

### Method of Sections

- If the forces in only a few members of a truss are to be determined, the **method of sections** is generally the most appropriate analysis procedure.
- The method of sections consists of passing an **imaginary line** through the truss, cutting it into sections.
- Each imaginary section must be in equilibrium if the entire truss is in equilibrium.

$$\sum F_x = 0 \quad \sum F_y = 0 \quad \sum M_z = 0$$

### Method of Sections

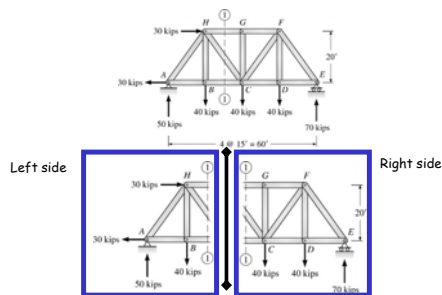
**Procedure for analysis** - the following is a procedure for analyzing a truss using the method of sections:

1. First, if necessary, determine the support reactions for the entire truss.
2. Next, make a decision on how the truss should be "cut" into sections and draw the corresponding free-body diagrams.
3. Try to apply the three equations of equilibrium such that simultaneous solution is **not** required.

Moments should be summed about points that lie at the intersection of the lines of action of two unknown forces, so that the remaining force may be determined.

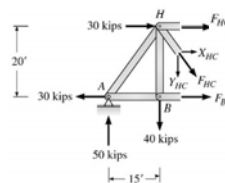
### Method of Sections

- Imagine cutting a structure into two sections about line 11



### Method of Sections

- Typically the section with the fewest forces or with section with the most convenient geometry is selected.
- In this example the left-hand side.

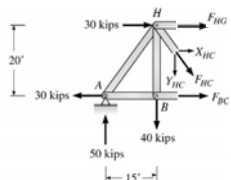


- Apply the three equations of equilibrium to the section.
- If possible, attempt to develop an equation in just one unknown.
- Look for points where the lines of action of several forces are concurrent.

### Method of Sections

$$\sum M_H = 0 = F_{BC}(20ft) - 30k(20ft) - 50k(15ft) \quad \boxed{F_{BC} = 67.5 k}$$

$$\sum M_C = 0 = -F_{HG}(20ft) - 30k(20ft) - 50k(30ft) + 40k(15ft) \quad \boxed{F_{HG} = -75 k}$$



$$\sum F_y = 0 = -\frac{4}{5}F_{HC} - 40k + 50k \quad \boxed{F_{HC} = 12.5 k}$$

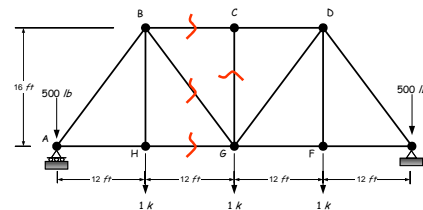
$$\boxed{F_{BC} = 67.5 k(T)}$$

$$\boxed{F_{HG} = 75 k(C)}$$

$$\boxed{F_{HC} = 12.5 k(T)}$$

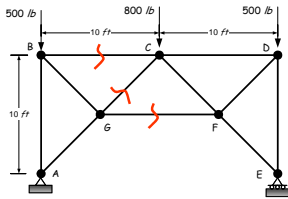
### Method of Sections

**Example:** Determine the forces BC, BG, HG, and CG in the following truss (see notes on Page 15)



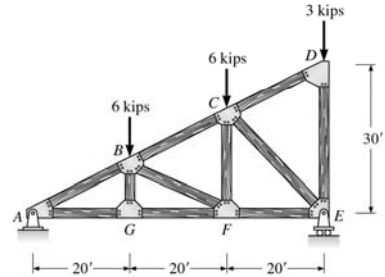
### Method of Sections

**Example:** Determine the forces BC, CG, and GF in the following truss (see notes on Page 16)



### Method of Sections

**Example:** Determine the forces in all bars of the truss



### End of Trusses - Part 3

Any questions?

