Truss

Triangular members

Pin joints

Purlins

Beams placed at joints of trusses

Transfer roof load to joints of the truss

Top members ⇒ compression

Bottom members ⇒ tension

forces line of action meets at one point ⇒ zero moment

Method of Join

Analyze each join individually

Draw FBD

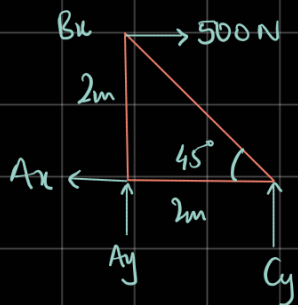
Find reaction forces

$\Sigma F_x = 0$

$\Sigma F_y = 0$

$\Sigma M = 0$

if you have 1 known and 2 unknowns, you can solve directly



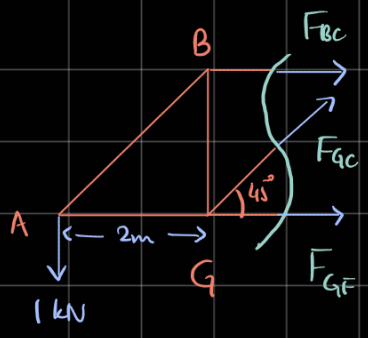
Zero Force Members

To reduce length

Used in stress reversal case

Method of Sections

Quicker method for partial section's analysis
Only 3 unknown forces and 1 known force in cut section



$\Sigma M_C = 0$

$1000 \times 4 + 2 F_{GF} = 0$

$F_{GF} = -2000\ N$

$\Sigma M_G = 0$

$1000 \times 2 - 2 F_{BC} = 0$

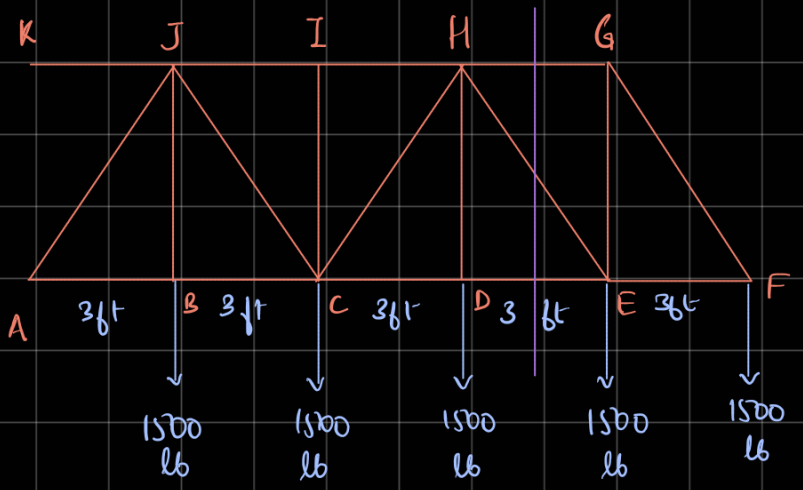
$F_{BC} = 1000\ N$

$\Sigma F_y = 0$

$-1000 + F_{GC} \sin 45 = 0$

$F_{GC} = 1000\sqrt{2}$

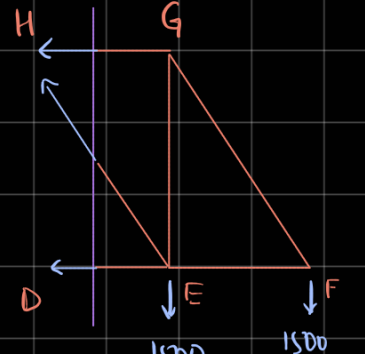
$= 1414\ N$



$\Sigma M_H = 0$

$-4 F_{ED} - 3 \times 1500 - 6 \times 1500 = 0$

$F_{ED} = -3375\ lb$



$\Sigma M_E = 0$

$4F_{GH} - 4500 = 0$

$F_{GH} = 1125$ lb

1500 lb lb

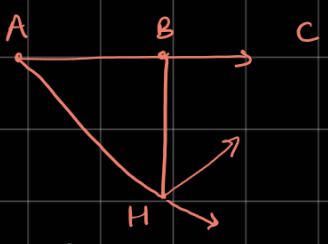
$\Sigma F_x = 0$

$-F_{GH} - F_{ED} - F_{EH}\left(\frac{3}{5}\right) = 0$

$-1125 + 3375 - F_{EH}\left(\frac{3}{5}\right) = 0$

$F_{EH} = \frac{5}{3} \times$

$F_{EH} = 3750$ lb



$\Sigma M_C = 0$

$-A_y(10) + 20 + 20 + F_{HG}\cos 68.2\,(5) + F_{HG}\sin 68.2\,(3) = 0$

$\Sigma M_H = 0$

$-5A_y + 10 - 3F_{BC} = 0$

$\Sigma M_{O'} = 0$

$-2(5) + 4(10) + F_{HC}\sin 21.8\,(10) + F_{HC}\cos 21.8\,(10) = 0$

Friction

Resistive force against movement

Tangent to surface at point of contact

Two types → Fluid

→ Coulomb ✓ (Dry)