Die Statik im Stahlbetonbau

Beyer, Kurt

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Verdrehungen der Endquerschnitte mit Angaben über die Biegelinien für Balkenträger mit konstantem Jh/J

Verdrehungen der Endquerschnitte mit Angaben über die Biegelinien für Balkenträger mit konstantem J_h/J.

Die Winkel φ_a, φ_b und die Ordinaten w, f der Biegelinie werden im EJ_c fachen Betrag angegeben.

Tabelle 17. Träger auf zwei Stützen.

$\varphi_a \Big/ \frac{l'}{6} = R_{(k-1)k}$, $\varphi_b \Big/ \frac{l'}{6} = R_{kk}$ werden auf S. 258 als Kreuzlinienabschnitte verwendet.

Abszissen der Belastung: ξl, $\xi' l$; Abszissen der Stabquerschnitte: ζl, $\zeta' l$; Schnitt h links der Last, Schnitt r rechts der Last. $l \cdot J_c/J_h = l'$

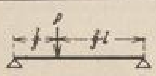
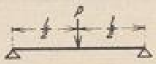
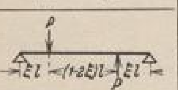
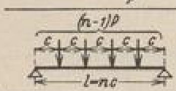
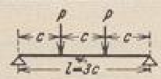
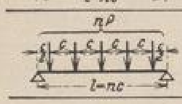
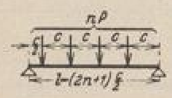
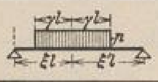
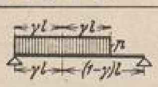
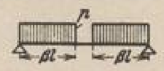
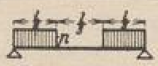
	$\varphi_a = \frac{l'}{6} P l \omega'_D$; $\varphi_b = \frac{l'}{6} P l \omega_D$; $w_h = \frac{l'}{6} P l^2 \xi' \zeta [\xi(1+\xi') - \zeta^2]$; $w_r = \frac{l'}{6} P l^2 \xi \zeta' [\xi'(1+\xi) - \zeta'^2]$ w im Lastpunkt ($\zeta = \xi$): $w = f = \frac{l'}{3} P l^2 \xi^2 \xi'^2$;		
	$\varphi_a = \frac{l'}{6} \frac{10}{27} P l$; $\varphi_b = \frac{l'}{6} \frac{8}{27} P l$		$\varphi_a = \varphi_b = \frac{l'}{6} \frac{3}{8} P l$
	$\varphi_a = \frac{l'}{6} 2 P l \xi' \left(1 - \xi'^2 - \frac{3}{4}\gamma^2\right)$; $\varphi_b = \frac{l'}{6} 2 P l \xi \left(1 - \xi^2 - \frac{3}{4}\gamma^2\right)$		
	$\varphi_a = -\frac{l'}{6} P l \omega''_D$; $\varphi_b = \frac{l'}{6} P l \omega''_D$		$\varphi_a = \varphi_b = \frac{l'}{6} 3 P l \omega_R$
	$\varphi_a = \varphi_b = \frac{l'}{6} P l \frac{n}{4}\left(1 - \frac{1}{n^2}\right)$		$\varphi_a = \varphi_b = \frac{l'}{6} \frac{2}{3} P l$
	$\varphi_a = \varphi_b = \frac{l'}{6} P l \frac{n}{4}\left(1 + \frac{1}{2n^2}\right)$		$\varphi_a = \varphi_b = \frac{l'}{6} \frac{19}{24} P l$
	$\varphi_a = \frac{l'}{6} P l \frac{2n+1}{8}\left[1 - \frac{1}{(2n+1)^4}\right]$; $\varphi_b = \frac{l'}{6} P l \frac{2n+1}{8}\left[1 - \frac{2}{(2n+1)^2} + \frac{1}{(2n+1)^4}\right]$		
	$\varphi_a = \frac{l'}{6} p l^2 2\gamma\xi'(1 - \gamma^2 - \xi'^2)$; $\varphi_b = \frac{l'}{6} p l^2 2\gamma\xi(1 - \gamma^2 - \xi^2)$		
	$\varphi_a = \frac{l'}{6} p l^2 4\gamma^2(1-\gamma)^2$; $\varphi_b = \frac{l'}{6} p l^2 2\gamma^2(1 - 2\gamma^2)$		
	$\varphi_a = \varphi_b = \frac{l'}{6} p l^2 \frac{\gamma}{4}(3 - 4\gamma^2)$		$\varphi_a = \varphi_b = \frac{l'}{6} \frac{13}{108} p l^2$
	$\varphi_a = \varphi_b = \frac{l'}{6} \frac{p l^2}{4}$; $w = \frac{l'}{24} p l^3 \omega''_P$; w in Stabmitte: $w = f = \frac{5}{384} l' p l^3$		
	$\varphi_a = \varphi_b = \frac{l'}{6} p l^2 \frac{\beta}{4}(3 - \beta^2 - 3\alpha^2)$		
	$\varphi_a = \varphi_b = \frac{l'}{6} p l^2 \frac{\beta^2}{2}(3 - 2\beta)$		$\varphi_a = \varphi_b = \frac{l'}{6} \frac{7}{54} p l^2$

Tabelle 17 (Fortsetzung).

