Die Statik im Stahlbetonbau

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Berlin [u.a.], 1956

Lösung für gerade Stäbe mit konstantem Jh/J

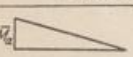
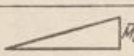
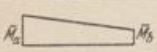
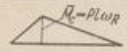
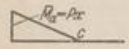
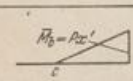
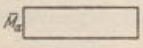
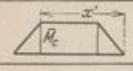
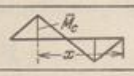
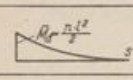
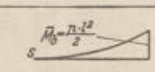
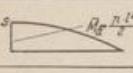
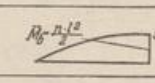
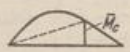
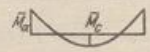
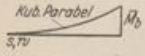
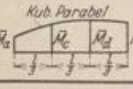
urn:nbn:de:hbz:466:1-74292

19. Lösungen der Funktion $\int M\overline{M}(J_c/J)\,ds$ und Funktionswerte ω.

Lösung für gerade Stäbe mit konstantem J_h/J.

Tabelle 12. $\int_0^l M\,\overline{M}\,\frac{J_c}{J}\,dx = l'\int_0^1 M\,\overline{M}\,d\xi\,, \qquad l' = l\,\frac{J_c}{J_h}\,.$

Abszissen des Punktes c: $\xi\,l$ und $\xi'\,l$ $\quad$ s = Parabelscheitel $\quad$ w = Wendepunkt

	$\frac{1}{3}\,M_a\,\overline{M}_a\,l'$		$\frac{1}{6}\,M_a\,\overline{M}_b\,l'$
	$\frac{1}{6}\,M_a\,(2\,\overline{M}_a + \overline{M}_b)\,l'$		$\frac{1}{6}\,M_a\,(2\,\overline{M}_a - \overline{M}_b)\,l'$
	$\frac{1}{6}\,M_a\,\overline{M}_c\,(1+\xi')\,l' = \frac{1}{6}\,M_a\,P\,l\,\omega'_D\,l'$		
	$\frac{1}{6}\,M_a\,\overline{M}_a\,\xi\,(3-\xi)\,l' = \frac{1}{6}\,M_a\,P\,l\,\xi^2\,(3-\xi)\,l'$		
	$\frac{1}{6}\,M_a\,\overline{M}_b\,\xi'^2\,l' = \frac{1}{6}\,M_a\,P\,l\,\xi'^3\,l'$		
	$-\frac{1}{6}\,M_a\,\overline{M}_c\,\omega'_M\,l'$		$\frac{1}{2}\,M_a\,\overline{M}_a\,l'$
	$\frac{1}{2}\,M_a\,\overline{M}_c\,\xi'\,l'$		$\frac{1}{6}\,M_a\,\overline{M}_c\,\xi'\,l'$
	$\frac{1}{3}\,M_a\,\overline{M}_c\,l' = \frac{1}{24}\,M_a\,p\,l^2\,l'$		$\frac{1}{6}\,M_a\,(\overline{M}_a + 2\,\overline{M}_c)\,l'$
	$\frac{1}{4}\,M_a\,\overline{M}_a\,l' = \frac{1}{8}\,M_a\,p\,l^2\,l'$		$\frac{1}{12}\,M_a\,\overline{M}_b\,l' = \frac{1}{24}\,M_a\,p\,l^2\,l'$
	$\frac{5}{12}\,M_a\,\overline{M}_a\,l' = \frac{5}{24}\,M_a\,p\,l^2\,l'$		$\frac{1}{4}\,M_a\,\overline{M}_b\,l' = \frac{1}{8}\,M_a\,p\,l^2\,l'$
	$\frac{1}{12}\,M_a\,\overline{M}_c\,\frac{1}{\xi}\,(2-\xi'^2)\,l'$		$\frac{1}{12}\,M_a\,\overline{M}_c\,\frac{1}{\xi'}\,(2-\xi)^2\,l'$
	$\frac{1}{12}\,M_a\,\overline{M}_c\,\frac{1}{\xi}\,(1+2\,\omega_R)\,l'$		$\frac{1}{6}\,M_a\,(\overline{M}_a - 2\,\overline{M}_c)\,l'$
	$\frac{1}{20}\,M_a\,\overline{M}_b\,l'$		$\frac{1}{5}\,M_a\,\overline{M}_a\,l'$
	$\frac{1}{120}\,M_a\,(13\,\overline{M}_a + 36\,\overline{M}_c + 9\,\overline{M}_d + 2\,\overline{M}_b)\,l'$		

