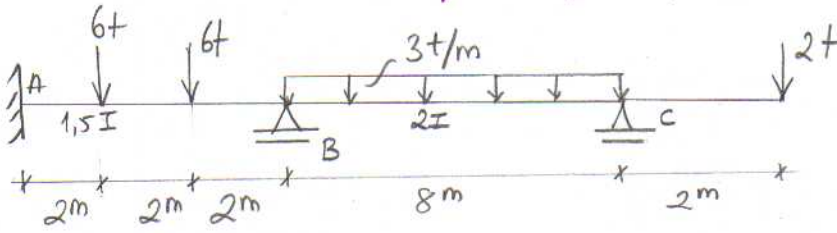


YAPI STATİĞİ UYGULAMA 3

1)



Ua rijitlikleri:

B düğüm noktasında

$$R_{BA} = \frac{4EI}{L} = \frac{4 \times (1,5EI)}{6} = EI$$

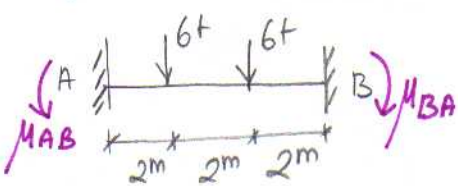
$$R_{BC} = \frac{3EI}{L} = \frac{3 \times (2EI)}{8} = 0,75EI$$

Dagıtma katsayıları:

$$\text{B dn} \rightarrow k_{BA} = \frac{EI}{EI + 0,75EI} = 0,57$$

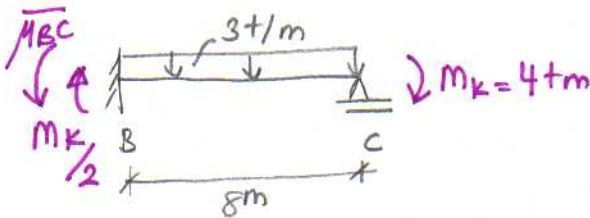
$$k_{BC} = \frac{0,75EI}{EI + 0,75EI} = 0,43$$

Ankastrelik momentler:



$$M_{AB} = \frac{2Pl}{9} = \frac{2 \times 6 \times 6}{9} = 8 \text{ tm}$$

$$M_{BA} = -\frac{2Pl}{9} = -8 \text{ tm}$$



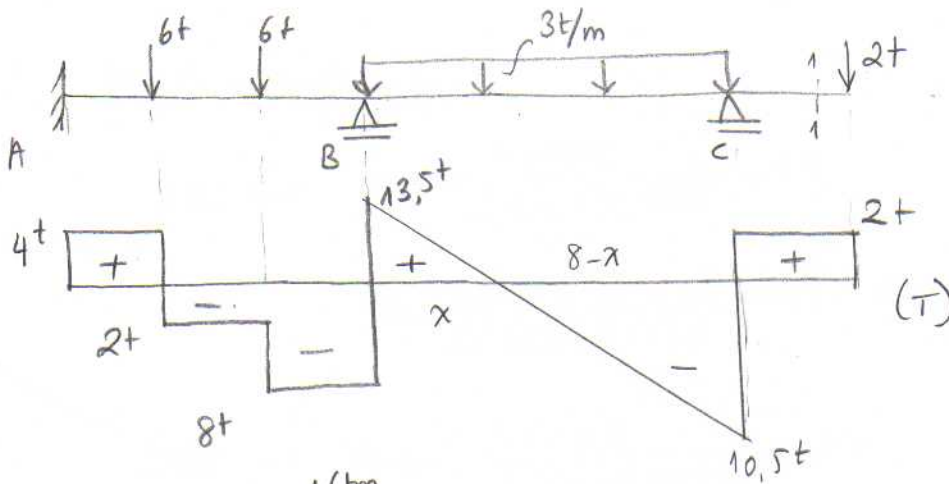
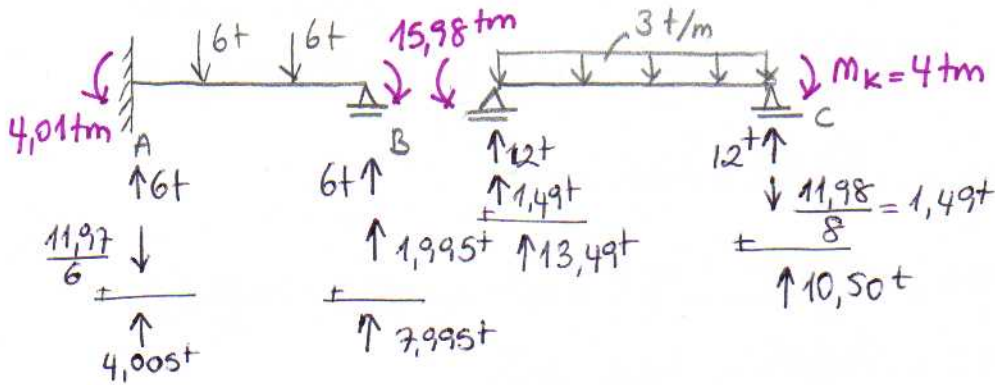
$$M_{BC} = \bar{M}_{BC} - \frac{m_k}{2} = \frac{pl^2}{8} - \frac{m_k}{2}$$

