

**ARCHITECTURAL STRUCTURES I:
STATICS AND STRENGTH OF MATERIALS**

ENDS 231

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SPRING 2008

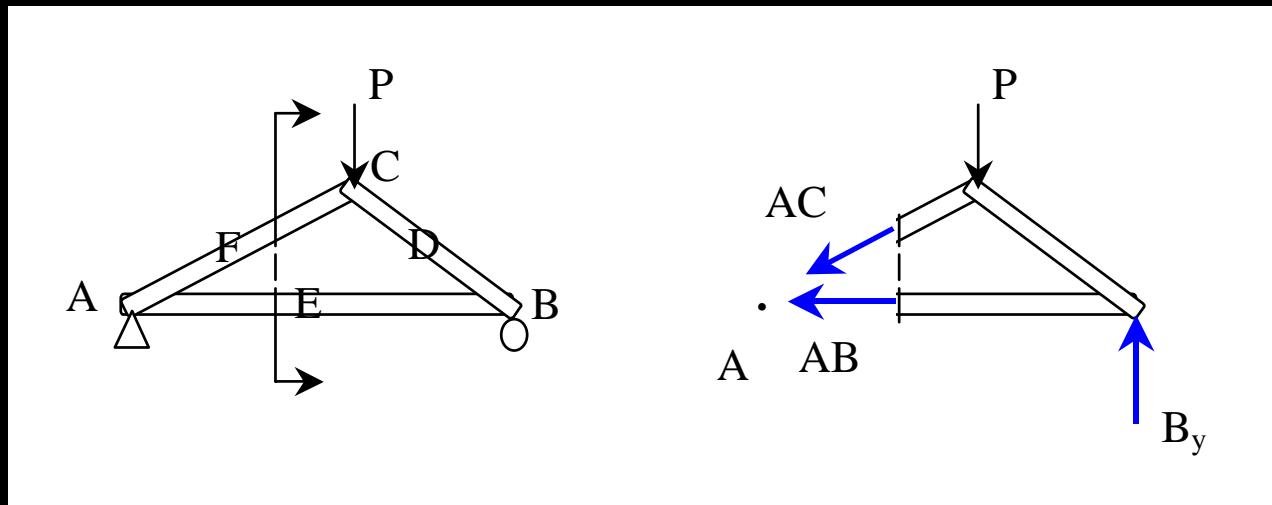
**lecture
eight**

**truss
analysis**



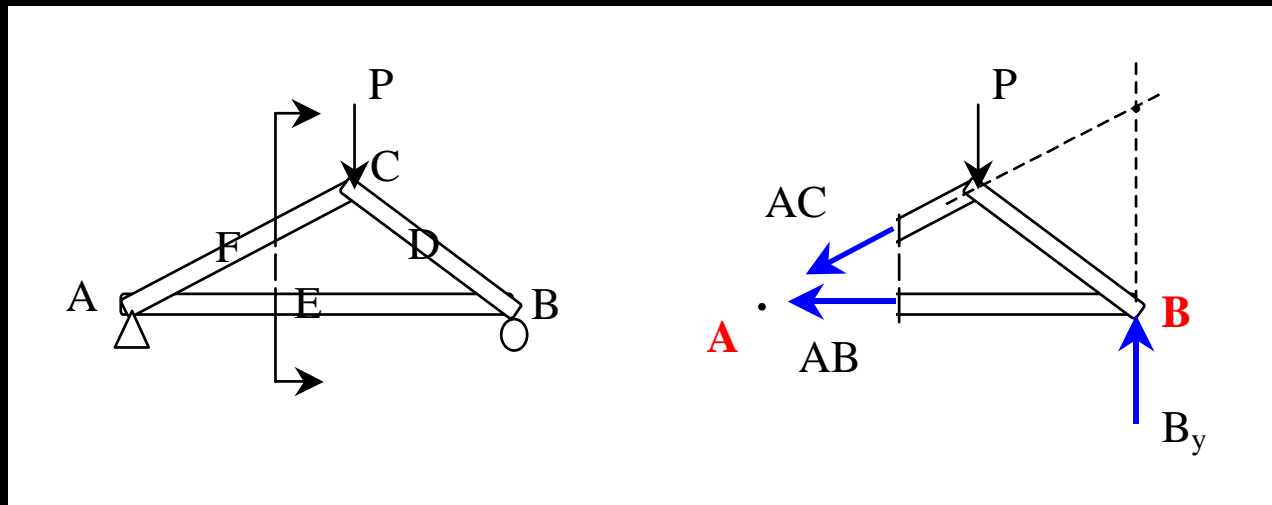
Method of Sections

- *relies on internal forces being in equilibrium on a section*
- *cut to expose 3 or less members*
- *coplanar forces $\rightarrow \sum M = 0$ too*



