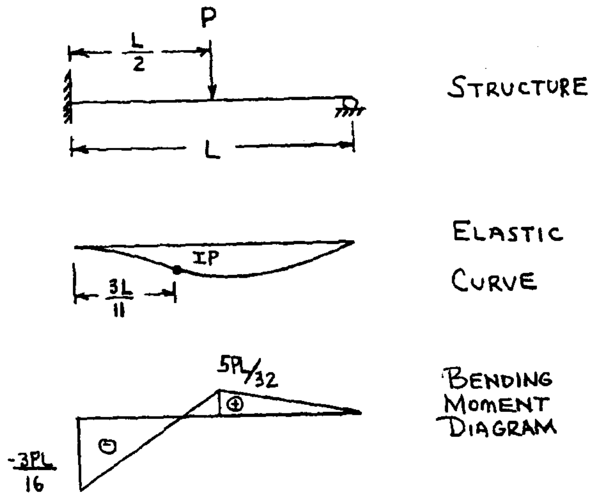
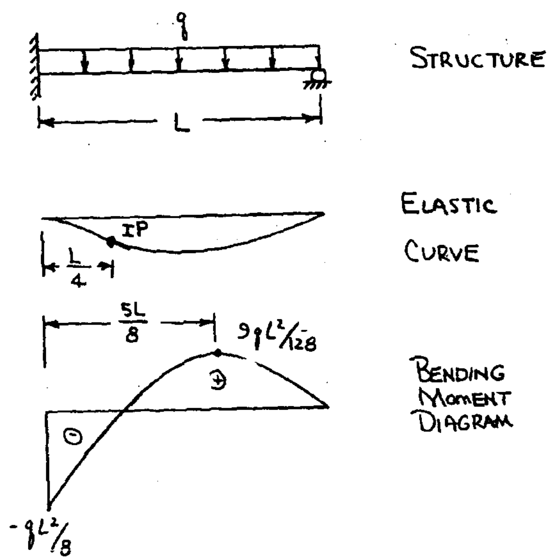
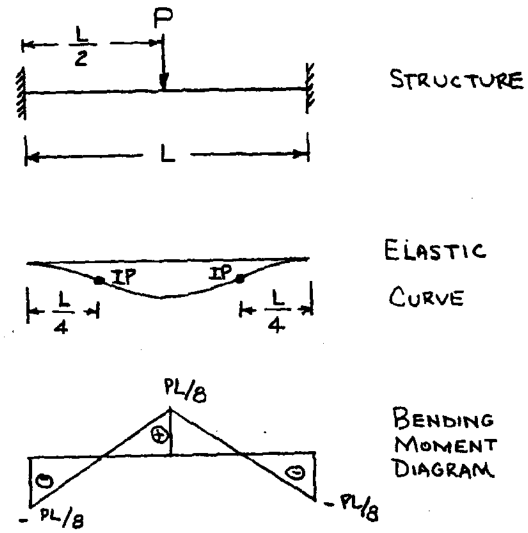
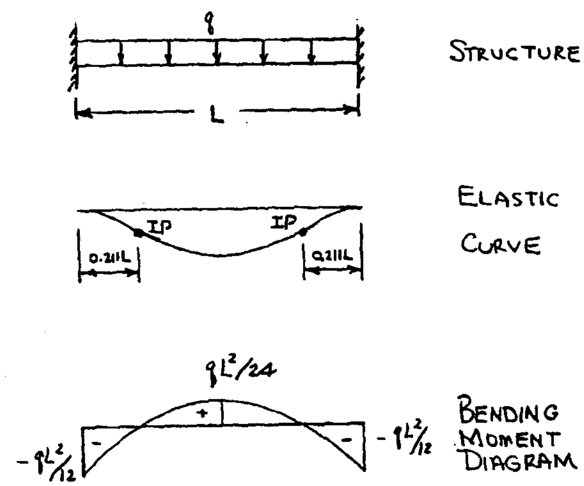