$$M_{BC} = \frac{3 \times 8^2}{8} - \frac{4}{2} = 22 \text{ tm}$$

A	B	C
$\frac{1}{2}$		0
B-A	B-C	
0,57	0,43	
8	-8	22
-3,99	-7,98	-6,02
4,01	-15,98	15,98
(-)		(-)

$\uparrow (+)$ kuvvet yöntemi

$\downarrow (+)$ yerdeğiştirme yöntemi



1.1 kesimi

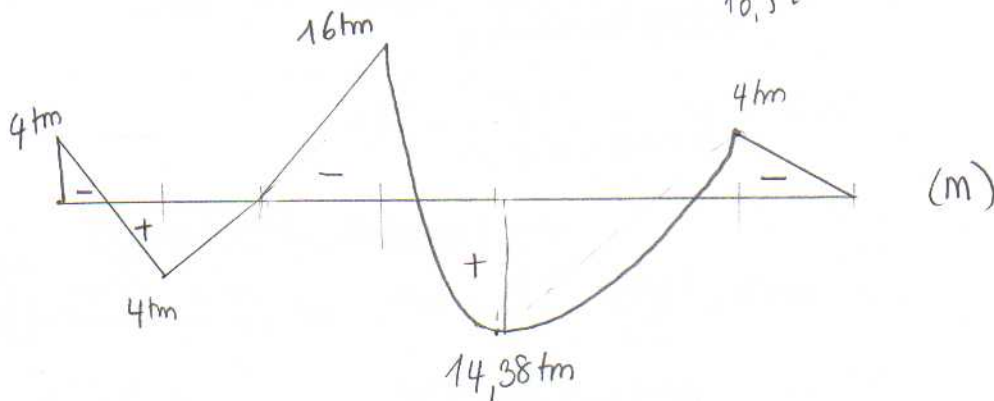
$$\uparrow \downarrow 2t$$

$$\uparrow \Sigma Y = 0$$

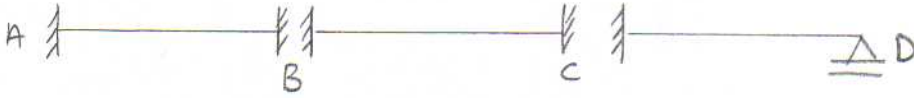
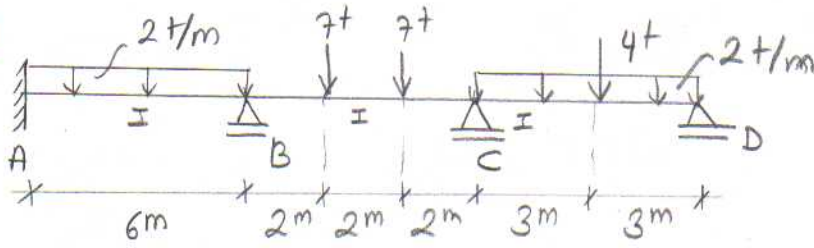
$$T = 2t$$

$$\frac{x}{8-x} = \frac{13,5}{10,5} \quad x = 4,5m$$

$$8-x = 3,5m$$



2)



Uç rijitlikleri:

B düğüm noktası $\rightarrow R_{BA} = \frac{4EI}{L} = \frac{4 \times (EI)}{6} = 0,67EI$