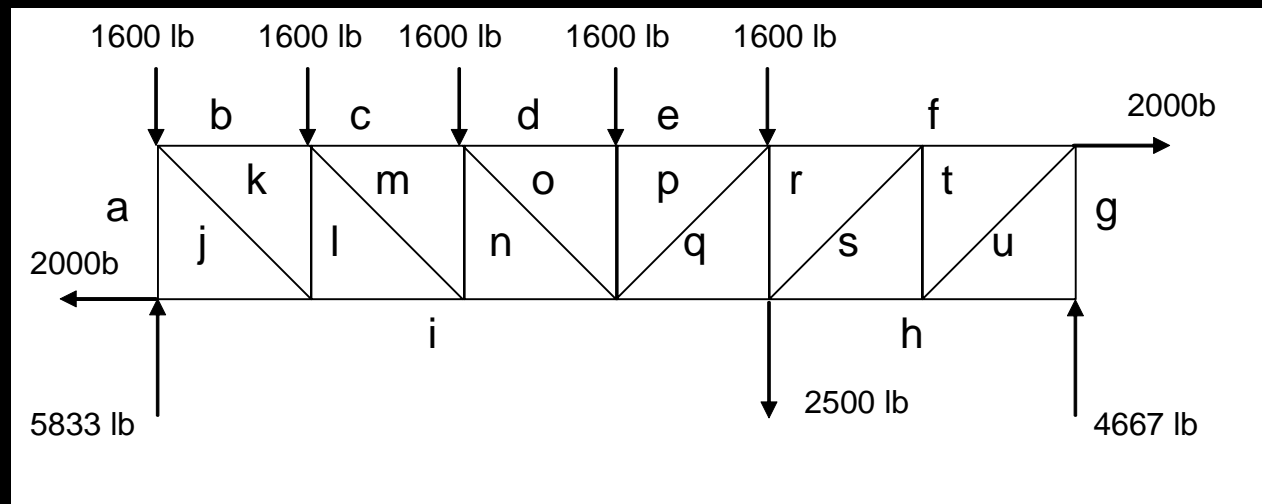
Method of Sections

- *joints on or off the section are good to sum moments*
- *quick for few members*
- *not always obvious where to cut or sum*



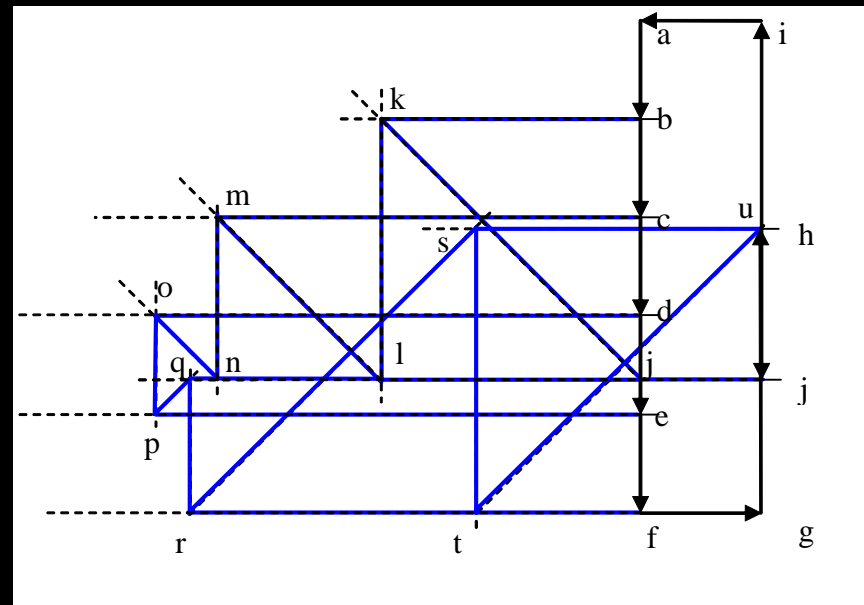
Graphical Analysis

- *lettering rules (Bow's notation)*
- *draw a force polygon of known loads and reaction forces*



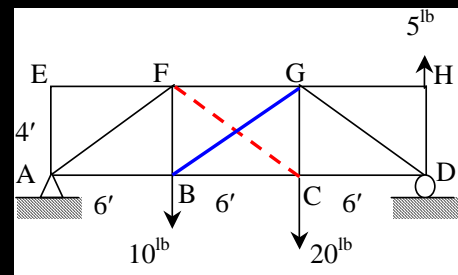
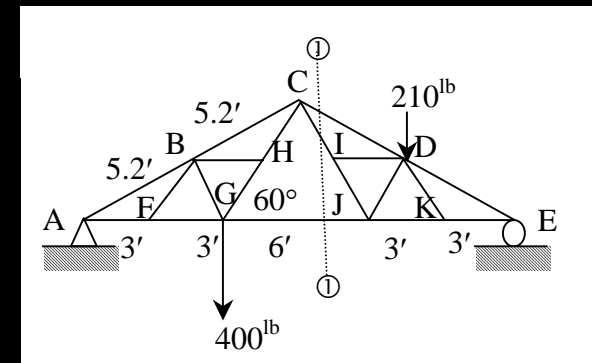
Graphical Analysis

