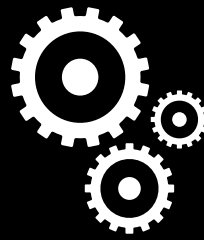


CURRIES



TYLER SIMON
CHEMICAL ENGINEERING
THE UNIVERSITY OF IOWA



COMPANY PROFILE

Located in Mason City, Iowa, CURRIES is a leading manufacturer of steel and Fiberglass Reinforced Polyester® (FRP) doors as well as steel and aluminium frames. CURRIES currently employs 660 people at its 326,000 sq. ft. facility, divided into either door or frame production. The door production cells operate five or six days per week with two shifts per day and the frame production cells operate five days per week with three shifts per day. CURRIES utilizes an ISO 14001:2004 certified environmental management system.

PROJECT BACKGROUND

CURRIES follows a sustainability-based agenda and is committed to reducing their environmental impact. The purpose of the 2017 internship project was to determine possible substitutes for the solvent used at CURRIES, with the intention of reducing the use of volatile organic solvents and hazardous waste generation. A secondary project goal was to reduce the energy used by large processing equipment.

INCENTIVES TO CHANGE

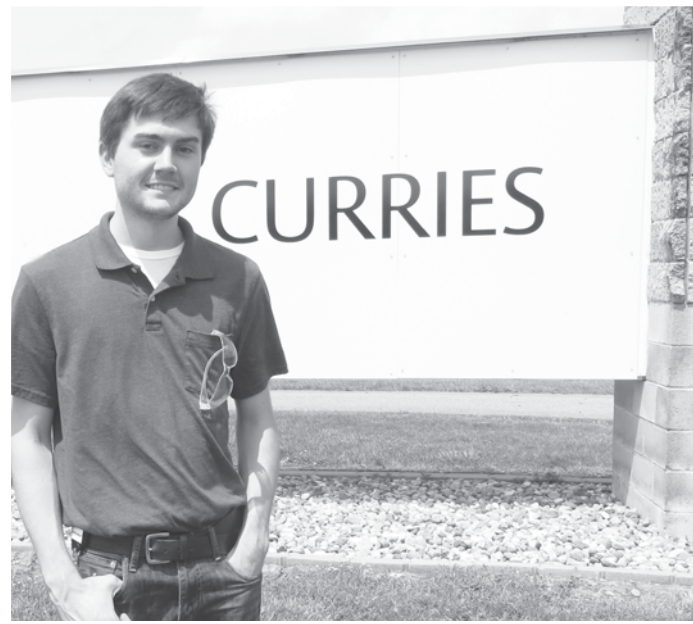
CURRIES is a subsidiary of ASSA ABLOY, a Swedish lock manufacturer. Since 2006, ASSA ABLOY has been committed to a sustainable business model. This has led to the development of a global initiative aimed at reducing company environmental impact by decreasing volatile organic solvent usage, reducing hazardous waste generation, reducing energy usage, and preventing greenhouse gas creation. By replacing their current cleaning solvent with a less hazardous alternative, CURRIES will be able to take a large step towards reaching this goal.

RESULTS

Solvent Replacement: CURRIES currently uses a cleaning solvent listed as hazardous to remove paint and other compounds from equipment. Distillation is currently used to recover a large percentage of the solvent for reuse. To eliminate the use of the hazardous solvent, the intern conducted tests to verify the efficacy of non-hazardous substitutes. By replacing the current solvent with a viable non-hazardous solvent, CURRIES could reduce hazardous waste generation by 11.36 tons per year, generate 60 percent less VOCs, and save \$20,201 annually. Additionally, the new solvent could reduce

staff time spent training on the safe use and handling procedures of the current solvent, and may also allow the facility to be reclassified to small quantity generator status.

Solvent Contaminated Wipe Exemption: CURRIES commonly uses machine shop rags or paper towels to dry tools or equipment of cleaning solvent. These wipes are currently disposed of as hazardous waste. It was recommended that CURRIES instead take advantage of the EPA's solvent contaminated wipe exemption, which would allow CURRIES to responsibly dispose of the wipes in a municipal solid waste landfill and save more than



\$16,602 in disposal costs. Should this recommendation be implemented along with solvent replacement, savings figures would be impacted.

Distillation of Waste: Waste containing solvent from one of CURRIES' special production units is not currently distilled because a hazardous composition forms when waste streams are mixed. By isolating this waste upstream, part of the solvent could be recovered through distillation and up to 48 percent of the waste could be eliminated. This could save CURRIES \$1,689 annually and prevent the creation of 0.77 tons of hazardous waste.

Dry-off Oven Adjustment: Prior to being painted, the frames CURRIES produces are washed and dried. It was unknown what oven temperature was required in order to ensure the frames were dry enough for the paint to adhere. By incrementally decreasing the temperature each day and monitoring the results, the minimum temperature required to maintain quality product was found. Permanently lowering the temperature of the oven to this optimal minimum temperature could reduce energy use by 4,085 therms and save CURRIES \$1,037 annually.

Auto Idling System: When the conveyors transporting the product are stopped, the production equipment remains active. This equipment uses large amounts of electricity, water, and natural gas. It was recommended that CURRIES implement a control program that sets the production equipment to an idle state when the conveyor system is inactive. This recommendation could save 413 therms, 18,255 kWh, 316,486 gallons of water, and \$3,550 annually.

PROJECT	ANNUAL COST SAVINGS	ANNUAL ENVIRONMENTAL RESULTS	STATUS
SOLVENT REPLACEMENT	\$20,201	11.36 tons	RECOMMENDED
SOLVENT CONTAMINATED WIPE EXEMPTION	\$16,602	0.10 tons	IN PROGRESS
DISTILLATION OF WASTE	\$1,689	0.77 tons	RECOMMENDED
DRY-OFF OVEN ADJUSTMENT	\$1,037	4,085 therms	IMPLEMENTED
AUTO IDLING SYSTEM	\$3,550	316,486 gallons 18,255 kWh 413 therms	RECOMMENDED

