New TechTransform Bearing Maintenance

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An increased focus on machine reliability in recent years, along with a wealth of new rotating equipment maintenance advancements, have dramatically increased plant operations' ability to boost uptime and improve productivity.

The developments impact all areas of rotating-equipment operation, including shaft alignment, bearing handling, installation, lubrication, and condition monitoring. Some maintenance practices and activities are being phased out in light of modern ideas and priorities. Others remain as relevant as ever.

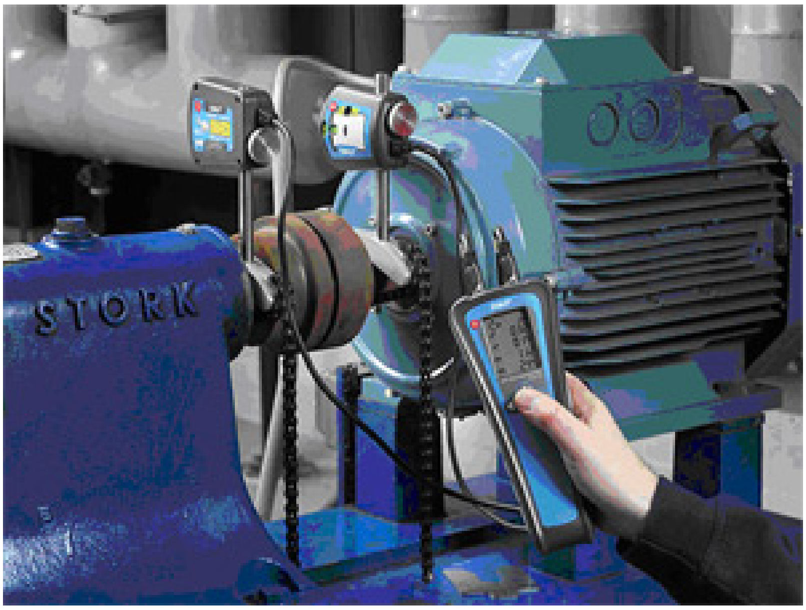
Is your plant's maintenance department keeping pace with the new developments? To avoid falling behind, it's a good idea to review your current procedures to determine if they conform with today's best practices.

Shaft Alignment

Consider shaft alignment, for example. Because even slight misalignment can generate additional loads and vibration, wasting energy and resulting in damage to bearings, seals, and couplings. Improving alignment accuracy has become a modern maintenance priority. Newly introduced shaft alignment technologies provide much greater accuracy than manual methods, improving bearing performance and addressing energy concerns.

One laser-equipped system consists of a hand-held control unit linked to dual measuring units, which are each capable of projecting laser lines and detecting those produced by the other unit. The measuring units are positioned on opposing shafts at distances ranging from several inches to almost 3 feet. During alignment, maintenance technicians can view real-time dimensions and values on the control unit's screen, allowing them to adjust the coupled shafts until they are correctly aligned. The system requires minimal training to learn and operate.

There are also advanced technologies for aligning belt-driven machinery. These include instruments that attach to pulley grooves and can align opposing pulleys of unequal widths or with dissimilar faces.



Bearing Handling/Installation

Poor bearing handling and installation practices were once widespread, with bearings removed from packaging prematurely and exposed to contaminants, then hammered onto shafts using makeshift materials such as sections of pipe. Often, the bearings were damaged before they were even operational.

The basic guidelines for handling and installing bearings remain valid. In fact, they have taken on greater importance due to the growing focus on bearing reliability. With that in mind, review your storeroom and installation practices. Store bearings flat and do not remove them from protective packaging until just before installation. Clean shafts, housings, and other components thoroughly when installing bearings. Also, keep new bearings free from exposure to excessive vibrations before mounting, which can result in brinelling damage.

Bearing installation devices have been introduced that handle a broader range of bearing types and sizes than previous generations of tools. These include induction heating systems designed to mount large bearings weighing as much as 2,600 pounds. One such heater comes equipped with energy-saving features and advanced electronics. It consumes only 20 kilovolt-amperes of electricity during operation, a 50 percent reduction compared to older heaters.

There are also fitting tool kits for mounting smaller bearings. The kits contain a series of impact rings and sleeves that match the most common bearing sizes. The impact rings and sleeves transmit the correct mounting force to the bearing ring with the interference fit, minimizing the risk of damage to bearing raceways and rolling elements.

Lubrication

Traditionally, factories used one general-purpose grease for diverse rolling bearing applications. In recent years, lubrication practices have evolved, and in place of an all-purpose grease, most plants now stock a number of advanced greases to fit specific application requirements. The greases have special performance characteristics such as high-temperature or high-pressure capabilities.

There is also greater awareness of the need to carefully control lubricant quantity and to prevent overlubrication. Research shows that less is more when it comes to lubrication. The correct amount is generally the minimum necessary for a specific application. Overlubrication produces a condition called churning, which increases operating temperatures and reduces lubricant viscosity. The result can be premature bearing failure.

At the macro level, overlubrication runs counter to efforts to improve sustainability and comply with environmental standards. More, it wastes lubricant, increases lubricant costs and creates disposal problems.

Accordingly, automatic lubricators are seeing increased use. They include single-point lubricators that attach directly to rotating machinery and supply a steady, regulated flow of grease or oil. One such lubricator consists of a small battery-operated electric motor and a lubricant canister that holds up to 250 milliliters of grease or oil. The user determines the flow rate during installation. When activated, the unit’s battery-powered motor dispenses lubricant at the preset rate, preventing overlubricating.

Higher-capacity, multipoint lubricators are also available. They distribute lubricant through up to eight feed lines. Intended for heavy-duty applications such as mining conveyors and hot gas fans, they can reduce labor in facilities where multiple pumps or fans require relubrication.

Condition Monitoring

Every maintenance-aware plant today employs preventive and predictive maintenance programs to guard against downtime, detect problems at the earliest stage, and schedule repairs for planned shutdown periods. The programs are based on the regular collection and trending of vibration, temperature, and other data.

Advanced monitoring instruments, many introduced in the last decade, support these activities. They include thermographic cameras, which detect temperature differences in operating machinery, revealing potential “hot spots” and problems areas; and electrical erosion detectors, which monitor potentially damaging electrical currents in operating motors.

Each industrial plant requires a different toolkit of monitoring technologies. Your maintenance department should be equipped with monitoring instruments that provide a range of useful data and are well suited to your plant’s operating machinery.

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