Die Statik im Stahlbetonbau

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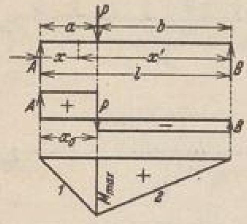
Berlin [u.a.], 1956

Tabellen für die Stütz- und Schnittkräfte des einfachen Balkenträgers und des Freiträgers

Tabelle 6. Balken auf zwei Stützen.

l: Stützweite, $\xi = x/l$, $\xi' = x'/l$; A, B: Stützkräfte; Q_m: Querkraft; M_m: Biegungsmoment im Querschnitt m; x_0: Querschnitt mit dem größten Biegungsmoment M_{max}.

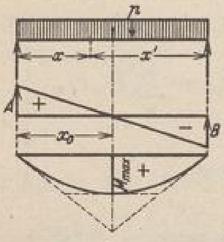
Jede Abbildung zeigt der Reihe nach die Art der Belastung und die Zustandslinien für die Querkraft Q_m und das Biegungsmoment M_m*.



$$A = \frac{P b}{l} \qquad B = \frac{P a}{l} \qquad Q_1 = + \frac{P b}{l} \qquad Q_2 = - \frac{P a}{l}$$

$$M_1 = P b \xi \qquad M_2 = P a \xi'$$

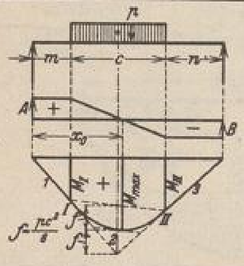
$$x_0 = a \qquad M_{max} = \frac{P a b}{l}$$



$$A = \frac{p l}{2} \qquad B = \frac{p l}{2} \qquad Q = \frac{p l}{2} (1 - 2 \xi)$$

$$M = \frac{p l^2}{2} \omega_R$$

$$x_0 = \frac{l}{2} \qquad M_{max} = \frac{p l^2}{8} = 0{,}125\, p\, l^2$$



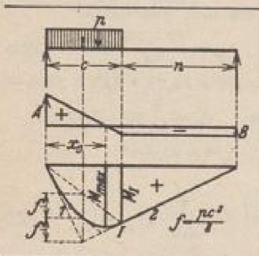
$$A = \frac{p c}{2 l} (2 n + c) \qquad B = \frac{p c}{2 l} (2 m + c)$$

$$Q_1 = A \qquad Q_2 = A - p (x - m) \qquad Q_3 = - B$$

$$M_I = A m \qquad M_{II} = B n \qquad M_1 = A x$$

$$M_2 = M_I \frac{x}{m} - p \frac{(x - m)^2}{2} \qquad M_3 = B x'$$

$$x_0 = m + \frac{c}{2 l} (2 n + c) = m + \frac{A}{p} \qquad M_{max} = M_I + \frac{A^2}{2 p}$$

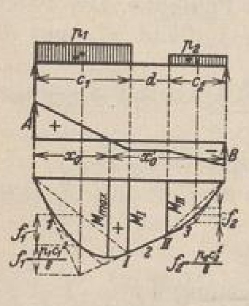


$$A = \frac{p c}{2 l} (2 n + c) \qquad B = \frac{p c^2}{2 l}$$

$$Q_1 = A - p x \qquad Q_2 = - B$$

$$M_I = B n \qquad M_1 = M_I \frac{x}{c} + \frac{p c^2}{2} \omega_R^{(c)} \qquad M_2 = M_I \frac{x'}{n}$$

$$x_0 = \frac{A}{p} \qquad M_{max} = \frac{A^2}{2 p}$$



$$A = p_1 c_1 - R \qquad B = p_2 c_2 + R \qquad R = \frac{p_1 c_1^2 - p_2 c_2^2}{2 l}$$

$$Q_1 = A - p_1 x \qquad Q_2 = - R \qquad Q_3 = - B + p_2 x'$$

$$M_I = \frac{p_1 c_1^2}{2} - R c_1 \qquad M_{II} = \frac{p_2 c_2^2}{2} + R c_2$$

$$M_1 = M_I \frac{x}{c_1} + \frac{p_1 c_1^2}{2} \omega_R^{(c_1)}; \quad M_2 = \frac{p_1 c_1^2}{2} - R x; \quad M_3 = M_{II} \frac{x'}{c_2} + \frac{p_2 c_2^2}{2} \omega_R^{(c_2)}$$

$$\frac{p_1}{p_2} > \frac{c_2^2}{c_1^2}: \qquad x_0 = \frac{A}{p_1} \qquad M_{max} = \frac{A^2}{2 p_1}$$

$$\frac{p_1}{p_2} < \frac{c_2^2}{c_1^2}: \qquad x_0' = \frac{B}{p_2} \qquad M'_{max} = \frac{B^2}{2 p_2}$$

* $\omega_R^{(c)}$ und $\omega_D^{(c)}$ nach Tab. 22 für das Intervall $0 \leq \frac{x}{c} \leq 1$.

