

Overview of proposed amendments to

Part 14: Cranes and Hoists Section 14.91, Hoisting ropes

Two layer non-rotating wire rope load lines of 19x7 and 8x19 construction are still in use on tower cranes. These ropes are subject to abrasion and fatigue because of the construction of the rope and the rope path that includes several reverse bends over a short rope distance. The damage occurs inside the rope and cannot be found by visual inspection. Section 14.91 requires a portion of the rope be removed periodically to shift the worst wear and tear and reduce the compound problems of abrasion and fatigue.

Three layer rope is now available and in use which is far more durable for the same operating conditions. This non-rotating wire rope has 14 or more outer strands or has an inner core that is coated with plastic, and meets the 2004 CSA Standard. It is difficult to cut this wire rope, seize the end and re-reeve it without causing damage.

By specifying that only the two-layer 8 or 12 strand rope is required to be shortened periodically, the three-layer non-rotating wire ropes will not be subject to this requirement.

PART 14: CRANES AND HOISTS

TOWER CRANES

- Hoisting ropes** **14.91** (1) ~~The hoisting rope on a tower crane~~ **A rotation resistant hoisting rope on a tower crane with less than 14 outer strands and an inner core that is not plastic coated** must be shortened by the removal of 3 m (10 ft) at the dead end after every 3 months of use ~~unless otherwise specified by the manufacturer.~~
- (2) The hoisting rope on a tower crane must be properly seized before cutting.
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Explanatory Note

In the 1970s and into the 1990s, two-layer non-rotating wire rope load lines of 19x7 and 8x19 construction were typically used on tower cranes. The construction of the rope was problematic because the strands on the outer layer cross over the strands of the inner layer to give the wire rope the non-rotating characteristic. This causes very high notching stresses which results in nicking on the individual wires. The nicking reduces the cross-sectional area of the individual wires and increases the stress. This problem is compounded by the rope path that includes several reverse bends over a short rope distance, creating a fatigue problem. The damage occurs inside the rope and cannot be detected by visual inspection.

By removing a portion of the wire rope at the dead end, the section of rope subjected to the worst wear is periodically shifted, somewhat reducing the compound problem of abrasion and fatigue and mitigating the risk of premature catastrophic failures. These types of hoisting ropes are still in use.

Wire rope now available has characteristics that make it far more durable for the same operating conditions and meets *CSA Standard Z248-04*. This three-layer non-rotating wire rope has 14 or more outer strands or has an inner core that is coated with plastic. It does not benefit from periodically removing a short length from the dead end because it is difficult to cut the wire rope, seize the end and re-reeve it without causing damage. These types of hoisting ropes are also in use.

The proposed amendment to existing section 14.91 (1) of the *Occupational Health and Safety Regulation* would specify which rope is subject to periodic shortening. This would mean that the three-layer non-rotating wire ropes that have 14 strands or more or that have a plastic coated inner core would not be subject to this requirement.