

Bulk Resin System

Case Study

Wheland Foundry

Warrenton, Georgia

Introduction

The Wheland Foundry, in Warrenton, Georgia, poured its first gray iron in October of 1995. They are a major manufacturer of brake rotors and drums for the automotive industry. Production is between 9 and 10 million castings per year with an average casting weight of 25 lb.

The Wheland Foundry Bulk System was installed and became operational in May of 1999 by receiving two 4,000 gallon tank wagons of phenolic urethane coldbox binder.

General Foundry Information

Binder:

Phenolic urethane coldbox

Project Objectives

Reduce the cost of resin products by purchasing in 4,000 gallon tank wagon loads instead of 300 gallon totes. A price discount is offered when purchasing resins in bulk tank wagons.

Eliminate the cost of handling totes: Unloading full totes, storing full and empty totes, loading empty totes for return shipment and return shipment costs.

Solution

Install the MT-Systems bulk resin system. The system consisted of the following:

Two 6,000 gallon storage tanks and tank hardware: vents, manways, dryer, nitrogen regulator, strainer, thermometer and site glass.

Electrical cabinet containing a programmable logic controller (PLC) for monitoring the state of the bulk resin tanks.

Instrumentation: tank level sensors, tank temperature sensors and tank pressure sensor.

Safety Equipment: Intrinsically safe barriers for all instrumentation and fire safe valves.

Heat tracing and heat tracing control for Part I tank.

Documentation package: Drawings - mechanical, electrical, and P&ID, MT Systems Bulk System User Manual, user manuals for supplied hardware.

Cost to Foundry

MT Systems Bulk tank system

Structural work consisting of a steel base for the tank, ladder and catwalk, and a concrete, truck unloading spill containment pad. A diked containment area was already in existence

Piping work consisting of two three inch pipes from tank to loading station, process piping from bulk tanks to the day tanks and vent pipes

Electrical installation consisting of 480 VAC drop, intrinsically safe wiring for instrumentation and explosion proof wiring for the heat tracing

A rented crane to unload and position the tanks

Implement a truck unloading procedure and train employees

Results and Benefits from Wheland Foundry Personnel

Reduced cost of resin	The cost differential is \$.035 per pound. @ 40,000 lbs per month this equates to a savings of \$1,400 per month
Increased cost of shipping.	Shipping and return shipping vs. shipping and truck cleaning. \$850 and \$850 vs. \$2500. - \$780 per month
Greatly reduce the loss due to residuals in container.	The residual in the tank wagon is much less than that of the residual in all the totes. Also, some totes are returned with a visible amount of resin in them that can not be removed without use of excessive labor Est. Residuals Given: 3,000 lbs. per tote X 0.5 % loss = 15.0 lbs. per Part I per tote. Given: 3,000 lbs. per tote X 0.25% loss = 7.5 lbs. per Part II per tote. 15.0 lbs. x 8 totes + 7.5lbs. X 7.5 totes = 176 lbs. of resin. 176lbs @ \$1.00/lbs (est.)= \$176 per month
Reduction in handling costs	Each tote is moved 3 to 4 times before empty. The estimated labor hours to handle totes is: Est. 2 hrs. to unload + 2 hours to load old totes x twice a month = 8 hours per month
Eliminated the need to change totes and monitor the level of the current tote.	This costs 8 labor hours per week or 64 hours per month.
Eliminated material wasted from spills	Est. 30 lbs. Part I and 30 Lbs. Part II @ \$1.00 per lb. = \$60.00 per month savings
Eliminated the need to clean up the spilled resin.	Elimination of labor hours and materials. Est. 3 barrels per month X 3 hours per barrel = 9 hours per month.
Reduced amount of waste disposal charges	Before bulk system, 36 to 48 barrels of waste per year were disposed of at \$100 per barrel. After the bulk system, it is estimated 4 to 5 barrels per year will be needed for truck lines. Approximately \$300 per month savings
Eliminate stock rotation and inventory	Labor hours reduction of 4 hours per month.
Eliminated the hazard of spilling resin in totes.	Reduced danger and exposure to employees. Goodwill and smart business savings.

Summary

Raw material cost savings:

The direct difference of receiving resin in bulk as compared with totes is a **\$620 per month savings.**

Manpower savings:

The reduction in manpower associated with the bulk system = 85 labor hours per month @ \$18.00 per hour (direct labor cost for wages only) = **\$1,530 per month.**

Waste disposal cost savings:

The company saves approximately **\$536 per month** by the elimination of waste disposal costs.

Total monthly savings:

The company saved approximately **\$2,686 per month** the first year.

The company is of the opinion that the system will pay for itself in approximately 30 months based on a total system cost of \$100,000. Depending on system features and total project cost, the pay back period can vary from 18 to 36 months.

Other Notables

One employee stated, "I remember what it was like before. Now, with the bulk system in place, the operation is transparent".