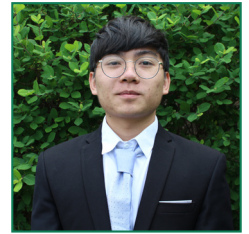




Pollution
Prevention
Institute

PEERLESS PRODUCTS INC.

Intern: Ngoc Huan Nguyen
Major: Biology
School: The University of Kansas



Company background

Peerless Products Inc. was founded in Fort Scott, Kansas, in 1952 and is a manufacturer of high-performance aluminum architectural doors and windows. Its products are used in new construction, historical construction and renovations. Since its founding, Peerless Products has formed three distinct workgroups: the Architectural Windows and Doors Group in Fort Scott, which employs 300-400 people; the Commercial Applications Group in Iola, Kansas; and the Innovative Solutions Group in Nevada, Missouri.



Project background

Peerless Products partnered with K-State Pollution Prevention Institute to host a Sustainable Materials Management, or SMM, intern. This is the first PPI intern to work with Peerless Products and was directed to investigate four projects at the Fort Scott location with the goal of reducing waste generation rates and improving financial savings. The first three projects focused on vinyl, paint and pallet waste. The fourth project focused on caustic wastewater, but was deemed a low priority compared to the first three projects. Due to time constraints and low priority, this fourth project was discussed but not fully investigated. By applying SMM principles — reduce, reuse, recycle — the first three projects can help build a circular economy, reduce Peerless-produced waste and save money if implemented.

Incentives to change

A goal of Peerless Products is to manufacture high-quality windows and doors in a sustainable and energy efficient manner. Its focus on this goal won them US Glass' Green Award in 2019, strengthening its position as a strong competitor in the window and door market. Peerless reached out to PPI to continue improving its sustainable manufacturing practices with a key focus on waste reduction.

PROJECTS REVIEWED FOR SMM POTENTIAL

Vinyl scrap recycling

Peerless uses strips of vinyl plastic in its window and door frames to act as thermal barriers, slowing the conduction of heat from one side to the other. These strips are bought in 24-foot lengths then cut to size in two stages — the thermal department first cuts strips to gross length then inserts them into frames, then the saw department cuts the frames with inserted vinyl to exact lengths for assembly.

The intern inspected invoices and observed both departments during production and calculated that 29 tons of vinyl scrap is landfilled per year, costing \$172,816 annually. The intern investigated the option of purchasing pre-cut vinyl but this had been tested previously and proved problematic. Further research is needed to reduce barriers to its implementation. In the meantime, the intern recommended collecting and selling all 27.9 tons of vinyl scrap to recyclers. This can reduce the overall cost by \$33,648 per year.

Wooden pallet waste

Peerless Products builds its product to user-specified dimensions, which requires the use of customized wooden pallets for its shipments. These pallets are effectively single-use due to their unique sizes. To understand the process, the intern conducted interviews with the shipping manager and evaluated purchase order history. With the current practice, around 6,500 wooden pallets are used per year, costing \$486,590 annually. This is estimated to result in 263 tons of wood waste per year.

The intern recommended Peerless replace its wooden pallets with modular plastic pallets and require its customers to ship pallets back to Peerless. These modular pallets could be reused for approximately 100 cycles and could be modified per each job requirement. With Peerless paying shipping fees, this change could save an estimated \$86,611 per year. If Peerless required a year's quantity of pallets to appropriately manage incoming and outgoing pallets, it could realize a simple payback period

PROJECTS REVIEWED FOR SMM POTENTIAL, CONTINUED

of 9.4 years. This recommendation prevents 263 tons of wood waste from being generated per year and creates 0.8 tons of plastic waste per year once fully implemented

Powder coating efficiency

Each piece of extruded aluminum is powder coated in one of two colors using a reclaim paint coating system with a transfer efficiency of 72%. After interviewing the paint line manager and reviewing internal documents, the intern calculated that 17.6 tons of paint powder is discarded per year, costing \$550,144 annually.

The intern recommended performing a quality check of current machinery to ensure parameters, such as spray angles, gun speeds and spray distances are optimally set. Improving equipment transfer efficiency to 85% would prevent 6.3 tons of powder waste saving \$196,226 per year. Additionally, the intern recommended Peerless improve inventory control procedures to ensure powders are used before expiration and to schedule painting operations by color type to reduce waste from color changes. Reducing waste powder from these sources by 10% could prevent 0.4 tons of powder waste per year at \$12,824 annually.

SUMMARY OF 2022 SMM INTERN RECOMMENDATIONS

Project	Annual estimated solid-waste reduction (tons)	Estimated cost savings (\$/year)	Status
Vinyl scrap recycling	27.9	\$33,648	Recommended
Wooden pallet waste	262	\$86,611	Recommended
Powder coating efficiency	6.7	\$209,050	Recommended
Total¹	297	\$329,309	
GHG reductions^{1,2}	330 metric tons CO₂e		

¹Does not include projects “not recommended” or where “more research needed.”

²EPA P2 GHG Calculator with Cost, Apr. 7, 2016 & EPA WARM Tool- Version 14, Mar. 13, 2018