Schwing America

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Company Background

Schwing America is a member of the Schwing Group, a worldwide designer, manufacturer and distributor of premium concrete production and handling equipment, headquartered in Herne, Germany. Schwing America's 400,000 square foot manufacturing plant in White Bear, one of seven production facilities in the global Schwing Group, produces concrete pumps, truck mixers, batch plants, reclaimers, and genuine parts for distribution throughout the world. Established in 1974, Schwing employs approximately 200 full time employees.

"The best part of the internship was the positive reaction to the recommendations I made and seeing some of the recommendations get implemented."

Project Background

The objective of this project was to help facilitate a lean manufacturing approach to the production process in a way that consciously links the goal of reducing waste from the lean perspective with environmental sustainability goals, such as materials and energy efficiency. The lean manufacturing principles naturally lead to sustainability improvements, both in energy, water, and materials use reduction and in terms of decreasing energy intensity of a product when production rates increase. Lean manufacturing typically uses a host of process analysis and improvement methods to classify and minimize non-value added steps and processing and resource usage. Schwing engaged with Enterprise Minnesota, the NIST Manufacturing Extension Partner for Minnesota, to provide training to employees in GreenLean® methodology. This training enabled everyone, from the executive sponsor to assembly workers, to work together to identify, communicate, and quantify opportunities for improvement and implementation.

Incentives to Change

Due to significant swings in the construction market, Schwing has seen a fluctuation in its business over the past five years and is now growing at a fast pace in response to the recovery of that sector. This growth positions its manufacturing centers to re-examine and optimize their layout and procedures in light of a growing and changing business. Through lean manufacturing analysis, a broad range of opportunities were found to improve the manufacturing process. Organization of work cells was found to be a priority that could improve the efficiency of the increasingly busy assembly workers. This included defining work spaces; providing visual clarity and standardization of where products, tools and parts belong, and organizing small parts into kits for each product, thereby minimizing mistakes and unnecessary movement of people and materials. Once a job on the assembly floor begins, the goal is to have all required tools and materials accessible within 30 seconds, instead of minutes.

Solutions

Optimize Work Cells

Using the 5S method, an array of work cells across one of the production buildings was optimized, resulting in clearly lined floors, removal of clutter, and tools and materials placed in standardized locations.

This enabled the floor to be fully utilized and prevented underutilizating work spaces due to sprawling jobs. Travel times for assembly workers were minimized by eliminating confusion about the parts needed and reducing time spent searching for parts, thereby increasing production efficiency. The method of using bulk parts bins was re-examined and it was recommended that kits be assembled for each bill of material to minimize potential for small part spillage and incorrect part selection. As part of this process, the bills of material were audited and updated as required. This suggestion highlighted the importance of applying lean as part of a supply chain philosophy and, in some cases, it was found that vendors had the capability to provide the required pre-assembled kits, allowing Schwing staff to focus on higher value activity.

Identify Patterns Using Root Cause Analysis

By observing the assembly process, I found that rework was the result of materials defects. I used root cause analysis to research any patterns in the defects and to identify the appropriate changes that could be implemented. This analysis enabled the production floor supervisor to accurately determine what portion of quality improvement they could implement by changes within the production cell and to what degree communication with the design staff or sub-assembly suppliers was necessary in order to gain improved quality and minimize time and materials spent on rework.

Optimize Paint Booth Loading Patterns

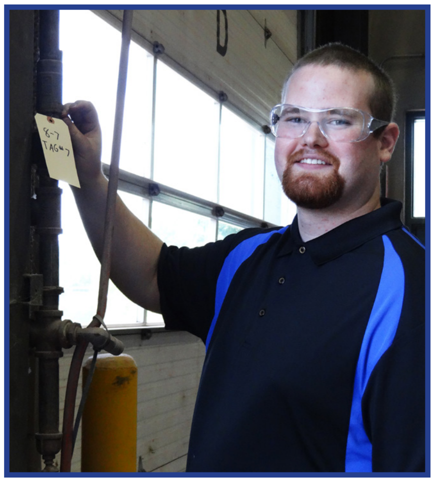
Another project focus area was energy savings in the paint room due to the significant energy required to maintain clean air within the building and the air exchange required to heat and cure the product. By analyzing the energy use in paint booths at multiple Schwing production sites, I was able to quantify and recommend loading patterns between paint booths that would minimize unnecessary energy usage. This recommendation could result in thousands of dollars of electrical and gas savings annually.

Repair Compressed Air Leaks

A system air leak analysis was performed in the areas utilizing significant amounts of compressed air. I worked with maintenance to recommend a regular testing method as well as to repair existing leaks. This was conservatively estimated to save over $2,000 per year in electrical costs.

Reduce Forklift Travel

I constructed a spaghetti diagram of forklift travel to examine travel patterns and load utilization of fork lifts between areas in the facility and to identify areas where one-way loads were common. I then recommended a staging area system that would reduce forklift travel. The new system could save over 390 gallons per year of propane fuel and reduce wear and tear on the equipment.



Recommendation	Reduction	Annual Savings	Status
Optimize paint booth loading patterns	24,150 kWh/yr 2,530 therms/yr	$2,600 $2,040	Under review
Repair compressed air leaks	21,000 kWh/yr	$2,125	In progress
Reduce forklift travel	390 gallons propane/yr	$975	In progress