

Human Memory Vs. Computerization

Lubrication reliability is an extremely important and complex issue that may not be getting enough attention in many plants. This type of “forgetfulness” can be very costly.

Eric Rasmusson, Generation Systems, Inc.

These days, successful manufacturing and process organizations would not dream of running their accounts receivable, accounts payable, inventory control, CRM and a host of other critical functions without the aid of software designed for those specific purposes. Yet, many of these same organizations seem to overlook the fact that running an effective industrial lubrication program is just as complex as these other activities—and one that can significantly benefit through the use of specialized software.

Depending on its product(s) and/or process(es), an industrial operation might run hundreds to thousands of pieces of equipment. Each of these machines and/or systems typically would include multiple component parts—a motor, drive-shaft and couplings, for example—that require lubrication. Multiple lube points per equipment result in thousands upon thousands of individual points to be serviced. But, that’s just the tip of the iceberg.

Do the math

Each individual lubrication point within a plant or facility often calls for multiple and differing activities to be performed, each at its own frequency. For instance, proper care of just one lubrication point will require topping off a reservoir each week, drawing a lab sample every quarter and draining and refilling with fresh fluid once a year.

Several thousand lube points in an operation, each with multiple tasks at varying frequencies, could translate into hundreds of thousands of annual activities that need to be performed. Accordingly, to ensure ongoing performance and reliability, it wouldn’t be unusual to find many sites performing over 250,000 lubrication activities each year. In fact, one proactive and successful East Coast paper plant reports performing over 700,000 lubrication activities annually.

Now, though, consider the problem of so many lubrication points spread across a site—that could mean vast expanses of land, numerous buildings, multiple stories, etc. Further complicating such situations is the fact that these various points probably require the application of a wide array of lubricants using the correct and very detailed procedures. How is this daunting task best handled? Too often it's left, in full or part, to human memory.

Historical approaches

#1. Relying on people...

In many plants, lubrication maintenance personnel who have been tending equipment for decades have developed a thorough understanding of the equipment's needs. With any luck, these experienced individuals are never sick or on leave. (How realistic, though, is that type of thinking?) Worse yet, what are the consequences when a highly experienced lubrication professional resigns or retires? A missioncritical information asset walks out the door. In turn, a long, tough, costly program devoted to reassembling details and lost knowledge kicks off. Meanwhile, lacking decades of experience, how does the new person on the block possibly lubricate without significant omission?

#2. Relying on spreadsheets...

Another widely used lubrication program management method involves a computer spreadsheet. Typically this comprises a list of equipment along with numerous columns for lubrication-specific data fields such as lube points and type, required lubricant, lubricant capacity and the frequencies at which to perform tasks. While able to convey the basics of what needs to be done and how often, such spreadsheets fail in knowing or communicating what needs to be done and when.

With the simple spreadsheet approach, what's most often lacking is the tracking of dates last completed—accurately entering this information for each of thousands of rows is an arduous, almost impossible task. Yet, while updating spreadsheets proves difficult, accidental changes and deletions come all too easily.

Knowledge of last-done is the key prerequisite to determining when individual tasks are next-due—without which several all-important questions remain unanswered.

- What tasks/activities are to be done this week?
- What tasks/activities were missed last week?
- What about the hundreds of tasks/activities of longer duration, such as those performed every quarter, every six months or just one time per year?

It's simply not possible to correctly remember when each task/activity was last completed. Once again the burden for proper lubrication is consigned to human memory.

#3. Relying on standard CMMS/EAM products...

A third common approach is attempting to properly execute lubrication using the PM system of a CMMS or EAM product. Focused on CM & PM work-order management, these systems perform the role well, and most maintenance professionals are comfortable with their use.

Alas, comfort in a systems' intended function is far from the best reason to apply it to other uses. Outside the CMMS are hundreds of products supporting additional reliability disciplines such as vibration, IR and others. Why? The work-order-centric design of a CMMS is incapable of supporting the unique data and activity requirements of these disciplines. Understanding that lubrication reliability

is a unique discipline is the first step toward gaining its considerable benefits.