P
L/2
L
IP
3L/11
5PL/32
-3PL/16
STRUCTURE
ELASTIC CURVE
BENDING MOMENT DIAGRAM


q
L
IP
L/4
5L/8
9qL²/128
-qL²/8
STRUCTURE
ELASTIC CURVE
BENDING MOMENT DIAGRAM

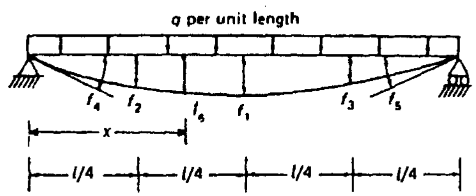

P
L/2
L
IP
IP
L/4
L/4
PL/8
-PL/8
-PL/8
STRUCTURE
ELASTIC CURVE
BENDING MOMENT DIAGRAM


q
L
IP
IP
0.211L
0.211L
qL²/24
-qL²/12
-qL²/12
STRUCTURE
ELASTIC CURVE
BENDING MOMENT DIAGRAM

Displacements of prismatic members

A. Ghali and A.M. Neville
Structural Analysis: A Unified Classical and Matrix Approach, 5th Edition
E&FN Spon, 2005

The following table gives the displacements in beams of constant flexural rigidity EI and constant torsional rigidity GJ, subjected to the loading shown on each beam. The positive directions of the displacements are downward for translation, clockwise for rotation. The deformations due to shearing forces are neglected.

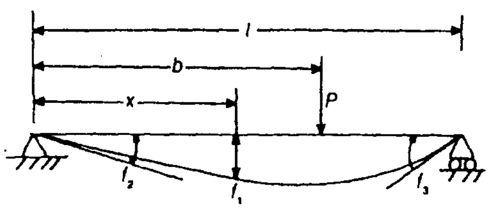


$$f_1 = \frac{5}{384}\frac{ql^4}{EI}$$

$$f_2 = f_3 = \frac{19}{2048}\frac{ql^4}{EI}$$

$$f_4 = -f_5 = \frac{ql^3}{24EI}$$

$$f_6 = \frac{qx}{24EI}(l^3 - 2lx^2 + x^3)$$

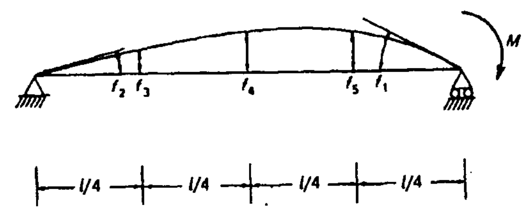


$$f_1 = \frac{P(l-b)x}{6lEI}(2lb - b^2 - x^2) \qquad \text{when } x \leqslant b$$

$$f_1 = \frac{Pb(l-x)}{6lEI}(2lx - x^2 - b^2) \qquad \text{when } x \geqslant b$$

$$f_2 = \frac{Pb(l-b)}{6lEI}(2l-b) \qquad f_3 = -\frac{Pb}{6lEI}(l^2 - b^2)$$

When $b = l/2$, $f_2 = -f_3 = Pl^2/(16EI)$, and $f_1 = Pl^3/48EI$ at $x = l/2$.



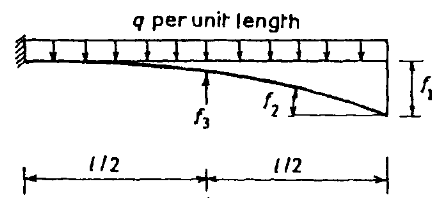
$$f_1 = \frac{Ml}{3EI}$$

$$f_2 = -\frac{Ml}{6EI}$$

$$f_3 = -\frac{15Ml^2}{384EI}$$

$$f_4 = -\frac{Ml^2}{16EI}$$

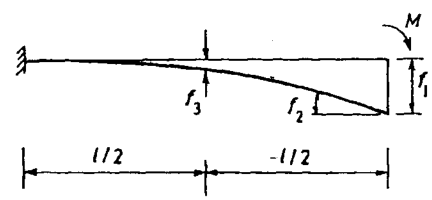
$$f_5 = -\frac{21Ml^2}{384EI}$$



$$f_1 = \frac{ql^4}{8EI}$$

$$f_2 = \frac{ql^3}{6EI}$$

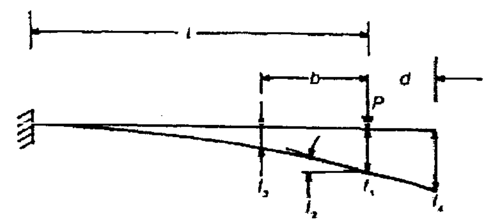
$$f_3 = \frac{17ql^4}{384EI}$$



$$f_1 = \frac{Ml^2}{2EI}$$

$$f_2 = \frac{Ml}{EI}$$

$$f_3 = \frac{Ml^2}{8EI}$$



$$f_1 = \frac{Pl^3}{3EI}$$

$$f_2 = Pl^2/2EI$$

$$f_4 = f_1 + df_2$$

$$f_3 = \frac{Pl^3}{3EI}\left(1 - \frac{3b}{2l} + \frac{b^3}{2l^3}\right)$$

for $0 \leqslant b \leqslant l$