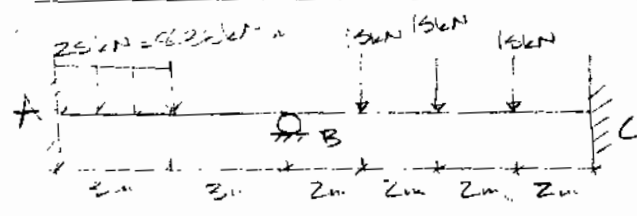


B: 12-1 S-1-06 - [REDACTED]



EI = constant  $M_{AB} = ?$  ✓  
 $M_{CB} = ?$  ✓

10/0

$K_{BA} = I/l$   
 $K_{BC} = I/2$

$\frac{VF}{DF} = \frac{VF_{CB}}{DF_{CB}} = 0$   
 $\frac{DF_{BA}}{DF_{BC}} = \frac{(-1/6)}{(7I/24)} = -.571$   
 $\frac{VF_{BC}}{DF_{BC}} = \frac{I/2}{(7I/24)} = -.429$

35  
50

**FEM**  
 $FEM_{AB} = \frac{2.22(3^2)}{12(6^2)} (6(6^2) - 8(2)(6) + 3(2^3)) = .174(99) = 17.19 \text{ kNm} \uparrow$   
 $FEM_{BA} = \frac{2.22(3^3)}{12(6^2)} (4(6) - 2(2^2)) = .521(16) = 7.81 \text{ kNm} \downarrow$   
 $FEM_{BC} = \frac{15(2)(6^2)}{8^2} + \frac{15(6)}{2} + \frac{15(6)(2^2)}{8^2} = 37.5 \text{ kNm} \uparrow$   
 $FEM_{CB} = -37.5 \text{ kNm} \downarrow$

Joint	A	B	C
Member	AB	BA, BC	CB
DF	0	.571, -.429	0
FEM	-17.19	-7.81, -12.74	-37.5
	-8.45	-16.95	-6.27
	8.71		-42.27

If the 25 kN is a typo & it should actually be 25 kN/m

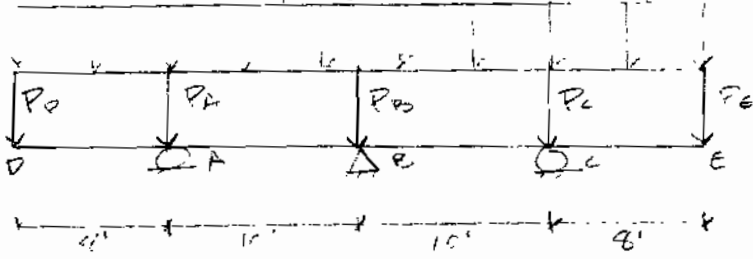
$FEM_{AB} = 51.56 \text{ kNm} \uparrow$   
 $FEM_{BA} = 22.44 \text{ kNm} \downarrow$   
 $FEM_{BC} = 37.5 \text{ kNm} \uparrow$   
 $FEM_{CB} = -37.5 \text{ kNm} \downarrow$

Joint	A	B	C
Member	AB	BA, BC	CB
DF	0	.571, -.429	0
FEM	51.56	22.44, -6.02	-37.5
	-4.02	-8.02	-3.02
Final (kNm)	47.5	-31.47	-40.52

2 HW #3: 12-6 0-0-06



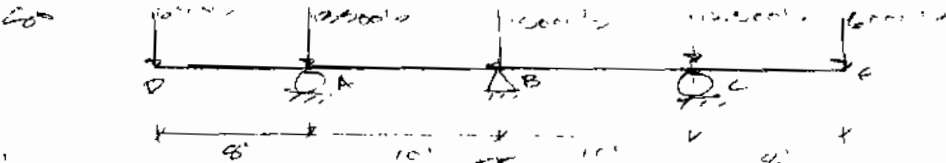
1500 lb/ft



MATLAB Moment Diagram  
 $EI = \text{const.}$

5/10

$P_1 = 5 (1500 \cdot 8) = 6000 \text{ lb}$   
 $P_2 = 5 (1500 \cdot 10) = 7500 \text{ lb}$   
 $P_3 = 5 (1500 \cdot 10) = 7500 \text{ lb}$   
 $P_4 = 5 (1500 \cdot 8) = 6000 \text{ lb}$



