

# ROSENBOOM MACHINE AND TOOL

SHELDON  
AND SPIRIT LAKE

**BRANDON HUTH**  
CHEMICAL ENGINEERING  
IOWA STATE UNIVERSITY

## COMPANY BACKGROUND

Rosenboom Machine & Tool manufactures custom hydraulic cylinders for a variety of markets. The Sheldon, Iowa, plant is home to the corporate headquarters and includes a 200,000-square-foot manufacturing plant. The company has added a 250,000-square-foot plant in Spirit Lake, Iowa. These two plants operate 22 hours per day, six days per week. Raw material enters the plant and is turned, milled, welded, and assembled into cylinders. The cylinders are then pressure tested and painted per customer requirements.

## PROJECT BACKGROUND

The intern conducted a waste audit of both the Sheldon and Spirit Lake manufacturing facilities. The key contributors to the waste stream were identified and prioritized according to potential savings. After identifying the large contributors, the intern identified solutions to reduce the amount of waste generated or to increase the marketability of the scrap that is unable to be reduced.

## INCENTIVES TO CHANGE

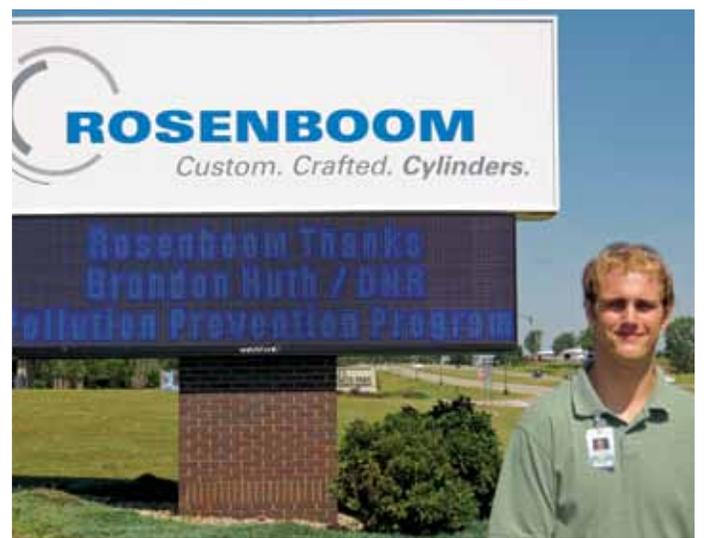
Rosenboom Machine & Tool teamed with the Pollution Prevention Intern Program for 24 weeks to strengthen its environmental stewardship and to lower operating costs at its Spirit Lake and Sheldon facilities. Solid waste going to the municipal landfills represents a large expenditure that could be reduced through source reduction and recycling. With a bit of careful planning, 90 percent of the current trash volume could be diverted from the landfill. Additionally, reducing clean solvent usage from the paint lines will help reduce Rosenboom's operating expenses and regulatory burdens.

## RESULTS

**Cardboard Recycling:** Over the last year, Rosenboom disposed of 200 tons of corrugated cardboard, cardboard cores and Kraft paper from the Spirit Lake production facility and 150 tons of these materials from the Sheldon facility. Much of this tonnage will be recyclable once appropriate markets are found. The intern worked to identify a market, establish a recycling framework, and identify necessary equipment and employee training. The project will be implemented in the Spirit Lake facility, and will be later expanded to Sheldon.

**Office Paper:** White office paper is an easily recyclable item that is generated in most office settings. After a baler is in place at Spirit Lake, the facility will be able to recycle its office paper. The Sheldon facility plans to install a baler once the Spirit Lake recycling program is implemented. The volume of material is low but the price paid per ton by recyclers provides a strong incentive to separate and recycle the material.

**Low Density Polyethylene (LDPE) Recycling:** Low density polyethylene (LDPE) in the form of shrink wrap and plastic bags protect and keep parts clean as they enter the plant. LDPE is a recyclable item if it can be segregated. The facility generates 20 tons of this material annually. Capturing this material would reduce the amount of waste going to the landfill.



**Pallet Recycling:** Last year, Spirit Lake sent 37 tons and Sheldon sent 35 tons of broken or off-sized wood pallets to the landfill. This material can be diverted and reclaimed into new pallets. The intern identified a company that can provide pallet recycling services to the Spirit Lake facility. More research is needed to find a pallet recycler to handle Sheldon's unique set of pallets.



**Solvent Source Reduction and Recycling:** Solvent is used in the paint lines of both facilities for cleaning after the paint process. The intern focused on the paint line in Spirit Lake and identified ways to reduce the amount of solvent used per color change and shut down. A solvent recycler was installed to clean and reuse solvent on site, further reducing operating expenses and regulatory burdens. This combination of source reduction and on-site recycling will cut the solvent costs for the paint line by 51 percent.

**CONVENTIONAL AIR POLLUTANTS AND GREENHOUSE GASES DIVERTED IN METRIC TONS**

TOTAL FOR ALL SECTORS							
CO <sub>2</sub>	SO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CFC	NO <sub>x</sub>	VOC	PM <sub>10</sub>
2240.93	0.01	7.63	10.26	1.83	0.13	0.10	0.02

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
CARDBOARD RECYCLING-SPIRIT LAKE	\$22,000	200 TONS	IN PROGRESS
CARDBOARD RECYCLING-SHELDON	\$13,000	150 TONS	RECOMMENDED
OFFICE PAPER RECYCLING-SPIRIT LAKE	\$2,900	10 TONS	RECOMMENDED
OFFICE PAPER RECYCLING-SHELDON	\$2,100	8 TONS	RECOMMENDED
LDPE RECYCLING	\$1,500	20 TONS	RECOMMENDED
PALLET RECYCLING-SPIRIT LAKE	\$4,900	37 TONS	IMPLEMENTED
PALLET RECYCLING-SHELDON	\$2,400	35 TONS	MORE RESEARCH NEEDED
SOLVENT SOURCE REDUCTION-SPIRIT LAKE	\$18,600	820 GALLONS OF HAZARDOUS WASTE	RECOMMENDED
SOLVENT RECYCLING-SPIRIT LAKE	\$17,400	2,420 GALLONS OF HAZARDOUS WASTE	IMPLEMENTED

