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Technical Information

The Cost of Leaks in a Compressed Air System

Air leaks are frequently ignored as a low priority maintenance issue in many facilities, and rarely are financial managers aware of the direct cost of ignoring them. The term "Phantom Load" is used to describe power expended to produce compressed air which is "lost" rather than used. Frequently, the cost of repairs to eliminate leaks can be recovered within a month or two in reduced energy cost.

The following hypothetical example is typical of many facilities:

For the sake of example, we will look at a medium sized printing facility that has two automated presses, four ink pumps, stackers, conveyors and a maintenance department. The plant has a 30 HP industrial compressor producing 125 CFM @ 125 PSIG, with a refrigerated air dryer and prefilter. The company is located in Hawaii, where the cost of electricity is $.35 per Kilowatt hour (KWH). They have no idea what portion of their $4,500 per month electric bill goes to their air compressor.

There are minor leaks at the prefilter drain valve, the oilers on the ink pumps and some valves on the presses. In the maintenance shop, there is an old air hose with a worn out coupler that "hisses just a bit". None of the leaks is bad enough to cause down time. When both presses are running full tilt, the stacker is a bit slow, and sometimes jams due to erratic operation due to low air pressure.

The company has decided that the compressor is not large enough to handle the shop and is considering replacement with a larger unit at a cost of around $25,000. While looking for extra cash in their budget, someone decides that in the interim, fixing some of the leaks might leave more air for the equipment.

Analysis of the operation:

The plant operated 6 days per week for 2 shifts; 16 hours per day. Lets say 400 hours per month. The compressor is running at full capacity when presses are running 200 hours per month, and at 55% capacity for the rest of the time.

30 HP x .748 KW x 100% x 200 hours = 4488 KWH
30 HP x .748 KW x 55% xx 200 hours = 2468 KWH
Total 6956 KWH @ $.35 = $2434 per month for electricity, or 54% of their total bill.

Calculating Loss and potential savings:

Leaks can be identified by the obvious "hissing" sound. Small leaks may not be audible to the human ear, but can be detected with an ultrasonic detector. Calculating the volume of a leak can be very interesting. By putting a 33 gallon trash bag (5 cu ft capacity) over the end of the leaking hose in the maintenance department, we fount that the bag would fully inflate in 30 seconds. 5 cu ft x .5 minutes = 10 CFM. of roughly 2.5 Hp of the compressor's output! In cash cost, this leak was costing the company 8.3% of the cost of the compressor energy cost or $202.00 per month. A new hose and coupler cost $55. The cost was recovered in one week.

Other leaks in the facility had equal impact. When all leaks were repaired the compressor was running at 80% capacity at full tilt and 35% during production lulls. The cost of repairing all leaks in the facility, including valves, fittings, gaskets, regulators and hoses, and labor for detection and replacement totaled $3,500.

The net effect of this investment was the indefinite postponement of replacement of the compressor and a reduction of the electric bill of $1,617.60. The cost of repairs was recovered in less than 2 months.