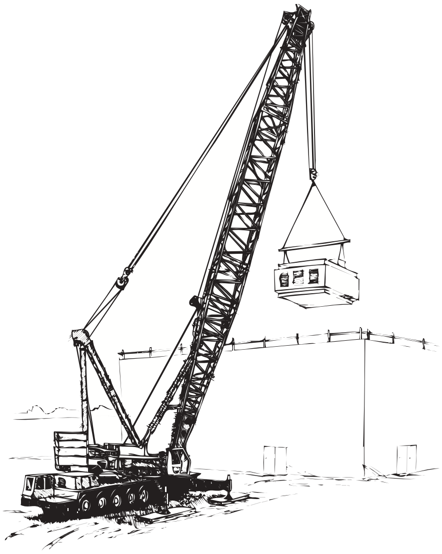
Rotation-Resistant Crane Ropes



Diameter (in.)	19 x 7 XIP® Approx. wt. / ft. (lbs.)	19 x 7 XIP® Nominal strength (tons of 2,000 lbs.) *	8 x 25 XIP® Approx. wt. / ft. (lbs.)	8 x 25 XIP® Nominal strength (tons of 2,000 lbs.) *	Flex-X® 19 Approx. wt. / ft. (lbs.)	Flex-X® 19 Nominal strength (tons of 2,000 lbs.) *
3/16	0.064	1.57				
1/4	0.113	2.77				
5/16	0.177	4.30	0.18	4.63		
3/8	0.25	6.15	0.26	6.63	0.31	8.3
7/16	0.35	8.33	0.36	8.97	0.40	11.2
1/2	0.45	10.8	0.47	11.6	0.54	14.6
9/16	0.58	13.6	0.60	14.7	0.69	18.5
5/8	0.71	16.8	0.73	18.1	0.85	22.7
3/4	1.02	24.0	1.06	25.9	1.25	32.4
7/8	1.39	32.5	1.44	35.0	1.68	43.8
1	1.82	42.2	1.88	45.5	2.17	56.9
1 1/8	2.30	53.1	2.39	57.3	2.75	71.5
1 1/4	2.83	65.1	2.94	70.5	3.45	87.9
1 3/8	3.43	78.4	3.56	84.9	4.33	106
1 1/2	4.08	92.8	4.24	100	5.11	125

* These strengths apply only when a test is conducted with both ends fixed. When in use, the strengths of these ropes may be significantly reduced if one end is free to rotate.

Block rotation: a very entangling problem.

Use the shortest fall length possible. The length of fall, or the distance from the pick point to the point sheaves, is critical. Longer fall lengths are less stable and more likely to lead to block rotation.

Avoid odd-part reeving. An even number of parts is more stable.

Use taglines on lifts. Attach a tagline to restrain the load block and keep the load from rotating.

Use a different rope construction. While there is no "right" or "wrong" wire rope to use to prevent block rotation, a rotation-resistant rope is your best choice due to its reduced torque produced under load. However, there may be a reduction in capacity with the same rigging configuration due to different nominal strengths and the higher design factor required when using rotation-resistant ropes.

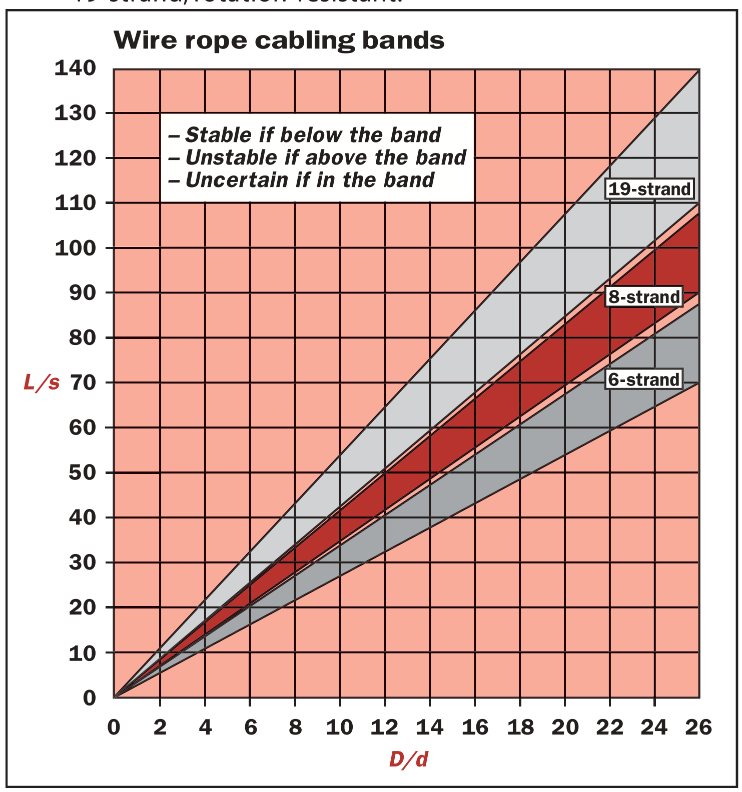
Avoid using a swivel that allows the rope to rotate. A swivel in an end termination will permit lay lengthening in the rope when loaded. While the lay only lengthens between the swivel and the first sheave, the unlaid rope travels over the sheave as the load is lifted and introduces unlaying to the section of the rope beyond the sheave. This unlaying becomes trapped and will not come out of the rope when the load is removed. The trapped unlaying causes twist in the rope, which leads to block rotation, erratic spooling, unbalancing and decreased rope service. Remove the swivel from the rope termination and follow steps to remove twist from the rope to optimize rope service.

Check sheave alignment and groove size. Improper sheave alignment or groove size can "milk" the lay in a rope and cause torque.

How to evaluate block stability due to rigging geometry.

Industry testing has been conducted to help you assess the block stability of your rigging configuration and rope selection. The bands on this graph approximate the block stability for three types of wire ropes tested in multi-part systems:

- 6-strand, right regular lay, IWRC.
- 8-strand, rotation-resistant.
- 19-strand, rotation-resistant.



Four independent variables are used in pairs to locate a reference point on the graph that indicates the stability of the lift being made. The ratios used include:

L/S = Length of fall (ft.) ÷ Spacing of the rope (ft.).

L = Length of fall measured from the centerline of the point sheave to the centerline of the traveling block sheave as shown in the diagram.

S = Average diagonal spacing of the rope at the boom point and the traveling block sheaves as shown in the diagram.

D/d = (D) Average pitch diameter of point and block sheaves (in.) ÷ (d) nominal rope diameter (in.).