$\xi = \frac{x}{l} \qquad \xi' = \frac{x'}{l}$

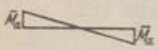
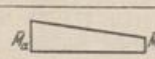
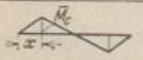
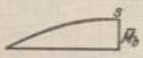
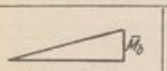
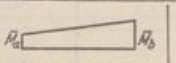
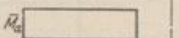
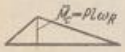
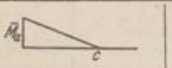
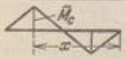
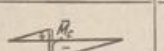
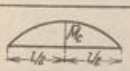
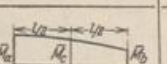
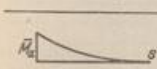
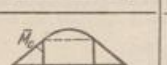
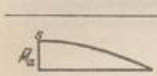
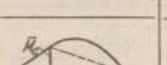
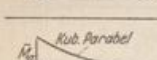
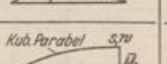
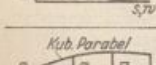
	$\frac{1}{3}\,M_a\,\overline{M}_a\,l'$		$\frac{1}{6}\,M_a\,(\overline{M}_a - \overline{M}_b)\,l'$
	$\frac{1}{3}\,M_a\,\overline{M}_c\,\xi'\,l'$		$\frac{1}{6}\,M_a\,\overline{M}_c\,(1-2\,\xi)\,l'$
	$+\frac{1}{6}\,M_a\,\overline{M}_b\,l'$		$-\frac{1}{6}\,M_a\,\overline{M}_b\,l'$

Tabelle 12. (Fortsetzung) $\int_0^l M\,\overline{M}\,\frac{J_c}{J}\,dx = l'\int_0^1 M\,\overline{M}\,d\xi, \qquad l' = l\,\frac{J_c}{J_k}.$

Abszissen des Punktes c: $\xi\, l$ und $\xi'\, l$

s = Parabelscheitel

w = Wendepunkt

	$\frac{1}{6}(M_a + 2M_b)\,\overline{M}_k\,l'$		$\frac{1}{6}[M_a(2\overline{M}_a + \overline{M}_b) + M_b(\overline{M}_a + 2\overline{M}_b)]\,l'$
	$\frac{1}{3}(M_a^2 + M_a M_b + M_b^2)\,l'$		$\frac{1}{2}(M_a + M_b)\,\overline{M}_a\,l'$
	$\frac{1}{6}[M_a(1+\xi') + M_b(1+\xi)]\,\overline{M}_c\,l' = \frac{P\,l}{6}(M_a\omega'_D + M_b\omega_D)\,l'$		
	$\frac{1}{2}\overline{M}_c(M_a + M_b)\,\xi'\,l'$		$\frac{1}{6}\xi[M_a(3-\xi) + M_b\xi]\,\overline{M}_a\,l'$
	$\frac{1}{6}\overline{M}_c(M_a - M_b)\,\xi'\,l'$		$\frac{1}{6}\overline{M}_c[M_b\omega_M - M_a\omega'_M]\,l'$
	$\frac{1}{3}\overline{M}_c(M_a + M_b)\,l'$		$\frac{1}{6}[M_a(\overline{M}_a + 2\overline{M}_c) + M_b(2\overline{M}_c + \overline{M}_b)]\,l'$
	$\frac{1}{12}\overline{M}_a(3M_a + M_b)\,l'$		$\frac{1}{12}\frac{1}{\xi}(1 + 2\omega_R)(M_a + M_b)\,\overline{M}_c\,l'$
	$\frac{1}{12}\overline{M}_a(5M_a + 3M_b)\,l'$		$\frac{1}{12}\frac{1}{\xi}[M_a(2-\xi'^2) + M_b(2-\xi')^2]\,\overline{M}_c\,l'$
	$\frac{1}{20}(4M_a + M_b)\,\overline{M}_a\,l'$		$\frac{3}{20}(2M_a + 3M_b)\,\overline{M}_b\,l'$
	$\frac{1}{120}[M_a(13\overline{M}_a + 36\overline{M}_c + 9\overline{M}_d + 2\overline{M}_b) + M_b(2\overline{M}_a + 9\overline{M}_c + 36\overline{M}_d + 13\overline{M}_b)]\,l'$		