Tabelle 6 (Fortsetzung)

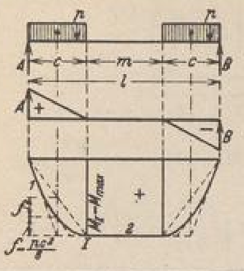
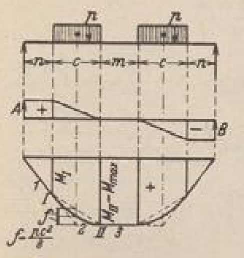
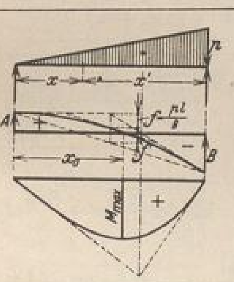
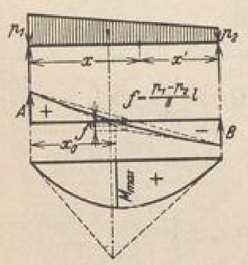
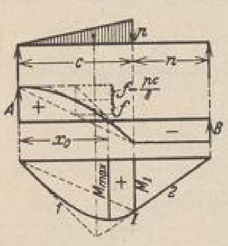
	$A = B = pc \qquad Q_1 = A - px$ $M_I = \frac{pc^2}{2} \qquad M_1 = M_I \frac{x}{c} + \frac{pc^2}{2}\,\omega_R^{(c)} \qquad M_2 = M_I$ $c \leqq x_0 \leqq c + m \qquad M_{\max} = M_I$
	$A = B = pc \qquad Q_1 = A \qquad Q_2 = A - p\,(x - n)$ $M_I = pcn \qquad M_{II} = \frac{pc^2}{2}\left(1 + 2\frac{n}{c}\right)$ $M_1 = pcx \qquad M_2 = \frac{pc^2}{2}\left(\frac{n+x}{c} + \omega_R^{(c)}\right) \qquad M_3 = M_{II}$ $n + c \leqq x_0 \leqq n + c + m \qquad M_{\max} = M_{II}$
	$A = \frac{pl}{6} \qquad B = \frac{pl}{3} \qquad Q = -\frac{pl}{6}\,\omega_M$ $M = \frac{pl^2}{6}\,\omega_D$ $x_0 = \frac{l}{\sqrt{3}} = 0{,}5774\,l \qquad M_{\max} = \frac{pl^2}{9\sqrt{3}} = 0{,}06415\,p\,l^2$
	$A = \frac{2p_1 + p_2}{6}\,l \qquad B = \frac{p_1 + 2p_2}{6}\,l$ $Q = A - \frac{p_1 + p_2}{2}\,l\,\xi - \frac{p_1 - p_2}{2}\,l\,\omega_R$ $M = \frac{l^2}{2}\,p_1\,\omega_R - (p_1 - p_2)\,\frac{l^2}{6}\,\omega_D = \frac{p_1 l^2}{6}\left(\omega_D' + \frac{p_2}{p_1}\,\omega_D\right)$ $x_0 = \frac{1 - \nu}{1 - \mu}\,l \qquad \nu = \sqrt{\frac{p_1^2 + p_1 p_2 + p_2^2}{3p_1^2}} \qquad \mu = \frac{p_2}{p_1}$ $M_{\max} = \frac{p_1 l^2}{6} \cdot \frac{2\nu^3 - \mu\,(1 + \mu)}{(1 - \mu)^2}$
	$A = \frac{pc}{6}\left(3 - 2\frac{c}{l}\right) \qquad B = \frac{pc^2}{3l}$ $Q_1 = A - \frac{pc}{2}\,\frac{x^2}{c^2} \qquad Q_2 = -\frac{pc^2}{3l}$ $M_I = \frac{pc^2}{3l}\,n \qquad M_1 = M_I \frac{x}{c} + \frac{pc^2}{6}\,\omega_D^{(c)} \qquad M_2 = M_I \frac{x'}{n}$ $x_0 = c\sqrt{\frac{A}{pc/2}} = c\sqrt{1 - \frac{2}{3}\,\frac{c}{l}} \qquad M_{\max} = \frac{2}{3}\,A\,x_0 = \frac{p\,x_0^3}{3c}$

Tabelle 6 (Fortsetzung).

