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Predictive Maintenance Programs

Compressed air is probably one of the most versatile operations within the manufacturing environment. It transcends industries, operations and applications. Compressed air is used to power tools, move conveyers, transport products and make process applications possible. It is the fourth utility. Therefore, similar to electricity, disruption of the compressed air supply can cause costly production delays.

Fortunately, compressor operations are constant and very predictable. Compressor applications and subsequent performance are based on specific physical conditions. Over time, the demand requirements can negatively affect a compressor's performance efficiency. For example, deposits found in the air can lead to a loss of air pressure. Therefore, there is an increase in electricity needed to produce the required pressure for a system's application.

Predictive maintenance programs, when utilized correctly, can alert the plant operator to these and other potential failures within the compressed air system. With the help of various types of control systems, companies can perform daily "observation maintenance" programs for compressed air systems and other rotating equipment. By reviewing daily readings of temperatures, pressures, and functions, plant operators can predict, not only where the failure could take place, but more importantly -- when it may happen. This advantage can prevent unscheduled repairs and costly downtime.

This article reviews the importance of establishing a predictive maintenance system and reviews strategies for selecting and managing an effective program.

How Predictive Maintenance Works

The first step in establishing a predictive maintenance program is to understand your goals. The overall goal of a predictive maintenance program is to maintain the compressed air system's efficiency, which in turn increases reliability and extends equipment life.

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Predictive maintenance programs provide protection for each sub-system within the compressed air system, including air, cooling, oil, and driver (i.e., electrical motor, steam turbine, diesel engine, etc.).

Here are some examples:

For the air system, maintaining aerodynamic efficiency and the health of moving parts are primary concerns. Both can be compromised by poor air quality. If air contaminants come in contact with impellers, rotors or pistons, it can increase the wear rate of the moving elements and decrease the overall system efficiency.

Air cooling systems can become contaminated simply due to the build up of deposits found in the water. Over time, this build up can cause a loss of heat transfer capability, resulting in an increase in air temperature.

- With oil cooling systems, if the lubricant is not kept clean and maintained at the correct temperature, metal to metal contact between rotating assemblies and bearings can occur. This can increase system vibration and required horsepower.

- With lubricated compressed air systems, improper changeout intervals for separators and/or oil coalescing elements can increase oil carryover throughout the compressed air system. This type of carryover can be detrimental to the compressed air system's application.

- The driver system can have the same potential problems as the other systems. If the system becomes contaminated, its ability to work efficiently will be compromised.

A predictive maintenance program will help prevent these potential faults in the system's efficiency and help reduce both downtime and unscheduled repair costs. Although, in order to ensure the success of a predictive maintenance program, there needs to be an understanding of what variables can be monitored.