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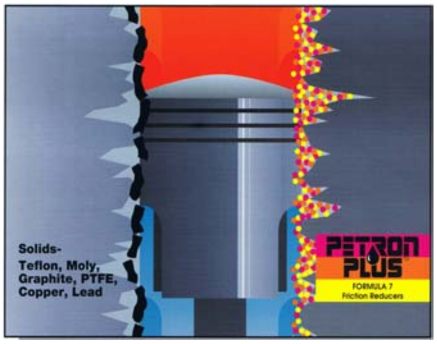

How Much Cash Is Your Poor Lube Practices Costing You?

TECHNICAL SERVICE BULLETIN

An important part of lubrication excellence is being able to identify the fiscal opportunity that a well-designed and properly executed lubrication program will provide. One of my main roles as technical director for Noria Reliability Solutions is to uncover these opportunities for clients. The first stage of any program is to take a step back and understand how the plant is performing in the current state. A simple, non-subjective benchmark analysis takes care of this. The final weighted score out of 10 identifies the gap between "business as usual" and "world class".

An additional tool that hones in on the financial opportunity is the cost benefit analysis. In the July 2005 issue of Machinery Lubrication, Mark Barnes explored cost benefit analysis as it relates to lubrication excellence (Figure 1). As Mark discussed in his article, there are two obvious areas of fiscal opportunity in most plants with regard to lubrication excellence. The first and most obvious is to try to reduce unscheduled downtime. Some portion of these unscheduled events can be attributed to poor contamination control or lubrication practices. Another area of opportunity is in right-sizing the lubrication PM tasks. When evaluated on a benefit-per-cost basis, approximately half of all planned maintenance activities have no value.

Even though a cost benefit analysis with input from several parties may illustrate that there is a significant fiscal opportunity and that a lubrication excellence program should provide a solid return on investment, many managers continue to be skeptical of the real value. Experience shows that poor lube practices will cost most industrial facilities approximately 8 to 15 percent of their annual maintenance budget. So, from where does this opportunity come?

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Lube Excellence Cost Benefit Analysis				
Company Name	ABC Manufacturing		Date of Estimate	10-May-05
Location	Anywheresville, USA		Estimates by	Mark Barnes

Benefits Potential Rollup	Low Case	Likely Case	High Case	Comments
Input estimated total annual maintenance costs to nearest thousand	$12,000,000	$13,000,000	$14,000,000	Parts, labor, supervision, management, overhead, insurance, risk-based, incidentals, etc.
Input estimated annual downtime costs and risk-based costs to nearest thousand	$4,000,000	$5,000,000	$6,000,000	Includes unscheduled downtime, excessive scheduled downtime, production derate costs.
Select percentage of maintenance and other costs attributable to repair	40%	60%	70%	Excludes PMs, inspections, etc. Includes inspection/PM follow-up work and scheduled rebuilds and replacements.
Select percentage of repair that is attributable to mechanical wear of lubricated components	30%	40%	50%	Abrasion, fatigue, adhesion, cavitation, corrosion, etc. Excludes operations failures, electrical failures, etc.
Select estimated percentage of mechanical wear that is attributable to poor lubrication	50%	60%	70%	Poorly selected lube, overlubrication, underlubrication, ineffective contamination control, ineffective oil analysis, etc.
Estimate percentage of lubrication-related wear that could have been avoided with a well-defined and executed lubrication program	40%	50%	70%	
Input percentage of total maintenance costs attributable to lubrication PMs, inspections, oil analysis and other non-repair-related activities	5%	5%	5%	Includes parts, labor, supplies, supervision, management, overhead, etc.
Input estimated percentage of these activities that are waste	10%	20%	30%	Either fail to add value or actually induce failure.
Estimated Potential Annual Savings	$444,000	$1,426,000	$3,640,000	

Figure 1. Lubrication Excellence Cost Benefit Analysis

Diving into the Numbers

It's really amazing to walk through a plant with fresh eyes, free from tunnel vision, and really see which lubrication practices are costing the plant huge losses and adding no value. Overgreasing is a big problem in most facilities, but have you ever considered the real cost. I always ask clients to take me to one of their most critical machines in the plant. I'll then query the lube technician on how much, how often and what type. Take, for example, one plant's most critical machine, which has no redundancy. If this machine fails, the plant stops until the machine gets fixed. This is not an overly complex machine, and the critical components are two fairly large bearings with a rotational speed of approximately 600 rpm. I collected product type, volume of relubrication and frequency of relubrication. I then compared this to calculated values and illustrated the difference. (Figure 2).

The numbers speak for themselves. The difference on an annual basis is $942.03 (Figure 3). Perhaps the biggest apparent benefit to adopting the calculated volumes is the savings in time for the lube tech. In this single example, the tech stands to save almost eight hours per year, which he can redirect to more value-added activities such as oil sampling, top-ups and inspections, using a filter cart for periodic decontamination, and others. Also, the not-so-apparent benefit here, which is difficult to quantify, is the improved reliability of the machine through calculated lubrication.