$R_{BC} = \frac{4EI}{L} = \frac{4 \times (EI)}{6} = 0,67EI$

C düğüm noktası $\rightarrow R_{BC} = \frac{4EI}{L} = \frac{4 \times (EI)}{6} = 0,67EI$

$R_{CD} = \frac{3EI}{L} = \frac{3 \times (EI)}{6} = 0,5EI$

Dagıtma katsayıları:

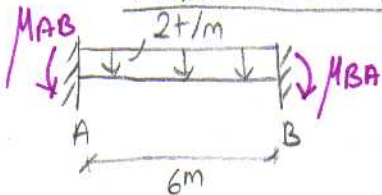
B dn $\rightarrow k_{BA} = \frac{0,67EI}{0,67EI + 0,67EI} = 0,5$

$k_{BC} = \frac{0,67EI}{0,67EI + 0,67EI} = 0,5$

C dn $\rightarrow k_{CB} = \frac{0,67EI}{0,67EI + 0,5EI} = 0,57$

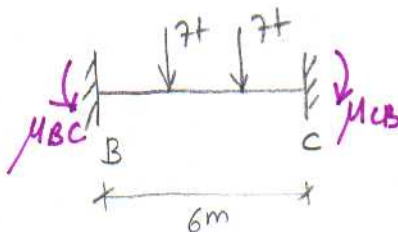
$k_{CD} = \frac{0,5EI}{0,67EI + 0,5EI} = 0,43$

Ankastrelik momentler:



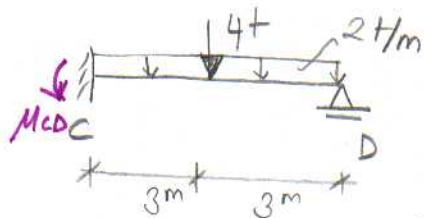
$M_{AB} = \frac{Pl^2}{12} = \frac{2 \times 6^2}{12} = 6tm$

