Chemical Reduction at a Components Manufacturer

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Company Background

- Supply components to OEM in regulated industries
- Outsources components across four continents
- Western Twin-Cities Metro Area
- 800 employees
- Assembly, machining, and grinding operations





Project Overview

- New cleaning system will eliminate Trichloroethylene (TCE) and n-Propyl Bromide (nPB)
 - Vacuum degreaser
 - Modified alcohol solvent
- Cleaning and sanitizing chemicals





Optimize Cycle Times

- New cleaning process has 3-cycle wash
- Analyzed current part cleanliness
 and cleaning cycles
- Designed experiments to find optimal wash times for each cycle





Methodology

- Collected data on the current cleaning process for each part
- Categorized parts into 4 different groups:
 - Dirtiest to cleanest parts
 - Based on grinding oils and manufacturing processes
- Designed full factorial experiment on a single part
 - Cleaning time for each of 3 cycles
- Conducted confirmation testing on parts in each category





Methodology

- Wipe Test
 - Verify cleanliness of parts in each category
 - Analyzing factorial design
 - Confirming cycle times
- Non-Volatile Residue Testing (nVR)
 - Confirmation testing





Solutions

Recommendation	Annual Reduction	Total Cost	Annual Savings	Payback Period	Status
Implement cycle times for new cleaning system	5,200 lbs TCE	N/A	\$10,000+	N/A	Implementing
Identify single fixture for nPB parts in new cleaning system	800 lbs nPB	TBD	\$1,800+	N/A	Implementing
Replace IPA squeeze bottles with plunger cans	TBD	TBD	TBD	TBD	Recommended



Personal Benefit

- Learned skills pertinent in a regulated industry that I can apply in my future career
- Conducted experiments that taught me the process of experimental design and analysis
- Hands on experience with manufacturing processes



