E_y = 120\,kN$

$A_y = E_y = 60\,kN$ por simetría

$\Sigma F_x = 0 \quad A_x = 0$

Nodo A



$\Sigma F_y = 0$

$60 - AB \operatorname{Sen}\theta = 0$

$AB = 96,05\,kN$ ↓

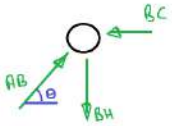
$\Sigma F_x = 0$

$AH - AB \cdot \cos\theta = 0$

$AH - 96,05 \cdot \cos 38,66 = 0$

$AH = 75\,kN$ ←

Nodo B



$\Sigma F_y = 0$

$AB \cdot \operatorname{Sen}\theta - BH = 0$

$96,05 \cdot \operatorname{Sen} 38,66 - BH = 0$

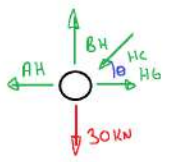
$BH = 60\,kN$ ↓

$\Sigma F_x = 0$

$AB \cdot \cos\theta - BC = 0$

$BC = 75\,kN$ →

Nodo H



$\Sigma F_y = 0$

$-30 + BH - HC \operatorname{Sen}\theta = 0$

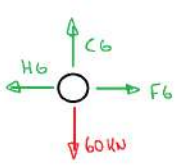
$HC = 48,02\,kN$

$\Sigma F_x = 0$

$-AH - HC \cdot \cos\theta + HG = 0$

$HG = 112,5\,kN$ →

Nodo G



$\Sigma F_y = 0$

$CG = 60\,kN$ ↑

$\Sigma F_x = 0$

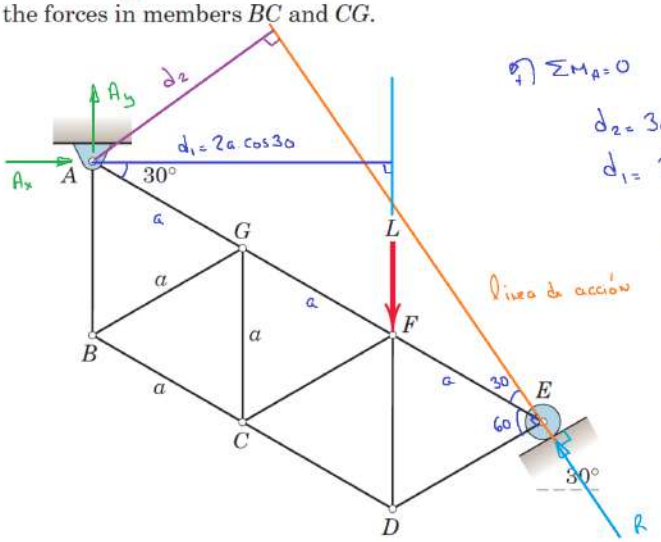
$FG = 112,5\,kN$ →

Tabla resumen

Barra	Carga	Tipo
AB	96,05	Compresión
AH	75	Tracción
BH	60	Tracción
BC	75	Compresión
HC	48,02	Compresión
HG	112,5	Tracción
CG	60	Tracción
HG	112,50	Tracción

Problema 43

The truss is composed of equilateral triangles of side a and is supported and loaded as shown. Determine the forces in members BC and CG.



$\curvearrowleft \Sigma M_A = 0$

$d_2 = 3a \operatorname{sen} 30 = 3a/2$

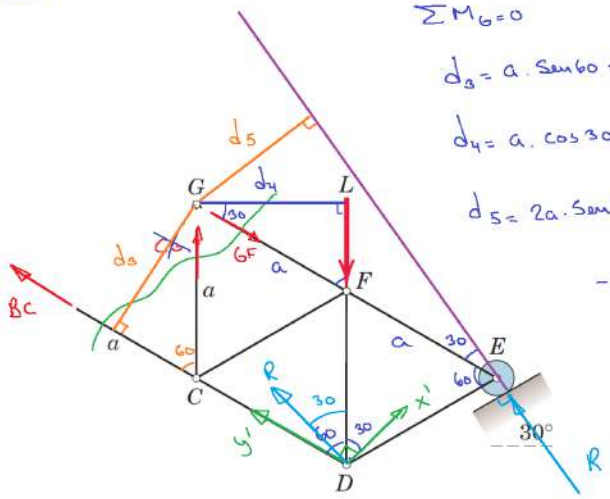
$d_1 = 2a \cos 30 = a\sqrt{3}$

$+R \cdot \frac{3a}{2} - L \cdot a\sqrt{3} = 0$

Línea de acción

$R = \frac{2L}{\sqrt{3}}$

método de las secciones:



$\Sigma M_G = 0$

$d_3 = a \operatorname{sen} 60 = a\frac{\sqrt{3}}{2}$

$d_4 = a \cdot \cos 30 = a\frac{\sqrt{3}}{2}$

$d_5 = 2a \operatorname{sen} 30 = a$

$-BC \cdot a\frac{\sqrt{3}}{2} - L \cdot a\frac{\sqrt{3}}{2} + R \cdot a = 0$

$BC = \frac{L}{3}$

$\Sigma F_{x'} = 0$

$+CG \cdot \frac{\sqrt{3}}{2} - L_x\frac{\sqrt{3}}{2} + R \cdot \frac{1}{2} = 0$

$CG = \frac{L}{3}$