SIVYER STEEL CORPORATION

BETTENDORF

MADISON CURRIE
MECHANICAL ENGINEERING
IOWA STATE UNIVERSITY

COMPANY PROFILE

Sivyer Steel Corporation was founded in 1909 as one of the first big steel foundries in the United States. The company produces steel castings for various industries including mining, military, energy, agriculture, railroad, and construction. The company is an ISO 9001:2008 certified steel foundry devoted to safety and quality of the products and services the company provides. Sivyer Steel is also committed to continuous improvement of plant operations to ensure safety of the employees and to be a good steward of the environment. The plant is currently located in Bettendorf, Iowa, operates 24 hours per day, 5 days per week, and employs approximately 250 people.

PROJECT BACKGROUND

Sivyer Steel's metal casting process consists of several steps that can be broken down into three main stages: pre-casting, casting, and post-casting. The metal casting process requires large amounts of energy to power the equipment or in performance of the manufacturing function. Reducing energy intensity and establishing an energy management program will help Sivyer accomplish their energy reduction goals and support substantial decreases in annual energy costs for both electricity and natural gas.

INCENTIVES TO CHANGE

Sivyer Corporation has set a goal to reduce energy usage by 10 percent in the next five years. To achieve this goal, Sivyer entered into a partnership with the U.S. EPA's ENERGY STAR Program and has also committed to participation in the ENERGY STAR Challenge for Industry (The Challenge). This program encourages a team within the company to develop a strategic action plan for reducing energy usage, associated costs and environmental impacts. Having a strategic plan will help the company maintain a focus on continuous development of best practices for source reduction and energy efficient alternatives and achieve their reduction goals.

RESULTS

ENERGY STAR Involvement: Initially, the intern enrolled Sivyer in The Challenge and established a file containing all of the information necessary to verify the company's participation. Additionally, the intern developed an energy intensity tracking tool used to monitor Sivyer's progress based on BTUs consumed per pound of steel produced. This metric will allow Sivyer to monitor the plant's energy intensity over a five year period and make the necessary adjustments for meeting The Challenge.

Energy Audit: The intern is conducting a plant-wide assessment to determine energy usage of the equipment. The intern will collect all necessary specifications to determine the amount of energy consumed by each piece of equipment currently in operation. This analysis will determine where to focus energy reduction efforts in order to have the greatest impact.

Energy Efficient Lighting: The intern conducted a plant-wide assessment of the lighting system and researched energy efficient technologies to replace the metal halide fixtures. A variety of LED replacement options could maintain or improve lighting quality and reduce energy usage and associated costs. The intern will continue to research available rebates and incentives and provide a cost analysis that will include projected annual environmental and cost savings, a simple payback, and ROI calculations.

Solid Waste Reduction: The intern researched beneficial reuse opportunities for foundry sand and slag, and discovered the most prominent use to be in manufactured top-soils and peat moss. The intern will continue to identify and evaluate disposal alternatives for sand and slag.

Flow-Coat Reuse: Currently, excess paint drips into a collection trough where it is allowed to dry before being manually removed. If the flow-coat paint could be removed after each coating while still wet, it could be put back into the system for reuse. Returning the paint to the system for reuse could save significant purchasing and disposal costs.

Flow-Coat Alternative: The properties of the current flow-coating used at Sivyer require it to be in constant suspension to avoid hardening, which requires continuous operation of the motors used to mix the paint. These motors are air-powered and are approximately 1/2 hp each; however, they are run by a 300 hp air compressor. In a recent demonstration, a new alumina-silica coating showed improved casting quality, was easier to remix and showed no tendency to form "hard packing" after the mixer was turned off. The intern will continue to evaluate the alumina-silica flow-coating for use at Sivyer. If feasible, switching to the alumina-silica flow-coat could extend the life and quality of the paint itself and greatly reduce disposal costs. Additionally, allowing the air compressor to be turned off when the paint system is not in use will reduce energy usage and associated costs and emissions.