

PRODUCT BULLETIN



A WireCo® WorldGroup Brand

CATEGORY 2 AND CATEGORY 3 ROTATION-RESISTANT ROPE AND SINGLE-PART HOISTING

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Rotation-resistant rope – torque and rotation.

When a load is placed on a rope, torques are created within the rope as wires and strands try to straighten out. Ropes are designed to operate with these load-created torques within them.

Category 2 (Flex-X19 and 19x7) and Category 3 (8x19 RTW and 8x25 RTW) rotation-resistant ropes are designed so that the torque created by the rope core acts in the opposite direction of the torque created by the outer strands. Because the torques are not equal (the outer strands create more torque than the core strands), rotation will occur in a direction that unlays the outer strands if a rope is allowed to rotate while it is loaded.

Category 2 and Category 3 rotation-resistant rope performs best if the rope does not rotate. Rope rotation will cause a reduction in strength, unequal loading in the rope, and possible rope unbalance. It will also cause additional internal wear to the rope that will be difficult to observe in rope inspection.

Four methods of making a lift that is within the capacity of a single-part line.

1. Headache ball that does not allow rotation under load and a tagline is used on the load. The rope operates with the load-induced torque within it and the tagline prevents load rotation.
2. Change the reeving to a two-part line and terminate the rope without a swivel. While this will slow hoisting speeds, it will remove the opportunity for the rope to freely rotate. An evaluation of the rigging and lift geometry can be made to determine if block rotation will be a problem.
3. Swivel at the headache ball. This allows the rope to rotate as the load is applied or removed from the rope. This can cause the problems outlined above.
4. Headache ball that does not allow rotation under load and no tagline on the load. As the load-induced rope torque overcomes the inertia of the load, the load and the rope will rotate. Because of the mass of the rotating load, the load will rotate past the “neutral” point that the rope is trying to reach. When the load is removed, the rope will rotate in the opposite direction. This can also cause the problems outlined above.

Methods 1 and 2 above allow hoisting while keeping the rope from rotating. While either of these methods are better for the rope than methods 3 or 4, other operational factors may make one or both of these methods impractical.

Methods 3 and 4 both allow the rope to rotate. This is not good for the rope and may produce operational problems.

If methods 1 or 2 cannot be used and method 3 or 4 is used, increase the frequency of rope inspection, with special attention to internal rope deterioration.

Rotation-resistant rope – removal criteria.

While much of the removal criteria for rotation-resistant rope is the same as the requirements for a standard rope, some requirements are more stringent. Abnormal loss of rope diameter, abnormal lengthening of rope lay, or protrusion of wire between the outer strands is cause for immediate removal of the rope from service. Rotation-resistant ropes should be replaced when you see two randomly distributed crown wire breaks in six rope diameters – or four randomly distributed crown wire breaks in 30 rope diameters. See ASME B30.5, Mobile and Locomotive Cranes, Section 5-2.4 for additional information on rope inspection, replacement, and maintenance.