$DF_{AD} = 0$   
 $DF_{AB} = 0.5$   
 $DF_{BC} = 0.5$   
 $DF_{CB} = 1$   
 $DF_{CE} = 0$

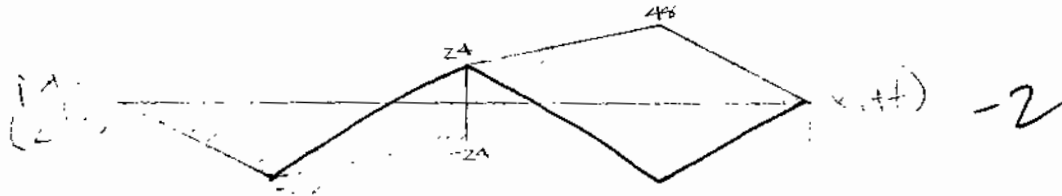
$EI \Delta_{AD} = (6000)(8) = 48000 \text{ lb-ft}$   
 $EI \Delta_{AB} = (7500)(10) = 75000 \text{ lb-ft}$   
 $EI \Delta_{BC} = (7500)(10) = 75000 \text{ lb-ft}$   
 $EI \Delta_{CB} = (6000)(8) = 48000 \text{ lb-ft}$   
 $EI \Delta_{CE} = 0$

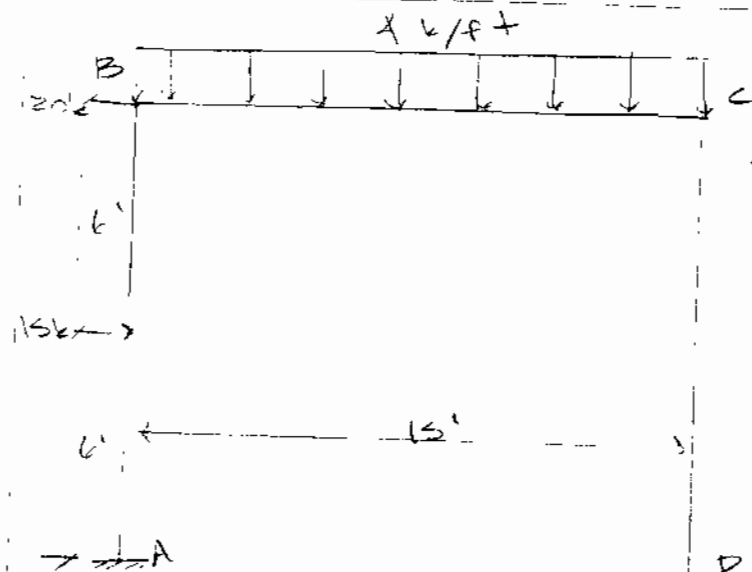
Joint  
 Member  
 DF  
 FEM  
 1/2  
 CO  
 Final kft

	A	B	C
AD	0		
AB	1	0.5	
BC	0	0.5	1
CB	-0.5	1	0
CE	0	0	0
FEM	+48	0	-48
1/2	-24	24	24
CO			
Final kft	+48	+24	-24

AD? DA?  
-2

-1 SIGNS!





$M_A, M_B, M_C, M_D$   
 $EI = \text{const.}$

$\frac{K}{L_{AB}} = \frac{I}{12} = K_{CD}$   
 $K_{BC} = \frac{I}{15}$

$DF_{AB} = \frac{F_{BC} = 0}{\frac{I}{12} + \frac{I}{15}} = -0.5556 = DF_{CB}$

$FEM_{AB} = \frac{PL}{8} = \frac{(15)(12)}{8} = 22.5 kft$

$DFEM_{BA} = -22.5 kft$   
 $FEM_{BC} = \frac{4(15)^2}{12} = 75 kft$

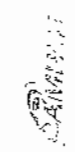
$FEM_{CD} = FEM_{DC} = 0$

Assume No Sidesway

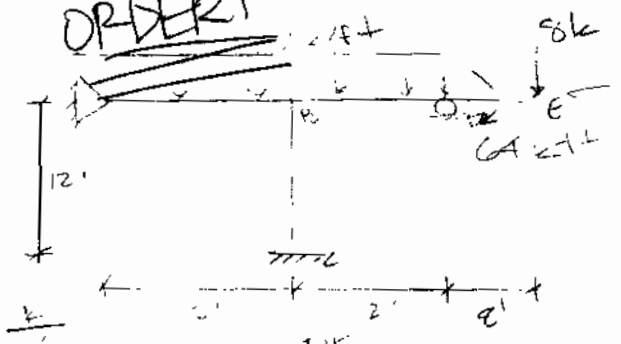
Joint	A	B	C	D
Member	AB	BA, BC	CB, CD	DC
DF	0	0.556, 0.444	0.111, 0.889	0
	0	-22.5, 75	-75, 0	0
		-29.91, -23.31	33.3, 41.7	
	-12.15	16.65	-11.66	20.95
	-4.63	-9.24, -7.39	5.18, 6.48	1.22
		2.59, -3.7		
	-7.2	1.14, -1.15	1.64, 2.06	1.12
		4.82, -5.0		
	-23	-1.16, -3.6	2.6, -3.2	1.1
		1.3, -1.9		
	-0.4	0.07, -0.6	0.06, 0.1	0.45
		-0.2, -0.2	0.1, 0.2	
Final (k-ft)	+2.24	-62.24, 62.94	-50.26, 50.66	+25.23

