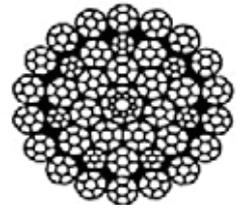
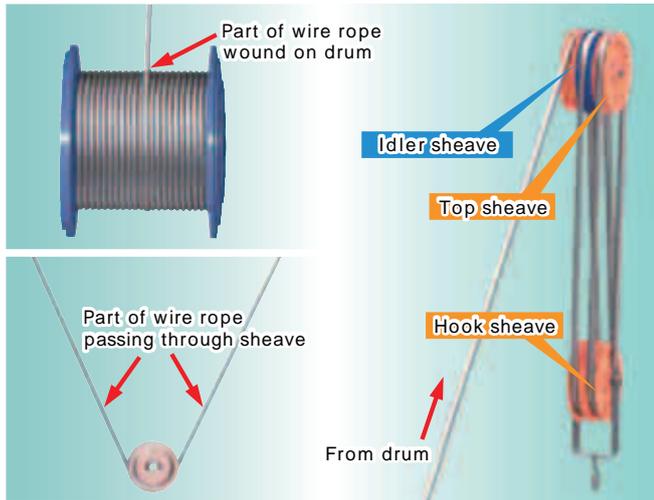


Wire ropes plays a leading role in Kobelco cranes such as lifting load, hoisting/lowering and supporting the booms. All wire ropes requires consistent maintenance and proper care in order to remain in good condition, functionally efficient and most importantly for the safety of your crane. Genuine wire ropes are especially designed with to suit the performance of our cranes.



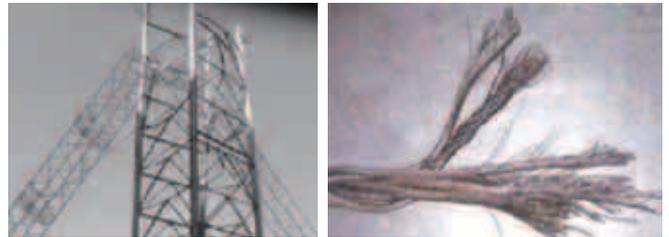
1. Why to maintain and where to check for maintenance

● The main areas for inspection



It is essential to maintain your wire ropes as the strands of the wire are under constant stress, strain and they are also rubbing against each other causing friction. The wire ropes passing through the drums and sheaves where a lot of stress and friction is caused should be inspected on a daily basis.

● An accident where the boom fell down due to the breakage of the boom wire rope



2. When wire ropes need to be replaced

A delay in the replacement of wire ropes can lead to a fatal accident such as the collapse of the boom or the fall of the lifting load. Be sure to replace the wire rope at an appropriate timing by referring the standard below.

● The standard for replacement

● Wire break

The disposal standard for the number of wire breaks refers to wires comprising the outer strands only. Wire breaks of inner strands and rope core are not included in the number of wire breaks. If wire breaks are concentrated on any point, replace the wire rope even if the number of wire breaks is less than the allowable number defined by the standard.



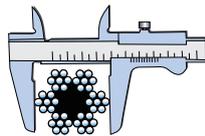
Number of wire breaks : 10% per pitch.
Number of wire breaks : 5% per strand.
Number of wire breaks : 20% per 5 pitches.

● Mechanical Wear

The rope diameter will be gradually reduced due to wear. When the reduction in rope diameter exceeds 7% of the nominal diameter, replace the wire rope.



Wear : 7% or more of the nominal diameter.



● Corrosion



If a rope suffers corrosion, it becomes brittle, resulting in strength deterioration. Even if neither wire break nor corrosion is found during use for a long period, internal corrosion should be assumed. The period of use should be also considered as replacement standard, as well as strength test using specimens, wire breaks and corrosion.

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● Kink



"Kink" means remarkable bend and irregular winding that has partially developed on a wire rope.

● Wave

If the wave height exceeds four thirds of the rope diameter, the wire rope must be disposed of.



$$\frac{\text{Wave height (d1)}}{\text{Rope diameter (d)}} = \frac{4}{3} \text{ or more}$$

● Crush

The disposal standard is that the short diameter becomes two thirds of the long diameter.