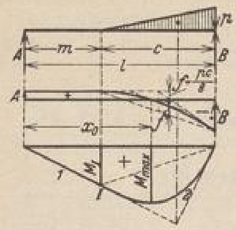
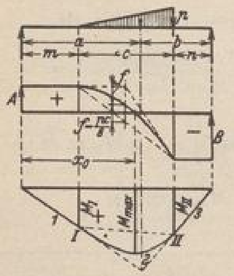
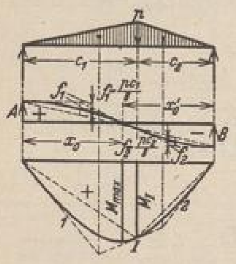
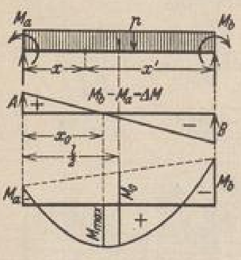
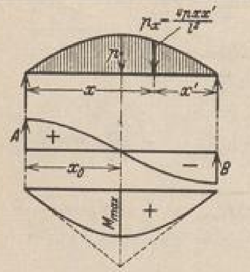
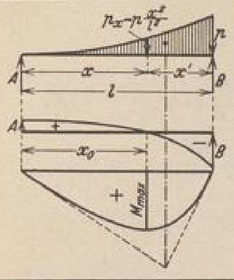
	$A = \frac{pc^2}{6l} \qquad B = \frac{pc}{6}\left(3 - \frac{c}{l}\right)$ $Q_1 = \frac{pc^2}{6l} \qquad Q_2 = A - \frac{pc}{2}\left(\frac{x-m}{c}\right)^2$ $M_I = \frac{pc^2}{6l}m \qquad M_1 = M_I\frac{x}{m} \qquad M_2 = M_I\frac{x'}{c} + \frac{pc^2}{6}\omega_D^{(c)}$ $x_0 = m + c\sqrt{\frac{c}{3l}} \qquad M_{\max} = \frac{pc^2}{6l}\left(m + \frac{2}{3}c\sqrt{\frac{c}{3l}}\right) = A\left(x_0 - \frac{c}{3}\sqrt{\frac{c}{3l}}\right)$
	$A = \frac{pc}{2}\frac{b}{l} \qquad B = \frac{pc}{2}\frac{a}{l}$ $Q_1 = \frac{pc}{2}\frac{b}{l} \qquad Q_2 = A - \frac{p(x-m)}{2} + \frac{pc}{2}\omega_R^{(c)} \qquad Q_3 = -\frac{pc}{2}\frac{a}{l}$ $M_I = \frac{pc}{2}\frac{b}{l}m \qquad M_{II} = \frac{pc}{2}\frac{a}{l}n$ $M_1 = M_I\frac{x}{m} \qquad M_2 = Ax - \frac{pc^2}{6}\left(\frac{x-m}{c}\right)^3 \qquad M_3 = M_{II}\frac{x'}{n}$ $x_0 = m + c\sqrt{\frac{A}{pc/2}} \qquad M_{\max} = \frac{A}{3}(2x_0 + m)$
	$A = \frac{p(l+c_2)}{6} \qquad B = \frac{p(l+c_1)}{6}$ $Q_I = p\frac{c_2 - c_1}{3} \qquad Q_1 = A - \frac{pc_1}{2}\frac{x^2}{c_1^2} \qquad Q_2 = -B + \frac{pc_2}{2}\frac{x'^2}{c_2^2}$ $M_I = p\frac{c_1 c_2}{3} \qquad M_1 = \frac{pc_2}{3}x + p\frac{c_1^2}{6}\omega_D^{(c_1)} \qquad M_2 = \frac{pc_1}{3}x' + \frac{pc_2^2}{6}\omega_D^{(c_2)}$ $c_1 > c_2: \qquad x_0 = c_1\sqrt{\frac{A}{pc_1/2}} = \sqrt{\frac{c_1(l+c_2)}{3}} \qquad M_{\max} = \frac{2}{3}Ax_0$ $c_1 < c_2: \qquad x_0' = c_2\sqrt{\frac{B}{pc_2/2}} = \sqrt{\frac{c_2(l+c_1)}{3}} \qquad M'_{\max} = \frac{2}{3}Bx_0'$
	$A = \frac{pl}{2} - \frac{\Delta M}{l} \qquad B = \frac{pl}{2} + \frac{\Delta M}{l} \qquad Q = \frac{pl}{2}\left(1 - 2\frac{x}{l}\right) - \frac{\Delta M}{l}$ $M = \frac{pl^2}{2}\omega_R - \Delta M\frac{x}{l} - M_a \qquad M_0 = \frac{pl^2}{8}$ $x_0 = \frac{l}{2} - \frac{\Delta M}{pl} \qquad M = 0$ für $x = x_0 \pm \sqrt{x_0^2 - \frac{2M_a}{p}}$ $M_{\max} = \frac{px_0^2}{2} - M_a = \frac{pl^2}{8} - \frac{M_a + M_b}{2} + \frac{\Delta M^2}{2pl^2}$
	$A = \frac{pl}{3} \qquad B = \frac{pl}{3} \qquad Q = \frac{pl}{3}(1 - 6\xi^2 + 4\xi^3)$ $M = \frac{pl^2}{3}(\xi - 2\xi^3 + \xi^4) = \frac{pl^2}{3}\omega_P''$ $x_0 = \frac{l}{2} \qquad M_{\max} = \frac{5}{48}pl^2 = 0.1042\,pl^2$

