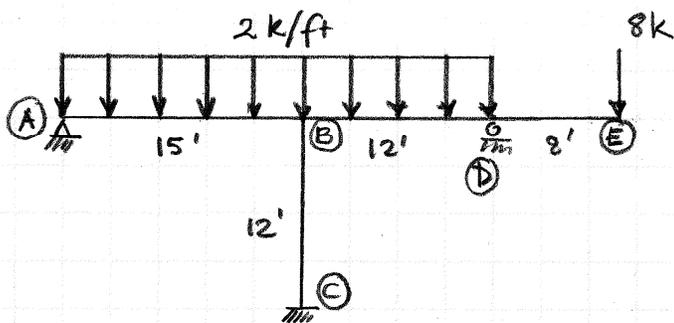


Example: Moment-distribution; frame with no sway.



EI constant

Frame does not sway.

$$K_{AB} = K_{BA} = 3 \left(\frac{EI}{L} \right)_{AB} = \frac{3}{15} EI$$

$$K_{BC} = K_{CB} = 4 \left(\frac{EI}{L} \right)_{BC} = \frac{4}{12} EI$$

$$K_{BD} = K_{DB} = 3 \left(\frac{EI}{L} \right)_{BD} = \frac{3}{12} EI \quad \times \text{ support D is a simple support with a cantilever end.}$$

$$K_{DE} = K_{ED} = 0$$

\times cantilever has no stiffness
we will use statics to take care of DE portion.

Distribution factors:

$$DF_{AB} = 1.0$$

$$DF_{CB} = 0$$

$$DF_{BA} = \frac{3/15}{3/15 + 4/12 + 3/12} = 0.255$$

$$DF_{DB} = 1.0$$

$$DF_{BC} = \frac{4/12}{3/15 + 4/12 + 3/12} = 0.426$$

$$DF_{DE} = 0$$

$$DF_{BD} = \frac{3/12}{3/15 + 4/12 + 3/12} = 0.319$$

FEMs:

$$FEM_{AB}^* = 0$$

$$FEM_{BD}^* = -\frac{2 \times 12^2}{8} = -36 \text{ k.ft}$$

$$FEM_{BA}^* = \frac{2 \times 15^2}{8} = 56.25 \text{ k.ft}$$

$$FEM_{DB}^* = 0$$

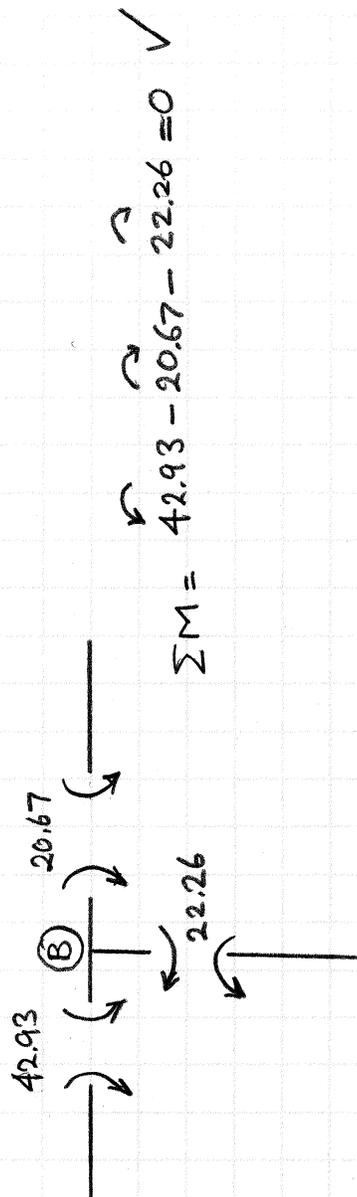
$$FEM_{BC} = 0 \quad FEM_{CB} = 0$$

$$FEM_{DE} = -64 \text{ k.ft}$$

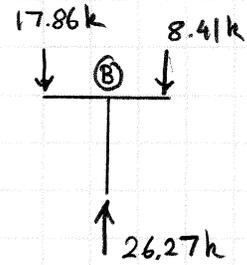
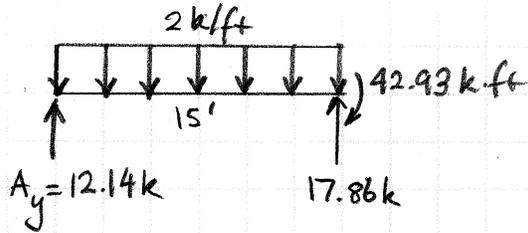
	AB	BA	BD	DB	DE	ED	BC	CB
D.F.	1.0	0.255	0.319	1.0	0	0	0.426	0
FEM	0	+56.25	-36	0	-64	0	0	0
Imbalance		(+26.25)		(-64)				
Distr.		-5.16	-6.46	+64	0		-8.63	-4.31
Carry-over		+32						
Net moments	0	+51.09	-10.46	+64	-64	0	-8.63	-4.31
Imbalance		(+32)		(0)				
Distr.		-8.16	-10.21	0	0		-13.63	-6.81
Carry-over		+42.93	-20.67	+64	-64	0	-22.26	-11.12
Net moments	0	+42.93	-20.67	+64	-64	0	-22.26	-11.12