Short diameter

Long diameter

$$\frac{\text{Short diameter}}{\text{Long diameter}} = \frac{2}{3} \text{ or more}$$

● Bend



● Swell (Birdcage)



● Protrusion of rope core



● Drop of strand

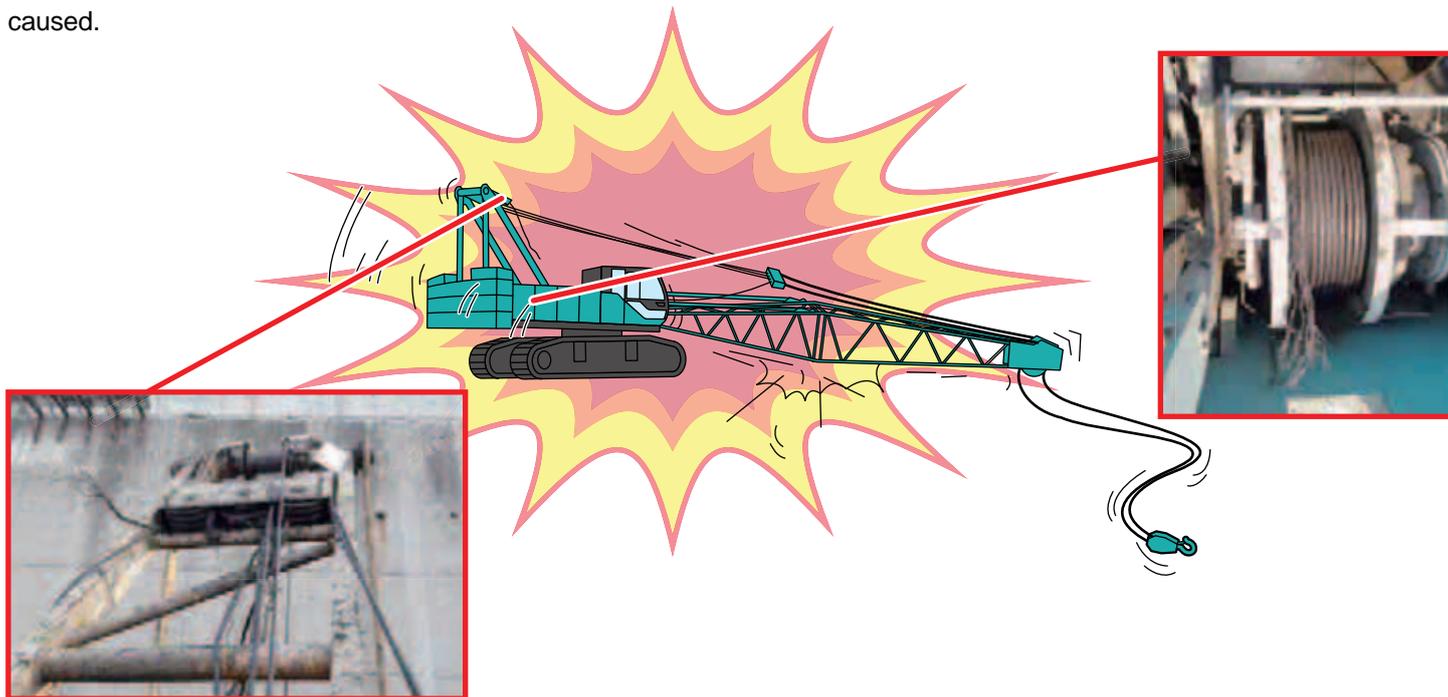


● Protrusion of strand / Remarkable protrusion of wire



Past accident cases

If you use non genuine parts and/or improper maintenance was conducted, below accidents and serious injuries may be caused.



Q&A about wire rope

Q.What about wire rope maintenance?

A. We recommend visual inspection every 8 hours of operation. maintenance should be conducted when disassembling and assembling machine, or when the surface becomes dry. In that time, not only applying grease to protect the outside, but also using oil that penetrate the inside of the wire rope can extend the wire rope life time.

Q.What are the replacement criteria for wire ropes?

A. The wire rope should be replaced based on the condition of wire rope. And wire rope condition will be changed depend on machine operating environment. Therefore, It is not possible to determine the recommended replacement period. As a condition standard, if 10% or more wire breakage per pitch or a diameter reduction of 7% or more is found, we recommend replacement of that wire rope.

Q.Why maintenance is required, even genuine one?

A. Even with genuine parts, the wire rope repeatedly stretches and wears during machine operation. Maintenance can delay premature wear as much as possible, which contributes to longer life.

Q.Genuine wire rope is expensive and we want to use non-genuine one?

A. Even if the price of wire rope is half price, and the life is half, more labor for replacement and machine down time will be required, which may result in higher cost compare with total cost with genuine one,



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