$M_{BA} = -\frac{Pl^2}{12} = -6tm$



$M_{BC} = \frac{2Pl}{9} = \frac{2 \times 7 \times 6}{9} = 9,33tm$

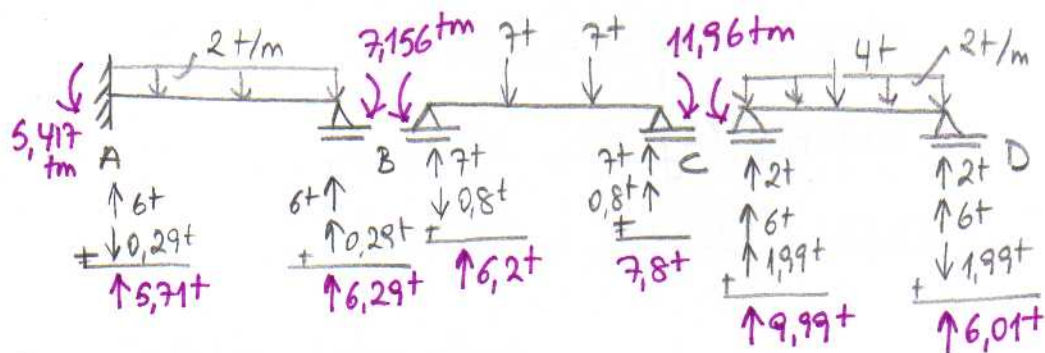
$M_{CB} = -\frac{2Pl}{9} = -9,33tm$

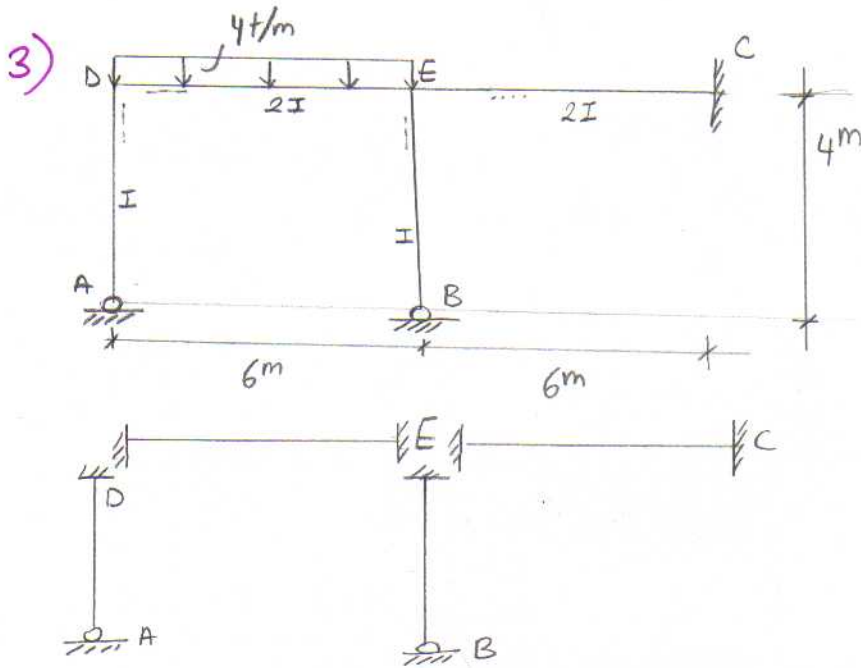


$$M_{CD} = \frac{3Pl}{16} + \frac{pl^2}{8} = \frac{3 \times 4 \times 6}{16} + \frac{2 \times 6^2}{8}$$

$$M_{CD} = 13,5 \text{ tm}$$

A		B		C		D	
		B-A	B-C	C-B	C-D		
		0,5	0,5	0,57	0,43		
6		-6	9,33	-9,33	13,5		
			-1,19	-2,38	-1,79		
-0,54	←	-1,07	-1,07	-0,54			
			0,16	0,31	0,23		
-0,04	←	-0,08	-0,08	-0,04			
			0,012	0,023	0,017		
-0,003	←	-0,006	-0,006	-0,003			
				0,0017	0,0013		
5,417		-7,156	7,156	-11,96	11,96		
(-)			(-)		(-)		





Ua rijiditlikleri:

$$\underline{D \text{ dn}} \rightarrow R_{DA} = \frac{3EI}{L} = \frac{3 \cdot (EI)}{4} = 0,75EI$$

$$R_{DE} = \frac{4EI}{L} = \frac{4 \times (2EI)}{6} = 1,33EI$$

$$\underline{E \text{ dn}} \rightarrow R_{ED} = \frac{4EI}{L} = \frac{4 \times (2EI)}{6} = 1,33EI$$

$$R_{EB} = \frac{3EI}{L} = \frac{3 \times (EI)}{4} = 0,75EI$$

$$R_{EC} = \frac{4EI}{L} = \frac{4 \times (2EI)}{6} = 1,33EI$$

Dağıtma katsayıları:

$$\underline{D \text{ dn}} \rightarrow k_{DA} = \frac{0,75EI}{0,75EI + 1,33EI} = 0,36$$

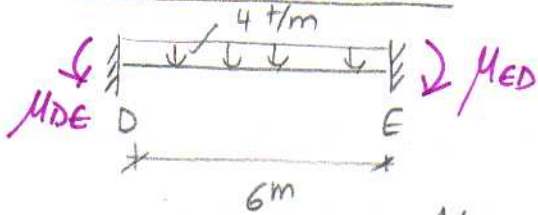
$$k_{DE} = \frac{1,33EI}{0,75EI + 1,33EI} = 0,64$$

$$\underline{E \text{ dn}} \rightarrow k_{ED} = \frac{1,33EI}{1,33EI + 0,75EI + 1,33EI} = 0,39$$

$$k_{EB} = \frac{0,75EI}{1,33EI + 0,75EI + 1,33EI} = 0,22$$

$$k_{EC} = \frac{1,33EI}{1,33EI + 0,75EI + 1,33EI} = 0,39$$

Ankastrelük moment:

