

## PART 14: CRANES AND HOISTS

### TOWER CRANES

- Hoisting ropes**    **14.91**    (1) ~~The~~ **A rotation resistant** hoisting rope on a tower crane must be shortened by the removal of 3 m (10 ft) **of rope** at the dead end after every **500 hours** ~~3 months~~ of use unless
- (a)** otherwise specified by the ~~manufacturer~~ **rope manufacturer,**
  - (b)** **the rope has 14 or more outer strands, or**
  - (c)** **the rope has a plastic coated inner core.**
- (2) The hoisting rope on a tower crane must be properly seized before cutting.
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### Explanatory Note

The amendment to section 14.91 (1) of the *Occupational Health and Safety Regulation* clarifies the interval for shortening the hoisting rope to take into account actual operating time. The original intent of section 14.91 (1) to require the rope to be shortened “after every 3 months of use” was based on the tower crane being used regularly during a normal “8 hour” shift, five days a week over the 3-month period. This is equivalent to approximately 500 hours of operating time for the crane. Under the previous wording, if the crane is used more than 8 hours each working day (for example for a “double shift” of 16 hours each work day) the employer is under no obligation to adjust this 3-month period to take into account this increase in service time. The hoisting rope would not necessarily be shortened at an interval that would maintain the integrity of the rope and thus ensure worker health and safety. On the other hand, if the crane is not used regularly throughout each shift, or is not used every day of the normal work week, the employer was still required to shorten the rope after 3 months of use even though this procedure is not needed to maintain the integrity of the rope at that time. This amendment will require the employer to track the hours of use for the crane and to shorten the rope when the number of hours in service reaches 500 hours. If the employer uses the crane for an 8-hour shift for 5 days a week, shortening of the hoisting rope would continue to be required approximately every 3 months.

The other amendments to this section create specific exemptions from the requirement to shorten a rotation resistant hoisting rope periodically.

Up until the 1990s, only two-layer non-rotating wire rope load lines of 19x7 and 8x19 construction were typically used on tower cranes. The construction of these rope types is problematic. The strands on the outer layer cross over the strands of the inner layer to give the wire rope the non-rotating characteristic. This rope construction causes high notching stresses and 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 rope failure. These types of hoisting ropes are still in use.

Other types of wire rope now available and used on tower cranes have characteristics that make them far more durable for the same operating conditions. These types of rope have a 3-layer construction with 14 or more outer strands or have an inner core that is coated with plastic. These ropes do not benefit from periodically removing a short length from the dead end. Also, it is

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difficult to cut these types of wire rope, seize the end and re-reeve it without causing damage to the rope.

The amendment to section 14.91 (1) specifies which rope is subject to periodic shortening. The non-rotating wire ropes that have 14 or more outer strands or that have a plastic coated inner core are now exempt from this requirement.