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Energy Savings Case Study

Monitoring and Detecting Leaks in Small Compressors Yields Big Savings

Company: Best Cutting Die – Skokie, IL -- A fully integrated design and manufacturing facility.

Background: Supplying cutting dies and complete cutting modules to the converting industries. The cutting applications include envelopes, diapers, labels and packaging products.

Equipment Monitored to Achieve Savings: 2 Air compressors – 40 HP & 60 HP

Operating Costs: $30,000 a year in electricity to operate both air compressors. Typically, these pieces of equipment are operated alternately.

Tools Used:

- Sensor Synergy's Watts Aware for Compressed Air – monitors electricity usage and monitors compressed air pressure
- CTRL UL101 – ultrasound detector to find air leaks

Findings & Actions: The 60 HP compressor required 1160 kWh during an average day. Reducing the upper set point pressure from 120 psi to 95 psi lowered the average daily power requirements to 1,030 kWh. On alternate days, the 40 HP air compressor was operated and required 770 kWh. Reducing the set point pressure from 120 to 95 psi lowered the average daily power requirement to 680 kWh. Measurements of the system air pressure with 2-second time resolution were displayed in real-time and logged to the Watts Aware system. These measurements, taken before and after pressure setting changes, verified that the compressed air system pressure never dropped below the required pressure for any machine or operations and consistently maintained a safe margin. The UL101 was used to detect and locate compresses air leaks throughout the compressed air system. The air leaks were tagged for repair. Approximately half of the leaks have been repaired.

Timeline: Each compressor was monitored for 2 weeks of operation before and after changes. Intermittent activities during a 5-day period identified and tagged the air leaks and set the target air pressure to the lower value. Aggregate leak rate monitoring for the entire system, location of individual leaks, and repair of these leaks are ongoing activities.

Savings: There were multiple categories of saving during this project. Approximately $3,200 a year was saved by adjusting the upper set point pressure from 120 psi to 95 psi on both the 60 HP and 40 HP air compressors. During the main work shift, this pressure change resulted in savings ranging from 9% to 12% of the compressor's electricity costs as measured by the Watts Aware during the before and after measurements. During periods of low demand (2nd shift and 3rd shift), the electricity savings approached 14%.

Fixing all the leaks found with the UL101 will yield an estimated annual savings of $6,000 to $7,000. Measurements of the aggregate leakage rate and power consumption indicate half of these savings have already been achieved.

The combined actions of fixing the leaks, modifying the set-point pressures, and re-configuring which compressors operate during the 2nd and 3rd shifts translates into about a 40% savings on the total amount of electricity used for air compressors.

Return on Investment: By using the combination of the UL101 leak detector and Watts Aware power and pressure monitoring equipment, Best Cutting Die will save enough money on their electric bill to pay for the entire package in about 9 months.

Based on the power measurement results and the distribution of air leaks, the company is pursuing other configuration changes that should result in even greater savings.

An interesting feature of this case study is that this customer had relatively modest air compressor equipment needs which averaged to be about 50 HP. However, even with this relatively small amount of operating air compressors, Best Cutting Die was able to save a significant amount of money with only minor investments of time and money.

From the Customer: "The use of Sensor Synergy's power and air pressure monitor combined with CTRL's leak detector has been very useful in finding ways to significantly reduce spending on electricity for our compressed air system. Our latest measurements have shown that we have already realized over 35% savings in our air compressor electricity use for only a small investment in measuring gear, leak repairs, and operational changes."

Lucian Predescu
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