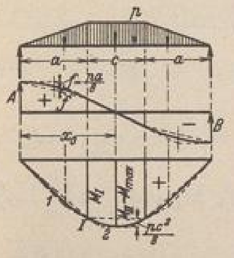
Tabelle 6 (Fortsetzung).



$$A = \frac{p\,l}{12} \qquad B = \frac{p\,l}{4} \qquad Q = \frac{p\,l}{12}(1 - 4\,\xi^3)$$

$$M = \frac{p\,l^2}{12}\,\omega_P \qquad \omega_P = \xi - \xi^4$$

$$x_0 = \frac{l}{2}\sqrt[3]{2} = 0{,}6300\,l \qquad M_{\max} = \frac{p\,l}{16}\,x_0 = 0{,}03935\,p\,l^2$$



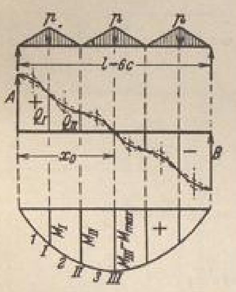
$$A = B = \frac{p\,(a + c)}{2} \qquad Q_I = \frac{p\,c}{2}$$

$$Q_1 = A - \frac{p\,a}{2}\,\frac{x^2}{a^2} \qquad Q_2 = Q_I - p\,(x - a)$$

$$M_I = \frac{p\,l^2}{6}\,\frac{a}{l}\left(3 - 4\,\frac{a}{l}\right) \qquad M_{II} = \frac{p\,l^2}{24}\left(3 - 4\,\frac{a^2}{l^2}\right)$$

$$M_1 = A\,x - \frac{p\,a^2}{6}\left(\frac{x}{a}\right)^3 \qquad M_2 = M_I + \frac{p\,c^2}{2}\,\omega_R^{(c)}$$

$$x_0 = \frac{l}{2} \qquad M_{\max} = M_{II}$$



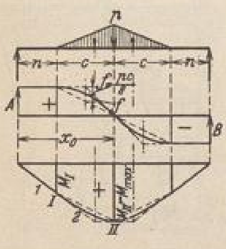
$$A = B = \frac{p\,l}{4} \qquad Q_I = \frac{p\,l}{6} \qquad Q_{II} = \frac{p\,l}{12} \qquad Q_1 = \frac{p\,l}{4}(1 - 12\,\xi^2)$$

$$Q_2 = \frac{p\,l}{12}[1 + 4\,(1 - 3\,\xi)^2] \qquad Q_3 = \frac{p\,l}{12}[1 - 4\,(1 - 3\,\xi)^2]$$

$$M_I = \frac{p\,l^2}{27} \qquad M_{II} = \frac{p\,l^2}{18} \qquad M_{III} = \frac{7}{108}\,p\,l^2$$

$$M_1 = \frac{p\,l^2}{4}\,\xi\,(1 - 4\,\xi^2) \qquad M_2 = \frac{p\,l^2}{108}[-1 + 9\,\xi\,(5 - 12\,\omega_R)]$$

$$M_3 = \frac{p\,l^2}{108}[7 - 27\,\xi\,(1 - 4\,\omega_R)] \qquad x_0 = l/2 \qquad M_{\max} = M_{III}$$

