

PREPRODUCTION INITIATIVE-NELP AQUEOUS PARTS WASHER (LARGE) COST ANALYSIS

PROTOTYPE SITES: NAS North Island, NS Mayport

DESCRIPTION: Cleans parts using a biodegradable aqueous solution in a closed-loop system with spray nozzles located along the interior walls and ceiling to direct the cleaning solution. High temperatures and blasting pressure combine to remove dirt and grease from parts without the use of 1,1,1 trichloroethane or other ozone-depleting cleaning solvents.

DATA COLLECTION PERIOD: July 1995 - February 1996

COST SAVINGS: The site previously used a Safety Kleen immersion tank for parts washing, which required hand brushing and soaking parts in solvent. The waste solvent is disposed of as hazardous waste under contract with Safety Kleen, which provides a service schedule for the collection and disposal of waste solvent. Many other sites use a P-D-680 dip tank; therefore, a cost comparison is provided for this method as well.

PREVIOUS METHOD: Safety Kleen Tank

The service schedule specified for the Safety Kleen Model 34 parts cleaner is 4 weeks, at a rental cost of \$144.37 per month. A service representative drains the spent Safety Kleen solvent, refills with fresh solvent, and disposes of the used solvent. Model 34 has a 30-gallon tank capacity. The site has stated that cleaning parts using the Safety Kleen system takes approximately the same amount of time as the aqueous parts washer. However, the operator can perform other tasks while parts are being cleaned in the aqueous parts washer, which is not possible with the Safety Kleen tank.

Service

Cost per month: \$144.37

Cost per year: \$1,732.44

Labor

E-3 labor rate per hour: \$10.39

Time per part: 20 minutes

Throughput per week: 50 parts

Throughput per year: 2,600 parts

Cost per year: \$9,004.67

Waste Disposal

Thirty (30) gallons of waste are generated per month. Waste disposal costs are included in the Safety Kleen contract for a monthly service fee of \$144.37 per Safety Kleen unit.

Total Annual Costs

Item	Cost
Service	\$1,732.44
Labor	9,004.67
Waste Disposal	<u>N/A</u>
Total	\$10,737.11

PREVIOUS METHOD: P-D-680 Tank

The P-D-680 tank is similar to the Safety Kleen tank, but it uses the non-proprietary solvent P-D-680.

Consumables

Solvent: P-D-680 Type II
Cost per month: \$440.00
Cost per year: \$5,280.00

Labor

E-3 labor rate per hour: \$10.39
Time per part: 30 minutes
Throughput per week: 50 parts
Throughput per year: 2,600 parts
Cost per year: \$13,507.00

Waste Disposal

Item disposed of: Spent P-D-680 Type II solvent mixture
Cost per month: \$300.00
Cost per year: \$3,600.00

Total Annual Costs

Item	Cost
Consumables	\$5,280.00
Labor	13,507.00
Waste Disposal	<u>3,600.00</u>
Total	\$22,387.00

NELP METHOD: Aqueous Parts Washer Unit (Model 300-P and Model 200)

Consumables

Item: Daraclean 282 detergent
Cost per gallon: \$17.25
Cost per month (5 gallons): \$86.25
Cost per year: \$1,035.00

Item: Better Engineering Defoamer (NAT-DF)
Cost per year: \$44.85

Labor

E-3 labor rate per hour: \$10.39
Time per part: 15 minutes
Throughput per week: 50 parts
Throughput per year: 2,600 parts
Cost per year: \$6,753.50

Waste Disposal

Amount of sludge to be disposed of per 3-week period: 250 cc
Cost per 3-week period: \$29.00
Cost per year: \$505.00
Cost per one 55-gallon drum of hazardous waste: \$21.30

Aqueous solution (75 gallons) is replaced once every 6 months. It has generally been found to be nonhazardous. If the solution *is* hazardous, the yearly waste disposal cost would be as shown below. This figure includes the disposal of four 55-gallon drums of waste per year, which would be used for disposal of the 150 gallons of solution as well as the cost of the sludge above.

