

〔技術データ〕 面積・重心・断面二次モーメントの計算

断面	A	e	I	Z=I/e	断面	A	e	I	Z=I/e
	bh	$\frac{h}{2}$	$\frac{bh^3}{12}$	$\frac{bh^2}{6}$		πab	a	$\frac{\pi}{4} ba^3 = 0.7854 ba^3$	$\frac{\pi}{4} ba^2 = 0.7854 ba^2$
	h^2	$\frac{h}{2}$	$\frac{h^4}{12}$	$\frac{h^3}{6}$		$\frac{\pi}{2} r^2$	$e_1 = 0.4244r$ $e_2 = 0.5756r$	$\left(\frac{\pi}{8} - \frac{8}{9\pi}\right) r^4$ $= 0.1098r^4$	$Z_1 = 0.2587r^3$ $Z_2 = 0.1908r^3$
	h^2	$\frac{h}{2}\sqrt{2}$	$\frac{h^4}{12}$	$0.1179h^3 = \frac{\sqrt{2}}{12} h^3$		$\frac{\pi}{4} r^2$	$e_1 = 0.4244r$ $e_2 = 0.5756r$	$0.055r^4$	$Z_1 = 0.1296r^3$ $Z_2 = 0.0956r^3$
	$\frac{bh}{2}$	$\frac{2}{3}h$	$\frac{bh^3}{36}$	$\frac{bh^2}{24}$		$b(H-h)$	$\frac{H}{2}$	$\frac{b}{12} (H^3 - h^3)$	$\frac{b}{6H} (H^3 - h^3)$
	$(2b+b_1)\frac{h}{2}$	$\frac{1}{3} \times \frac{3b+2b_1}{2b+b_1} h$	$\frac{6b^2+6bb_1+b_1^2}{36(2b+b_1)} h^3$	$\frac{6b^2+6bb_1+b_1^2}{12(3b+2b_1)} h^2$		$A^2 - a^2$	$\frac{A}{2}$	$\frac{A^4 - a^4}{12}$	$\frac{1}{6} \frac{A^4 - a^4}{A}$
	$\frac{3\sqrt{3}}{2} r^2$	$\sqrt{\frac{3}{4}} r = 0.866r$	$\frac{5\sqrt{3}}{16} r^4 = 0.5413r^4$	$\frac{5}{8} r^3$		$A^2 - a^2$	$\frac{A}{2}\sqrt{2}$	$\frac{A^4 - a^4}{12}$	$\frac{A^4 - a^4}{12A}\sqrt{2}$ $= \frac{0.1179(A^4 - a^4)}{A}$
	$= 2.598r^2$	r	$\frac{5\sqrt{3}}{16} r^4 = 0.5413r^4$	$\frac{5\sqrt{3}}{16} r^3 = 0.5413r^3$		$\frac{\pi}{4} (d_2^2 - d_1^2)$	$\frac{d_2}{2}$	$\frac{\pi}{64} (d_2^4 - d_1^4)$ $= \frac{\pi}{4} (R^4 - r^4)$	$\frac{\pi}{32} \left(\frac{d_2^4 - d_1^4}{d_2}\right)$ $= \frac{\pi}{4} \times \frac{R^4 - r^4}{R}$
	$2.828r^2$	$0.924r$	$\frac{1+2\sqrt{2}}{6} r^4$ $= 0.6381r^4$	$0.6906r^3$		$a^2 - \frac{\pi d^2}{4}$	$\frac{a}{2}$	$\frac{1}{12} \left(a^4 - \frac{3\pi}{16} d^4\right)$	$\frac{1}{6a} \left(a^4 - \frac{3\pi}{16} d^4\right)$
	$0.8284a^2$	$b = \frac{a}{1+\sqrt{2}}$ $= 0.4142a$	$0.0547a^4$	$0.1095a^3$		$2b(h-d) + \frac{\pi}{4} d^2$	$\frac{h}{2}$	$\frac{1}{12} \left\{ \frac{3\pi}{16} d^4 + b(h^3 - d^3) + b^3(h-d) \right\}$	$\frac{1}{6h} \left\{ \frac{3\pi}{16} d^4 + b(h^3 - d^3) + b^3(h-d) \right\}$
	$\pi r^2 = \frac{\pi d^2}{4}$	$\frac{d}{2}$	$\frac{\pi d^4}{64} = \frac{\pi r^4}{4}$ $= 0.0491d^4$ $\approx 0.05d^4$ $= 0.7854r^4$	$\frac{\pi d^3}{32} = \frac{\pi r^3}{4}$ $= 0.0982d^3$ $\approx 0.1d^3$ $= 0.7854r^3$		$2b(h-d) + \frac{\pi}{4} (d_1^2 - d_2^2)$	$\frac{h}{2}$	$\frac{1}{12} \left\{ \frac{3\pi}{16} (d_1^4 - d_2^4) + b(h^3 - d_1^3) + b^3(h-d_1) \right\}$	$\frac{1}{6h} \left\{ \frac{3\pi}{16} (d_1^4 - d_2^4) + b(h^3 - d_1^3) + b^3(h-d_1) \right\}$
	$r^2 \left(1 - \frac{\pi}{4}\right)$ $= 0.2146r^2$	$e_1 = 0.2234r$ $e_2 = 0.7766r$	$0.0075r^4$	$\frac{0.0075r^4}{e_2} = 0.00966r^3$ $\approx 0.01r^3$					

A: 断面積 e: 重心の距離 I: 断面二次モーメント Z=I/e: 断面係数