Table 3–22c

tinuous Beams

and Shear Coefficients – pans, Equally Loaded

Uniform Load — Shear in terms of *wl*

0.13 0.5 0.5 0.13 0.5 0.5 0.13 0.5 0.5

0.14 0.5 0.5 0.5 0.5 0.5 0.14 0.5 0.5

0.11 0.17 0.15 0.13 0.13 0.15 0.17 0.11 0.11

.078

0.15 0.23 0.20 0.18 0.19 0.18 0.20 0.23 0.15 0.15

.106 +.078

0.41 0.63 0.55 0.49 0.51 0.53 0.53 0.51 0.49 0.55 0.63 0.41 0.41

-.106 +.078

0.56 0.86 0.75 0.67 0.70 0.72 0.71 0.71 0.72 0.70 0.67 0.75 0.86 0.56 0.56

Concentrated Loads at center — Shear in terms of *P*

.31 .69 .69 .31

.35 .65 .50 .50 .65 .35

+.171

.34 .66 .54 .46 .50 .50 .46 .54 .66 .34

Concentrated Loads at third points — Shear in terms of *P*

.67 1.33 1.33 .67

.73 1.27 1.0 1.0 1.27 .73

+.0146 +.24

.72 1.28 1.07 .93 1.0 1.0 .93 1.07 1.28 .72

Concentrated Loads at quarter points — Shear in terms of *P*

1.03 1.97 1.97 1.03

1.13 1.87 1.50 1.50 1.87 1.13

+.303

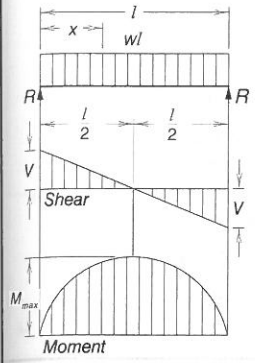
+.079 -.277

1.11 1.89 1.60 1.40 1.50 1.50 1.40 1.60 1.89 1.11

Table 3–23

Shears, Moments, and Deflections

1. SIMPLE BEAM — UNIFORMLY DISTRIBUTED LOAD



Total Equiv. Uniform Load ..... $= wl$

$R = V$ ..... $= \frac{wl}{2}$

V_x ..... $= w\left(\frac{l}{2} - x\right)$

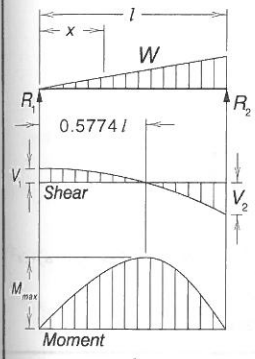
M_{max} (at center) ..... $= \frac{wl^2}{8}$

M_x ..... $= \frac{wx}{2}(l - x)$

Δ_{max} (at center) ..... $= \frac{5\,wl^4}{384\,EI}$

Δ_x ..... $= \frac{wx}{24\,EI}\left(l^3 - 2lx^2 + x^3\right)$

2. SIMPLE BEAM — LOAD INCREASING UNIFORMLY TO ONE END



Total Equiv. Uniform Load ..... $= \frac{16\,W}{9\sqrt{3}} = 1.03\,W$

$R_1 = V_1$ ..... $= \frac{W}{3}$

$R_2 = V_2 = V_{max}$ ..... $= \frac{2W}{3}$

V_x ..... $= \frac{W}{3} - \frac{Wx^2}{l^2}$

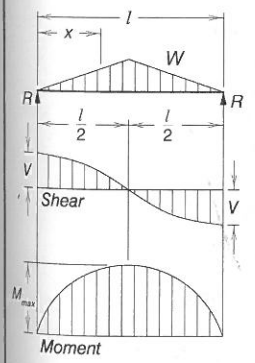
M_{max} $\left(\text{at } x = \frac{l}{\sqrt{3}} = 0.557\,l\right)$ ..... $= \frac{2\,Wl}{9\sqrt{3}} = 0.128\,Wl$

M_x ..... $= \frac{Wx}{3l^2}\left(l^2 - x^2\right)$

Δ_{max} $\left(\text{at } x = l\sqrt{1 - \sqrt{\frac{8}{15}}} = 0.519\,l\right)$ ..... $= 0.0130\,\frac{Wl^3}{EI}$

Δ_x ..... $= \frac{Wx}{180\,EIl^2}\left(3x^4 - 10l^2x^2 + 7l^4\right)$

3. SIMPLE BEAM — LOAD INCREASING UNIFORMLY TO CENTER



Total Equiv. Uniform Load ..... $= \frac{4W}{3}$

$R = V$ ..... $= \frac{W}{2}$

V_x (when $x < \frac{l}{2}$) ..... $= \frac{W}{2l^2}\left(l^2 - 4x^2\right)$

M_{max} (at center) ..... $= \frac{Wl}{6}$

M_x (when $x < \frac{l}{2}$) ..... $= Wx\left(\frac{1}{2} - \frac{2x^2}{3l^2}\right)$

Δ_{max} (at center) ..... $= \frac{Wl^3}{60\,EI}$

Δ_x (when $x < \frac{l}{2}$) ..... $= \frac{Wx}{480\,EIl^2}\left(5l^2 - 4x^2\right)^2$