STANLEY ENGINEERED FASTENING

DECORAH

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COMPANY PROFILE
Stanley Engineered Fastening is a world renowned leader in fastening solutions. Stanley serves diverse industries in automotive, medical, electronic, construction, and defense applications. Stanley Engineered Fastening has more than 5,000 associates around the globe, with facilities in India, China, Spain, Brazil, and United States. With more than 100 years of experience and the most diverse product selection in the world, Stanley Engineered Fastening has become the gold standard in fastener manufacturing.

PROJECT BACKGROUND
When fasteners are produced, a solid hazardous waste is generated as a byproduct of the wastewater treatment process. Stanley Engineered Fastening tasked their P2 intern with finding solutions to reduce the amount of hazardous waste generated at the Decorah facility. To find the optimal solution to reducing the amount of hazardous waste, the intern first generated piping and instrumentation diagrams (P&IDs) of the wastewater process. These P&IDs offered a comprehensive overview of the wastewater process flow throughout the plant. Separately, a newly implemented cleaner in the facility's passivation line was analyzed to determine the most efficient usage concentration.

INCENTIVES TO CHANGE
At the Decorah Stanley facility a large quantity of solid hazardous waste is generated as a natural result of their production process. This waste needs to be transported offsite to a treatment facility more than 150 miles away for proper treatment and disposal. Because of these environmental and economic reasons, Stanley has placed hazardous waste reduction at the forefront of their process improvement priorities. A recent change of cleaning agents used in the passivation line provided another opportunity to improve economic and environmental impacts by fine-tuning the dosing ratio.

RESULTS
Wastewater System Redesign: At the Stanley Engineered Fastening facility, a hazardous solid waste is generated as a byproduct of the wastewater treatment facility. The wastewater treatment facility treats the liquid waste it receives from three major production sources: the passivation line, the electropolish line, and the washers. Of these three lines, only the waste produced in the electropolishing line is classified as hazardous. The other two lines produce non-hazardous waste.

However since all three lines mix together prior to treatment and are treated using the same process, all of the resulting solid waste from the wastewater treatment facility must be classified as hazardous.

In addition to exploring source reduction strategies, the intern investigated various separation and elimination processes such as magnetic separation, eddy current separation, and moisture extraction to reduce the volume of hazardous waste generated. Research proved these strategies to be not permissible, insufficient or unreliable to provide a long-term or viable solution.

A wastewater system redesign could provide separation and isolation of the hazardous and non-hazardous solid waste streams. The plant currently runs a clarifier system designed to treat waters and solids, and a batch tank system to treat oils, waters, and solids. These two systems come together before the solids are extracted. The wastewater system was redesigned to isolate the hazardous stream from the non-hazardous stream prior to mixing. With minimal one-time purchases, modifications could be made to create two independent treatment processes, with the clarifier system treating the hazardous material and the batch tank system treating the non-hazardous material. The hazardous solids would no longer come into contact with the non-hazardous solids during or after the treatment process. This recommended solution would reduce the amount of hazardous material generated by 90 percent and could allow Stanley to reduce their EPA hazardous waste generator status from a large quantity generator to a small quantity generator, providing additional regulatory benefits. The next steps for Stanley to implement this recommendation would be to purchase the additional equipment and services needed for implementation.

Passivation Cleaner Reduction: Cleaner is used on the passivation line to remove impurities on the product's surface in preparation for passivation. This cleaner is utilized in a batch process, and an average concentration of 12 percent by volume is currently used. After checking the cleaner's Technical Data Sheet (TDS) and confirming with the manufacturer's lab manager, it was determined that the concentration may be reduced to 5 percent by volume without losing effectiveness. The next step for Stanley to implement this recommendation would be to gradually decrease cleaner concentration from the 12 percent to the 5 percent concentration to verify efficacy.

Piping and Instrumentation Diagram (P&ID) Development: Piping and Instrumentation Diagrams (P&IDs) are commonly used throughout industry to determine corrective process changes. P&IDs of the waste water treatment facility, oil recovery unit, and electropolishing line were fabricated to aid in finding source reduction solutions in the wastewater system redesign project and will provide an on-going resource for maintenance and repair at the facility.

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
WASTEWATER SYSTEM REDESIGN	$20,061	63.4 tons of hazardous waste	RECOMMENDED
PASSIVATION CLEANER REDUCTION	$95,550	9,555 gallons	RECOMMENDED
P&ID DEVELOPMENT	$7,200 (one time)	–	IMPLEMENTED