Oil Mist Lubrication

How to Preserve Equipment

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The reason people invest money in construction projects is that they want a return on their investment (ROI). That is, they want to maximize revenue and owner's equity while minimizing liabilities and expenses. In addition, they want the ROI to be as rapid as possible.

With this in mind, consider the example of a construction project in the continuous process industry. The contractor typically will specify and purchase rotating machinery well in advance of its installation date for several reasons. Therefore, machinery may sit in a secure storage yard for up to three years.

In Storage

During the storage period, the machinery might be exposed to hundreds of daily thermal cycles as the ambient temperature rises and falls. In each cycle, the machinery will exhale as the temperature increases during the day, and will inhale as the temperature decreases at night. With each inhalation, ambient air enters the machinery, bringing with it whatever is in the air (moisture and dirt particles). As the temperature continues to decrease during the night, the dew point is exceeded and the result is a growing accumulation of water and dust, or mud, inside the machine.

One need not be a genius to predict the outcome when these machines are skillfully set on the foundation, carefully connected to the process and electricity, and started only after the checklist is completed. The bearings will fail - no surprise here. In fact, experienced project managers report that the premature bearing failure rates for stored machines are quite high; sometimes the failure rate is 100 percent.

Investors face not only the cost of replacing failed, unused bearings but also collateral damage, which often well exceeds the bearing replacement costs. To make matters worse, investors' return is delayed by the time required

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Temporary Oil Mist Systems

The following are recommended practices published in the American Petroleum Institute's (API) Document 686, "Machinery Installation and Installation Design". It provides recommeded procedures, practices and checklists for the installation and pre-commissioning of new and reapplied machinery for petroleum, chemical and gas industry services facilities. Intended to supplement vendor instructions, the instructions provided by the original equipment manufacturer should be carefully followed with regard to equipment installation and checkout.

API-RP 686 3.2.1 - When more than 10 pieces of equipment are to be stored for a period longer than six months from time of shipment, an oil mist protection should be considered.

API-RP 686 3.2.2 - Oil mist should be used to protect the bearings, bearing housings, and seal areas and process end of the equipment.

API-RP 686 3.2.3 - through 3.2.16 states the full recommendation.

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to repair the damage, resulting in a time value of money that cannot be ignored.

One solution to this infant mortality bearing failure problem is rather simple. It is oil mist preservation. In fact, American Petroleum Institute Standard API-RP 686 3.2.1 states "when more than 10 pieces of equipment are to be stored longer than six months from time of shipment, an oil mist protection should be considered" (see sidebar). Considering the costs for new machinery, replacing new bearings, repairing new but failed machinery, and the delays realizing ROI, one can often justify using oil mist to preserve machinery stored even for a short period of time.

Corrosion and Fretting

Stored machines are subjected to two primary static-state failure mechanisms, corrosion and fretting. Corrosion, including rust, occurs when uncoated and unprotected surfaces are exposed to chemically reactive agents like water and acid. Fretting occurs when a surface is continuously subjected to vibration over a long period of time (even low amplitude vibration), which results in localized material distress by multiple wear mechanisms.

Putting On the Pressure

The principle of oil mist preservation is base on pressuring the equipment with one-micron to three-micron oil droplets in an air suspension of a ratio of 1:200,000 parts per million at of pressure of 20 inches of water column. This pressure, although slight, is sufficient to exclude foreign substances that will damage the machine. Likewise, the mist will continuously coat the machine's surfaces, preventing corrosion.

Project managers are traditionally driven by two key measurements: is the project completed on time and within budget? Oil mist preservation is often specified for large projects but is often dropped when budgets get tight. Although this maneuver helps the near-term project performance objectives, it hurts the overall project economics in the final analysis. Oil mist preservation should, in reality, be the last to be dropped to reduce project costs because the payback is high.

Two large projects in Formosa and Thailand, Southeast Asia, involved thousands of pumps using oil mist preservation. In both cases, there were no bearing failures on start-up of machines that were preserved with oil mist. When comparing the benefits of other projects, oil mist preservation is an incredible success story.

Related Reading

Lubrication Systems Company. "LubriMist Oil Mist for Machinery Preservation." 2003
www.lsc.com/flash/pdf/products/oilmist/brochures/preserve.pdf

Bloch, H. "Protection of Equipment During Storage. Standby and Decommissioning." *Machinery Lubrication magazine.* January - February 2003.