- draw reference directions for members and find intersections
- measure and determine C or T
- follow steps!
- learn by example



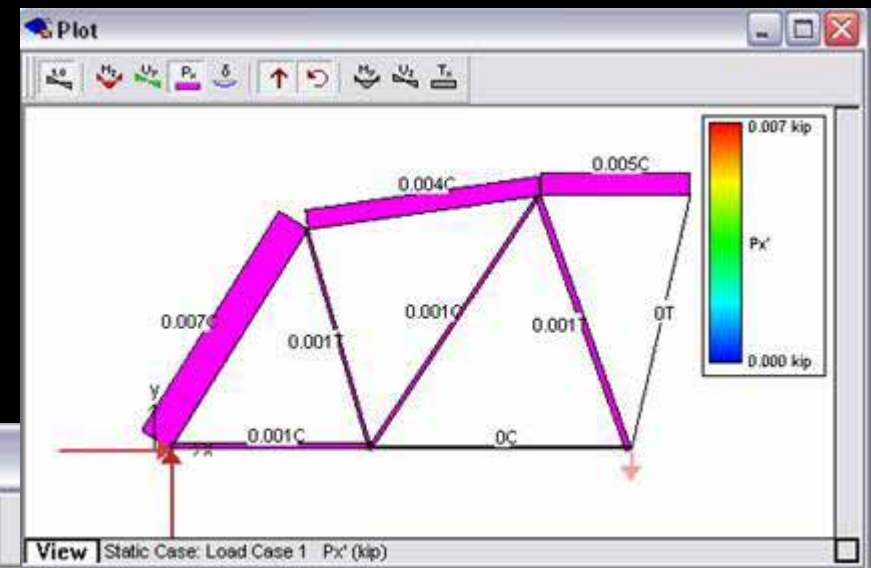
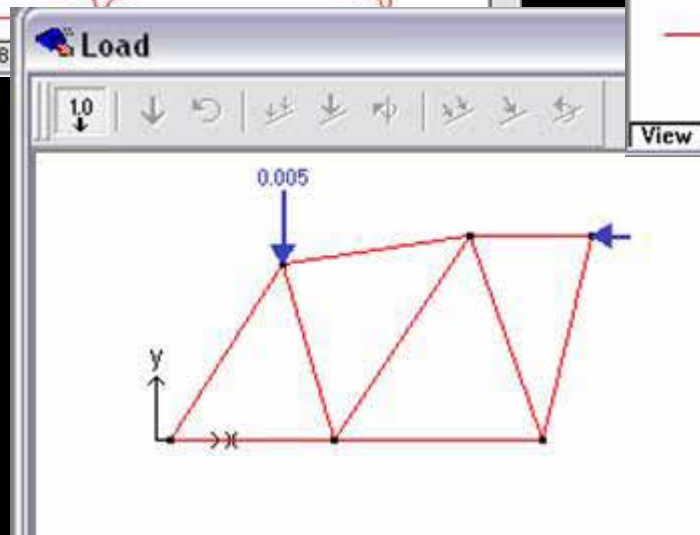
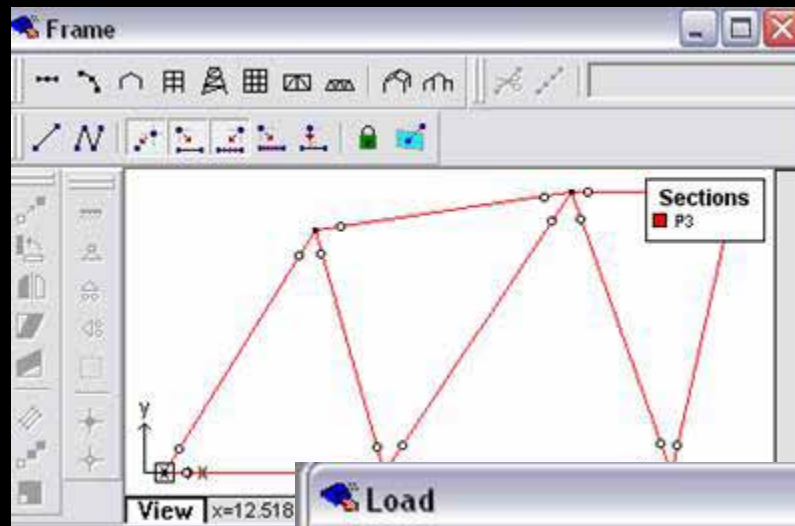
Other Trusses