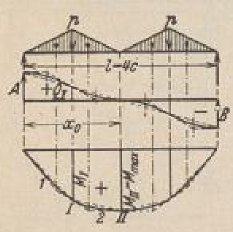


$$A = B = \frac{p\,c}{2} \qquad Q_1 = \frac{p\,c}{2} \qquad Q_2 = A - \frac{p\,c}{2}\left(\frac{x - n}{c}\right)^2$$

$$M_I = \frac{p\,c\,n}{2} \qquad M_{II} = \frac{p\,c^2}{12}\left(3\,\frac{l}{c} - 2\right)$$

$$M_1 = \frac{p\,c\,x}{2} \qquad M_2 = A\,x - \frac{p\,c^2}{6}\left(\frac{x - n}{c}\right)^3$$

$$x_0 = \frac{l}{2} \qquad M_{\max} = M_{II}$$



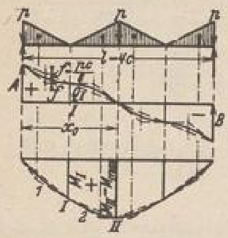
$$A = B = \frac{p\,l}{4} \qquad Q_I = \frac{p\,l}{8}$$

$$Q_1 = \frac{p\,l}{4}(1 - 8\,\xi^2) \qquad Q_2 = \frac{p\,l}{2}(1 - 2\,\xi)^2$$

$$M_I = \frac{5}{96}\,p\,l^2 \qquad M_{II} = \frac{p\,l^2}{16} \qquad M_1 = \frac{p\,l^2}{2}(1 - 8\,\xi^2)\,\xi$$

$$M_2 = \frac{p\,l^2}{48}[3 - 4\,(1 - 2\,\xi)^3] \qquad x_0 = \frac{l}{2} \qquad M_{\max} = M_{II}$$

Tabelle 6 (Fortsetzung).



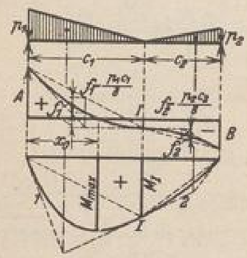
$$A = B = \frac{p\,l}{4} \qquad Q_I = \frac{p\,l}{8}$$

$$Q_1 = \frac{p\,l}{8}\left[1 + (1 - 4\,\xi)^2\right] \qquad Q_2 = \frac{p\,l}{8}\left[1 - (1 - 4\,\xi)^2\right]$$

$$M_I = \frac{p\,l^2}{24} \qquad M_{II} = \frac{p\,l^2}{16}$$

$$M_{\frac{1}{2}} = \frac{p\,l^2}{96}\left[4 - 3\,(1 - 4\,\xi) \mp (1 - 4\,\xi)^3\right]$$

$$x_0 = \frac{l}{2} \qquad M_{\max} = M_{II}$$



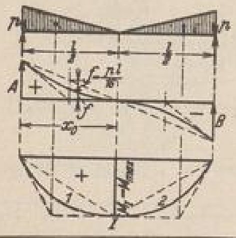
$$R = \frac{p_1\,c_1^2 - p_2\,c_2^2}{6\,l} = -Q_I \qquad A = \frac{p_1\,c_1}{2} - R \qquad B = \frac{p_2\,c_2}{2} + R$$

$$Q_1 = A - \frac{p_1\,c_1}{2}\left(\frac{x}{c_1} + \omega_R^{(c_1)}\right) \qquad Q_2 = -B + \frac{p_2\,c_2}{2}\left(\frac{x'}{c_2} + \omega_R^{(c_2)}\right)$$

$$M_I = \frac{c_1\,c_2}{6\,l}(p_1\,c_1 + p_2\,c_2);\quad M_1 = M_I\frac{x}{c_1} + \frac{p_1\,c_1^2}{6}\,\omega_D'^{(c_1)};\quad M_2 = M_I\frac{x'}{c_2} + \frac{p_2\,c_2^2}{6}\,\omega_D^{(c_2)}$$

$$R > 0: \qquad x_0 = c_1 - \sqrt{\frac{2\,R\,c_1}{p_1}} \qquad M_{\max} = M_I + \frac{2}{3}\,R\sqrt{\frac{2\,R\,c_1}{p_1}}$$

