CNH AMERICA, LLC

OLIN POSTLETHWAIT
MECHANICAL ENGINEERING
IOWA STATE UNIVERSITY

COMPANY BACKGROUND

CNH America, LLC (Case) is a global manufacturer of heavy construction and agricultural machinery. Established in 1937, the Burlington, Iowa, plant specializes in producing tractor-loader backhoes, tractor-loader landscapers, and rough-terrain forklifts for Case and New Holland. The plant, which employs more than 400 people, is credited with making Burlington known as "The Backhoe Capital of the World".

PROJECT BACKGROUND

A previous intern with the Pollution Prevention Intern Program provided the Case plant with an energy map. This analysis showed that electricity consumption had great opportunities for improvement, especially in the production areas of the plant. Case's industrial curing ovens are a large part of the plant and account for a major portion of the energy consumed. The current intern focused on identifying opportunities in the production equipment, primarily in the ovens and their components, to reduce energy usage and associated costs.

INCENTIVES TO CHANGE

Case is part of the Fiat Industrial group, which has worked extensively to implement sustainability initiatives worldwide and was the first on the Dow Jones Sustainability Index. The Burlington plant, certified by International Organization for Standardization (ISO) 14001, strives to continuously exceed their established reduction goals for energy, water use, solid waste generation and emissions. Reducing energy usage would help the company meet their environmental performance goals and save money.

RESULTS

Pre-treat Motors: The oven system at the plant is nearly 30 years old. There has been much advancement in technology since the original installation, especially for motors. Motors rated as "Premium®" by the National Electrical Manufacturers Association (NEMA) are more energy efficient and require less maintenance. Replacing pre-treat motors with NEMA-rated motors would save energy, but the return on investment does not justify immediate implementation. It is recommended that as motors become inoperable that they be replaced with motors labeled by NEMA.

Circulation Blower Motors: Replacement of recirculation blower motors with NEMA Premium® motors show similar results. Although replacement of the motors would lead to energy savings the return on investment was not feasible. It is recommended the circulation blower motors also be replaced with NEMA-labeled motors as they become inoperable.

Insulation: Insulation is necessary for minimizing heat losses. Over time, insulation can become ineffective due to wear and tear and other factors. One oven in the E-coat paint process has lost most of its original insulation. Installing new insulated oven panels on the outer wall could lead to significant energy savings of more than 441,000 therms.

Replacing the insulation would also increase the production efficiency of the oven with faster start-up times and a shorter system run time. Lower demand on the motors, burners, belts and blowers could reduce costly repairs and down time. A reduction in energy usage, fewer maintenance issues, and prolonged system life would provide substantial cost savings.

Preventative Maintenance Plan: A preventative maintenance plan (PMP) keeps the system running at maximum efficiency and prolongs the useful life of the equipment. When a regular maintenance plan is followed, problems can be identified and scheduled for repair. Often this can help avoid unexpected breakdowns, costly repairs and loss of production.

Implementing a PMP for the oven system will ensure it is running at maximum efficiency and reduce energy usage. Additional data is needed to quantify the specific results pertaining to the Burlington plant, but documentation of the benefits can be found within the industry.

CONVENTIONAL AIR POLLUTANTS AND GREENHOUSE GASES DIVERTED IN METRIC TONS

TOTAL FOR ALL SECTORS							
CO_2	SO_2	CH_4	N_2O	CFC	NO_X	VOC	PM_{10}
501.11	1.73	614.55	2.27	6.48	1.44	2.35	0.11

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
PRE-TREAT MOTORS	$276	3,168 KWH	RECOMMENDED
CIRCULATION BLOWER MOTORS	$872	10,000 KWH	RECOMMENDED
INSULATION	$70,863	441,742 THERMS	IN PROGRESS
PREVENTATIVE MAINTENANCE PLAN	$600	TBD	RECOMMENDED