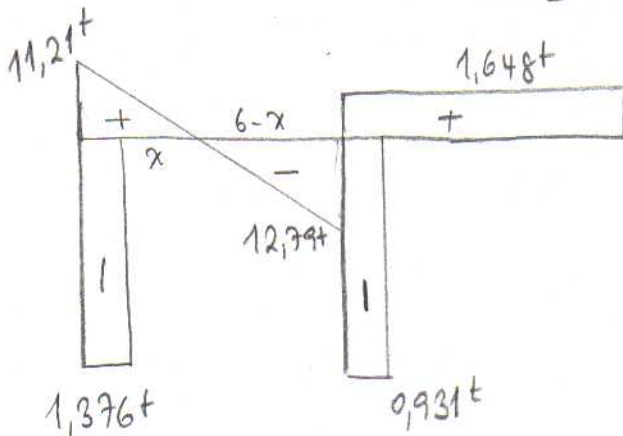
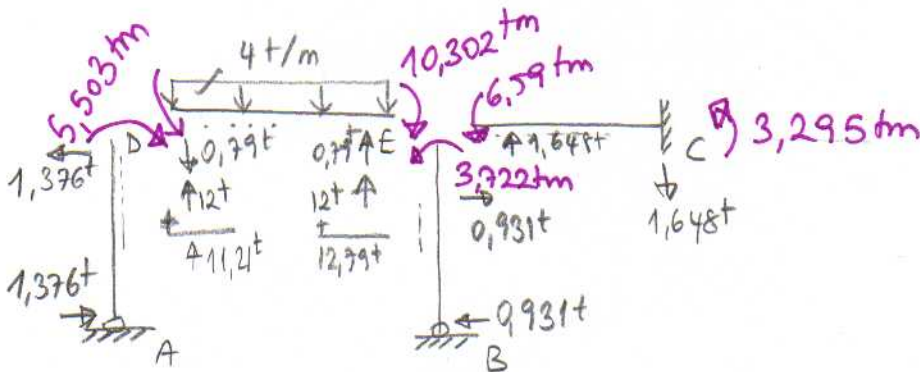


$$M_{DE} = \frac{Pl^2}{12} = \frac{4 \times 6^2}{12} = 12 \text{ tm}$$

$$M_{ED} = \frac{-Pl^2}{12} = \frac{-4 \times 6^2}{12} = -12 \text{ tm}$$

A	D			E			C
	D-A	D-E		E-D	E-B	E-C	
	0,36	0,64		0,39	0,22	0,39	
	-4,32	12 -7,68	→	-12 -3,84			
		3,09	←	6,18	+3,49	6,18	→ 3,09
	-1,11	-1,98	→	-0,99			
		0,193	←	0,386	0,218	0,386	→ 0,193
	-0,069	-0,124	→	-0,062			
		0,012	←	0,024	0,014	0,024	→ 0,012
	-0,0043	-0,0077		-10,302	3,722	6,59	
	-5,503	5,503 (-)			(-)	(-)	3,295

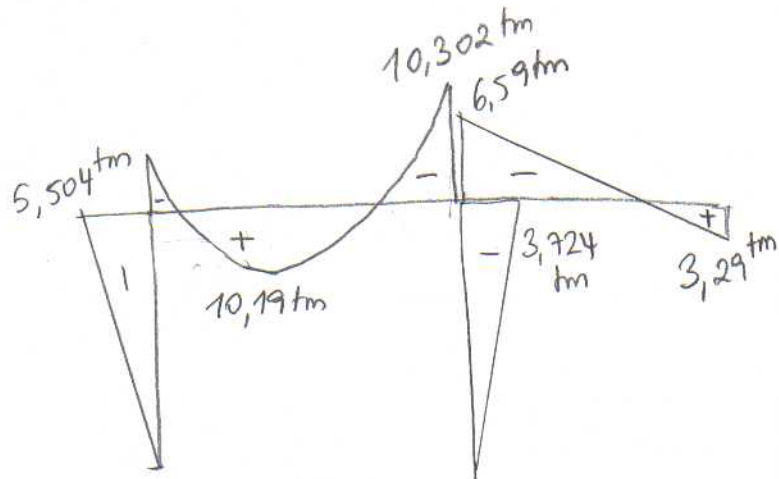
$10,302 \text{ tm}$
 $\leftarrow \begin{matrix} E \\ \hline R \end{matrix} \rightarrow 6,59 \text{ tm}$
 $3,722 \text{ tm}$
 $\sum M_E \approx 0$



(T)

$$\frac{x}{6-x} = \frac{11,21}{12,79}$$

$$x = 2,80 \text{ m} \quad 6-x = 3,20 \text{ m}$$



(M)