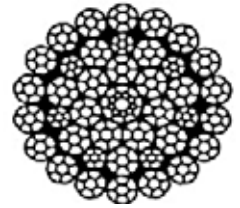
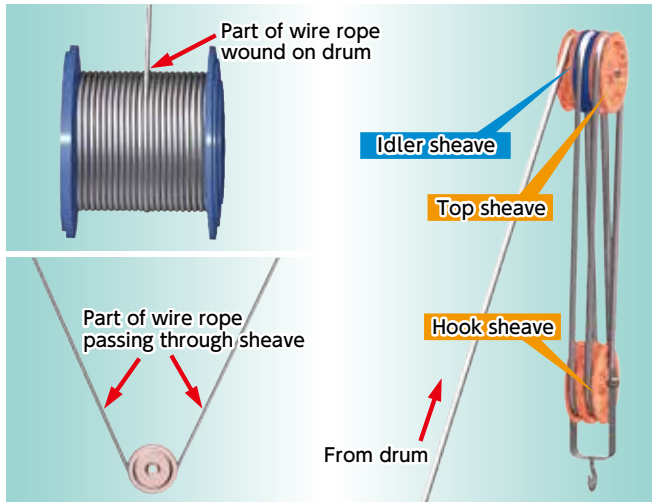


Wire ropes plays a leading role in Kobelco cranes such as lifting load, hoisting/lowering and supporting the booms. All wire ropes requires consistent maintenance and proper care in order to remain in good condition, functionally efficient and most importantly for the safety of your crane. Genuine wire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



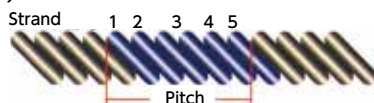
2. When wire ropes need to be replaced

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.



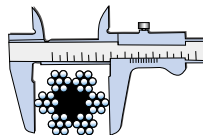
- Number of wire breaks : 10% per pitch.
- Number of wire breaks : 5% per strand.
- Number of wire breaks : 20% per 5 pitches.

● 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.

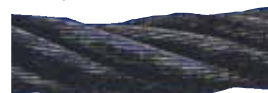
● Kink



"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.



$$\frac{\text{Short diameter}}{\text{Long diameter}} = \frac{4}{3} \text{ or more}$$

● Bend



● Swell (Birdcage)



● Protrusion of rope core



● Drop of strand

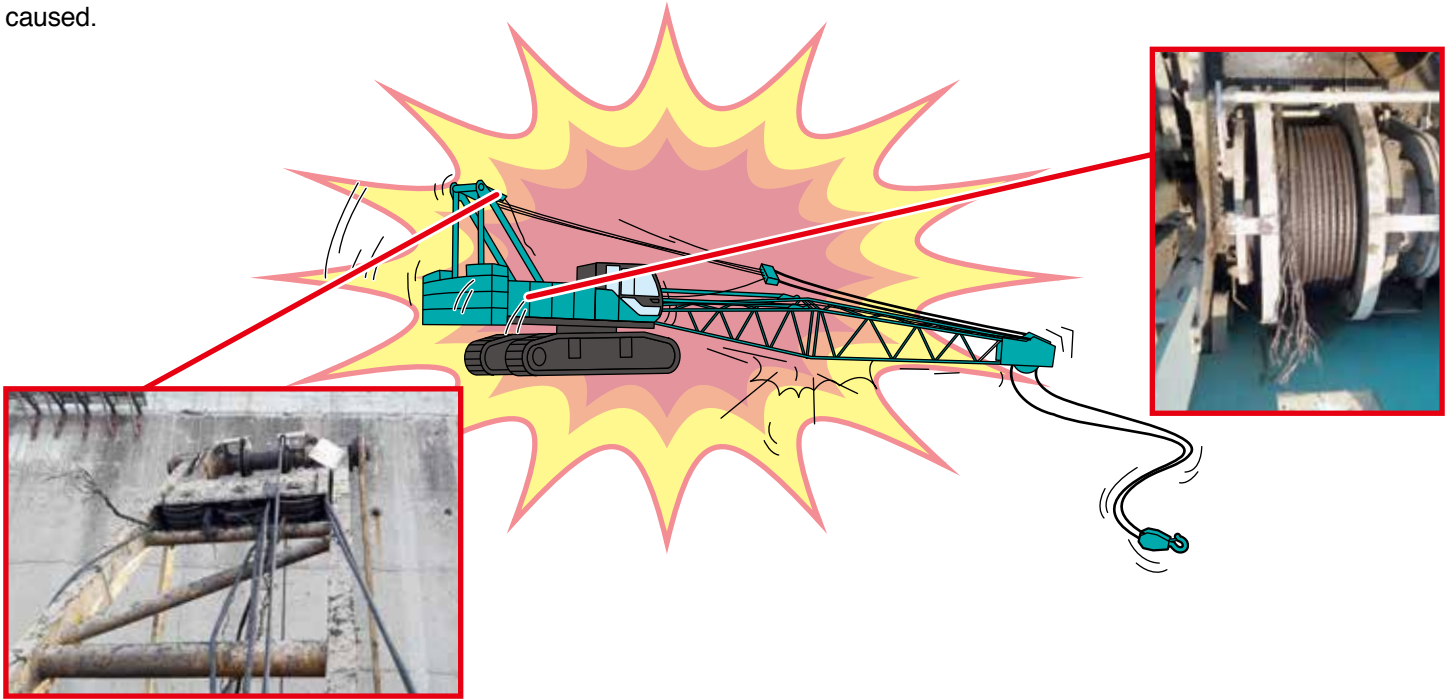


● Protrusion of strand / Remarkable protrusion of wire



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.

