ıble 3–23 (continued)
ɔments, and Deflections

ᴧD PARTIALLY DISTRIBUTED

$= V_1$ (max. when $a < c$) .... $= \frac{wb}{2l}(2c+b)$

$= V_2$ (max. when $a > c$) .... $= \frac{wb}{2l}(2a+b)$

(when $x > a$ and $< (a+b)$) .... $= R_1 - w(x-a)$

ıx $\left(\text{at } x = a + \frac{R_1}{w}\right)$ .... $= R_1\left(a + \frac{R_1}{2w}\right)$

(when $x < a$) .... $= R_1 x$

(when $x > a$ and $< (a+b)$) .... $= R_1 x - \frac{w}{2}(x-a)^2$

(when $x > (a+b)$) .... $= R_2(l-x)$

ιD PARTIALLY DISTRIBUTED AT ONE END

$V_1 = V_{max}$ .... $= \frac{wa}{2l}(2l-a)$

V_2 .... $= \frac{wa^2}{2l}$

(when $x < a$) .... $= R_1 - wx$

ϰ $\left(\text{at } x = \frac{R_1}{w}\right)$ .... $= \frac{R_1^2}{2w}$

(when $x < a$) .... $= R_1 x - \frac{wx^2}{2}$

(when $x > a$) .... $= R_2(l-x)$

(when $x < a$) .... $= \frac{wx}{24EIl}\left(a^2(2l-a)^2 - 2ax^2(2l-a) + lx^3\right)$

(when $x > a$) .... $= \frac{wa^2(l-x)}{24EIl}\left(4xl - 2x^2 - a^2\right)$

D PARTIALLY DISTRIBUTED AT EACH END

V_1 .... $= \frac{w_1 a(2l-a) + w_2 c^2}{2l}$

V_2 .... $= \frac{w_2 c(2l-c) + w_1 a^2}{2l}$

(when $x < a$) .... $= R_1 - w_1 x$

(when $a < x < (a+b)$) .... $= R_1 - w_1 a$

(when $x > (a+b)$) .... $= R_2 - w_2(l-x)$

$\left(\text{at } x = \frac{R_1}{w_1}, \text{when } R_1 < w_1 a\right)$ .... $= \frac{R_1^2}{2w_1}$

$\left(\text{at } x = l - \frac{R_2}{w_2}, \text{when } R_2 < w_2 c\right)$ $= \frac{R_2^2}{2w_2}$

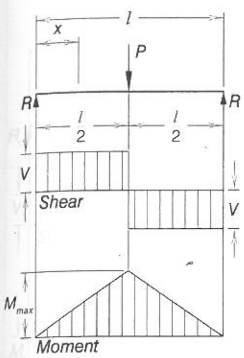
(when $x < a$) .... $= R_1 x - \frac{w_1 x^2}{2}$

(when $a < x < (a+b)$) .... $= R_1 x - \frac{w_1 a}{2}(2x-a)$

(when $x > (a+b)$) .... $= R_2(l-x) - \frac{w_2(l-x)^2}{2}$

Table 3–23 (continued)
Shears, Moments, and Deflections

7. SIMPLE BEAM — CONCENTRATED LOAD AT CENTER



Total Equiv. Uniform Load .... $= 2P$

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

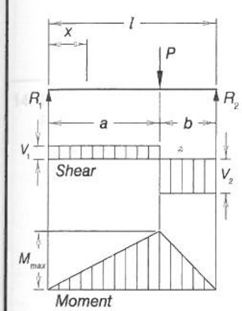
M_{max} (at point of load) .... $= \frac{Pl}{4}$

M_x (when $x < \frac{l}{2}$) .... $= \frac{Px}{2}$

Δ_{max} (at point of load) .... $= \frac{Pl^3}{48EI}$

Δ_x (when $x < \frac{l}{2}$) .... $= \frac{Px}{48EI}(3l^2 - 4x^2)$

8. SIMPLE BEAM — CONCENTRATED LOAD AT ANY POINT



Total Equiv. Uniform Load .... $= \frac{8Pab}{l^2}$

$R_1 = V_1$ ($= V_{max}$ when $a < b$) .... $= \frac{Pb}{l}$

$R_2 = V_2$ ($= V_{max}$ when $a > b$) .... $= \frac{Pa}{l}$

M_{max} (at point of load) .... $= \frac{Pab}{l}$

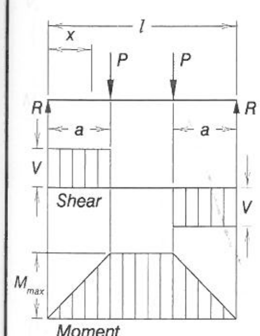
M_x (when $x < a$) .... $= \frac{Pbx}{l}$

Δ_{max} $\left(\text{at } x = \sqrt{\frac{a(a+2b)}{3}}, \text{when } a > b\right)$ .... $= \frac{Pab(a+2b)\sqrt{3a(a+2b)}}{27EIl}$

Δ_a (at point of load) .... $= \frac{Pa^2b^2}{3EIl}$

Δ_x (when $x < a$) .... $= \frac{Pbx}{6EIl}(l^2 - b^2 - x^2)$

9. SIMPLE BEAM — TWO EQUAL CONCENTRATED LOADS SYMMETRICALLY PLACED



Total Equiv. Uniform Load .... $= \frac{8Pa}{l}$

$R = V$ .... $= P$

M_{max} (between loads) .... $= Pa$

M_x (when $x < a$) .... $= Px$

Δ_{max} (at center) .... $= \frac{Pa}{24EI}(3l^2 - 4a^2)$

Δ_{max} (when $a = \frac{l}{3}$) .... $= \frac{Pl^3}{28EI}$

Δ_x (when $x < a$) .... $= \frac{Px}{6EI}(3la - 3a^2 - x^2)$

Δ_x (when $a < x < (l-a)$) .... $= \frac{Pa}{6EI}(3lx - 3x^2 - a^2)$