

2016 Case Study

Webco Manufacturing, Inc.

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Major: Civil Engineering
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Olathe, KS



Company background

Webco Manufacturing is an original equipment manufacturer of steel products for heavy machinery. Founded in 1980, the Olathe-based company relocated to its present facility in 2013, consolidating operations in a 200,000-square-foot workshop and office. Its clients span industrial and commercial markets, including aviation, construction, industrial cooling, mining, railway maintenance, and trucking, with an average output of 2,200 fabricated parts per day. Webco's capabilities include laser and plasma cutting; computer-guided braking and machining; robotic welding; submerged arc and gas metal arc welding; sand blasting and deburring; and liquid and powder painting, including zirconium-primed powder coating.

Project background

The Webco Way, a corporate culture of 31 fundamentals, encourages best practices, ethical principles, innovation, operational efficiency, and positive experiences, all of which lead to greater competitiveness and increased customer satisfaction.

Webco already employs several environmental strategies, including purchasing wooden pallets from second-hand distributors, reusing weld scale from the submerged arc-welding process, selling metal shavings and cuttings back to suppliers for reclamation, and ultrasonic cleaning of painting plugs for increased life.

Incentives to change

Webco continually works to improve its manufacturing and production abilities. March saw the installation of a new powder paint line, including a five-stage zirconium pretreatment process. May saw the maintenance team begin the process of installing a new robotic welder, and June saw the addition of a new saw.

However, these improvements come at other costs. The new paint line required the company to obtain a wastewater pretreatment permit, and the various shop processes may make Webco subject to 6X regulations for air quality. However, Webco has no dedicated environmental specialist. The quality assurance manager, operations manager, and safety coordinator work together when environmental issues that come up, or they outsource complex problems to third parties, such as the Kansas State University Pollution Prevention Institute.

Projects reviewed for P2 potential

The intern completed recommendations in three main project areas: environmental compliance, indoor lighting retrofits, and high volume/low speed (HVLS) fans. Table 1 summarizes the projected environmental and economic benefits from the intern's recommendations.

Environmental compliance

The intern completed baseline monitoring and biennial compliance reporting for Webco's wastewater pretreatment permit. This process included comprehensive evaluation of safety data sheets and purchasing orders. Sixty-six liquid chemical data sheets were cross-referenced with a list of 110 toxic organic substances listed on the pretreatment permit. A potential chemical substitution was discovered, replacing a solvent-based, aerosol, anti-spatter welding spray with a biodegradable, water-based one that would save 68 pounds of methylene chloride annually. Other potential risks included toluene, ethylbenzene and phenol, and equivalent annual use of these chemicals was documented.

Based on Webco's existing practices for storage and use of a six-gallon Becca Solvent Saver for solvent reclamation, the intern wrote an official solvent management plan (SMP), and assisted in writing a spill prevention, containment, and cleanup (SPCC) plan. These two plans will save the company \$4,240 in annual sampling requirements and provide guidelines for preventing accidental chemical discharges to the sewer system.

This project is complete and implemented, pending the final approval of the SMP and SPCC plan by the city of Olathe's pretreatment coordinator.

Indoor lighting retrofits

The intern researched substitute light bulbs for compact fluorescent lights (CFLs) and linear T8 fluorescent bulbs; fixture replacements for six-bulb, T5, high-output (HO) fluorescent, high-bay fixtures; and potential savings due to occupancy sensing. Between the shop floor and the front offices, Webco has 897 fluorescent fixtures, with 149 CFLs; 783 four-foot, linear T8 fluorescent bulbs; and 2,292 four-foot, linear, T5 HO fluorescent bulbs. Lights in Webco's offices operate 10 hours per day, five days per week; primary lights in the warehouse operate for 19 hours per day, five days per week; and emergency lighting in the warehouse operates continuously. Together, these three light sources account for 20% of Webco's 3.7 GWh average annual

electric use, and cleaning the fixtures to maintain light output takes 127 hours of maintenance labor (almost 16 working days) for the T5 fixtures alone. Additionally, the second shift in the warehouse operates with minimal employees, leaving areas of the shop unoccupied with the lights on for an extended period of time.

The recommended changes total an annual savings 370,628 kWh and avoid annual disposal of 226 pounds of fluorescent bulbs as hazardous waste. Estimated savings for this project—including electricity cost per kWh and kW, and maintenance labor costs for cleaning—is \$78,604, after accounting for the increased annual cost of purchasing LEDs.

Research for this project is complete and the intern recommended implementation. However, Webco is a Westar customer and Kansas City Power & Light (KCP&L) is in the process of purchasing Westar. This means Webco may be eligible for KCP&L’s lighting retrofit rebates once the two energy companies complete the terms of the acquisition. As such, Webco has chosen to wait on retrofitting the lights until more details about the merger are released.

HVLS fans

The intern examined the fan’s potential to improve airflow during the summer months and heating efficiency during the winter. When the shop heats up during the summer, indoor temperature can be 10°F warmer or more than the outside temperature, an effect that persists until the end of the second shift at 12 a.m. In winter, heaters are set at 70°F and run around the clock. Both of these conditions are likely due to thermal stratification in the 35-foot ceilings.

Based on an average of annual energy use for heating the shop and area-heat loss calculations, the intern estimated installing the fans would lead to a savings of 11,632 therms of natural gas. Area coverage estimates for the fans indicate needing up to eight fans for the shop floor, but the shop layout makes installing six fans more feasible. Assuming six fans will still provide maximum energy savings, Webco could annual increase of 1,098 kWh for operating the fans, leading to a net annual savings of \$5,090.

As with the indoor lighting retrofit, research for this project is complete and the intern recommended implementation. Yet again, as with the lighting retrofit, KCP&L offers rebates for customers who install HVLS fans for energy efficiency and Webco has chosen to wait to install the fans.

The combined effects of the three projects totals a reduction of 68 lbs of toxic organics, 369,530 kWh of electricity and 11,632 therms natural gas; total estimated savings for these projects is \$43,568. Using the Environmental Protection Agency’s 2014 greenhouse gas (GHG) calculation tool, these projects total an annual reduction of 424 metric tons of carbon dioxide equivalent (CO₂e).



Table 1: Summary of 2016 intern recommendations for Webco Manufacturing Inc.

Project description	Annual estimated environmental impact	Annual estimated cost savings	Status
Environmental compliance	68 lbs toxic organics	\$4,240	Implemented
Indoor lighting retrofit			
Offices spaces, CFL and T8 bulb substitution	18,884 kWh	\$3,502	Recommended
Emergency lighting, T8 bulb substitution	48,412 kWh	\$3,679	Recommended
T5 high-bay fixture replacements	303,332 kWh	\$31,297	Recommended
High-volume, low-speed fans	11,632 therms -1,098 kWh	\$5,090	Recommended
Total savings *	68 lbs toxic organics 369,530 kWh 11,632 therms	\$43,568	
GHG reductions¹	424 metric tons CO₂e		

• Does not include projects that are “not recommended” or “further research is needed.”

¹EPA GHG Conversion Tool, April 7, 2010