Ball Corporation

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Organization Background

Ball Corporation is a world leading producer of recyclable aluminum packaging headquartered in Westminster, Colorado. Although the company was founded in 1880, the Global Beverage Packaging department was not formed until 1969, when Ball Corporation acquired the Jeffco Manufacturing Company in Golden, Colorado. Ball Corporation acquired an existing Rexam plant in Saint Paul, Minnesota in 2016. Ball Corporation - Saint Paul is just over 160,000 square feet and employs roughly 110 personnel full-time. The facility's only manufactured product is the 12 oz aluminum can and it produces roughly 5 million cans per day.

"My role as a MnTAP intern gave me hands-on experience in a dynamic manufacturing setting. I had the opportunity to network with industry professionals and improve my project management skills. I am very grateful to Ball Corporation for hosting me, and I value the connections I have made with both the MnTAP and Ball Corporation team members. This project has also shown me the importance of combining my career in mechanical engineering with my passion for environmental stewardship." ~ MF

Project Background

Ball Corporation is continuously making investments towards improving the can manufacturing process from start to finish. Water is a critical component of many manufacturing steps at Ball. This project specifically focused on reducing the facility's water consumption and improving various processes within the wastewater treatment protocol. Opportunities were identified to save water through reuse of treated wastewater and improve discharged water quality by making a more robust monitoring and control system for chemical use in treatment of wastewater.

Incentives to Change

Ball is focused on sustainability and as a leader in producing recyclable aluminum packaging, they are committed to reducing waste, energy and water consumption. Not only does a greener industry support the company's overarching mission, but it also aligns with Ball customers' desire for a responsibly sourced and produced product. Ball has made a commitment to being carbon neutral prior to 2050 and is currently working towards a 55% reduction in greenhouse gas emissions by 2030. Ball Corporation also places a large focus on using recycled materials for production. It is estimated that 75% of all aluminum ever produced is still in use today and Ball has its sights set on developing an infinitely recyclable product.

SOLUTIONS

Reclaimed Water Use for Polymer System

Anionic polymer is added to a tank and mixed with wastewater before entering a series of two lamella clarifiers. The activated polymer binds with any metals or particles in the wastewater and eventually forms a flocculant that can be precipitated out of solution. Currently, a chemical feeder uses a freshwater feed to inject polymer into the flash tank. A system has been proposed to utilize recycled water in place of the freshwater feed. The recommended solution would result in 1,100,000 gallons per year (GPY) of water savings and $10,800/yr in cost reduction.

Automation of pH Control for Wastewater Holding Tank

A volumetric feeder injects a lime slurry into a wastewater holding pit to maintain a desired pH. The current pH correction system often needs manual pH adjustments. A system has been proposed that would monitor and correct pH with caustic soda and would use a chemical dosing pump and automatic pH controller. The recommended solution would remove the need for manual pH adjustment and eliminate 6,000 lbs/yr of waste.

Solutions

Automatic Flow Control Valve for Can Washer

The nine-stage can washer at the facility accounts for almost 60% of the facility's daily water usage. A manually operated valve with an upstream flowmeter controls the flow of water and requires adjustments as facility water demands fluctuate. To keep the flow at a constant rate, a hydraulic actuated automatic flow control valve has been recommended to replace the manual control valve currently in use. The recommended solution would result in 1,500,000 GPY in water savings and $13,800/yr in cost reduction.

Deionized Water Recharge Frequency

Deionized (DI) water is used in the last two stages of the can washer for a spot-free rinse. During the internship, the service life of the DI systems was monitored, and it was found that an increase in the recharge set point of the DI columns from 3.5 uS/cm to 4.5 uS/cm would result in substantive chemical and water savings. Increasing the system recharge set point by 1 uS/cm would result in 230,000 GPY and $2,800/yr in water savings. The recommended solution would also decrease chemical use due to fewer system recharges, resulting in savings of an additional $4,300/yr in cost reduction.

"Having a MnTAP intern this summer was a great experience. Water conservation opportunities were quickly found at our plant in St. Paul, and detailed plans were prepared on how to reuse water, save capital, and in one case, run our equipment more consistently. These plans and ideas were also shared and implemented in other manufacturing plants across North America."

~Scott Lang, Quality Manager
Ball St. Paul

Recommendation	Annual Reduction	Annual Savings	Status
Recycled Water Use in Anionic Polymer System	1,100,000 gal water	$10,800	Recommended
pH Automation	26,000 lbs lime 6,000 lbs sludge	NA	Tentatively recommended
Automatic Flow Control Valve	1,500,000 gal water	$13,800	Recommended
DI System Recharge Adjustment	230,000 gal water 40,000 lbs chemical	$7,100	Recommended

MnTAP Advisor: Kelsey Klucas, Engineer