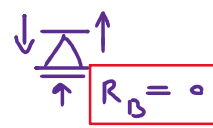


$$M = \frac{3EI}{L} \left(\theta_B - \frac{\Delta}{L} \right) + FEM$$



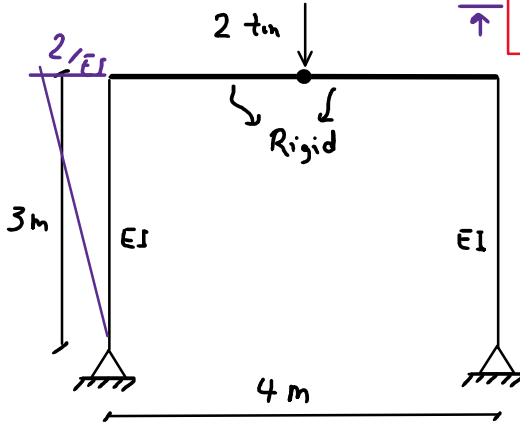
مثال: $\theta_B, \theta_C, R_B = ?$

$$\frac{M}{2} = \frac{3EI}{L} \theta_B \rightarrow \theta_B = \frac{ML}{6EI}$$

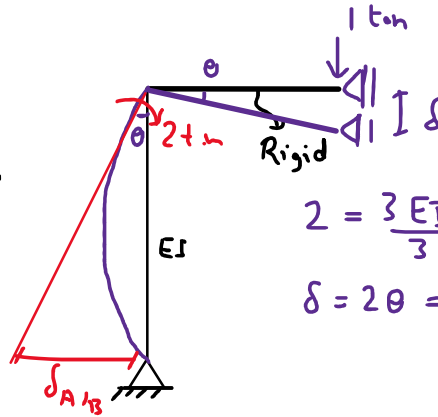
$$M_{C0} = \frac{2EI}{L} (2\theta_C + \theta_B) = 0 \rightarrow \theta_C = -\frac{\theta_B}{2}$$

$$\theta_C = \frac{ML}{12EI}$$

مثال: تغییر مکان قائم زیر بار متمرکز را محاسبه کنید.



$$EI = 1000 \text{ t.m}^2$$

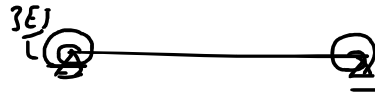


$$2 = \frac{3EI}{3} \theta \rightarrow \theta = \frac{2}{EI} = 0.002$$

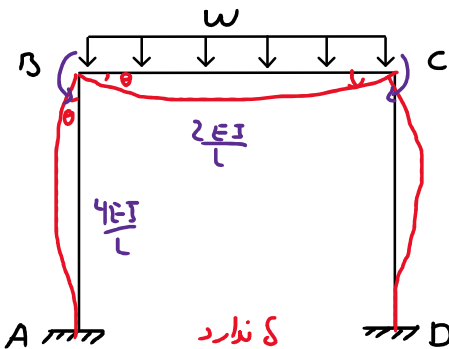
$$\delta = 2\theta = \frac{4}{EI} = 0.004 \text{ m}$$

$$\delta_{A/B} = \frac{1}{2} (2)(3)(2) = \frac{6}{EI}$$

$$\theta = \frac{\delta_{A/B}}{3} = \frac{2}{EI}$$

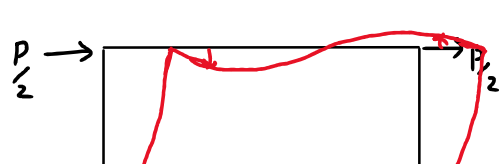
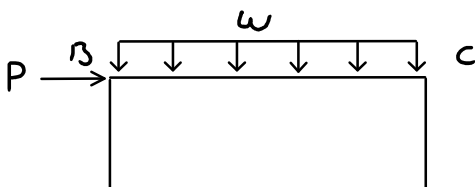
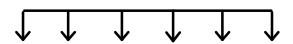