Note that equilibrium is satisfied at all joints

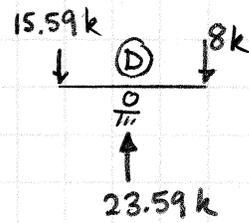
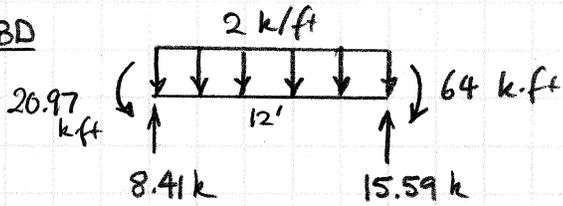
For example, joint B



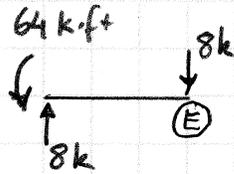
FBD AB:



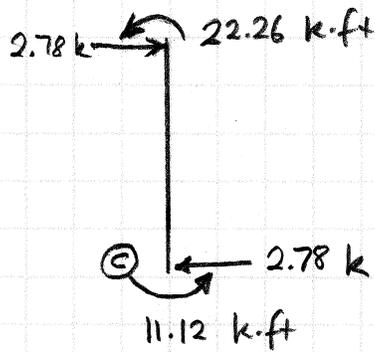
FBD BD

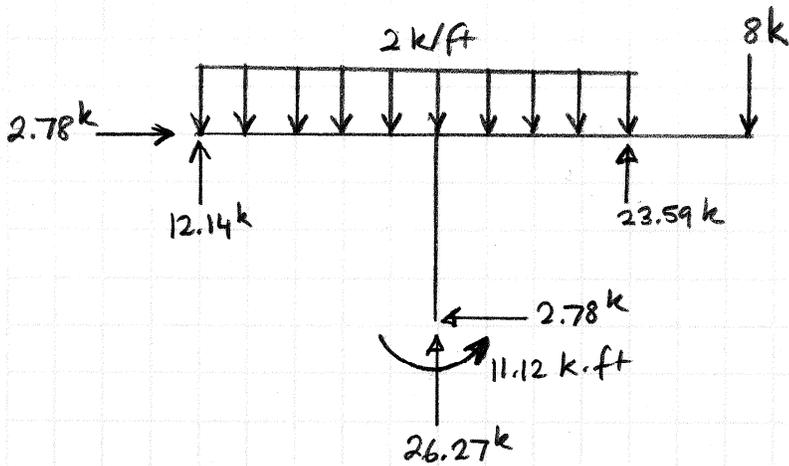


FBD DE

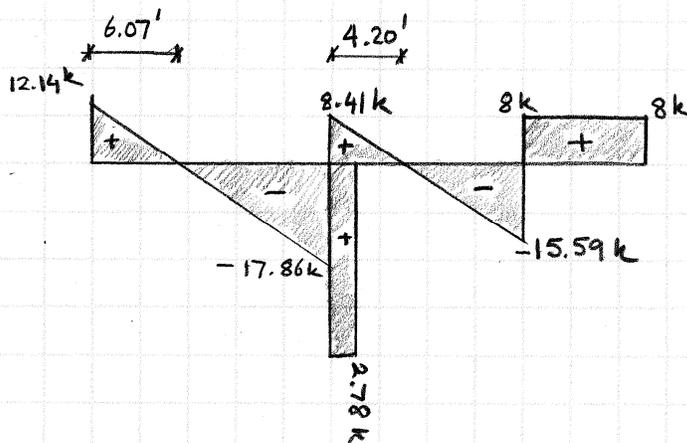


FBD BC

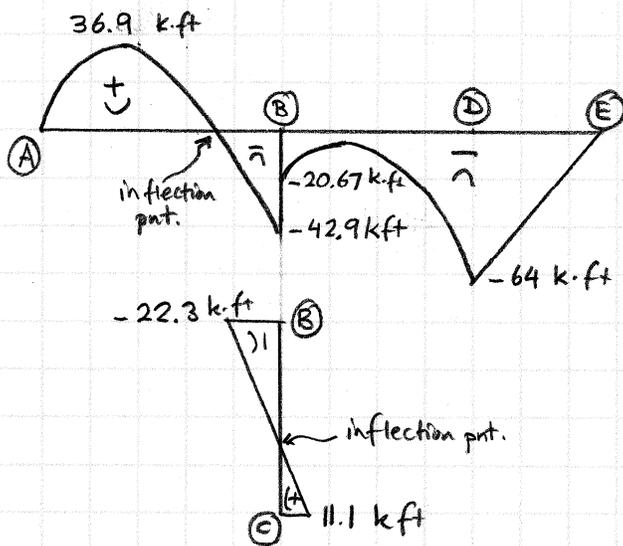




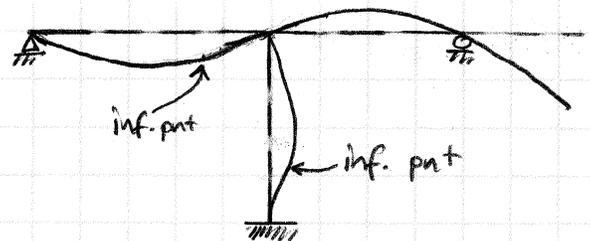
[FBD for the structure]



[Shear]



[Moment]



[Deformed shape]