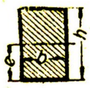
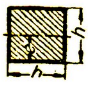
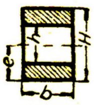
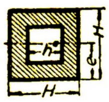
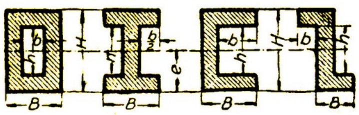
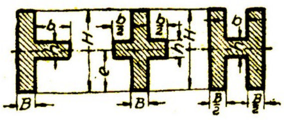
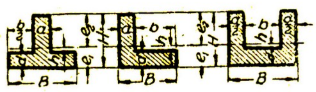
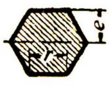
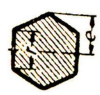
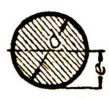
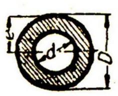
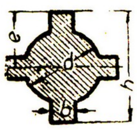
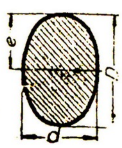
Kleine Formelsammlung

c) Schwerpunktsabstände, Trägheits- und Widerstandsmomente.

Querschnitt	Schwerpunktsabstand e	Trägheitsmomente J cm⁴	Widerstandsmomente $W = \frac{J}{e}$ cm³	Polare Trägheitsmomente und Widerstandsmomente J_p cm⁴ W_p cm³
	$e = \frac{h}{2}$	$J = \frac{b \cdot h^3}{12}$	$W = \frac{b \cdot h^2}{6}$	
	$e = \frac{h}{2}$	$J = \frac{h^4}{12}$	$W = \frac{h^3}{6}$	$J_p \approx 0{,}14\, h^4$ $W_p = 0{,}21\, h^3$
	$e = \frac{H}{2}$	$J = \frac{b(H^3 - h^3)}{12}$	$W = \frac{b(H^3 - h^3)}{6H}$	
	$e = \frac{H}{2}$	$J = \frac{H^4 - h^4}{12}$	$W = \frac{H^4 - h^4}{6H}$	
 $e = \frac{H}{2}$		$J = \frac{BH^3 - bh^3}{12}$	$W = \frac{BH^3 - bh^3}{6H}$	
 $e = \frac{H}{2}$		$J = \frac{BH^3 + bh^3}{12}$	$W = \frac{BH^3 + bh^3}{6H}$	
 $e_1 = \frac{1}{2} \cdot \frac{a \cdot H^2 + b \cdot d^2}{a \cdot H + b \cdot d}$		$J = \frac{1}{3}(B \cdot e_1^3 - bh^3 + ae_2^3)$	$W_1 = \frac{J}{e_1}$ $W_2 = \frac{J}{e_2}$	

Querschnitt	Schwerpunktsabstand e	Trägheitsmomente J cm⁴	Widerstandsmomente $W=\frac{J}{e}$ cm³	Polare Trägheitsmomente und Widerstandsmomente J_p cm⁴ W_p cm³
	$e=\frac{r}{2}\sqrt{3}$ $=0{,}866\cdot r$	$J=\frac{5}{16}\sqrt{3}\cdot r^4$ $=0{,}5413\cdot r^4$	$W=\frac{5}{8}r^3$	$J_p=1{,}847\,e^4$ $W_p=1{,}511\,e^3$
	$e=r$		$W=0{,}5413\,r^3$	
	$e=\frac{d}{2}$	$J=\frac{\pi}{64}\cdot d^4\approx\frac{d^4}{20}$	$W=\frac{\pi}{32}\cdot d^3\approx\frac{d^3}{10}$	$J_p=\frac{\pi}{32}\cdot d^4\approx\frac{d^4}{10}$ $W_p=\frac{\pi}{16}\cdot d^3\approx\frac{d^3}{5}$
	$e=\frac{D}{2}$	$J=\frac{\pi}{64}(D^4-d^4)$ $\approx\frac{D^4-d^4}{20}$	$W=\frac{\pi}{32}\cdot\frac{D^4-d^4}{D}$ $\approx\frac{D^4-d^4}{10\,D}$	$J_p=\frac{\pi}{32}(D^4-d^4)$ $\approx\frac{D^4-d^4}{10}$ $W_p=\frac{\pi}{16}\cdot\frac{D^4-d^4}{D}$ $\approx\frac{D^4-d^4}{5\,D}$
	$e=\frac{h}{2}$	$J=\frac{1}{12}\left[\frac{3\pi\cdot d^4}{16}+b(h^3-d^3)+b^3(h-d)\right]$	$W=\frac{1}{6\cdot h}\left[\frac{3\pi\cdot d^4}{16}+b(h^3-d^3)+b^3(h-d)\right]$	$W_p\approx\frac{d^3}{5}$
	$e=\frac{D}{2}$	$J=\frac{\pi}{64}(D^3\cdot d)\approx\frac{D^3\cdot d}{20}$	$W=\frac{\pi}{32}D^2\cdot d\approx\frac{D^2\cdot d}{10}$	$W_p=\frac{\pi}{16}D\cdot d^2$ $\approx\frac{D\cdot d^2}{5}$

6. Abscherfestigkeit.

Übertragbare Kraft	Erforderlicher Querschnitt	Auftretende Abscherspannung
$P=F\cdot\tau_{s\,zul}$	$F=\frac{P}{\tau_{s\,zul}}$	$\tau_s=\frac{P}{F}$

Quellennachweis:
Fachbuchverlag Dr.Pfannenberg und Co.
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Sechste Auflage
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