

Formulas

Measurement unit abbreviations

ft.	foot
ft ³	cubic foot
in.	inch
lb.	pound

Constants

π	3.1416
1 ft. $\times$ 1 ft. $\times$ 1 in. of steel plate	40.8 lb.
Density of steel	490 lb./ft ³
Theoretical mechanical advantage of pulley	1:X

Formulas

Descriptions	Full	Abbreviated
Area of circle	$\pi \times \text{radius}^2$	πr^2
Circumference	$\pi \times \text{diameter}$	πD
Force	area $\times$ pressure	$A \times P$
Lead line pull	$\frac{\text{total load weight}}{\text{number of parts of line}} \times \text{friction per part of line}$	$\frac{W}{N} \times f$
Number of wire rope clips	$(3 \times \text{diameter of rope}) + 1$ to next whole number	$3D + 1$

Formulas (continued)

Pythagorean theorem	$(\text{side } a)^2 + (\text{side } b)^2 = (\text{side } c)^2$	$a^2 + b^2 = c^2$
Sling tension	$\frac{\text{weight}}{\text{number of slings}} \times \frac{\text{length}}{\text{vertical length}}$	$\frac{W}{\# \text{ slings}} \times \frac{L}{\text{vert. } L}$
Spacing between clips	$6 \times \text{diameter}$	$6D$
Theoretical mechanical advantage	$\frac{\text{effort length}}{\text{resistance height}}$	$\frac{L_e}{H_r}$
Working load limit	$\text{diameter}^2 \times 2\,000$	$D^2 \times 2\,000$

Turn-of-nut rotation from snug tight condition

Bolt length	Flat surfaced under bolt head and nut	1 face normal to bolt axis, other sloped not more than 1:20	Both faces sloped not more than 1:20 from normal to bolt axis
$\leq 4D$	1/3 turn	1/2 turn	2/3 turn
$4D \leq 8D$	1/2 turn	2/3 turn	5/6 turn
$8D \leq 12D$	2/3 turn	5/6 turn	1 turn