

# Lubrication of mechanical chains

Steel chains are widely used in all types of industries because of the real advantages of this type of transmission system, which eliminate sliding, are flexible, are compact and have high transmission capacities. A chain well maintained, will give efficiency around 98% due to the inherent low friction losses.

There are a number of different types of chains, all of which require lubrication in some way. It is known that 60% of chain failures are due to the lubricant or lubrication system. It is therefore essential to use the right product for the right application in order to optimize chain life.

Wear occurs mainly along the shaft - sleeve - roller contact points, which causes the chain to stretch. If stretching is excessive, gear meshing will be downgraded and increase stretching further. Stretching is acceptable when it is in the order of 1 to 3%.

The role of the lubricant is to decrease wear on the chain but also to protect the chain from corrosion; reduce transmission noise and improve transmission efficiency.

The lubricant acts on the chain in the friction areas of the rotating parts, in the gaps between the main shafts, sleeves, rollers and links. It is in these gaps that the oil has to reduce the contact between the different moving parts. It is important for the lubricant to be able to penetrate between the links in order to lubricate the sleeve and the shaft.

There are a number of different types of wear mechanisms that occur, namely:

- **Friction wear** - Due to micro-welding caused by metal-to-metal contact and shear arising from friction.
- **Abrasive wear**- Due to friction of abrasive foreign particles which penetrate the chain moving parts.
- **Fretting** - When running over a gear wheel, vibration causes wear on the metal and micro-cracking if there is insufficient lubrication.
- **Corrosive wear**- Due to the corrosive effect of the environment followed by removal of this corrosion due to friction.

It is important to lubricate the chain components in the minimum chain load area, to allow the lubricant to penetrate.

Several types of products can be used for chain lubrication, depending on the type of chain and operating conditions. The oil should have sufficient fluidity to penetrate the internal surfaces of the link, sufficient thickness to maintain the oil film under a heavy load, sufficient adherence of greases to stick to the chain, good anti-corrosion properties and in some cases good temperature resistance.

In all instances, reducing friction reduces wear and minimises wasted energy lost in transmission. It is critical that the chain is sufficiently lubricated on a regular basis, with the correct lubricant to ensure that that the high power transfer is maintained and energy consumption is reduced. The question is when last did you look at your chain lubrication strategy?

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