Yearly waste disposal cost:
 $\$9.70 \text{ sludge/week} \times 52 \text{ weeks/year} + [(\$21.30 \times 2 \text{ drums}) \times 2 \text{ times/year}] = \590.00

Total Annual Costs

Item	Cost
Consumables	\$1,079.85
Labor	6,753.50
Waste Disposal	<u>590.00</u>
Total	\$8,423.35

COST ANALYSIS SUMMARY (PER YEAR): MODEL 300-P

Safety Kleen	\$10,737.11
Aqueous Parts Washer	\$8,423.35
Cost Change	\$2,313.76
Initial Procurement	\$13,434.10
Expected Service Life	10 years
Return on Investment (per 10-year period)	\$9,703.50 per unit [10 x \$10,737.11] – [\$13,434.10 + (10 x \$8,423.35)]
Break Even	5.81 years [\$13,434.10/\$2,313.76]
P-D-680	\$22,387.00
Aqueous Parts Washer	\$8,423.35
Cost Change	\$13,963.65
Initial Procurement	\$13,434.10
Expected Service Life	10 years
Return on Investment (per 10-year period)	\$126,202.40 per unit [10 x \$22,387.00] – [\$13,434.10 + (10 x \$8,423.35)]
Break Even	0.96 years [\$13,434.10/\$13,963.65]

COST ANALYSIS SUMMARY (PER YEAR) - MODEL 200

Safety Kleen	\$10,737.11
Aqueous Parts Washer	\$8,423.35
Cost Change	\$2,313.76
Initial Procurement	\$8,747.60
Expected Service Life	10 years
Return on Investment (per 10-year period)	\$14,390.00 per unit [10 x \$10,737.11] – [\$8,747.60 + (10 x \$8,423.35)]
Break Even	3.78 years [\$8,747.60/\$2,313.76]
P-D-680	\$22,387.00
Aqueous Parts Washer	\$8,423.35
Cost Change	\$13,963.65
Initial Procurement	\$8,474.60
Expected Service Life	10 years
Return on Investment (per 10-year period)	\$130,888.90 per unit [10 x \$22,387.00] – [\$8,747.60 + (10 x \$8,423.35)]
Break Even	0.63 years [\$8,747.60/\$13,963.65]

Two items need to be mentioned that have not been taken into account in this analysis. First, cost and labor hour savings can be realized by cleaning several parts simultaneously in the aqueous parts washer. One aqueous parts washer can do the work of three Safety Kleen units. Many activities are currently using aqueous parts washers to do the work of several chemical solvent units.

The aqueous parts washer provides the following process improvements over the existing method (Safety Kleen tanks).

- Although the labor hours appear to be the same for the two methods, they double for each additional component cleaned in the Safety Kleen tanks. However, because the aqueous parts washer can clean multiple parts, there is no increase in labor hours.
- Three Safety Kleen tanks would have to be procured to match the maximum utility of one aqueous parts washer.

Data gathered for this analysis are compiled from military activities included in the LMTCE Jacksonville report “High Pressure Spray Parts Washers: I-level Prototype Study,” dated 3 March 1994; “Environmental Compliance Cook Book,” based on pollution prevention equipment aboard the USS THEODORE ROOSEVELT; “Pollution Prevention Study for PWC-T NAS Mayport” prepared by Pacific Environmental Services; Utah National Guard “Hazardous Waste Minimization and Pollution Prevention Leadership Demonstration Project of 21 May 1992”; data from the TECHEVAL of the aqueous parts washer currently being evaluated at NAWCAD Patuxent River, MD; and data from the East Coast NELP site, NS Mayport, FL.

Cost Analysis Report Disclaimer

This cost analysis report applies only to the site(s) indicated where the equipment was prototyped and monitored. This information is offered as a guide so that readers can determine if such equipment will benefit their particular site based on factors such as comparative hazardous waste generation.