	Current Product	Product Description	Current Amount	Current Frequency	Required Product	Required Amount	Required Frequency
Electric motor	EM Grease	PU-2-100-M-G1-AW	-	Condition based	PU-2-100-M-G1-AW	24 shots	3 months
Bearings	High Temp	IN-2.5-460-M-G1-AW	2 fluid ounces	Twice per week	LX-2-100-S-PAO-AW	2 fluid ounces	1 month

Figure 2.

Is Time-Based Costing You?

Another situation I try to highlight in the plant is the real cost of time-based oil changes. In the May 1999 issue of Practicing Oil Analysis, Ken Brown illustrates the real cost of changing a five-gallon sump in a nuclear facility. Ken not only identifies the apparent oil and labor costs, but the not-so-apparent costs associated with overhead, supervision, etc. He finds that the actual "real cost" to change the oil in a rather small system at a power plant requiring five gallons of oil (at $5 per gallon), two man-hours of direct labor and a purchase order to obtain the oil is $988.70 – almost 40 times the cost of the new oil.

Based on significant research, hydraulic fluid and lubricants can have a very long service life (longer than 12 months) when the oil is kept clean, cool and dry. In most cases, I suspect the lubricant in most sumps is replaced prematurely and simple activities such as the installation of hybrid-style breathers would help to extend the oil's life. A combination of appropriate breathers and storage and handling could extend the oil life to 18 or 24 months.

	Quantity Per Year Per 2 Bearings	Grease Cost Per Year ($2.14 Per Fluid Ounce)	Time Spent Relubricating Per Year (Five Minutes Per Visit)	Labor Cost Per Year ($20 Per Hour, Five Minutes Per Relube)	Total Annual Cost
2 fl.oz. twice a week =	416 fluid ounces	$891.42	8.67 hours	$173.33	$1,064.75
2 fl.oz. once per month =	48 fluid ounces	$102.72	1 hour	$20.00	$122.72

Figure 2.

To evaluate the cost of time-based oil changes, understand the apparent and non-apparent costs. For a typical one-gallon sump, I list costs based on information I receive from the plant and guesstimates. A conservative cost of $54.55 can be applied to each gallon oil change in the plant.

Data suggests that this plant is spending approximately $73,400 per year based on one oil change per year on systems that use the most common lubricants in the plant (when you account for apparent and non-apparent oil change costs). Appropriate storage and handling, contamination control and condition-based oil changes could extend some drains to 24 months or more. Extending drain intervals to 24 months from 12 months would effectively redirect $73,000 annually in maintenance costs from non-value added tasks to tasks that are worthwhile (Figure 4).

The five-year net present value of the savings from not doing this non-value-added task calculated with a 10 percent discount rate totals more than $276,670.

One-Gallon Oil Change	Apparent Oil Change Costs	Non-Apparent Oil Change Costs
Oil (per 1 gallon)	$25.55	
Labor and Benefits (1 hour)	$20.00	
Paperwork		$2.00
Ancillary Activity		$2.00
Supervision		$2.00
Oil Disposal		$1.00
Solid Waste		$1.00
New Oil Overhead		$1.00
Sum Total	$45.55	$9.00
Cost per 1-Gallon Oil Change	$54.55	
Annual Cost of Most Common Lubricants*	$34,221.00	
Approximate (Gallons) Volume of Most Common Lubricants	1,339.37	
Volume of Oil Times Cost Per Oil Change	$73,062.84	

Figure 3.

You Can Achieve Savings

With a few simple examples and very real numbers to back them up, it is apparent from where the estimated potential savings can come. Keep in mind that no account has been made for improved equipment reliability or reduced downtime costs. For the plant in the examples in this article, two specific activities account for a loss of almost $300,000 over the next five years. This is almost three times the cost of what a well-designed and executed lubrication excellence program would cost. To explore cost improvement opportunities at your facility or your company, e-mail me at jkopschinsky@noria.com.

References

Mark Barnes, Noria, "Lubrication: Maintenance Cost or Opportunity?". Machinery Lubrication magazine. July 2005.

Ken Brown, Utility Service Associates, "The Hidden Cost of Oil Changes". Practicing Oil Analysis magazine. May 1999.

About the Author

As technical operations director for Noria Reliability Solutions, Jason Kopschinsky's primary responsibilities include managing numerous and varied projects in the areas of: plant audits and gap analysis, Lubrication Process Design, oil analysis program design, lube PM rationalization and redesign, lubricant storage and handling, contamination control system design, and lubrication and mechanical failure investigations. Contact Jason at jkopschinsky@noria.com.

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