Koehring Cranes, Inc.,
a subsidiary of Terex Cranes

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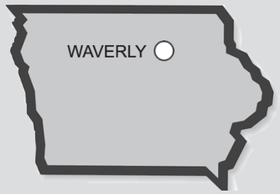

Terex is one of the leading multi-national companies in the arena of high quality, innovative equipment manufacturing for construction, infrastructure, quarrying, recycling, surface mining, shipping, transportation, refining, utility and maintenance industries. Terex Cranes' Waverly division partially manufactures and fully assembles a broad range of mobile cranes. The 250,000 square foot plant has an annual production rate of 400 Rough Cranes, 200 Truck Cranes and 960 Boom Trucks that collectively contributes 30 percent of the North American market. The plant employs 333 team members.

Project Background

The major portion of the energy consumption at Terex Waverly is electricity. Over the past few years, the plant has ramped up production to meet customer needs, with increasing energy demand every year. In order to reduce the energy demand as well as to optimize the lighting and air systems, Terex Waverly partnered with the Iowa Department of Natural Resources to recognize potential energy and cost saving opportunities.

Incentives to Change

In compliance with the mission statement of producing quality products in a safe environment, Terex is seeking cost effective solutions to upgrade plant lighting and improve air generation and distribution systems. An optimized, energy efficient lighting and air system will not only improve the quality of the product but also the working environment and the production rate.

Results

Lighting

Currently, Terex is using combinations of High-Pressure Sodium (HPS), Metal Halides (MH), fluorescent and incandescent luminaires on low, intermediate and high bays. By upgrading the lighting system to low power efficient pulse start MH, T5HO and T8 fixtures with electronic ballast and aluminum reflectors, 815,569 KWh and $47,300 can be saved annually.

Air quality

The water and oil contamination in the air was jeopardizing the life and the power of tools. Water was present due to the malfunctioned air conditioning system in the dryer unit. The dryer has been repaired and water is now eliminated from the air lines. Reducing the oil content on the discharge by using the manufacturer's recommended synthetic oil can further ameliorate air quality and tool life.

Air Leaks and Methods

Leaks in the compressed air system contribute significant amounts of lost compressed energy. The compressor was feeding approximately 30 percent of its capacity in leaks. Almost 40 percent of these leaks were due to an open valve, which was primarily kept open to remove excessive water in lines. The water problem was solved, and the valves are now closed. The air pressure measured at different stations is on average 10 psi higher than the tool requirements. The higher pressure also increases the volume of air lost in leaks. By resetting the cut in and cut out pressure of the pressure switch, a considerable amount of energy can be saved.

Control system

The existing compressor has inlet modulation with an unload control, which is highly inefficient from energy saving standpoint when air demand is lower than the supply. A dual control automatic shut down system with the integration of a large storage tank is recommended, as well as the installation of a variable speed compressor.

Under-Powered Tools

Air power tools work require a precise combination of air pressure and volume to produce maximum torque. Elimination of water in the air lines has addressed the volume problem partially. Inadequate connectors and hose sizes, however, make heavy tools lose power at the end of the stroke.

By using the manufacturer's recommended hose size and minimizing the possible connections in lines, the probability of ergonomic related injuries will be reduced. Whenever a tool loses power, the operator experiences high amplitude vibrations.

End Use Efficiency

Team members in the plant use compressed air for cleaning operations. These processes roughly consume 50-100 CFM in every shift. This volume can be saved by using other alternatives.

Air Pollutants Diverted in Tons

	Total for all sectors
SO2	111.6
CO	11.3
NOX	53.0
VOC	1.9
LEAD	0.0
PM	2.7

Green House Gases Diverted in Tons (CO2 Equivalent)

	Total for all sectors
CO2	20,831.0
CH4	686.8
N2O	226.9
CFCS	228.9

Project	Annual Cost Savings	Environmental Results	Status
LIGHTING	$47,300	815,569 kWh	In process
AIR QUALITY	$54,000	52,000 kWh	Implemented
AIR LEAKS	$17,680	275,166 kWh	In process
CONTROL SYSTEM/VSD COMPRESSOR	$41,200	629,448 kWh	In process
UNDER POWERED TOOLS	$40,000	52,000 kWh	Recommended
END USE EFFICIENCY	$3,000	50,779 kWh	Recommended