

Block rotation: a very entangling problem.

Also called cabling, block rotation occurs when multi-part reeving twists together at a certain height, entangling the parts of rope between the traveling block and boomtip. It can happen with little warning, making it virtually impossible to lift or lower a suspended load. Twisted hoist lines can bring a construction project to a sudden halt, resulting in downtime.

But the good news is this. You can minimize block rotation through proper installation and handling, as well as take corrective measures

THE KEY IS UNDERSTANDING TORQUE.

Every wire rope – regardless of type, classification, grade or manufacturer – will develop torque when loaded.

Torque is normal and natural, caused by the way wire ropes are made. Wires are first laid together in a spiral to form strands, then several strands are laid together in a spiral to form the rope. When loaded, wires and strands try to straighten out, thus creating torque.

Another source of torque is any change in the rope lay length. This is normally caused by “milking” or rotation at the end of the rope.

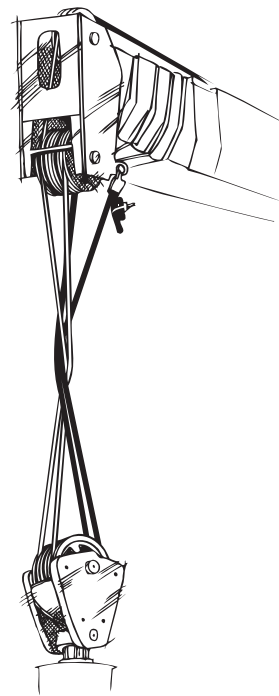
Torque in a rope affects the tendency of the traveling block to rotate. Thus, it's important to minimize any torque.

HOW TO HELP REDUCE BLOCK ROTATION.

There are at least seven different operating practices you can use to minimize block rotation on your crane.

CHANGE THE RIGGING GEOMETRY. This includes the following operating practices:

- Use larger diameter traveling block sheaves to increase the rope spacing. As the diameter of the traveling block sheave increases, the chances for block rotation are reduced.
- Use the outer (farthest apart) sheaves – traveling block and boom.
- Dead-end the rope at the boomtip to increase the spread between the wire rope parts.



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.

Standard 6-strand ropes do not provide any rotation resistance. There are different levels of rotation resistance that can be obtained from specialty ropes. For maximum block stability use XLT⁴. The unique design of XLT⁴ results in extremely low torque under load. This characteristic makes XLT⁴ one of the most stable ropes in multiple part reeving comparable to Category 1 rotation-resistant ropes. Both XLT⁴ and Category 1 ropes are also used in single part hoisting.

There are other specialty ropes that provide lower levels of rotation resistance. These ropes have been divided into categories based on their rotation resistance. The lowest level of rotation-resistant ropes is Category 3 which include our 8 x 25. Our Flex-X 19 PS and 19 x 7 ropes are Category 2 rotation-resistant ropes. They provide greater rotation resistance than Category 3 ropes. Flex-X 19 PS is very resistant to crushing in multiple layer spooling and is frequently used in multi-part hoisting applications.

USE A SWIVEL ONLY WITH XLT⁴ AND CATEGORY 1 ROPES. XLT⁴ and Category 1 ropes, due to their special design, may be used with a swivel. Other wire ropes should not be used with a swivel.

With standard ropes, Category 2 (Flex-X 19 PS and 19 x 7) rotation-resistant rope and Category 3 (8 x 25) rotation-resistant rope, a swivel in an end termination will allow rotation in a direction that unlays the outer strands when the rope is loaded. This can cause a reduction in rope strength, unbalance in the rope and spooling problems.

While the rope rotation only occurs between the swivel and the first sheave, the unlayed 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.

