Rust-Oleum: MEK Alternatives and Waste Reduction

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Company Background

RUST-OLEUM

- Part of the larger RPM International
- Produces surface coatings like paints, adhesives, primer, grout, and more
- Brooklyn Park facility produces primarily concrete coatings
  - Most products contain an A-side and B- side that cure when mixed
  - Products sold to contractors and distributed to big box stores like The Home Depot and Lowe's

Process Overview

Tank Cleaning

- Chemicals are mixed in large tanks before being packaged
- MEK (methyl ethyl ketone) was used to clean tanks
  - DBE (dibasic esters), a non-haz solvent is used for some products
  - MEK usage was reduced to only very difficult to clean products

- Opportunities for process/equipment changes

Project Motivation

MEK

- MEK is a VOC (volatile organic compound) and requires use of a respirator
  - Was exempted from EPA's list of hazardous air pollutants in 2005
  - EPA F-listed waste
  - Highly flammable
- Costly to dispose of

Goals

- Implement a non-haz cleaning solvent
- Reduce solvent usage
- Achieve small quantity hazardous waste generator status with county

New Solvents – Safety

SDS/MSDS

- **Ideal: non-hazardous**
  - No GHS symbols
  - Flash Point > 142 °F
  - No health or environmental hazards
- **Acceptable: improved safety**
  - No health or environmental hazards

MEK:

New Solvents - Testing

Bench Testing

- **Solvent effectiveness is tested**
  - Truck Bed Liner is the toughest product and was used for testing
- **Solvent Contenders:**
  - Non-Haz: TOU and Iris
  - Flammable: Dioxolane, DMC, DIBK

New Solvents - Testing

Reactivity Testing

- Tested 8 different product groups
- Monitored temperature, viscosity, and visual cues
- Dioxolane and DIBK were found to be reactive

Solvent Contenders – Compared to MEK

TOU

- 2.7x cost of MEK
- 81% as much solvent used on TB Activator
- 64% as much solvent used on TB Base

Iris

- 3.4x cost of MEK
- 176% as much solvent used on TB Activator
- 66% as much solvent used on TB Base

Tank Cleaning – Dual Solvent Approach

DBE

- Cheaper than MEK
- Non-Haz
- Continue to clean easy products
- Net Cost: 35% less than MEK

TOU

- More effective than MEK on Truck Bed Base and Activator
- Non-Haz
- Use for Truck Bed, metallics, and amine-based activators
- Net Cost: 31% more than MEK

Tank Cleaning – Sure Shot Sprayer

- **Fill with solvent and compressed air**
- **For use with non-volatile solvent**

Solvent Reduction

- **Truck Bed Base Trial:**
  - Before:6 gal. of MEK
  - After: 1.25 gal. of TOU
- **Silver Bullet Trial**
  - Before: 2-3 gal. of DBE
  - After: 36oz DBE

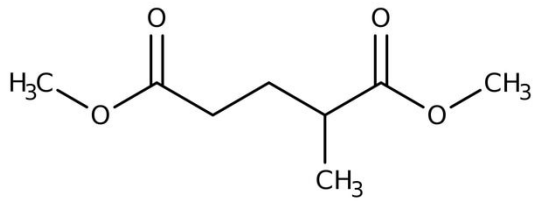
Solutions (examples below)

Recommendation	Annual Reduction	Total Cost	Annual Savings	Payback Period	Status
TOU and DBE	98,000 lbs. Haz Waste	none	$42,000	Immediate	Investigating
Sure Shot Sprayer	13,000 lbs. Solvent	$100	$21,000	2 days	Implemented
DMC and TOU in Lab	100 lbs. Haz Waste	none	$150	Immediate	Recommended
Tank Washer	TBD	~$100,000	TBD	TBD	Investigating
Tote Tilters	Labor and Space	$12,000	TBD	TBD	Implementing
Bucket Management	5,000 lbs. Product	none	$19,000	Immediate	Implemented

Anecdote

Chemistry is Hard to Predict

Iris: Effective and Expensive



DBE: Cheap and Ineffective