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DEE ZEE, INC.

DES MOINES



COMPANY PROFILE

Dee Zee, Inc. is a premier truck accessories manufacturer headquartered in Des Moines, Iowa. The company occupies seven buildings, comprising more than one million square feet, dedicated to manufacturing, packaging, warehousing, and shipping. Approximately 1,000 employees cater to the automotive industry as an Original Equipment Manufacturer (OEM) and also supply product to the retail consumer sector. Dee Zee is the largest manufacturer of running boards and side steps in the world.

PROJECT BACKGROUND

The intern was tasked with analyzing energy consumption in targeted systems and establishing a baseline to prioritize improvement opportunities. This project primarily focused on reducing utility and gas emissions in the oven systems at the main plant. The intern conducted an assessment, explored options and developed an implementation plan to improve efficiency and reduce energy and associated costs. The intern also explored improvement opportunities in the compressed air system.

INCENTIVES TO CHANGE

Dee Zee is committed to environmental sustainability and incorporates LEAN practices, source reduction, and recycling



efforts throughout their operations. The company is ISO 14001 certified and relies on vendors that participate in the Sustainable Forestry Initiative to supply their paper and cardboard packaging needs. A sustainability team collaborates to set sustainability initiatives and projects, keeping Dee Zee on track to meet their environmental goals. This year's project to reduce energy usage and associated greenhouse gases fits with Dee Zee's ongoing commitment to environmental continuous improvement.

RESULTS

Insulate Combustion Chambers: The assessment showed that a significant amount of energy is lost through the walls of the combustion chamber. Inside the combustion chamber, air is heated to extremely high temperatures, which is then transferred to supply heat to the ovens for the powder coating process. Installing ceramic insulation around the combustion chamber could improve the thermal resistance of the barrier, helping to maintain the high-temperatures of the energy inside. This insulation could be purchased and installed by a maintenance technician when the gas burners are turned off.

Install Natural Gas Meters: A single meter, located outside the plant, tracks the facility's natural gas usage. More accurate data of the gas usage could be achieved by installing volumetric flow rate meters in each of the natural gas lines that supply the equipment. A continuous flow of gas to the gas burner with and without the meter being present could be achieved by installing two routes of steel piping to the same heating unit. The increased data tracking would allow Dee Zee to monitor trends and identify areas of opportunity to reduce natural gas usage.

Repair Compressed Air Leaks: Using an ultrasonic leak detector, the intern located and quantified leaks in the compressed air system. Leaks in the compressed air lines make the compressors work above their optimal setpoint.

The majority of leaks were found in connection points between compressed air lines or at end use applications. Repairing these compressed air leaks would allow the air compressor to operate at a lower setpoint. Teflon tape can be used to seal the threading where the leaks are occurring. A regular maintenance plan with an ultrasonic leak detector could identify leaks as they occur and save on energy costs associated with the compressed air system.

Adjust and Replace Compressed Air Filters: Manual air filters are in place to filter out contaminants in the compressed air lines. When these filters are inadvertently left open, contaminants and compressed air exit the line. Replacing the manual filters with automatic filters allows for lines to be kept closed while the contaminants are being drained out. These filters do not require an external power source or maintenance. The automatic air filters could directly replace the manual filters in the line with minimal maintenance.

Compressed Air and Natural Gas Pipe Mapping:

Compressed air and natural gas lines run along the decking inside of the main plant. From the ground, the pipes all look similar. The intern created piping and instrumentation diagrams of the compressed air and natural gas lines at the main plant to help identify and locate the pipes. While not yet to scale, the diagrams give guidance as to where the pipes are located to assist with maintenance.

Preventative Maintenance: Preventative maintenance could eliminate unplanned down time and leaks during production. Build-up of paint in the nozzles on the powder coat paint line can create flow issues and even cause clogging, making it necessary to stop the process to clean the nozzles. Cleaning the nozzles in the paint booth and washing units while the ovens are purging could increase efficiency and prevent the line from being shut down unexpectedly, reducing down time.



PROJECT	ANNUAL COST SAVINGS	ANNUAL ENVIRONMENTAL RESULTS	STATUS
INSULATE COMBUSTION CHAMBERS	\$68,148	136,295 therms	RECOMMENDED
INSTALL NATURAL GAS METERS	\$4,849	9,782 therms	RECOMMENDED
REPAIR COMPRESSED AIR LEAKS	\$16,840	120,152 kWh	RECOMMENDED
ADJUST AND REPLACE COMPRESSED AIR FILTERS	\$5,059	36,134 kWh	RECOMMENDED
COMPRESSED AIR AND NATURAL GAS PIPE MAPPING	\$900 (ONE-TIME)	-	IMPLEMENTED
PREVENTATIVE MAINTENANCE	\$22,251	158,934 kWh	RECOMMENDED