- *compound truss*
 - *simple trusses with more links*
 - *might have pins in middle of members*
- *statically indeterminate*
 - *too many members*
 - *constrained*
 - *diagonal tension counters*



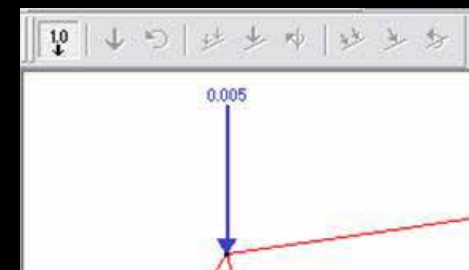
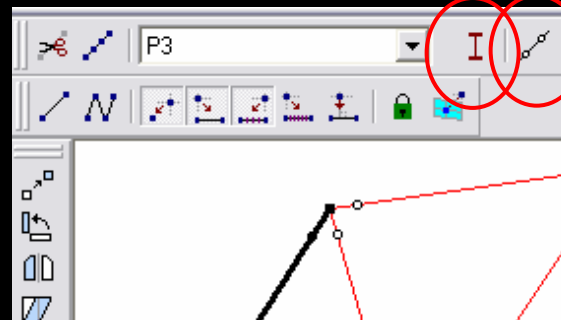
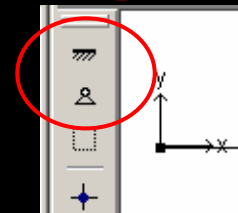
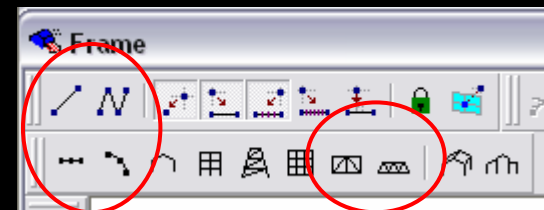
Tools – Multiframe4D

- *in computer lab*



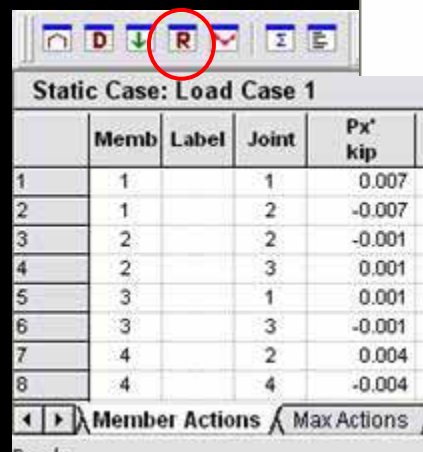
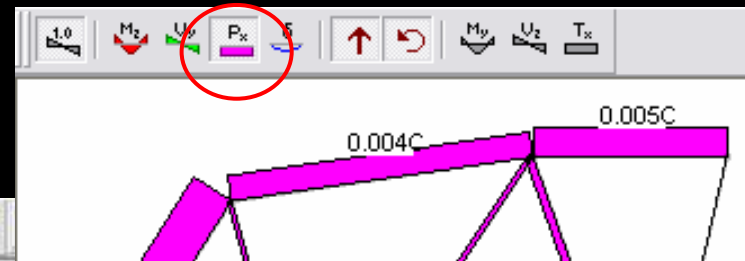
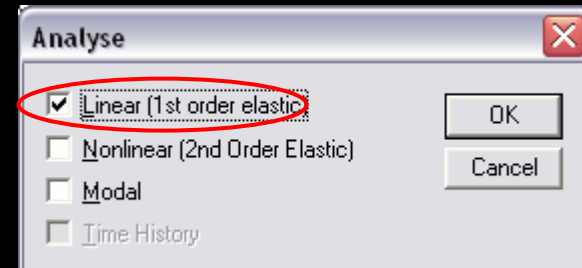
Tools – Multiframe4D

- *frame window*
 - *define truss members*
 - *or pre-defined truss*
 - *select points, assign supports*
 - *select members, assign section & assign pin ends*
- *load window*
 - *select points, add point load*



Tools – Multiframe4D

- *to run analysis choose*
 - *case menu*
 - *Analyse...*
 - *Linear (1st order elastic)*
- *plot*
 - *choose options*
- *results*
 - *choose options*



	Memb	Label	Joint	Px' kip
1	1		1	0.007
2	1		2	-0.007
3	2		2	-0.001
4	2		3	0.001
5	3		1	0.001
6	3		3	-0.001
7	4		2	0.004
8	4		4	-0.004