Case Study *- Dual audit of air compression and fluid cooling processes saves on operating cost*

Dual audit on large printing company allows for new equipment payback in 1.4 years reducing capital expenditures by $300K.

…eliminates the need for an additional chiller and saves $300k in capital expenditures, as well as additional operating and maintenance costs.

A large printing company retained John Henry Foster to perform a dual audit to evaluate and maximize their air compression and fluid cooling system processes. The intent of the study was to evaluate the efficiency of the existing air compression and fluid cooling systems and provide recommendations to improve performance, reliability, and efficiency.

CHALLENGES

The air systems audit produced two design challenges.

Fluid Cooling System

For the fluid cooling side, the issues were a lack of chiller capacity, a needed reduction in operating costs, and an increase in overall system reliability. Chiller capacity was completely utilized and with the new installation of a printing press, an additional chiller would be required. This would not only require a capital expenditure of $300,000 but also result in additional operational and maintenance costs. With the compressed air and vacuum systems and printing operations dependant upon chilled water for cooling, a failure in the chiller system would result in a partial shutdowns in plant production areas.

Compressed Air System

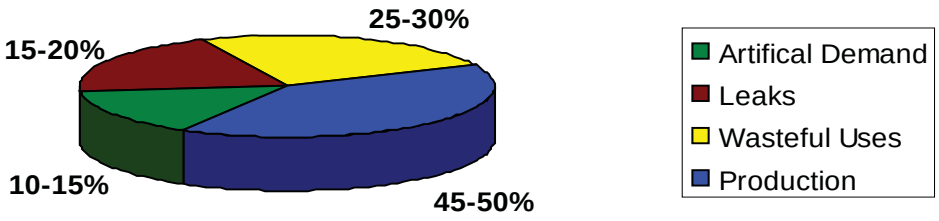
The compressed air system has an adequate capacity albeit operating at an inefficient level. Without the benefit of demand storage and regulation, the plant suffered from wide pressure fluctuations of approximately 25 psi. This created the need to maintain a high operating pressure on the system, resulting in higher than necessary air leakage, artificial demand and operational costs. Also, without the benefit of a central control system, the compressors were not being controlled efficiently, thus resulting in higher than necessary operational costs and the inability to effectively match horsepower to demand.

SOLUTIONS AND BENEFITS

Fluid Cooling System

After performing the fluid cooling audit, it was determined that the compressed air and vacuum systems could be separated from the chiller system. By sizing the coolers on all industrial equipment to handle warmer water, JHF suggested installing a dry cooler system that would not only operate the compressed air and vacuum systems effectively, but also do so without utilizing trim water.

JHF John Henry Foster



Maximum performance efficiency and reliability was achieved for large printing firm after a dual air system audit by John Henry Foster.

This resulted in the customer removing 120 ton of online chiller, more than enough to accommodate the new printing press. The addition of the dry cooler resulted in the customer removing 120 ton of online chiller, more than enough to accommodate the new printing press operation. This eliminates the need for an additional chiller and saved $300,000 in capital expenditures as well as additional operating and maintenance costs. With the projected new fluid cooling system in operation the plant could save over $53,000 annually with a capital investment of $273,604. With a rebate of $75,628 from Minnesota Power the payback for the project is under four years.

Compressed Air System

Data from the compressor air audit not only verified that no additional compressed air capacity was needed, but also identified areas to increase system efficiency. It was determined that by proper utilization of demand storage and regulation we could effectively reduce the plant pressure from as high as 113 psi to a maximum of 88 psi thus eliminating the wide pressure fluctuations. The audit also provided the information needed to justify the application of a flow/pressure based centralized compressor controller to efficiently match demand to compressor online horsepower. With this information the compressed air system was designed with 3,000 gallons of storage as well as demand regulation and a flow/pressure based centralized compressor controller. The compressed air system costs approximately $190,515 annually in electrical and maintenance costs. With the appropriate modifications JHF suggested, it is expected to save over $34,000 annually with a capital investment of $78,977. With a $29,556 rebate from a local utility to purchase the needed equipment, the return on investment in 1.4 years should be realized.

RESULTS

The air compressor and fluid cooling audit resulted in significant savings to the facility's total operating cost. Fixing tagged leaks in the system, adding dry storage tanks, a steady pressure control valve, flow/pressure based compressor controller and drains, and rebates for purchasing needed equipment all contributed to providing maximum performance efficiency and desired reliability.