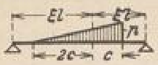
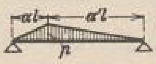
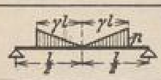
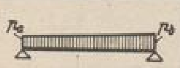
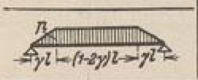
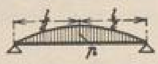
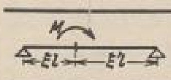
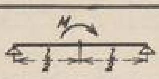
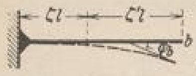
 $\gamma = \frac{c}{l}$	$\varphi_a = \frac{l'}{6}\frac{3}{2} p l^2 \gamma \xi' \left[\xi (1+\xi') - \frac{15\xi' + 2\gamma}{10\xi'}\gamma^2\right]$; $\varphi_b = \frac{l'}{6}\frac{3}{2} p l^2 \gamma \xi \left[\xi' (1+\xi) - \frac{15\xi - 2\gamma}{10\xi}\gamma^2\right]$		
	$\varphi_a = \frac{l'}{6}\frac{p l^2}{60}\alpha^2 (40 - 45\alpha + 12\alpha^2)$; $\varphi_b = \frac{l'}{6}\frac{p l^2}{15}\alpha^2 (5 - 3\alpha^2)$		
	$\varphi_a = \frac{l'}{6}\frac{p l^2}{60}\beta^2 (10 - 3\beta^2)$; $\varphi_b = \frac{l'}{6}\frac{p l^2}{60}\beta^2 (20 - 15\beta + 3\beta^2)$		
	$\varphi_a = \frac{l'}{6}\frac{7 p l^2}{60}$; $\varphi_b = \frac{l'}{6}\frac{2 p l^2}{15}$; $w = \frac{p l^4}{360}\zeta (7 - 10\zeta^2 + 3\zeta^4)$		
	$\varphi_a = \frac{l'}{6}\frac{1}{2} p l^2 \gamma \xi' [2\xi (1+\xi') - \gamma^2]$; $\varphi_b = \frac{l'}{6}\frac{1}{2} p l^2 \gamma \xi [2\xi' (1+\xi) - \gamma^2]$		
	$\varphi_a = \varphi_b = \frac{l'}{6}\frac{p l^2}{8}\gamma (3 - 2\gamma^2)$		$\varphi_a = \varphi_b = \frac{l'}{6}\frac{5}{32} p l^2$
	$\varphi_a = \frac{l'}{6}\frac{p l^2}{60}(1+\alpha')(7 - 3\alpha'^2)$; $\varphi_b = \frac{l'}{6}\frac{p l^2}{60}(1+\alpha)(7 - 3\alpha^2)$		
	$\varphi_a = \varphi_b = \frac{l'}{6}\frac{p l^2}{4}\gamma^2 (4 - 3\gamma)$		$\varphi_a = \varphi_b = \frac{l'}{6}\frac{17}{128} p l^2$
	$\varphi_a = \frac{l'}{6}\frac{p l^2}{2}\gamma \xi' [2\xi (1+\xi') - 3\gamma^2]$; $\varphi_b = \frac{l'}{6}\frac{p l^2}{2}\gamma \xi [2\xi' (1+\xi) - 3\gamma^2]$		
	$\varphi_a = \varphi_b = \frac{l'}{6}\frac{3}{8} p l^2 \gamma (1 - 2\gamma^2)$		$\varphi_a = \varphi_b = \frac{l'}{6}\frac{3}{32} p l^2$
	$\varphi_a = \frac{l'}{6}\frac{p l^2}{60}[15 - (1+\alpha')(7 - 3\alpha'^2)]$; $\varphi_b = \frac{l'}{6}\frac{p l^2}{60}[15 - (1+\alpha)(7 - 3\alpha^2)]$		
	$\varphi_a = \varphi_b = \frac{l'}{6}\frac{p l^2}{4}\gamma^2 (2 - \gamma)$		$\varphi_a = \varphi_b = \frac{l'}{6}\frac{15}{128} p l^2$
	$\varphi_a = \frac{l'}{6}\frac{l^2}{60}(8 p_a + 7 p_b)$; $\varphi_b = \frac{l'}{6}\frac{l^2}{60}(7 p_a + 8 p_b)$		
	$\varphi_a = \varphi_b = \frac{l'}{6}\frac{p l^2}{4}[1 - \gamma^2 (2 - \gamma)]$		$\varphi_a = \varphi_b = \frac{l'}{6}\frac{1}{5} p l^2$
	$\varphi_a = \frac{l'}{6} M \omega'_M$; $\varphi_b = -\frac{l'}{6} M \omega_M$		$-\varphi_a = \varphi_b = \frac{l'}{6}\frac{M}{4}$
	$\varphi_a = \frac{l'}{6}(2 M_a + M_b)$; $\varphi_b = \frac{l'}{6}(M_a + 2 M_b)$		

Tabelle 18. Freiträger.



