Assessment Date: June 18, 2003

Benefits:

- Could save nearly $210,000 in annual energy and productivity costs
- Could reduce energy use by almost 9.6% per year
- Achieves payback periods ranging from immediate to less than 6 months

Applications:

To decrease energy use and costs and enhance productivity, the assessment focused on the manufacturing process and on the heating and air compressor systems.

Ferro Corporation: Industrial Energy Assessment Identifies $210,000 in Savings Opportunities for Glaze and Coatings Manufacturer

Summary

The University of Michigan's Industrial Assessment Center (IAC) performed an energy audit at Ferro Corporation's plastic colorant plant in Stryker, Ohio; it showed that the plant could save almost $210,000 per year in energy-related and operating costs. The IAC, sponsored by the U.S. Department of Energy (DOE) Industrial Technologies Program (ITP), is one of 26 across the nation in which faculty and students provide eligible small- and medium-sized manufacturers with no-cost energy assessments. This assessment project was sponsored by ITP and The Society of the Plastics Industry, Inc. (SPI), a DOE Allied Partner.

Opportunities for saving electricity and natural gas and for increasing productivity included installing devices to improve water cooling and optimizing the use of the compressed air system. The assessment team also recommended making changes to the heating system as well as improving the water-cooling system, insulating dies and extruder cases, moving radiant heater units, and optimizing the use of compressed air, all of which would reduce annual energy consumption by 4,807 MMBtu and reduce operating costs by $209,534 per year.

Company Background

Ferro Corporation is the world's largest supplier of ceramic glaze and porcelain enamel coatings. Ferro produces powder coatings, pigments, specialty plastic compounds, polymer additives, and plastic colorant, which are used extensively in new buildings and renovations, major appliances, and industrial products. The facility assessed measures 100,000 square feet and has a total energy budget of approximately $1.13 million per year, chiefly for electricity but also for natural gas.

Assessment Approach

A team of students and staff from the University of Michigan IAC, led by IAC Assistant Director Dr. David Everest, performed an assessment of this facility on June 18, 2003. The following sections describe the team's approach to conducting the audit.

Recommendations

Energy Conservation Awareness. At the Stryker facility, 100% of total natural gas consumption goes for heating. Among electricity-using equipment, motors use 67% of the total, air compressors consume 14%, pumps use 8%, electric heaters use 8%, and lighting accounts for 3%. The assessment team identified some energy

conservation practices for Ferro employees to use to significantly reduce the amount of energy consumed by the equipment, such as turning off all energy-using equipment that is not being used.

The Water-Cooling System. The material mixers are critically important to production at the plant. If the temperature of the lubricating oil is too high, the mixing process will have to slow down or even stop. The mixer is a closed-loop system cooled by water from a cooling tower. Because fouling caused by other equipment affects the tower/loop heat exchanger, water going into the mixing lines is usually very hot; this lowers the productivity of the major production lines. The assessment team recommended installing additional equipment to reduce fouling of the heat exchanger.

The Compressed Air System. Compressed air systems require a significant amount of energy to operate. At Ferro's plant, compressed air was being used to dry product. This was expensive, in part because much of the energy required to compress air is lost to heat and leakage. The assessment team recommended that the facility install equipment that is better suited for drying operations.

The Heating System. Currently, the facility has approximately 1,000 lineal feet of radiant heaters on the ceiling of the finished goods warehouse. Most of the heaters are directly above boxes rather than above the aisles. Because radiant heaters will heat only those objects that are directly underneath them, most of the ones in the plant heat only the finished product boxes.

Results

The table shows Ferro's estimated annual cost savings if the plant implements the energy conservation and productivity opportunities identified. These results indicate that the facility can decrease natural gas usage by nearly 2,100 MMBtu and electrical usage by almost 800,000 kWh, lowering electrical demand by approximately 1,600 kW. These reductions will decrease natural gas and electricity usage and electric demand costs while increasing production, for a total savings of almost $210,000.

Recommendations for Ferro Corporation's Plant in Stryker, OH

Project Category/ Recommendation	Annual Resource Savings	Annual Cost Savings	Implementation Cost	Payback Period
Heating and Cooling System				
• Improve the water cooling system	357 MMBtu	$132,000	$31,500	3 months
• Insulate dies and extruder cases	783 MMBtu	$20,715	$4,565	3 months
• Move radiant heater units	2,082 MMBtu	$13,955	$6,000	5 months
Compressed Air				
• Replace compressed air drying units	942 MMBtu	$24,928	$520	Less than 1 month
• Repair compressed air leaks	486 MMBtu	$12,854	$150	Less than 1 month
• Duct outside air to the compressor	157 MMBtu	$5,082	$100	Less than 1 month
Total	**4,807 MMBtu/yr**	**$209,534**	**$42,835**	

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Project Partners:

Ferro Corporation
Stryker, OH

The Society of the Plastics Industry, Inc.
Washington, DC

For Additional Information:

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