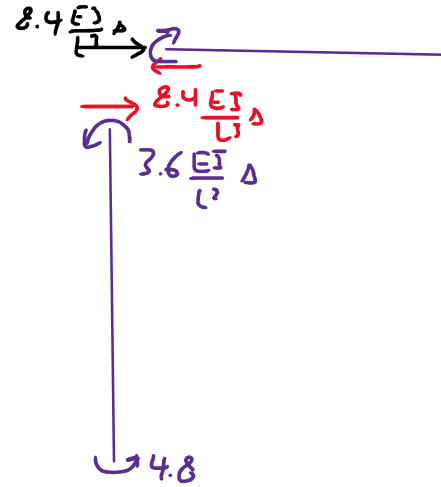
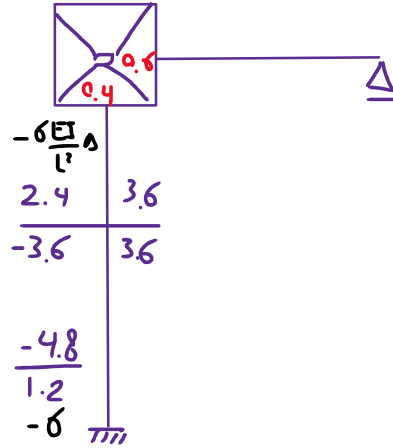
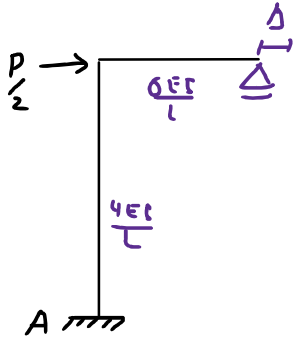
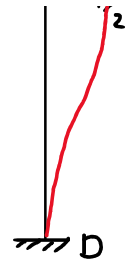
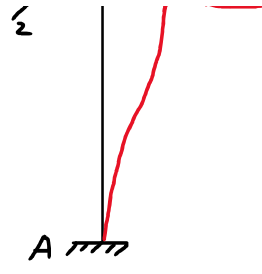
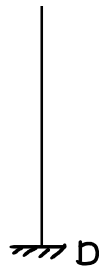
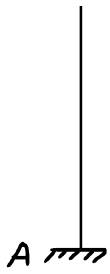
مثال: $\theta_B, M_B = ?$



$$\theta_B = \frac{wL^2}{12} = \frac{wL^3}{72EI}$$

$$M_B = \frac{2}{3} \times \frac{wL^2}{12} = \frac{wL^2}{18}$$





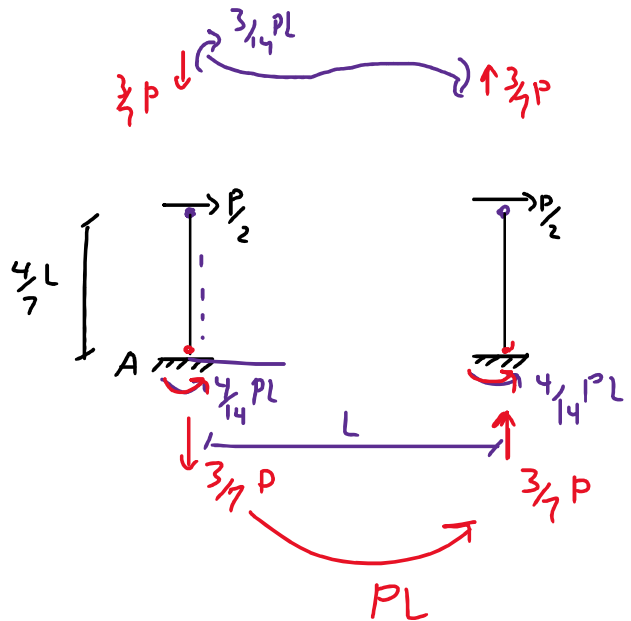
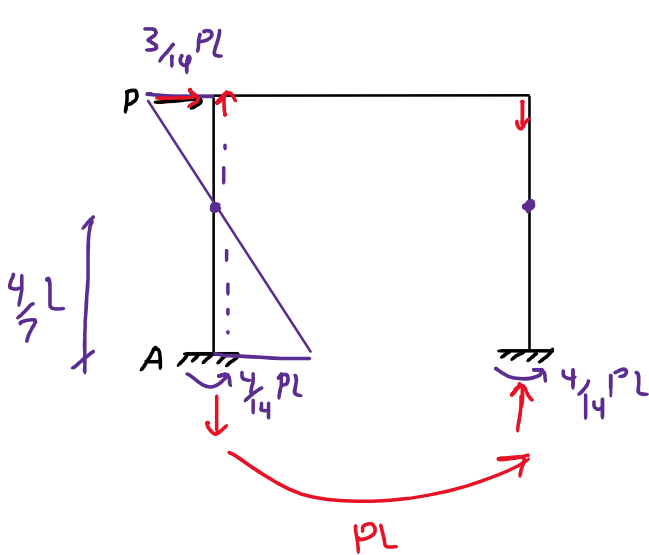
$$\frac{P}{2} = 8.4 \frac{EI}{L^3} \Delta \rightarrow \Delta = \frac{1}{16.8} \frac{PL^3}{EI} = \frac{5}{84} \frac{PL^3}{EI}$$