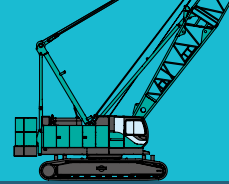
Q.Genuine wire rope is expensive and we want to use non-genuine one?

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,

KOBELCO CONSTRUCTION MACHINERY CO., LTD.
Crane Customer Support Department

740, Yagi, Okubo-cho, Akashi-shi, Hyogo, 674-0063 JAPAN
TEL: +81-78-936-1408 FAX: +81-78-935-5240

For further information, please contact...



Genuine VS Non Genuine

Currently customers have the choice to purchase non genuine and genuine parts. However, it is crucial to purchase genuine parts from your nearest Kobelco dealer as genuine parts are especially made or selected by us and rigorously tested by the vendors to meet the high quality. Most importantly it is important to use genuine parts to maintain the safety and quality of your crane. If you choose to purchase parts not certified by Kobelco there will be no warranty coverage and we will not take any responsibility for any accidents. We would like to explain why genuine wire ropes are better in quality.

1. Understanding the "Class" types of wire ropes

Wire ropes are classified depending on the nominal tensile strength of the wires that make up a rope.

There are four types of classes, E,G,A and B which are standards set forth by JIS (Japanese Industrial Standards Committee). There is the Class (C) which has a higher nominal tensile strength compared to the JIS standard. Kobelco genuine wire ropes have even a higher standard the Class (C) type under "Specified Class". This "Specified Class" is what we mostly use for our Kobelco cranes and these ropes have been manufactured and developed closely between the vendor and Kobelco.

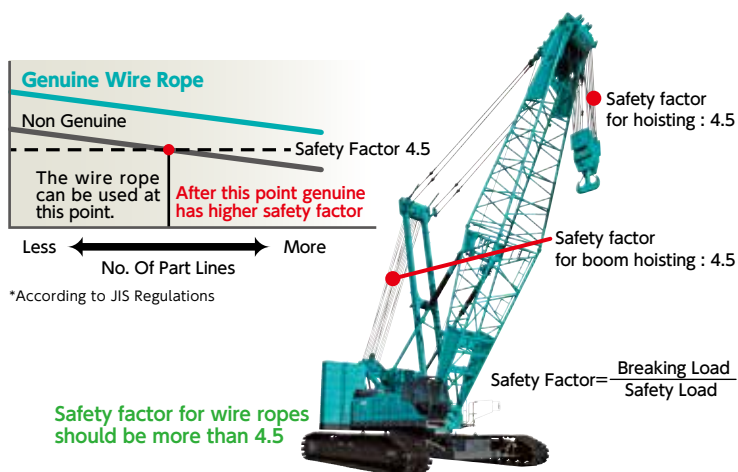
● Example

Classification	Class	Nominal tensile strength of wire N/mm ² (kgf/mm ²)
JIS	Class E	1,320(135)
	Class G	1,470(150)
	Class A	1,620(165)
	Class B	1,770(180)
Wire rope manufacturer's high strength standard	Special class (C)	1,910(195)
Specified by crane manufacturer	Specified class	—

2. Safety Factor

The safety factor of a wire rope is calculated based on the classification of wire, the breaking load and the number of part lines (number of sheaves) on the wire rope. For instance the more sheaves the wire ropes go through the more tension on the wire rope therefore the lower the safety factor.

Kobelco genuine wire ropes are made so that the safety factor does not go below 4.5 (set forth by Ministry of Health, Labour and Welfare) this is because the breaking load is 10~15% higher compared to non genuine wire ropes.



3. Wire Rope Tolerance

There are two ways explain the diameter of the wire rope. "Nominal" diameter and "Actual" diameter. "Nominal" is the diameter which is designated and the "actual" diameter is based on the actual measurement indicated in millimeters. There is a wide tolerance of the wire rope which is from 0 to +7% under JIS regulation. With our cranes, if the diameter of the rope does not match the groove of our drums, it will cause rough spooling or even damage to your drum. Kobelco genuine wire ropes are manufactured under extremely strict tolerance of +3.7 to ±0.7%.

	Diameter Tolerance (%)	Example if the nominal diameter 22mm
JIS (Japan Industrial Standard)	+7 to 0	Dia. 22 to 23.54mm acceptable
KOBELCO Standard	+3.7 to ±0.7	Dia. 22.66 to 22.97mm only acceptable

● Examples of the wire ropes on the groove of a drum

Genuine Wire Rope

Due to the narrow tolerance of the Kobelco genuine wire ropes, each wire rope will fit into the groove of the drums perfectly.

Non Genuine

If the tolerance is too wide and the diameter of the wire rope is too small or too big the wire ropes will not perfectly match the drum grooves, which causes... **ROUGH SPOOLING!!** Which will damage the groove of a drum!!

ROUGH SPOOLING!!