



Corrugated Shipping Container Plant: Manufacturer of Paperboard Containers and Boxes Implements Big Energy Savings Recommendations

Assessment Date: APRIL 10, 2009

Benefits:

- Implemented eight of the twelve assessment recommendations
- Recommendations will save approximately 11% of their total annual energy bills
- Recognized as a energy saver by the Department of Energy

Applications:

The Rusken Packaging assessment team discovered opportunities to decrease energy usage thereby increasing capacity, improving product quality, and enhancing corporate competitiveness. In order to decrease energy usage, the assessment team identified potential energy savings on eight different energy expending components of the facility.

Summary

Through the Department of Energy's Industrial Assessment Center located at the University of Alabama at Tuscaloosa, Rusken Packaging, a corrugated shipping container product maker, was able to save a significant amount of money from reductions in energy consumption. Rusken Packaging implemented eight of the twelve assessment recommendations. Savings were from a result in reductions of both natural gas and electricity usage. Through a variety of recommended actions, Rusken Packaging was able to save approximately \$187,500. The overall average payback realized was .26 years. Savings realized from the implemented recommendations resulted in a 12.5% energy savings, which qualifies the plant for DOE Energy Saver recognition.

Company Background

Rusken Packaging manufactures corrugated shipping containers. The facility consists of two linked plants that are treated as separate business units, and comprise 354,470 square feet. A selected roll of paper is placed on a machine where the layers are cut, then assembled. The layers are glued with cornstarch and caustic soda. The resulting corrugated cardboard is cured to dry out any moisture. A rotary drive cuts the cardboard sheet into the required shape based on the specific die. The shaped cardboard is printed using a water-based flexography. Glue is then applied, and the container is folded and finished. Annual utility bills for the facility totaled approximately \$1,786,000.

Assessment Approach

A team of faculty and students from the University of Alabama's Industrial Assessment Center performed an Industrial Assessment in the spring of 2009. The assessment was led by Center Director, Dr. Keith Woodbury, a Professor in the Department of Mechanical Engineering at the University of Alabama. A group of five students also participated in the assessment. The team spent one day on-site gathering information and making measurements regarding energy usage.

Energy Conservation Awareness

Prior to the visit, Rusken Packaging was employing several good energy conservation practices. The company checks the combustion efficiencies of the steam generators on a regular basis. Heat is recovered from the air compressors in Plant 2. Higher energy transmission cogged belts are used in one of the plants.



Energy Conservation Improvements

The University of Alabama Industrial Assessment team recommended the following measures, all of which were implemented by the company. These recommendations are designed to ensure reduced energy usage and more efficient operations:

- Repair leaks in the steam system by replacing leaking fittings and valves.
- By insulating all exposed pipe and fittings, the amount of fuel required to maintain the desired temperature will be decreased by 2,035 MMBtu/yr.
- A considerable amount of energy can be saved in the compressed air system by reducing the system pressure to the lowest allowable operating level.
- A program to repair the leaks and regularly check the air distribution components to detect leaks resulted in a yearly cost savings of \$9,571.
- Exhaust gases are being vented to the atmosphere. The waste heat from these gases can be recovered to preheat the combustion air for the steam generators.
- The heat generated by the 100 hp air compressors next to the boiler room can be used to heat the feedwater for the boiler, thereby saving 151 MMBtu/yr.
- Turn off the pilot lights on the 16 unit heaters that are left on during the summer.
- Install programmable controllers to raise the set points for the office area after working hours and on weekends.

Results

Table 1 shows the annual cost savings that Rusken Packaging obtained by implementing these energy conservation opportunities identified by the IAC team during the assessment. Based on these results, the facility can reduce energy consumption by 13,510 MMBtu/yr, thereby saving the facility \$187,523 per year. The total estimated implementation cost of these recommendations is \$47,912 yielding an overall simple payback of .26 years.

Projects Identified

Opportunities for reducing energy consumption that were identified during the assessment are described in the following table:

Table 1. Opportunities at Rusken Packaging				
Recommended Action	Annual Resource Savings	Annual Cost Savings (\$)	Implementation Costs (\$)	Payback (years)
Repair Leaks in Steam System	5,000 MMBtu/yr	\$60,900	\$1,744	0.0
Insulation on Steam Pipes and Exposed Valves and Fittings	2,035 MMBtu/yr	\$25,667	\$3,523	0.1
Reduce Overall Pressure in Compressed Air System	594 MMBtu/yr	\$14,336	\$0	0.0
Repair Leaks in Compressed Air System	396 MMBtu/yr	\$9,571	\$2,500	0.3
Preheat Combustion Air	4,606 MMBtu/yr	\$58,174	\$32,445	0.6
Use Air Compressor Waste Heat for Boiler Feedwater Heating	151 MMBtu/yr	\$1,904	\$6,000	3.1
Shut Off Pilot Lights During Non-Heating Months	59 MMBtu/yr	\$836	\$0	0.0
Install Programmable Thermostats in Office	669 MMBtu/yr	\$16,135	\$1,700	0.1
Totals	13,510 MMBtu/yr	\$187,523	\$47,912	.26

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