With sidesway -3  
M? -4

10 SHEETS  
20 SHEETS  
30 SHEETS



ORDER 1



$MA, MB, I^A = I^B$   
 Diagram + RDE  
 $I = 12000 \text{ in}^4$   
 $E = 29,000 \text{ ksi}$   
 $\therefore EI = \text{const}$

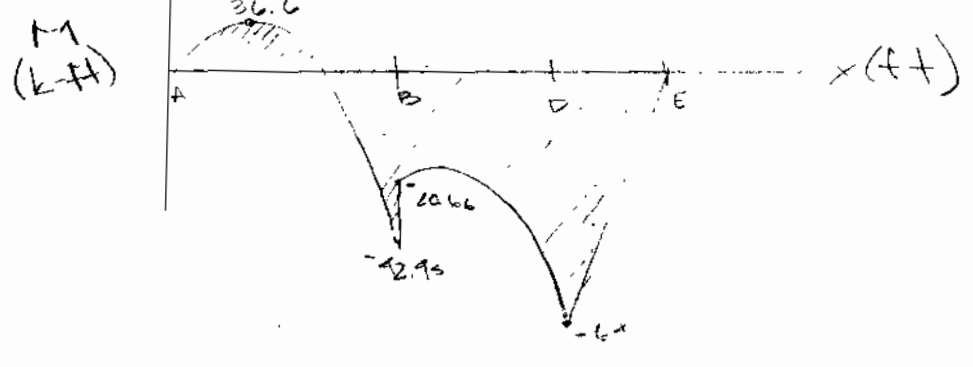
10/10

$K_{BC} = \frac{EI}{12}$   
 $K_{ED} = \frac{EI}{10}$   
 $K_{DE} = \frac{EI}{10} = -0.8332$

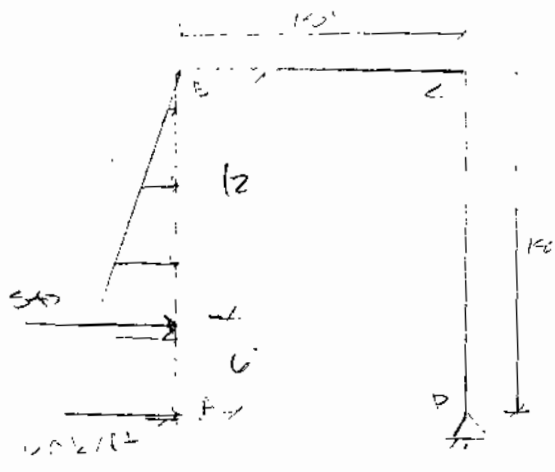
$\frac{0.08332I}{(0.08332I + 0.08332I - 0.08332I)} = 0.23$   
 $0.08332I, -2.1667I = -0.385$   
 $0.08332 / 0.16664I = 0.285$

$\frac{1}{EI}$   
 $FEM_{BC} = 0$   
 $FEM_{ED} = \frac{2(10)^2 \sqrt{2}}{8} = 56.25 \text{ k-ft}$   
 $FEM_{BC} - FEM_{ED} = 0$   
 $FEM_{ED} = 24 \text{ k-ft}$   
 $FEM_{DE} = 12 \text{ k-ft}$

Joint	Member	End	BA	BC	BD	DB	DE	LB
0	1	B	0.23	-0.385	0.385	1	0	0
0	0	A	-56.25	0	+24	-24	4	0
		B	+7.49	+12.4	+12.4	7.40		
		D	+4.6	+7.7	+7.7	-6.2		1.2
		E	+7.12	+11.9	+11.9	-3.05		0
		D	+4.4	+7.4	+7.4	-1.6		0
		E	+0.7	+12	+12	-3.7		+3.7
		E	+0.3	-0.5	-0.5	-0.6		0
FINAL			-42.9	+22.2	+20.1	-6.4	6.4	11.1



22-141 50 SHEETS  
22-142 100 SHEETS  
22-144 200 SHEETS  
SAMPAD



$EI = \text{constant}$   
 $EA = \infty$   
 $EA_c = \infty$   
 $EA_d = \infty$   
 $K_{AB} = \infty$      $K_{CD} = \frac{3EI}{A(18)}$   
 $DF_{AB} = 0$   
 $DF_{BC} = 1$   
 $DF_{CD} = \frac{1}{15} = .067$   
 $DF_{CB} = \frac{I/15}{I/15 + \frac{3I}{A(18)}} = .615$   
 $DF_{BC} = \frac{3I}{1047.3} = .285$

