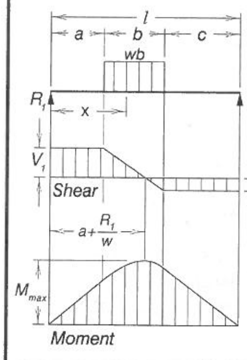
Table 3–23 (continued)
Shears, Moments, and Deflections

4. SIMPLE BEAM — UNIFORM LOAD PARTIALLY DISTRIBUTED



$R_1 = V_1$ (max. when $a < c$) .... $= \dfrac{wb}{2l}(2c + b)$

$R_2 = V_2$ (max. when $a > c$) .... $= \dfrac{wb}{2l}(2a + b)$

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

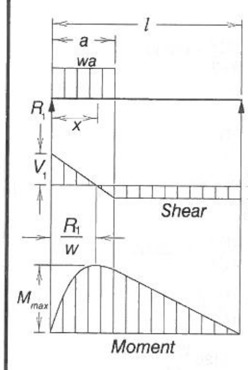
M_{max} $\left(\text{at } x = a + \dfrac{R_1}{w}\right)$ .... $= R_1\left(a + \dfrac{R_1}{2w}\right)$

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

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

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

5. SIMPLE BEAM — UNIFORM LOAD PARTIALLY DISTRIBUTED AT ONE END



$R_1 = V_1 = V_{max}$ .... $= \dfrac{wa}{2l}(2l - a)$

$R_2 = V_2$ .... $= \dfrac{wa^2}{2l}$

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

M_{max} $\left(\text{at } x = \dfrac{R_1}{w}\right)$ .... $= \dfrac{R_1^2}{2w}$

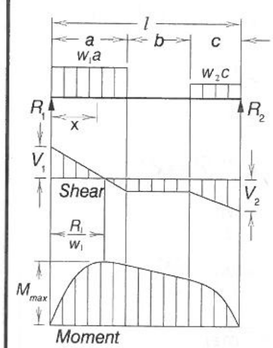
M_x (when $x < a$) .... $= R_1 x - \dfrac{wx^2}{2}$

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

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

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

6. SIMPLE BEAM — UNIFORM LOAD PARTIALLY DISTRIBUTED AT EACH END



$R_1 = V_1$ .... $= \dfrac{w_1 a(2l - a) + w_2 c^2}{2l}$

$R_2 = V_2$ .... $= \dfrac{w_2 c(2l - c) + w_1 a^2}{2l}$

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

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

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

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

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

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

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

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