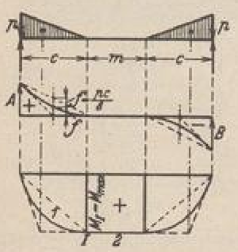
$$R < 0: \qquad x_0' = c_2 - \sqrt{\frac{-2\,R\,c_2}{p_2}} \qquad M'_{\max} = M_I - \frac{2}{3}\,R\sqrt{\frac{-2\,R\,c_2}{p_2}}$$



$$A = B = \frac{p\,l}{4} \qquad Q_1 = \frac{p\,l}{4}\,(1 - 2\,\xi)^2$$

$$M_I = \frac{p\,l^2}{24} \qquad M_1 = \frac{p\,l^2}{24}\left[1 - (1 - 2\,\xi)^3\right]$$

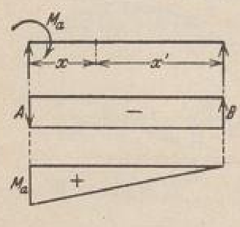
$$x_0 = \frac{l}{2} \qquad M_{\max} = M_I$$



$$A = B = \frac{p\,c}{2} \qquad Q_1 = \frac{p\,c}{2}\left(\frac{c - x}{c}\right)^2$$

$$M_I = \frac{p\,c^2}{6} \qquad M_1 = \frac{p\,c^2}{6}\left(1 - \left(\frac{c - x}{c}\right)^3\right)$$

$$c \leqq x_0 \leqq c + m \qquad M_{\max} = M_I$$



$$A = -\frac{M_a}{l} \qquad B = +\frac{M_a}{l} \qquad Q = -\frac{M_a}{l}$$

$$M = +M_a\,\xi'$$

$$x_0 = 0 \qquad M_{\max} = +M_a$$

Tabelle 6 (Fortsetzung).

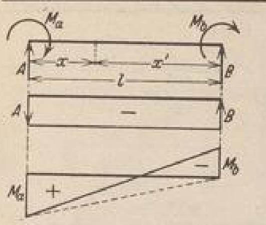
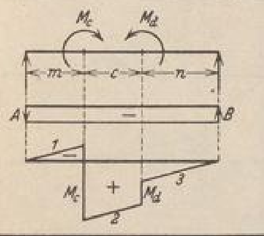
	$A = -\frac{M_a + M_b}{l}$ $\quad B = +\frac{M_a + M_b}{l}$ $\quad Q = -\frac{M_a + M_b}{l}$ $M = M_a \xi' - M_b \xi$ $M_a > M_b$: $\quad x_0 = 0$ $\quad M_{\max} = + M_a$ $M_a < M_b$: $\quad x_0 = l$ $\quad M'_{\max} = - M_b$
	$A = -\frac{M_c - M_d}{l}$ $\quad B = +\frac{M_c - M_d}{l}$ $\quad Q = -\frac{M_c - M_d}{l}$ $M_1 = -(M_c - M_d)\,\xi;\ M_2 = + M_c \xi' + M_d \xi;\ M_3 = +(M_c - M_d)\,\xi'$ $x_0 = m$ für $M_c > M_d$ $M_{\max} = -(M_c - M_d)\frac{m}{l}$ oder $M_{\max} = M_c - (M_c - M_d)\frac{m}{l}$

Tabelle 7. Freiträger.

l: Länge, $\xi = x/l$; C: Stützkraft; M_c: Einspannmoment; Q_m: Querkraft; M_m: Biegungsmoment im Querschnitt m; x_0: Querschnitt mit dem größten Biegungsmoment $M_{\max}$.

