

Biegelinientafel

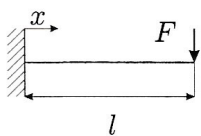
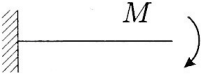
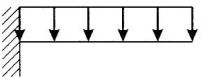
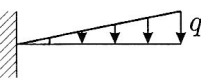
	Gleichung der Biegelinie (x vom linken Auflager aus)	Durchbiegung	Verdrehungen $\varphi(x) = -w'(x)$
	$w = \frac{F}{6EI} (3lx^2 - x^3)$	$w(l) = w_{\max} = \frac{Fl^3}{3EI}$	$\varphi(l) = -\frac{Fl^2}{2EI}$
	$w = \frac{M}{2EI} x^2$	$w(l) = w_{\max} = \frac{Ml^2}{2EI}$	$\varphi(l) = -\frac{Ml}{EI}$
	$w = \frac{q}{24EI} (6l^2x^2 - 4lx^3 + x^4)$	$w(l) = w_{\max} = \frac{ql^4}{8EI}$	$\varphi(l) = -\frac{ql^3}{6EI}$
	$w = \frac{q_0}{120EI l} (20l^3x^2 - 10l^2x^3 + x^5)$	$w(l) = w_{\max} = \frac{11q_0l^4}{120EI}$	$\varphi(l) = -\frac{q_0l^3}{8EI}$

Tabelle 2: Biegelinien und Verformungen von Balken ($EI = \text{konst.}$)

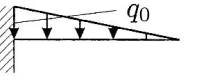
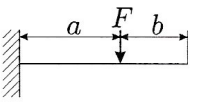
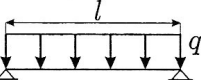
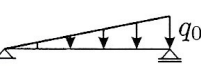
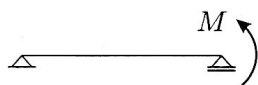
	Gleichung der Biegelinie (x vom linken Auflager aus)	Durchbiegung	Verdrehungen $\varphi(x) = -w'(x)$
	$w = \frac{q_0}{120EI l} (10l^3x^2 - 10l^2x^3 + 5lx^4 - x^5)$	$w(l) = w_{\max} = \frac{q_0l^4}{30EI}$	$\varphi(l) = -\frac{q_0l^3}{24EI}$
	$w = \frac{F}{6EI} (3ax^2 - x^3), \quad 0 \leq x \leq a$ $w = \frac{F}{6EI} (3a^2x - a^3), \quad a \leq x \leq l$	$w(a) = \frac{Fa^3}{3EI}$ $w(l) = \frac{F}{6EI} (3la^2 - a^3)$	$\varphi(a) = -\frac{Fa^2}{2EI}$ $\varphi(l) = -\frac{Fa^2}{2EI}$
	$w = \frac{q}{24EI} (l^3x - 2lx^3 + x^4)$	$w\left(\frac{l}{2}\right) = w_{\max} = \frac{5ql^4}{384EI}$	$\varphi(l) = -\varphi(0) = \frac{ql^3}{24EI}$
	$w = \frac{q_0}{360EI l} (7l^4x - 10l^2x^3 + 3x^5)$	$w\left(\frac{l}{2}\right) = 0.00651 \frac{q_0l^4}{EI}$ $w_{\max} = 0.00652 \frac{q_0l^4}{EI}$ bei $x_m = 0.5193l$	$\varphi(0) = -\frac{7q_0l^3}{360EI}$ $\varphi(l) = \frac{q_0l^3}{45EI}$

Tabelle 2: Fortsetzung – Biegelinien und Verformungen von Balken ($EI = \text{konst.}$)

Gleichung der Biegelinie
(x vom linken Auflager aus)

Durchbiegung

Verdrehungen
 $\varphi(x) = -w'(x)$



$$w = \frac{Ml}{6EI}(l^2x - x^3)$$

$$w\left(\frac{l}{2}\right) = \frac{Ml^2}{16EI}$$

$$w_{\max} = \frac{Ml^2}{9\sqrt{3}EI}$$

$$\text{bei } x_m = \frac{l}{\sqrt{3}}$$

$$\varphi(0) = -\frac{Ml}{6EI}$$

$$\varphi(l) = \frac{Ml}{3EI}$$

für $0 \leq x \leq a$

$$w = \frac{M}{6EI} \left[(6al - 3a^2 - 2l^2)x - x^3 \right]$$

für $a \leq x \leq \frac{l}{2}$

$$w = \frac{M}{6EI} \left[3l^2 - (3a^2 + 2l^2)x + 3lx^2 - x^3 \right]$$

$$w(a) = \frac{M}{3EI} (3a^2l - 2a^3 - l^2a)$$

$$\varphi(0) = -\frac{M}{6EI} (6al - 3a^2 - 2l^2)$$

$$\varphi(l) = \frac{M}{6EI} (l^2 - 3a^2)$$

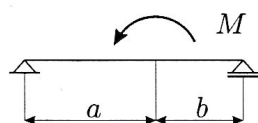


Tabelle 2: Fortsetzung – Biegelinien und Verformungen von Balken ($EI = \text{konst.}$)

Gleichung der Biegelinie
(x vom linken Auflager aus)

Durchbiegung

Verdrehungen
 $\varphi(x) = -w'(x)$

für $0 \leq x \leq a$

$$w = \frac{F}{6EI} (3alx - 3a^2x - x^3)$$

für $a \leq x \leq \frac{l}{2}$

$$w = \frac{F}{6EI} (3alx - 3ax^2 - a^2)$$

$$w\left(\frac{l}{2}\right) = w_{\max}$$

$$= \frac{Fa}{24EI} (3l^2 - 4a^2)$$

$$\varphi(l) = -\varphi(0) = \frac{Fa}{2EI} (l - a)$$

$$\varphi(a) = -\frac{Fa}{2EI} (l - 2a)$$

für $0 \leq x \leq a$

$$w = \frac{Fb}{6EI} (l^2x - b^2x - x^3)$$

für $a \leq x \leq \frac{l}{2}$

$$w = \frac{Fb}{6EI} \left[\frac{l}{b} (x - a)^3 + (l^2 - b^2)x - x^3 \right]$$

$$w\left(\frac{l}{2}\right) = \frac{Fb}{48EI} (3l^2 - 4b^2)$$

$$w_{\max} = \frac{Fb}{9\sqrt{3}EI} (l^2 - b^2)^{\frac{3}{2}}$$

$$\text{bei } x_m = \sqrt{\frac{l^2 - b^2}{3}}, \quad (a > b)$$

$$\varphi(0) = -\frac{Fb}{6EI} (l + b)$$

$$\varphi(l) = \frac{Fb}{6EI} (l + a)$$

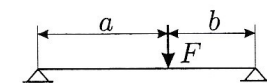
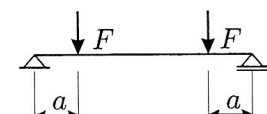


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