SHEAVE

●What is the Sheave?

The sheave is a grooved wheel that is used for guiding and holding wire rope. The sheave rotates on a bearing which allows the wire rope to move freely ,minimizing the friction and wear on the rope as well as providing a smooth crane operation.

●Types of sheaves

In KOBELCO cranes, U-grooved nylon and steel sheaves are used. The sheaves afford full support of the rope with their large “arc of contact”. Both Nylon and steel sheaves provide high load bearing capability, corrosion protection and grease nipples for bearing lubricant.

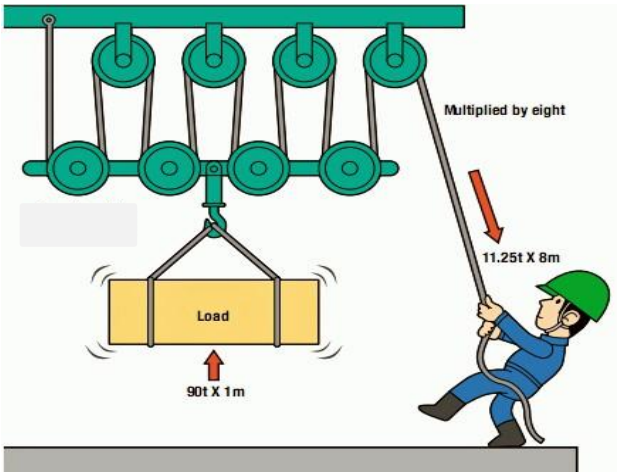
Nylon sheave

Steel sheave

●Use of sheaves in cranes?

Sheaves ensures smooth, safe hoisting and lowering operations of loads as well as preventing premature damage of the wire rope. A sheaves main purpose is to redirect wire rope, hold the lifted loads and to transmit power.

By increasing the number of sheaves , the number of falls of line can be increased ,thus maximum lifting capacity can be achieved as per the design.



For example, based on the above figure,

Force required to lift a load of 90 t using 8 sheaves is,

90÷8 = 11.25 T

Thus, the force required to lift the load is reduced to one eighth by increasing the part of line using sheaves.

● Effect of sheave groove vs diameter of wire rope

The groove depth and groove angle is paramount in sheaves so that the rope does not rub against the flange of the sheave while entering, running or leaving the sheave.

The groove diameter of sheave should always be slightly larger than actual diameter of the rope. But if the groove diameter is too large the rope will tend to flatten and if it is too small, pinching of rope will take place. The radius of bend also has an effect on the strength of wire rope. The repeated bending will develop stress and fatigue, which will affect the life and eventually damage the wire rope.

● Factors that leads to sheave damage.

- Physical aging.
- Environmental degradation influenced by extreme temperature and high humidity.
- Incorrect lifting methods.
- No lubrication
- Failure to follow the wire rope reeving diagram.

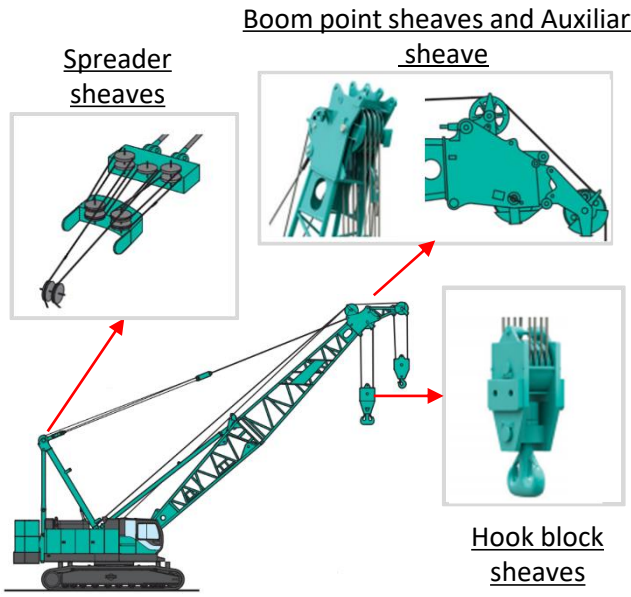
Common failures on sheaves are;

- Damage to sheave bearing and the snap rings comes out from sheaves

- Rubbing of outer surface with the nearby sheaves

SHEAVE

● Crane sheaves that need to be inspected periodically!! & include

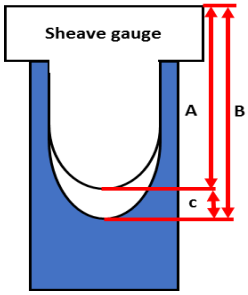


● Why sheave inspection is important?

Sheave inspection is crucial for the safe operation of crane and considered as a key component in reducing the breakdown cost related with the replacement of wire rope.

Points to be noted during sheave inspection,

▸ Groove clearance -Groove clearance is measured using sheave gauge.

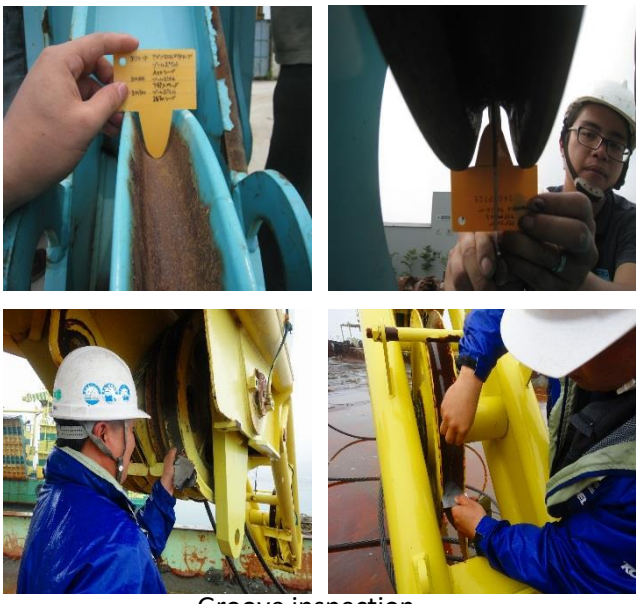


Groove clearance calculation

Sheave Gauge

Groove clearance (C) is the difference between the height of sheave (A) and the measured value (B).
If C ≥ 1.5 mm, replace the sheave
If C < 1.5 mm, sheave is safe to use.

Maximum groove clearance of sheave that is allowed to use in KOBELCO crane is 1.5 mm.



Groove inspection

KOBELCO supplies SHEAVE INSPECTION GAUGE

▸ Any rubbing marks appeared at the outer surface of sheaves.
▸ Check whether the snap ring comes out from the sheave bearing.
▸ Make sure that the reeving of wire rope is done as per the manufacture recommendation.
▸ Proper lubrication, that indirectly increase the life of wire rope.

Check It Now!!

Please feel free to contact us for inspection gauge and for any further inquiries .

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