



TOOLBOX TALKS

ITI salutes National Safety Week with this informative series on Crane & Rigging Safety

D/d Ratio & Multi-Part Braided Slings

The use of multi-part braided slings appears to be returning to the marketplace. In the fabrication of these slings, generally a single wire rope is braided or helically laid back against its own body to form an eye & eye sling. By design it allows the sling to have the relative bendability of the component wire rope plus a high strength value based on the sum of its parts. The number of component wire ropes in a multi-part sling could be as many as nine or as few as three.

One area in which to use multi-part braided slings is the "super heavyweight" category. A lift may require a sling capacity that cannot be achieved by a single part sling, but can be reached by braiding small component wire ropes together into an eye & eye sling configuration.

Example: A 4" single part, swaged E/E sling in a basket has a rated capacity of 226 tons. The same amount can be lifted by using a 7-part, 1-5/8" multi-part sling in a basket hitch.

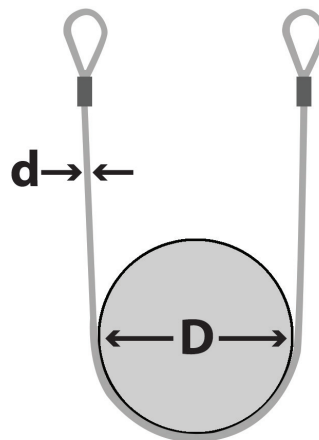
A second and more common reason for selecting multi-part slings is their bendability. If a sling is bent around too small a diameter while making its lift, there is a reduction in lifting efficiency. A ratio has been developed to help determine minimum allowable bending diameter for slings.



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Mike holds 34 years of progressive experience in wire rope, rigging, and crane operations in various industries including mining, maritime, electric utility, pulp and paper, manufacturing, nuclear, oil & gas, and construction. He has developed innovative training techniques, resource materials, workbooks, videos and reference cards which are widely used in the rigging industry today. Through ITI Field Services, Mike and his team provide consulting, accident investigation, and expert witness services.



D/d Ratio

D = diameter of bend
d = diameter of wire rope

Standard D/d Ratio for:

- Single Part, swaged E/E is 25 x rope diameter
- Multi-Part Braided E/E is 25 x component wire rope

Example: A 10" horizontal steel shaft is the lifting attachment for a pre-fabricated structure. Weight is 18 tons. (It is determined a wire rope sling is the best type of sling for this application.)

Options:

- 1-1/8" single part, swaged E/E in a basket hitch will meet the 18 ton requirement; however the 10" steel shaft is too small for 1-1/8" wire rope when applied to D/d ratio. (The standard minimum bending diameter for 1-1/8" wire rope sling is 22½".)
- 6 parts of ½" component wire rope braided E/E in a basket hitch will also meet the 18 ton requirement: the standard minimum bending diameter for ½" wire rope is 10". (This would be an ideal choice for this application.)