Lockheed Martin: Industrial Energy Assessment Finds Potential Savings from Aircraft Assembly Company

ASSESSMENT DATE: MAY 22, 2002

BENEFITS:

- Implemented 2 of 4 recommendations aimed at minimizing energy consumption and optimizing efficiency
- Recommendations will reduce total energy usage by 8.3% per year
- Can achieve paybacks ranging from 0 to 0.5 years

APPLICATIONS:

The Lockheed Martin 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 detected several leaks in the lines supplying the compressed air in the facility.

Summary

The assistance of the Mississippi's State University Industrial Assessment Center was solicited to perform an energy audit of the Lockheed Martin Corporation's Meridian plant. Opportunities for saving electricity were identified through the installation of a new air-compressor system. The aircraft assembly company was able to save a significant amount of money from reductions in energy and waste costs. The assessment team concluded that the installation of a new air compressor would reduce energy consumption. Also, further results from this assessment are highlighted throughout the case study.

Company Background

Lockheed Martin is a company which assembles the tail end of aircrafts. The plant duties in this case consist of the assembly of tails sections for the C-130 and the assembly for the vertical stabilizers for the F-22 jet fighter. Its operations produce sales of $6 Million. This facility is 100,000 square feet in size and uses a significant amount of energy in its process. The total energy budget for the plant is approximately $ 158K per year, the bulk of which is electricity usage and the remainder natural gas consumption.

Assessment Approach

A team of faculty, staff and students from the Mississippi State University Industrial Assessment Center performed an Industrial Assessment in the spring of 2002. The assessment was led by Center Director, Dr. B. K. Hodge and Former Assistant Director, Dr. Richard Forbes, both Professors in the Department of Mechanical Engineering at Mississippi State University.

Energy Conservation Awareness

The assessment team identified energy conservation awareness practices for the employees at the Lockheed Martin facility as a cost-effective way to significantly reduce energy consumption. Employees are encouraged to implement a preventative compressed air leaks maintenance system into their facility.

At the facility, heating comprises 38% of total natural gas usage while the remainder is used in process. Motors comprise 16% of total electricity usage while the remaining consists of compressed air (14%), lighting (21%), and HVAC miscellaneous systems (11%).

Compressed Air Systems

Compressed air requires significant amounts of energy to operate, subsequently resulting in higher costs. The Mississippi University Industrial Assessment team recommended the following measures, all of which were implemented by the company. These assessment recommendations are designed to ensure reduced energy usage and more efficient operations:

- The IAC team found that the compressed air system was losing a substantial amount of air from small leaks throughout the plant. An aggressive program to locate and fix the compressed air leaks was implemented by the facility resulting in a yearly cost savings of $900 and a payback period of six months.

- In addition to energy savings recommendations, the team observed significant maintenance costs for the facility's air compressors. The assessment team identified the problem and proposed the purchase of a new 200-hp air compressor to be used as the plant's primary compressor, then utilizing one of the old compressors as a backup. The facility's $30K per year billed maintenance cost was, thus, reduced to $1,000 per year. This recommendation was implemented by the facility and had a payback period of 2.7 years.

Results

Table 1 shows the annual cost savings the Lockheed Martin facility obtained by implementing these energy conservation opportunities identified by the IAC team during the assessment. Based on these results, the facility can reduce its energy consumption by over 95 MMBtu each year and save the facility over $29,000 in cost savings per year. The total estimated implementation cost of both recommendations is $79,700 yielding an overall simple payback of 2.7 years.

Projects Identified

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

Table 1. Opportunities at Lockheed Martin's Meridian Facility

Recommended Action	Annual Resource Savings	Annual Cost Savings ($)	Implementation Cost ($)	Payback (months)
Compressed Air Systems				
Repair Leaks in the Compressed Air System	98.2 MMBtu/yr	$982	$477	6
Purchase New Compressor to Replace 30 year aged Compressor	N/A	$29,000	$79,245	33
Totals	**98.2 MMBTU/yr**	**$29,982**	**$79,722**	**32**

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