

INFASTECH™



KELLY BARNETT
CHEMICAL ENGINEERING, THE UNIVERSITY OF IOWA



COMPANY BACKGROUND

Decorah Operations has been manufacturing fasteners since 1969. The company was acquired by Infastech™ in 2010. The current facility produces fasteners of all shapes and sizes used in diverse applications, from cars and construction equipment to cell phones. In 2011, the company added a zinc electroplating process line to the existing cold forming, heading, threading, heat treating, painting, and Class 100 clean room cleaning and packaging processes.

PROJECT BACKGROUND

Water reduction and potential reuse were priorities of Infastech™, with the objective of lowering the strain of increasing water costs. Alternative methods of treating wastewater and the possibility of harvesting rainwater were considered. In addition, soap usage in the plant's parts washing stations was examined, to reduce consumption and develop a standard operating procedure. This is the eighth year that the company has participated in the Pollution Prevention Internship Program.

INCENTIVES TO CHANGE

Decorah Operations is an ISO 14001:2004 certified facility and emphasizes continuous environmental improvement through waste reduction and utility minimization. A new electroplating (EP) line is expected to more than double the current water usage. Since Infastech™ treats its water prior to disposal, this increase in water usage affects the company's water bill, as well as the cost of operating its own wastewater system.

Over-soaping is an issue in the parts washing stations; it places an extra burden on the wastewater pre-treatment (WWPT) system and the company incurs excessive purchasing costs for the soap.

RESULTS

Water Meters: Installing meters on key systems in the plant would provide accurate quantitative data to develop and maintain a baseline for each system. Ongoing monitoring will help identify variances and areas of opportunity to reduce usage.

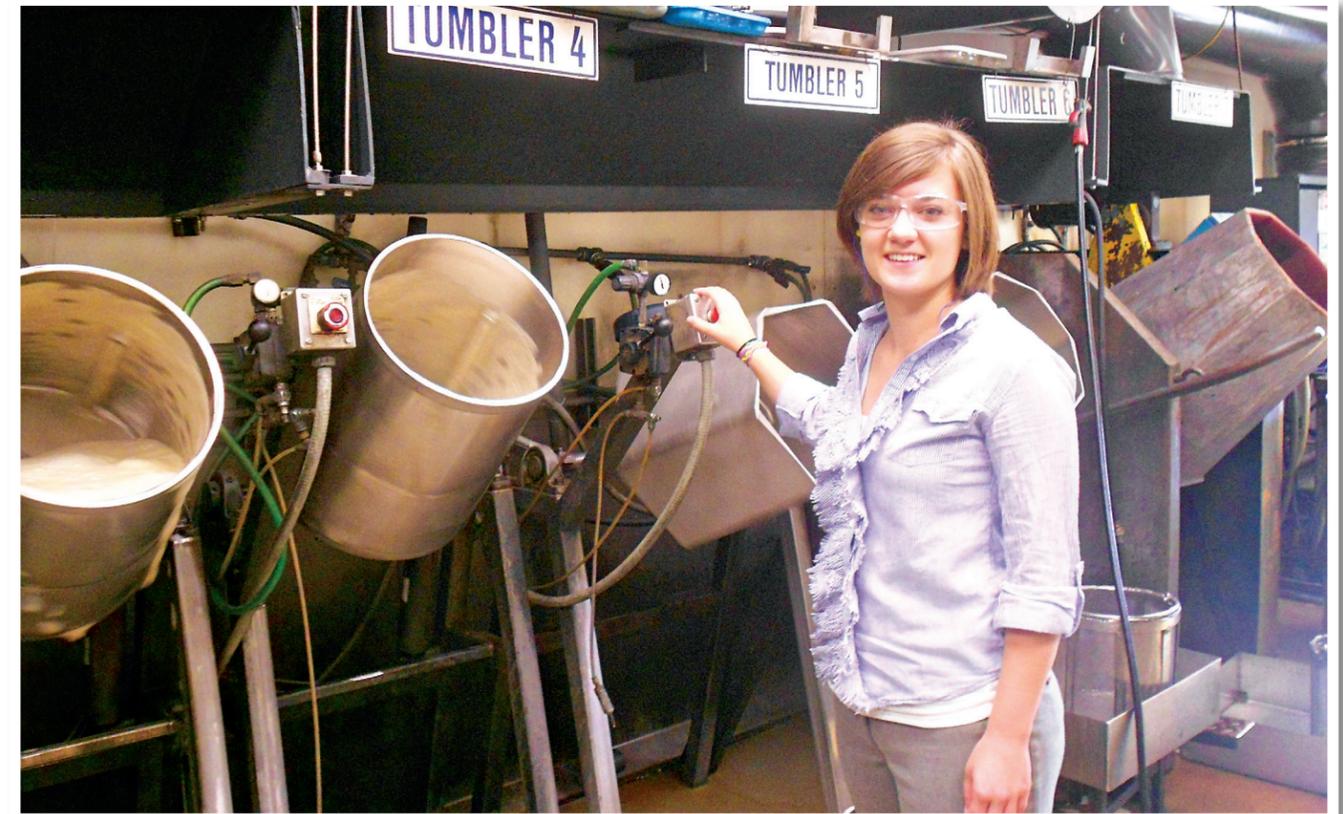
Soap Reduction: Miniature and specialty parts are washed in the Microtech area in tumbler washers. After forming, parts are washed to remove the oils that would slow down the threading process. Parts were washed in a 60 percent solution of powdered alkaline soap. Testing determined that a 20