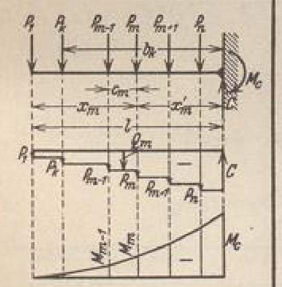
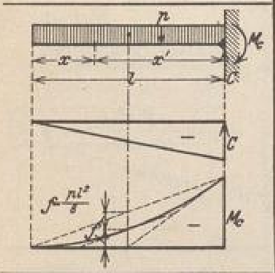
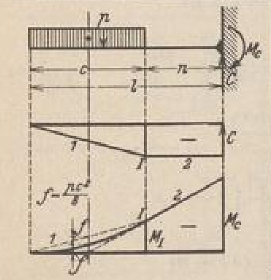
	$C = \sum_1^n P_k$ $\quad M_c = + \sum_1^n P_k b_k$ $Q_m = - \sum_1^{m-1} P_k = Q_{m-1} - P_{m-1}$ $M_m = - \sum_1^{m-1} P_k (b_k - x'_m) = M_{m-1} + Q_m c_m$ $x_0 = l$ $\quad M_{\max} = - M_c$
	$C = pl$ $\quad M_c = \frac{p l^2}{2}$ $\quad Q = -px$ $M = -\frac{p x^2}{2}$ $x_0 = l$ $\quad M_{\max} = -\frac{p l^2}{2}$
	$C = pc$ $\quad M_c = \frac{pc}{2}(l + n)$ $\quad Q_1 = -px$ $\quad Q_2 = -pc$ $M_1 = -\frac{p x^2}{2}$ $\quad M_I = -\frac{p c^2}{2}$ $\quad M_2 = -\frac{p c^2}{2}\left(\frac{2x}{c} - 1\right)$ $x_0 = l$ $\quad M_{\max} = -\frac{pc}{2}(l + n)$

Tabelle 7 (Fortsetzung).

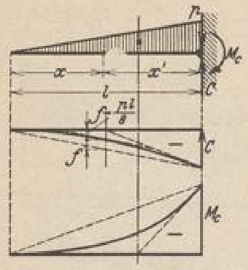
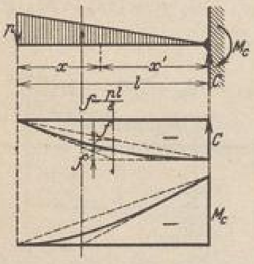
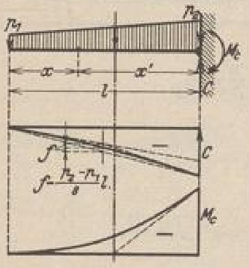
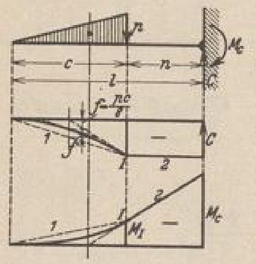
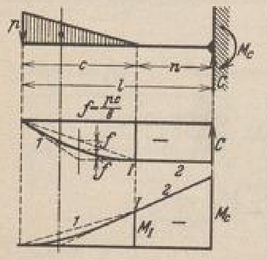
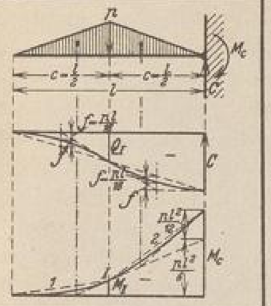
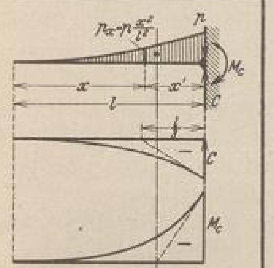
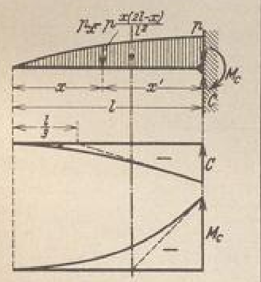
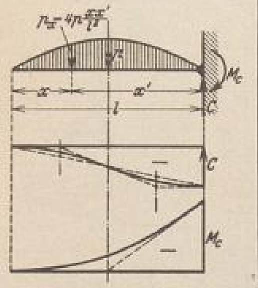
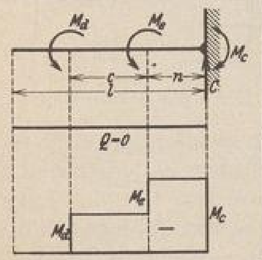
	$C = \frac{p\,l}{2} \qquad M_c = \frac{p\,l^2}{6} \qquad Q = -\frac{p\,l}{2}\,\xi^2$ $M = -\frac{p\,l^2}{6}\,\xi^3$ $x_0 = l \qquad M_{max} = -\frac{p\,l^2}{6}$
	$C = \frac{p\,l}{2} \qquad M_c = \frac{p\,l^2}{3} \qquad Q = -\frac{p\,l}{2}\,(2\,\xi - \xi^2)$ $M = -\frac{p\,l^2}{6}\,(3\,\xi^2 - \xi^3)$ $x_0 = l \qquad M_{max} = -\frac{p\,l^2}{3}$
	$C = (p_1 + p_2)\,\frac{l}{2} \qquad M_c = (2\,p_1 + p_2)\,\frac{l^2}{6}$ $Q = -\frac{l}{2}\,[2\,p_1\,\xi + (p_2 - p_1)\,\xi^2]$ $M = -\frac{l^2}{6}\,[3\,p_1\,\xi^2 + (p_2 - p_1)\,\xi^3]$ $x_0 = l \qquad M_{max} = -(2\,p_1 + p_2)\,\frac{l^2}{6}$
	$C = \frac{p\,c}{2} \qquad M_c = \frac{p\,c}{6}\,(l + 2\,n)$ $Q_1 = -\frac{p}{2\,c}\,x^2 \qquad Q_2 = -\frac{p\,c}{2}$ $M_1 = -\frac{p}{6\,c}\,x^3 \qquad M_I = -\frac{p\,c^2}{6} \qquad M_2 = +\frac{p\,c^2}{6}\left(2 - 3\,\frac{x}{c}\right)$ $x_0 = l \qquad M_{max} = -\frac{p\,c}{6}\,(l + 2\,n)$
	$C = \frac{p\,c}{2} \qquad M_c = \frac{p\,c}{6}\,(2\,l + n)$ $Q_1 = -\frac{p\,c}{2}\left(2\,\frac{x}{c} - \frac{x^2}{c^2}\right) \qquad Q_2 = -\frac{p\,c}{2}$ $M_1 = -\frac{p\,c^2}{6}\left(3\,\frac{x^2}{c^2} - \frac{x^3}{c^3}\right)$ $M_I = -\frac{p\,c^2}{3} \qquad M_2 = -\frac{p\,c^2}{6}\left(3\,\frac{x}{c} - 1\right)$ $x_0 = l \qquad M_{max} = -\frac{p\,c}{6}\,(2\,l + n)$