Abszissen der Belastung: ξl, $\xi' l$; Abszissen der Stabquerschnitte: ζl, $\zeta' l$.
Schnitt h links, Schnitt r rechts der Last. $l\, J_c/J_h = l'$.
φ_b und die Ordinaten w, $w_b = f$ der Biegelinie sind $E J_c$ fache Beträge.

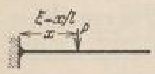
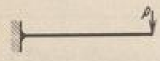
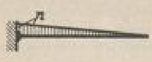
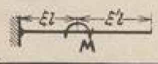
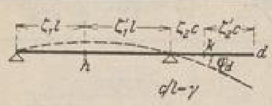
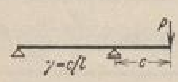
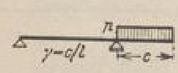
	$\varphi_b = \frac{l'}{2} P l \xi^2$; $f = \frac{l'}{6} P l^2 \xi^2 (3 - \xi)$; $w_h = \frac{l'}{6} P l^2 \zeta^2 (3\xi - \zeta)$; $w_r = \frac{l'}{6} P l^2 \xi^2 (3\zeta - \xi)$
	$\varphi_b = \frac{l'}{6} 3 P l$; $f = \frac{l'}{3} P l^2$; $w = \frac{l'}{6} P l^2 \zeta^2 (3 - \zeta)$
	$\varphi_b = \frac{l'}{6} p l^2 \xi' (3 - 3\xi' + \xi'^2)$; $f = \frac{l'}{24} p l^3 \xi' (8 - 6\xi' + \xi'^3)$
	$\varphi_b = \frac{l'}{6} p l^2 \xi^3$; $f = \frac{l'}{24} p l^3 \xi^3 (4 - \xi)$
	$\varphi_b = \frac{l'}{6} p l^2$; $f = \frac{l'}{8} p l^3$; $w = \frac{l'}{24} p l^3 \zeta^2 (6 - 4\zeta + \zeta^2)$
	$\varphi_b = \frac{l'}{24} p l^2 \xi' (6 - 8\xi' + 3\xi'^2)$; $f = \frac{l'}{30} p l^3 \xi' (5 - 5\xi' + \xi'^3)$
	$\varphi_b = \frac{l'}{24} p l^2$; $f = \frac{l'}{30} p l^3$; $w = \frac{l'}{120} p l^3 (4 - 5\zeta' + \zeta'^5)$
	$\varphi_b = \frac{l'}{24} p l^2 \xi' (6 - 4\xi' + \xi'^2)$; $f = \frac{l'}{120} p l^3 \xi' (20 - 10\xi' + \xi'^3)$
	$\varphi_b = \frac{l'}{8} p l^2$; $f = \frac{11\, l'}{120} p l^3$; $w = \frac{l'}{120} p l^3 (11 - 15\zeta' + 5\zeta'^4 - \zeta'^5)$
	$\varphi_b = \mathrm{M}\, l \xi$; $f = \frac{\mathrm{M}\, l^2}{2} (1 - \xi'^2)$ |  | $w = \frac{\mathrm{M}\, l^2}{2} \zeta^2$

Tabelle 19. Auslegeträger.



Abszissen der Stabquerschnitte: Im Feld: $\zeta_1 l$, $\zeta_1' l$; im Kragarm: $\zeta_2 c$, $\zeta_2' c$. Schnitt h im Feld, Schnitt k im Kragarm. $l\, J_c/J_h = l'$.
φ_d u. die Ordinaten w, $w_d = f$ der Biegelinie sind $E J_c$ fache Beträge.

	$w_h = -\frac{l'}{6} P l^2 \gamma (\zeta_1 - \zeta_1^3) = -\frac{l'}{6} P l^2 \gamma\, \omega_D$; $\varphi_d = \frac{l'}{6} P l \gamma (2 + 3\gamma)$ $w_k = \frac{l'}{6} P l^2 \gamma^2 \zeta_2 [2 + \zeta_2 \gamma (3 - \zeta_2)]$; $f = \frac{l'}{3} P l^2 \gamma^2 (1 + \gamma)$
	$w_h = -\frac{l'}{12} p l^3 \gamma^2 (\zeta_1 - \zeta_1^3) = -\frac{l'}{12} p l^3 \gamma^2 \omega_D$; $\varphi_d = \frac{l'}{6} p l^2 \gamma^2 (1 + \gamma)$ $w_k = \frac{l'}{24} p l^3 \gamma^3 \zeta_2 [4 + \gamma \zeta_2 (2 + (1 + \zeta_2')^2)]$; $f = \frac{l'}{24} p l^3 \gamma^3 (4 + 3\gamma)$