percent concentration would still achieve the same level of cleanliness. No capital investment is required to make this process change, which would reduce soap purchases by 32,170 pounds per year.

All other parts are handled by the primary parts washing process. They are cleaned by one of three different types of machines and use a liquid alkaline soap. A piece of proportioning equipment adds a 7 percent concentration to the vibratory wash when only a 5 percent concentration is needed. If this piece of equipment could be adjusted or modified to reduce the soap concentration in this process, \$29,835 and 3,900 gallons of soap could be saved annually.

Rainwater Harvesting: Decorah Operations has a roofing surface area of about 185,000 square feet and annual rainfall is 31.5 inches. As a result, 2.6 million gallons of water could be collected each year. For the rainwater to be used, it would need to be filtered and pumped inside. Implementation would require a capital investment of more than \$50,000, with an annual cost savings of approximately \$2,244. With a 25-year return on investment, rain harvesting is not a cost-effective opportunity at this time.

Wastewater System Reconfiguration: Batch treatment is currently used with pH adjustment and chemical coagulation to remove oil, grease and heavy metals from the wastewater. An ultrafiltration unit was recently purchased to help with the increased demand from the EP line, but is not yet in service. Electrocoagulation is a cost-effective alternative to chemical coagulation because it uses an electrical current to settle out the contaminants in the water. Using electrocoagulation in conjunction with ultrafiltration would enable the wastewater to be reused. Savings would be approximately \$247,650 per year from the elimination of coagulation chemicals.



Recycling Wastewater: Since the new wastewater system would enable the effluent water to be reused, it could be recycled to different processes. The parts washing stations and the EP line could use the recycled wastewater, which would save 5.4 million gallons of water per year. Additional savings would be gained from eliminating the need to soften the recycled water. Recycling wastewater could reduce the water costs by approximately 50 percent.

CONVENTIONAL AIR POLLUTANTS AND GREENHOUSE GASES DIVERTED IN STANDARD TONS

Total for all sectors					
CO ₂	SO ₂	CH ₄	N ₂ O	CFC	PM-10
485.09	1.48	135.35	78.54	2.87	0.02

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
WATER METERS	TBD	MEASUREMENT ONLY	IMPLEMENTING
SOAP REDUCTION IN MICROTECH PARTS WASH	\$52,838	32,170 POUNDS SOAP	RECOMMENDED
SOAP REDUCTION IN PRIMARY PARTS WASH	\$29,835	3,900 GALLONS SOAP	RECOMMENDED
RAINWATER HARVESTING	\$2,244	2,625,700 GALLONS WATER	NOT RECOMMENDED
WASTEWATER SYSTEM RECONFIGURATION	\$247,650+	499,150 POUNDS CHEMICALS	RECOMMENDED
RECYCLING WASTEWATER	\$18,680+	5,418,000 GALLONS WATER	RECOMMENDED

