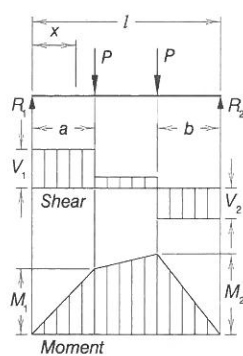


Table 3-23 (continued)
Shears, Moments, and Deflections

10. SIMPLE BEAM — TWO EQUAL CONCENTRATED LOADS UNSYMMETRICALLY PLACED



$$R_1 = V_1 (= V_{max} \text{ when } a < b) \dots\dots\dots = \frac{P}{l}(l - a + b)$$

$$R_2 = V_2 (= V_{max} \text{ when } a > b) \dots\dots\dots = \frac{P}{l}(l - b + a)$$

$$V_x \text{ (when } a < x < (l - b)) \dots\dots\dots = \frac{P}{l}(b - a)$$

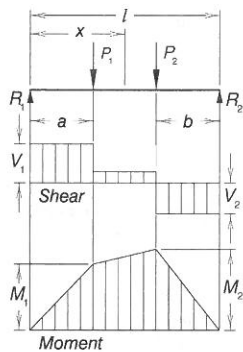
$$M_1 \text{ (= } M_{max} \text{ when } a > b) \dots\dots\dots = R_1 a$$

$$M_2 \text{ (= } M_{max} \text{ when } a < b) \dots\dots\dots = R_2 b$$

$$M_x \text{ (when } x < a) \dots\dots\dots = R_1 x$$

$$M_x \text{ (when } a < x < (l - b)) \dots\dots\dots = R_1 x - P(x - a)$$

11. SIMPLE BEAM — TWO UNEQUAL CONCENTRATED LOADS UNSYMMETRICALLY PLACED



$$R_1 = V_1 \dots\dots\dots = \frac{P_1(l - a) + P_2 b}{l}$$

$$R_2 = V_2 \dots\dots\dots = \frac{P_1 a + P_2(l - b)}{l}$$

$$V_x \text{ (when } a < x < (l - b)) \dots\dots\dots = R_1 - P_1$$

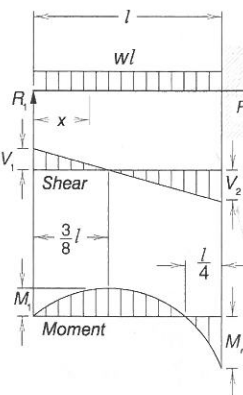
$$M_1 \text{ (= } M_{max} \text{ when } R_1 < P_1) \dots\dots\dots = R_1 a$$

$$M_2 \text{ (= } M_{max} \text{ when } R_2 < P_2) \dots\dots\dots = R_2 b$$

$$M_x \text{ (when } x < a) \dots\dots\dots = R_1 x$$

$$M_x \text{ (when } a < x < (l - b)) \dots\dots\dots = R_1 x - P_1(x - a)$$

12. BEAM FIXED AT ONE END, SUPPORTED AT OTHER — UNIFORMLY DISTRIBUTED LOAD



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

$$R_1 = V_1 \dots\dots\dots = \frac{3wl}{8}$$

$$R_2 = V_2 = V_{max} \dots\dots\dots = \frac{5wl}{8}$$

$$V_x \dots\dots\dots = R_1 - wx$$

$$M_{max} \dots\dots\dots = \frac{wl^2}{8}$$

$$M_1 \text{ (at } x = \frac{3l}{8}) \dots\dots\dots = \frac{9}{128}wl^2$$

$$M_x \dots\dots\dots = R_1 x - \frac{wx^2}{2}$$

$$\Delta_{max} \text{ (at } x = \frac{l}{16}(1 + \sqrt{33}) = 0.422l) \dots\dots\dots = \frac{wl^4}{185EI}$$

$$\Delta_x \dots\dots\dots = \frac{wx}{48EI}(l^3 - 3lx^2 + 2x^3)$$