Snap-on Tools

COMPANY BACKGROUND

Snap-on Tools in Algona, Iowa is a global manufacturer of tools and equipment that are known for their high quality and durability. The Algona plant is approximately 500,000 square feet in area, employs approximately 270 workers, and manufactures large tool storage equipment. Rolls of sheet metal enter the plant and are stamped, formed, welded, painted and assembled to create the final product. The powder-coat paint systems allow for a variety of colors and textures to match the customers' needs.

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PROJECT BACKGROUND

Snap-on Tools uses three air-cooled reciprocating chillers to cool several important plant processes. With reliability and efficiency as top priorities for Snap-on, a decision was made to consider upgrades to improve the chiller system and compressed air system.

INCENTIVES TO CHANGE

The 30-year old chillers affect production at Snap-on Tools, which would be temporarily interrupted if the chillers were to quit working. Maintenance costs escalate as aged parts wear out. Audible air leaks are an indication that a compressed air system is not working as it should be, and subsequent costs of these inefficiencies can be unknown. It was determined that an upgrade to the efficiency and reliability of the chiller and compressed air systems would generate significant cost savings and reduce the risk of production delays.

RESULTS

Chiller System: The current chillers, rated at 340 tons, are used for cooling plant air compressors, welders, and air conditioners. Two newer, more efficient, water-cooled chillers, rated at a total of 360 tons, are available at the plant since the removal of an electrocoat painting system in 2008.

Switching the chillers would benefit Snap-on in several ways. The most important reason to switch the cooling load to the water-cooled chillers is to minimize potential production disruptions. Switching to water-cooled chillers would also reduce the amount of electricity required to operate the plant, which will result in cost savings.

Compressed Air System: Compressed air is used in the majority of processes at the plant and is essential for production. For Snap-on, compressed air is one of the most expensive utilities, accounting for 15 percent of the electricity used at the plant. The cost of leaks and of running the compressors overnight and on weekends adds up quickly.

With the assistance of the intern a plan was developed to optimize the compressed air system. Modifications to operating and maintenance procedures were also developed which are expected to produce substantial cost savings for Snap-on Tools with minimal capital cost. The benefits of implementing the comprehensive plan to optimize the compressed air system would include reductions in noise, heat generated, cooling capacity required, and energy used.

Repair Compressed Air Leaks: With leaks accounting for a significant portion of daytime air use, a great deal of electricity and money can be saved by spending a small amount of time repairing them. A tagging system was developed to enhance consistency in maintenance of the compressed air system.

On-going Leak Detection Program: A preventative maintenance program is necessary to ensure leaks are kept to a minimum and the compressed air system continues to operate efficiently. Snap-on Tools owns an Ultraprobe 100 leak detector, which has the ability to locate costly air leaks that are not otherwise audible, and has implemented it into the preventative maintenance program so the entire plant can be checked quarterly with the leak detector to keep the system working efficiently.

Reduce Air Compressor Running Times
Only a small amount of air is needed during the overnight and weekend hours to supply a small area of the plant, yet demand was not dropping proportionately during this time. Snap-on Tools uses valves which are tied to the lighting system and allow for specified sections of the plant to be provided with compressed air while other sections are not operating. Installing an additional valve into a recently installed air line will eliminate leakage into plant areas not currently in production.

A timing device that would allow for automatic settings for one shift, two shift, and manual on/off positions can be added to the compressed air system to further reduce wasted run time. Based on the number of shifts that the plant is currently operating, the timer would be set to automatically shut down and restart the compressors at specified times.

Add Receivers & Increase Main Air Line Size: Additional demand side storage capacity would reduce the pressure settings that are required for the lack of current volume.

Turn 2 Pumps Off Nights & Weekends: An additional compressor can be shut down during the off hours by supplying the required compressed air for the product recovery area through re-plumbing to another operating unit.

AIR POLLUTANTS DIVERTED IN TONS

Total for all sectors	
SO2	6.46
CO	0.66
NOx	3.07
VOC	0.11
PM	0.16

GREEN HOUSE GASES DIVERTED IN TONS
(CO2 Equivalent)

Total for all sectors	
CO2	1,193.73
CH4	44.88
N2O	0.61
CFC	14.68

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
CHILLER UPGRADE TO WATER-COOLED UNITS	$35,739	1,089,964 KWH	IN PROGRESS
REPAIR COMPRESSED AIR LEAKS	$25,541	851,367 KWH	IN PROGRESS
ON-GOING LEAK DETECTION PROGRAM	$10,000	333,333 KWH	RECOMMENDED
REDUCE AIR COMPRESSOR RUNNING TIMES	$27,153	905,112 KWH	IN PROGRESS
ADD RECEIVERS & INCREASE MAIN AIR LINE SIZE	$8,000	200,000 KWH	RECOMMENDED
TURN 2 PUMPS OFF NIGHTS & WEEKENDS	$1,861	63,307 KWH	RECOMMENDED