Acument Global Technologies

COMPANY BACKGROUND

Acument Global Technologies manufactures fasteners for the commercial, industrial, electronics, distribution, construction and automotive industries. The Decorah plant is a global enterprise, serving hundreds of companies in more than 30 countries. Acument Global Technologies produces a wide range of fasteners, including standard catalog, special custom and miniature. Manufacturing processes include cold forging, standard upsetting, deep part extrusion, reverse extrusion, thread rolling, CNC & form tool shaving, tapping, crimping, heat treating, painting, stripping, passivating, and class 100 cleanroom cleaning and packaging. In 2008 Acument saw $81.9 million in sales.

BEN PETERSON
MECHANICAL ENGINEERING, IOWA STATE UNIVERSITY

PROJECT BACKGROUND

2009 is the sixth year Acument has participated in the Pollution Prevention Intern Program. Nearly a decade ago, Acument's insurance provider encouraged infrared (IR) inspections of the plant for fire prevention measures. Since then, Acument has seen an opportunity to use IR technology in-house for predictive maintenance (PdM). This summer, the intern focused on the feasibility of an IR PdM program, locating problematic areas and wasted energy.

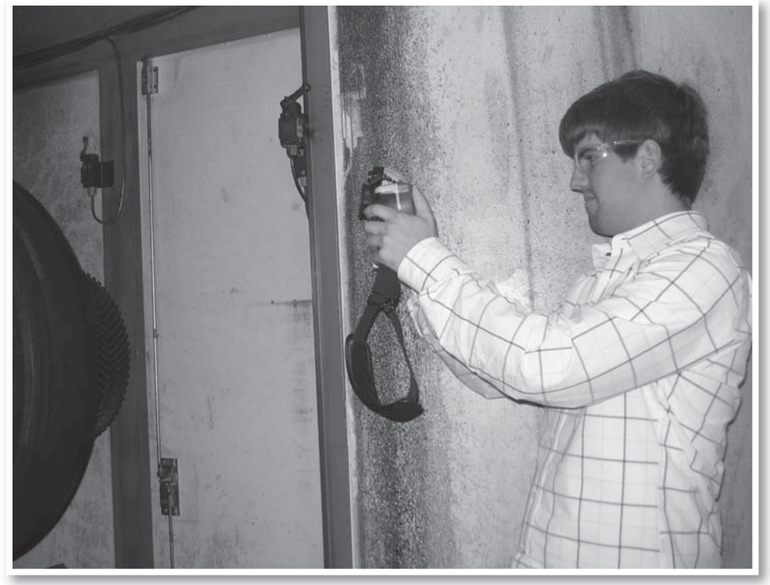
INCENTIVES TO CHANGE

Acument Global Technologies operates on preventative and reactive maintenance strategies. However, unexpected downtime is still an issue that affects the productivity of the plant. Acument continues to be ISO 14001 certified because of the company's commitment to continual improvement of their environmental management system and prevention of pollution. Due to the rising cost of utilities it is important that manufacturing processes run as efficiently and reliably as possible in order to reduce cost, maintain customer loyalty and increase the bottom line.

RESULTS

Motor Management and Upgrades: Motor management is important for reducing energy usage and downtime. Acument has no inventory of motors in operation or on hand for backup. A free software package from the U.S. Department of Energy, MotorMaster, serves as a database for motor nameplate information. MotorMaster also stores field data and makes calculations that are significant to motor efficiency and reliability, such as voltage imbalance and load factor. MotorMaster will ensure backup motors are available and properly sized and the database will serve as a vital part of the PdM program. Nearly all motors at Acument are rated below National Electrical Manufacturers Association (NEMA) premium efficiency. When replacing motors, NEMA premium efficient motors should be considered by assessing life-cycle cost.

IR Predictive Maintenance: Critical equipment should be inspected for thermal anomalies regularly. Electrical, mechanical and electro-mechanical systems can be inspected using an IR imager.



Electric components such as transformers, breakers and busses should be inspected regularly for loose connections, phase imbalance and overheating indicated by temperature differentials. As mechanical equipment degrades, friction increases and the IR imager will detect an increase in heat. Almost all rotating equipment, such as bearings, is eligible to be inspected with an IR imager. When a thermal anomaly is identified, maintenance can be scheduled during planned downtime, fixing the problem before it causes any unplanned downtime. Over the summer several hundred IR images were captured and analyzed for maintenance risks. Because of advances in IR technology, the cost of the technology is relatively inexpensive. Acument would see payback periods of only a few months.

Motor Preventative Maintenance: Motors are often overlooked, unless they have failed and need replacement. Factors such as voltage imbalance, inadequate ventilation, dirty surfaces and improper lubrication can quickly degrade motor efficiency, usable life expectancy and rated capacity. Using the IR imager and a scale to estimate motor inefficiencies, a figure for wasted radiant energy was calculated. To keep motors from degrading, simple actions such as cleaning, properly lubricating and correcting voltage imbalances should be taken.

AIR POLLUTANTS DIVERTED IN TONS

Total for all sectors	
SO2	1.61
CO	0.165
NOx	0.764
VOC	0.026
PM	0.040

GREEN HOUSE GASES DIVERTED IN TONS

(CO2 Equivalent)

Total for all sectors	
CO2	298
CH4	11.2
N2O	0.149
CFC	3.66

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
MOTOR MANAGEMENT AND NEMA PREMIUM MOTOR UPGRADES	$14,200	225,000 KWH	IMPLEMENTING
INFRARED PREDICTIVE MAINTENANCE	$200,000	30,750 KWH	RECOMMENDED
MOTOR PREVENTATIVE MAINTENANCE	$10,800	170,000 KWH	RECOMMENDED