$$\xi = \frac{x}{l}, \qquad \xi' = \frac{x'}{l}$$

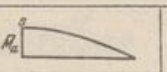
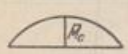
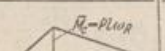
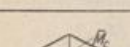
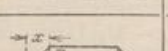
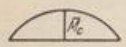
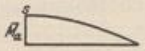
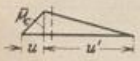
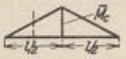
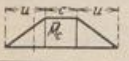
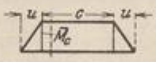
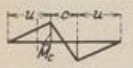
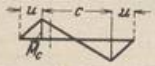
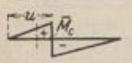
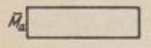
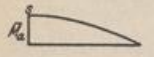
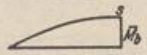
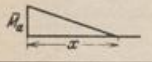
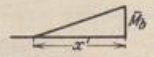
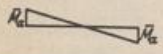
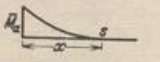
	$\frac{1}{5}M_c\,\overline{M}_b\,l'$		$\frac{7}{15}M_c\,\overline{M}_a\,l'$
	$\frac{8}{15}M_c\,\overline{M}_c\,l'$		$\frac{1}{3}M_c\,\overline{M}_c(1+\omega_R)\,l' = \frac{1}{3}M_c\,P\,l\,\omega''_P\,l'$
	$\frac{5}{12}M_c\,\overline{M}\,l'$		$\frac{2}{3}M_c\,\overline{M}_c\,\xi'(1+\omega_R)\,l'$

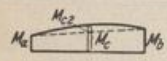
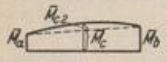
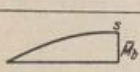
Tabelle 12 (Fortsetzung). $\int_0^l M\,\overline{M}\,\frac{J_c}{J}\,dx = l'\int_0^1 M\,\overline{M}\,d\xi, \qquad l' = l\,\frac{J_c}{J_h}.$

$$\xi = \frac{x}{l}, \qquad \xi' = \frac{x'}{l}, \qquad \zeta = \frac{u}{l}, \qquad \zeta' = \frac{l-u}{l}$$

	$\frac{1}{3} M_c \overline{M}_c (1+\omega_R)\, l'$		$\frac{1}{12} M_c \overline{M}_a [5-\xi(1+\xi)]\, l'$
	$\frac{1}{12} M_c \overline{M}_b [1+\xi(1+\xi)]\, l'$		$\frac{1}{6} M_c \overline{M}_c \left[2-\frac{(\xi'-\zeta')^2}{\xi'\zeta}\right] l'$
	$\frac{1}{6} M_c \overline{M}_c \left[2-\frac{(\xi-\zeta)^2}{\xi\zeta'}\right] l'$		$\frac{1}{12} M_c \overline{M}_c \frac{3-4\xi^2}{\xi'}\, l'$
	$\frac{1}{6} M_c \overline{M}_c \left(3\frac{\zeta'}{\xi'}-\frac{\xi^2}{\xi'\zeta}\right) l'$		$\frac{1}{6} M_c \overline{M}_c \left(3-\frac{\zeta^2}{\xi\xi'}\right) l'$
	$\frac{1}{6} M_c \overline{M}_c \frac{\zeta'}{\xi'}\left(1-\frac{\xi^2}{\zeta\zeta'}\right) l'$		$\frac{1}{6} M_c \overline{M}_c \frac{\xi'-\xi}{\zeta'-\zeta}\left(1-\frac{\zeta^2}{\xi\xi'}\right) l'$
	$\frac{1}{6} M_c \overline{M}_c \left(1+\xi-3\frac{\zeta'^2}{\xi'}\right) l'$		$-\frac{1}{6} M_c \overline{M}_c \left(1+\xi'-3\frac{\zeta^2}{\xi}\right) l'$
	$\frac{1}{2} M_c \overline{M}_a\, l'$		

$$\xi = \frac{x}{l} \qquad \xi' = \frac{x'}{l}$$

	$\frac{1}{5} M_a \overline{M}_a\, l'$		$\frac{1}{30} M_a \overline{M}_b\, l'$
	$\frac{3}{10} M_a \overline{M}_a\, l'$		$\frac{2}{15} M_a \overline{M}_b\, l'$
	$\frac{1}{12} M_a \overline{M}_a \xi [2+(1+\xi')^2]\, l'$		$\frac{1}{12} M_a \overline{M}_b \xi'^3\, l'$
	$\frac{1}{6} M_a \overline{M}_a\, l'$		$\frac{1}{30} M_a \overline{M}_a \xi [10-\xi(5-\xi)]\, l'$

	$\left[M_c^2+\frac{(M_b-M_a)^2}{12}-2\frac{M_{c2}M_c}{3}+\frac{M_{c2}^2}{5}\right] l'$
	$\left[M_c\overline{M}_c+\frac{(M_b-M_a)(\overline{M}_b-\overline{M}_a)}{12}-\frac{M_{c2}\overline{M}_c}{3}-\frac{\overline{M}_{c2}M_c}{3}+\frac{M_{c2}\overline{M}_{c2}}{5}\right] l'$
	$\frac{1}{60}(15M_a+5M_b+12M_{c2})\,\overline{M}_a\, l'$
	$\frac{1}{60}(15M_a+25M_b+28M_{c2})\,\overline{M}_b\, l'$