Rust-Oleum

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Company Background

Rust-Oleum is a consumer brand under RPM International focused on producing surface coatings for many applications. The company was founded in 1921 on rust resistant paints for boats, the company's product line now includes paints, adhesives, coatings, cleaning solutions, grout, sealers, and more. The Brooklyn Park facility, that was the focus of the MnTAP project, works primarily in concrete coatings which are sold to contractors and distributed to big box stores like Menards, The Home Depot, and Lowe's.

"My project was a wonderful mix of lab research and process and equipment improvement that always kept me engaged and let me work with many different people." ~ MR

Project Background

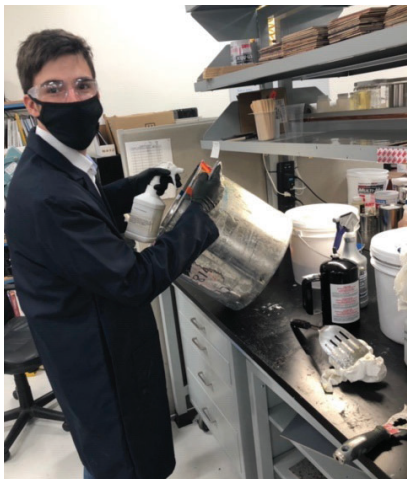
The primary directive of the project was to reduce the hazardous waste generation of the facility. The main target for reduction was methyl ethyl ketone, otherwise known as MEK or butanone, a low cost, highly effective solvent used in many industrial cleaning operations. In 2019, the facility used 35,000 lbs of MEK and generated 98,000 lbs of hazardous waste as a result of its cleaning operations. MEK was used for cleaning production tanks that range from 30 to 600 gallons. MEK has many drawbacks. Despite being removed from the EPA's list of hazardous air pollutants in 2005, MEK is a highly flammable VOC (volatile organic compound) and requires the use of a respirator.

Notable Solvents

MEK	Methyl Ethyl Ketone
DBE	Dibasic Ester
TOU	2, 5, 7, 10-Tetraoxaundecane
DMC	Dimethyl Carbonate

Incentives To Change

Currently, the facility is considered a large quantity generator of hazardous waste by the county and state. With that status comes inspections and fees as well as the additional cost of disposing of the hazardous waste. Changing to a non-hazardous cleaning solvent would reduce the hazardous waste generated at the facility and allow reclassification as a small quantity generator. This change would make a safer environment for the operators cleaning the tanks. A change in cleaning solvent could allow production flow improvements and more efficient use of equipment. This includes the ability to move the tank cleaning process to an area that does not require equipment rated for flammable environments such as forklifts.



"The MnTAP program helped Rust-Oleum achieve one of our core objectives for our fiscal year: finding an opportunity to clean our tanks/totes in a safer, more environmental friendly and cheaper way. It was a challenging problem, but one Mika worked hard on and provided solutions that were implemented. We couldn't have been happier with the MnTAP program, from selection of intern to relationship with their staff."

~ Steve Pisca, Plant Manager

Solutions

Use DBE and TOU as Solvents for Tank Cleaning

TOU and DBE are both non-hazardous cleaners. This means that it is safer to use, and operators will no longer be required to wear a respirator while using it. TOU was more effective than MEK on the hardest to clean products in the facility, meaning less solvent can be used when cleaning the really tough products. DBE was not as effective as MEK or TOU, however it is a low cost non-hazardous alternative to MEK which can be used effectively on the easier to clean products. Eliminating the flammable MEK, the tank cleaning process can be moved from the flammable production area. This frees up space for production and allows for more low-cost equipment options as tools would not need to be non-sparking.

Use Refillable Solvent Sprayer

A refillable sprayer was purchased to apply solvents when cleaning tanks. The sprayer is easily pressurized with compressed air. The sprayer was tested with both TOU and DBE to clean production tanks. Each test used less material compared to the previous method of splashing the sides of the tank with cups filled with solvent and did not add noticeable time or effort to the process. Solvent usage in trials was reduced by more than 75%. This suggestion has been implemented.

Use DMC and TOU in the Lab

Use of alternative solvents in the lab will improve worker comfort and safety. DMC has lower health hazards than MEK and had similar performance during tests. DMC is not an irritant, has lower odor and a higher flashpoint than MEK. DMC retains the ability to flash off, meaning that no residue is left of the equipment.

TOU was found to perform similarly to MEK in the equipment cleaning dip tanks. Dip tanks are used to rinse or soak equipment. TOU has a much lower evaporation rate and would not need to be refilled as frequently. This also reduces the quantity of flammable liquid present in lab workstations.

Automated Tank Washer

Dedicated tank washing equipment was researched, specified and quoted. The equipment is capable of washing all of the tank sizes currently used as well as drums and totes. DBE is expected to clean most of the products as the tank washing equipment sprays the surfaces with higher pressure and increased flow. Water-based products are not compatible with DBE and will not be cleaned with this equipment. The machine would free up labor as well as increase the number of tanks that can be washed per day. Washing drums would allow the facility to reuse some drums as opposed to having to buy new drums and send old ones for reconditioning.

Bucket Management

The startup and shut down standard operating procedures for the product filling lines were updated. Most products are packaged with two separate component bags that are mixed by the customer when ready to use. Each component bag contains a specific amount of material that requires adjustments and fine tuning of the filling equipment when product changes are made. New standards and dedicated containers were tested and put in place over the summer which allow reuse of all material used during filling equipment set-up and shut down. These procedures are saving a projected 100 pounds of material a week and eliminating the need for disposal of valuable product.

Recommendation	Annual Reduction	Annual Savings	Status
Replace MEK with TOU and DBE in production	98,000 lbs of hazardous waste	$46,000	Implemented
Replace MEK with DMC and TOU in lab	100 lbs of hazardous waste	$130	Recommended
Use sprayer for solvent application	13,000 lbs of solvent	$20,000	Implemented
Automated tank washer	98,000 lbs of hazardous waste	$36,000	Planned
Bucket Management	5,000 lbs of product	$19,000	Implemented

MnTAP Advisor: Paul Pagel, Senior Engineer