



**PRE-PRODUCTION INITIATIVE  
WIRE ROPE LUBRICATOR  
COST ANALYSIS**

**PROTOTYPE SITE:** NAS North Island

**DESCRIPTION:** The wire rope lubricator (WRL) is designed to efficiently clean and lubricate crane cables. The conventional method of crane cable cleaning was performed by Navy personnel, who would first remove the cable from the crane, place a section of the cable in a large drip pan filled with degreaser (Safety Kleen 105 mineral spirit solvent), and scrub the cable with wire brushes. This process was completed on each section until the entire cable was cleaned. The crane cables were then ready to be lubricated. Navy personnel would place grease on their gloves and wipe the crane cable.

The WRL system pumps grease from a 5-gallon pail to the lubrication collar that the cable passes through. The grease is injected into the cable under pressure, which allows the grease to penetrate the inner strands. The system includes groove cleaners to clean impacted surface material from the cable before it enters the lubrication collar, and scrapers to remove excess grease before the cable exits the collar. In both the conventional and the PPEP methods, rags were used to clean grease off of the gloves and equipment. This evaluation examined the feasibility of using the WRL rather than the conventional method of cable cleaning and lubrication to provide a safer and more efficient way of cleaning and lubricating cables.

**DATA COLLECTION PERIOD:** July 2002-May 2003

**COST SAVINGS:** The WRL reduces the quantity of hazardous and nonhazardous materials used for cleaning and lubricating crane cables. Therefore, use of the WRL will result in quantifiable cost reductions for consumables, such as rags and degreaser, and waste disposal, which includes spent degreaser, solid contaminants, and metals removed from the cable. The man-hours required to clean the cables using the WRL are significantly less than the conventional method, thus creating labor savings. In addition, by using the WRL, fewer rags are used during the cleaning and lubrication process, which results in another cost reduction.

**ASSUMPTIONS:** Based on information provided by the site, the following assumptions were made for the purposes of this cost analysis:

- The average number of crane cable cleaning and lubricating events in one year is 9. The lubrication of crane cables varies based on the number of ships in port during any given year and the maintenance schedule for the cranes. The cranes lubricated during the PPEP evaluation were 4 LRT-110, 4 A/S32A-35A, and 1 A/S32A-36A. Baseline data for the conventional method assumed and considered the same types and quantity of cranes.
- For those cranes with multiple cables, all cables were cleaned and lubricated during a lubrication event.
- Maintenance of the WRL was assumed to be insignificant.

**CONVENTIONAL METHOD—Manual Cleaning and Lubricating**

Average number of cranes cleaned and lubricated per year: 9  
Total feet of cable cleaned and lubricated per year: 6,445

***Consumables***

Average number of rags used per 100 ft of cable: 5.81  
Average number of rags used per year: 374.45  
Average cost of a rag: \$0.30  
Average cost of rags per year: \$112.34

Average gallons of grease used per 100 ft of cable: 0.68  
Average gallons of grease used per year: 43.83  
Average cost for one gallon of grease: \$7.50  
Average cost for grease per year: \$328.73

Average gallons of degreaser used per 100 ft of cable: 0.12  
Average gallons of degreaser used per year: 7.73  
Average cost per gallon of degreaser: \$3.58  
Average cost of degreaser per year: \$27.67

Total cost for consumables per year: \$468.74

***Labor***

Average labor hours per person per crane: 10.44  
Average number of personnel per crane: 4.67  
Average number of man-hours per crane: 48.75  
Total number of man-hours per year: 438.75  
Average labor cost per person: \$34.00

Total cost of labor per year: \$14,917.50

***Waste Disposal***

Average pounds of rags disposed of per 100 ft of cable: 0.42  
Average pounds of rags disposed of per year: 27.07  
Average cost per pound to dispose of rags per year: \$0.44  
Average cost of rag disposal per year: \$11.91

Average pounds of hazardous waste disposed of per 100 ft of cable: 1.21  
Average pounds of hazardous waste disposed of per year: 77.98  
Average cost per pound to dispose of hazardous waste: \$0.44  
Average cost of hazardous waste disposal: \$34.31

Total cost of waste disposal per year: \$46.22

**Total Annual Cost**

<u>Item</u>	<u>Cost</u>
<b>Consumables</b>	\$468.74
<b>Labor</b>	\$14,917.50
<b>Waste Disposal</b>	<u>46.22</u>
<b>Total</b>	\$15,432.46

**PREPRODUCTION METHOD—Wire Rope Lubricator**

Average number of cranes cleaned and lubricated per year:	9
Total feet of cable cleaned and lubricated per year:	6,445

***Consumables***

Average number of rags used per 100 ft of cable:	1.43
Average number of rags used per year:	92.16
Average cost of a rag:	\$0.30
Average cost of rags per year:	\$27.65

Average gallons of grease used per 100 ft of cable:	0.26
Average gallons of grease used per year:	16.76
Average cost for one gallon of grease:	\$7.50
Average cost for grease per year:	\$125.70

No degreaser was needed for the PPEP method.

Total cost of consumables per year:	\$153.35
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***Labor***

Average labor hours per person per cable lubrication:	1
Average number of personnel per cable lubrication:	3.56
Average number of man-hours per cable lubrication:	3.56
Total number of man-hours per year:	32.04
Average labor cost per person:	\$34.00

Total cost of labor per year:	\$1,089.36
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***Waste Disposal***

Average pounds of rags disposed of per 100 ft of cable:	0.06
Average pounds of rags disposed of per year:	3.87
Average cost per pound to dispose of rags per year:	\$0.44
Average cost of rag disposal per year:	\$1.70

Average pounds of hazardous waste disposed of per 100 ft of cable:	0.17
Average pounds of hazardous waste disposed of per year:	10.95
Average cost per pound to dispose of hazardous waste:	\$0.44
Average cost of hazardous waste disposal:	\$4.82

Total cost for waste disposal per year:	\$6.52
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**Total Annual Cost**

<u>Item</u>	<u>Cost</u>
Consumables	\$153.35
Labor	1,089.36
Waste Disposal	<u>6.52</u>
<b>Total</b>	<b>\$1,249.23</b>

## COST ANALYSIS SUMMARY (PER YEAR)

### Annual Operating Cost

Conventional Method:	\$15,432.46
WRL:	\$1,249.23
Operating Cost Change per Year:	\$14,183.23

### Initial Procurement

Cost of WRL (unit and shipping):	\$3,525.00
Cost of five seal and scraper plate kits and groove cleaner kit <sup>1</sup> :	\$2,406.70
Total initial procurement cost:	\$5,931.70

<i>Expected Service Life</i>	10 years
<i>Return on Investment (per 10-year period):</i>	\$135,900.60
$(15,432.46 \times 10) - (\$5,931.70 + [\$1,249.23.02 \times 10]) = \$135,900.60$	

**Break-even Point:** **0.41 years**

\$5,931.70/\$15,992.14

### Note:

<sup>1</sup>The number and cost of seal and scraper plate kits and groove cleaner kits will vary based on the number of different cable widths that are maintained at a given site.

### 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.



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