Tabelle 7 (Fortsetzung).

	$C = \frac{p\,l}{2} \qquad M_c = \frac{p\,l^2}{4}$ $Q_I = -\frac{p\,l}{4} \qquad Q_1 = -p\,l\,\xi^2; \qquad Q_2 = -\frac{p\,l}{4}(2\,\xi + \omega_R^{(c)})$ $M_1 = -\frac{p\,l^2}{3}\xi^3 \qquad M_I = -\frac{p\,l^2}{24} \qquad M_2 = -\frac{p\,l^2}{24}(10\,\xi - 4 - \omega_D^{(c)\prime})$ $x_0 = l \qquad M_{\max} = -\frac{p\,l^2}{4}$
	$C = \frac{p\,l}{3} \qquad M_c = \frac{p\,l^2}{12} \qquad Q = -\frac{p\,l}{3}\xi^3$ $M = -\frac{p\,l^2}{12}\xi^4$ $x_0 = l \qquad M_{\max} = -\frac{p\,l^2}{12}$
	$C = \frac{2}{3}\,p\,l \qquad M_c = \frac{p\,l^2}{4} \qquad Q = -\frac{p\,l}{3}(3\,\xi^2 - \xi^3)$ $M = -\frac{p\,l^2}{12}(4\,\xi^3 - \xi^4)$ $x_0 = l \qquad M_{\max} = -\frac{p\,l^2}{4}$
	$C = \frac{2}{3}\,p\,l \qquad M_c = \frac{p\,l^2}{3} \qquad Q = -\frac{2}{3}\,p\,l\,(3\,\xi^2 - 2\,\xi^3)$ $M = -\frac{p\,l^2}{3}(2\,\xi^3 - \xi^4)$ $x_0 = l \qquad M_{\max} = -\frac{p\,l^2}{3}$
	$C = 0 \qquad M_c = M_d + M_e \qquad Q = 0$ $M_1 = -M_d \qquad M_2 = -(M_d + M_e)$ $x_0 = (l - n)$ bis $l \qquad M_{\max} = -(M_d + M_e)$