$$\frac{3.6}{L^2} EI \Delta = \frac{6}{L} EI \theta \rightarrow \theta = 0.6 \frac{\Delta}{L} = \frac{3}{10} \times \frac{5}{84} \frac{PL^2}{EI} = \frac{1}{28} \frac{PL^2}{EI} \quad \theta = \frac{6EI \Delta}{10EI L}$$

$$\theta_A = \frac{-WL^3}{72EI} + \frac{PL^2}{28EI}$$

$$M_B = 3.6 \frac{EI}{L^2} \Delta = \frac{3.6}{2 \cdot 10} \times \frac{5}{84} PL = \frac{3}{14} PL$$

$$M_D = -\frac{WL^2}{18} + \frac{3}{14} PL$$

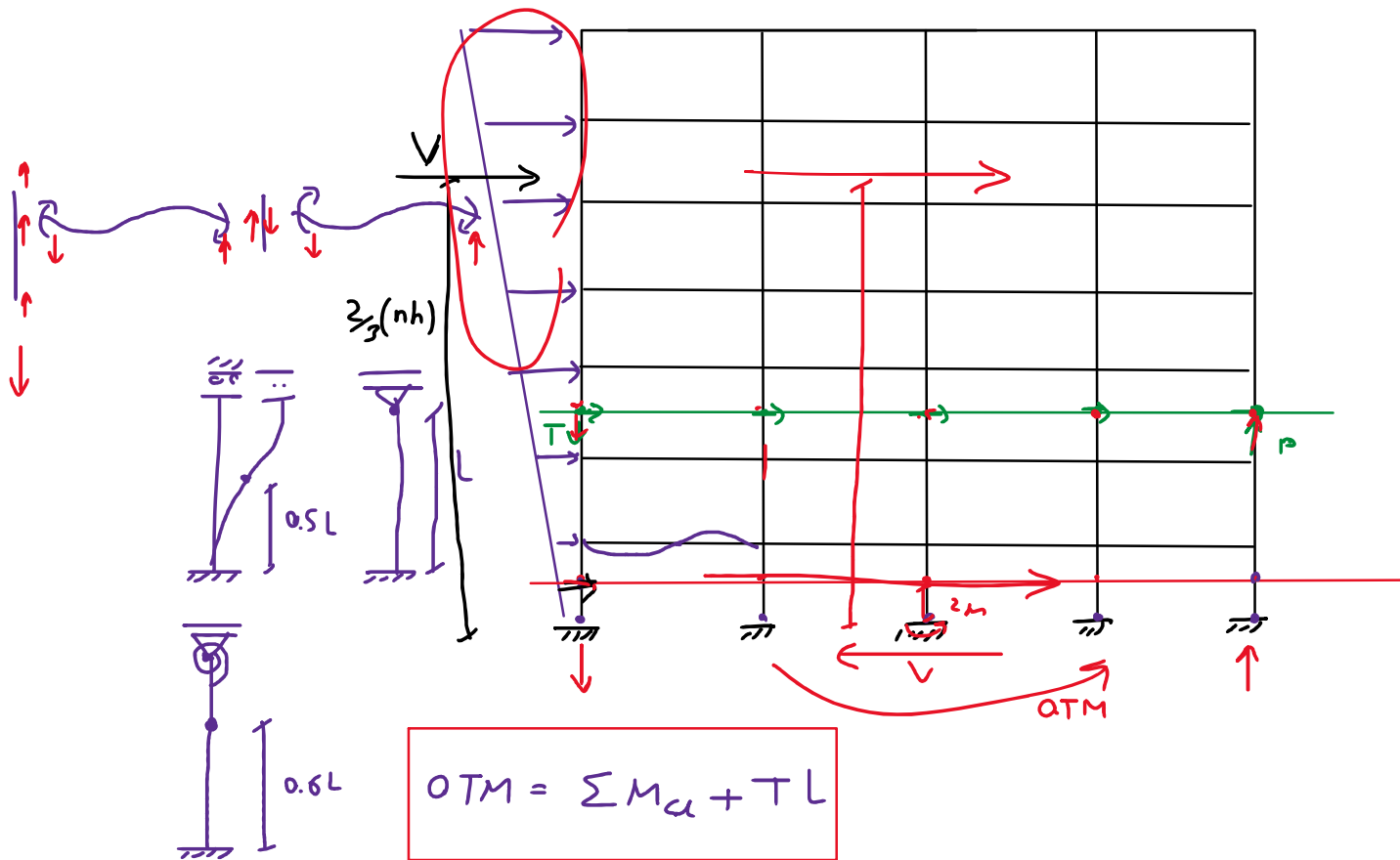


$$TL = OTM - \sum M_{cl}$$

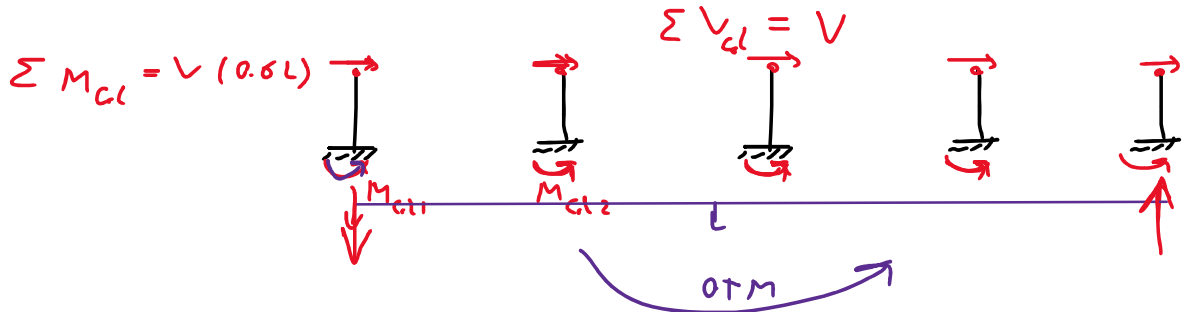
$$TL = PL - 2 \times \frac{2}{7} PL \rightarrow T = \frac{3}{7} P$$

$\frac{3}{7} PL$ کوپن ببرد
 $\frac{4}{7} PL$ کنده بستن

سمم از OTM



$$OTM = \sum M_{cl} + TL$$



$$V\left(\frac{2}{3}nh\right) = \underline{V(0.5h)} + TL$$

$$* TL = V\left(\frac{2}{3}n - 0.5\right)h$$

$\underline{0.17}h$ کوپن ببرد
 $\underline{0.6}h$ کنده بستن

سمم از OTM