**FEM**  
 $FEM_{AB} = \frac{Pl^2}{L^2} = 972 \text{ kft}^2$   
 $FEM_{BA} = -\frac{Pl^2}{L^2} = -648 \text{ kft}^2$

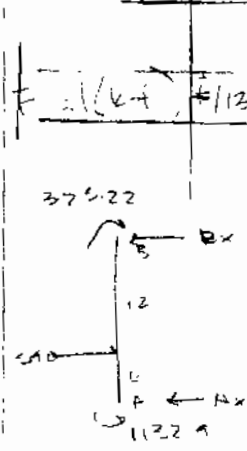
Node	Member	End	DF	FEM	CP	CD	VC
1	AB	B	0	972	0	0	0
		A	0	-648	0	0	0
		1	0	0	0	0	0
2	BC	C	.615	0	0	0	0
		B	.285	0	0	0	0
		2	0	0	0	0	0
3	CD	D	1	0	0	0	0
		C	0	0	0	0	0
		3	0	0	0	0	0

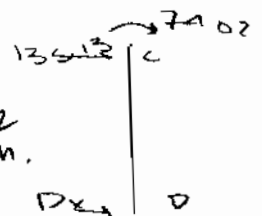
Node	Member	End	DF	FEM	CP	CD	VC
1	AB	B	0	972	0	0	0
		A	0	-648	0	0	0
		1	0	0	0	0	0
2	BC	C	.615	0	0	0	0
		B	.285	0	0	0	0
		2	0	0	0	0	0
3	CD	D	1	0	0	0	0
		C	0	0	0	0	0
		3	0	0	0	0	0

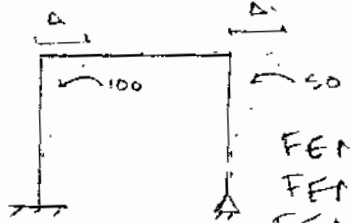
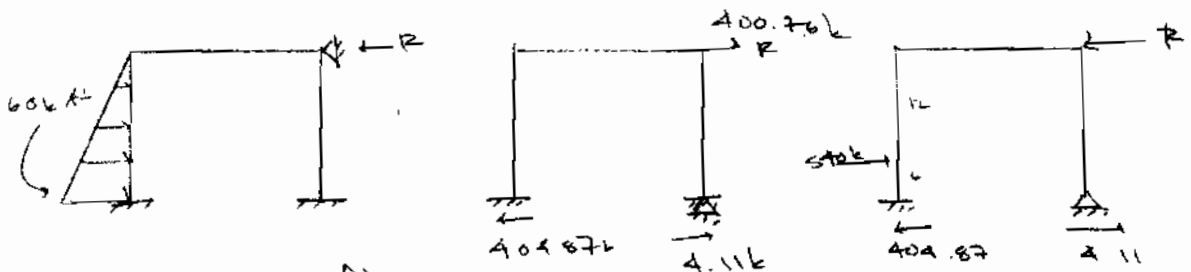
Node	Member	End	DF	FEM	CP	CD	VC
1	AB	B	0	972	0	0	0
		A	0	-648	0	0	0
		1	0	0	0	0	0
2	BC	C	.615	0	0	0	0
		B	.285	0	0	0	0
		2	0	0	0	0	0
3	CD	D	1	0	0	0	0
		C	0	0	0	0	0
		3	0	0	0	0	0



$\sum \mathcal{M}_B = 0 = -325.22 + 540(12) - Ax(18) + 1132.9 \rightarrow Ax = 404.87 \text{ k}$   
 $\sum \mathcal{F}_x = 0 = -404.87 + 540 - Bx \rightarrow Bx = 135.13 \text{ k}$   
 $\sum \mathcal{M}_C = 0 = -71.02 + Bx(12) - Px(18) \rightarrow Px = 135.13 \text{ k}$



Kerf 6



$$R = 404.87 - 4.11 = 400.76 \text{ k}$$

$$FEM_{AB} = -100 \text{ kft}$$

$$FEM_{BA} = -100 \text{ kft}$$

$$FEM_{CD} = -50 \text{ kft}$$

Joint	A	B	C	D
Member	AB	BA	BC	CB
DF	0	.455	.545	.615
FEM	-100	-100	0	-50
		+26.5	+45.5	+30.75
	+22.75	+15.34	+27.75	+19.25
	-7	-9.39	-17.07	-10.68
	-3.54	-8.54	-4.19	-5.34
	+1.94	+3.89	+2.54	+1.61
	-2.29	-1.59	-1.43	-1.9
	+1.65	+3.33	+2.35	+1.45
		+3.33	+2.22	+1.14
		+1.11	+1.19	+0.07
Final (kft)	-78.97	-57.11	58.9	40.76

$$M = ? \quad -2$$