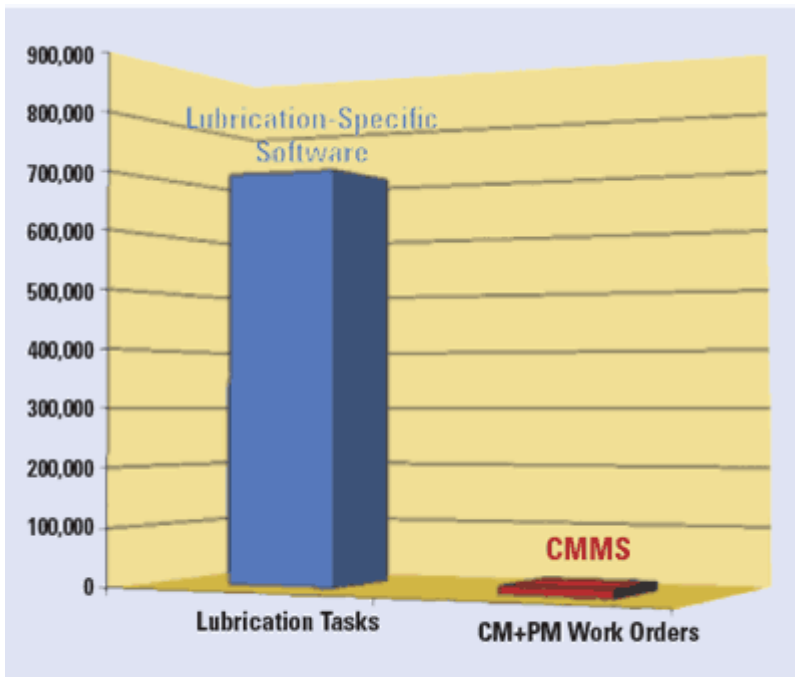


Fig. 1. Although CM and PM work orders at a site might total a few thousand annually, the same site typically will require far more lubrication activities per year.

As shown in Fig. 1, although CM and PM work orders at a site might total a few thousand annually, the same site typically will require far more lubrication activities per year—ranging to 700,000+ at the East

Coast paper plant referenced earlier. The typical CMMS may be able to catalog equipment details at the nameplate level, but these systems lack any clear approach for cataloging the related multiple lubrication points, let alone the multiple activities for each of these points. Also missing are the many data elements regularly found in the previously explained spreadsheets. The fact that these discipline-specific details are missing from the typical CMMS is the main reason such spreadsheets find common use.

This lack of requisite details forces many into a minimalist, work-order level approach to lubrication. Simple monthly PMs are created for each equipment section or area, producing work orders with generic instructions such as “Lubricate stations 1 thru 8,” or “Check Levels in Bldg 12.” (Striving for more detail, one plant of an integrated forest products company was required by management to use a corporate-specified plant-wide asset management system as part of its lubrication program. The plant’s reliability engineer invested months of effort on repetitive keyboard entry of lubrication details into long-text fields. Shortly thereafter, and much to his dismay, it was decided to switch more than 200 reservoirs to synthetic lubricants—which required him to edit each individually. Furthermore, with his hands tied by data locked into non-actionable text-fields, he was forced to answer with a definitive “NO,” when the plant manager asked him if his time and effort had resulted in an accurate and consistent lubrication program.)

Many CMMS products allow for inclusion of a list or block of items with a PM, which can be used to list the lubrication points for an equipment area. Sounds simple, doesn’t it? Unfortunately, the actual complexities of lubrication cannot be overlooked.

Lubrication points within any equipment area are not identical. For example, their frequency rate will vary, with some being weekly, others quarterly or annually. A single PM can’t really address this fact—resulting in the need for multiple PMs to be created for each equipment area, one per frequency. Equally important to this situation are the lubricant required, number of lubrication points, activity type (top-off, change-out, sample, etc.) and other activity-related procedures. With the CMMS offering no native support for this information, how is it conveyed using a PM? How many PMs are needed to convey a bare minimum of compulsory details? Remember, give a CMMS more PMs and it will return the favor with

increased work orders and paperwork. More importantly, within these numerous work orders and pieces of paper, there is no opportunity to bring optimization and efficiency to lubrication.

Yes, having a multitude of detail deficient lubrication PMs might look and feel good on the surface, but it veils reality with a false sense of security. Once again, details required for success are left to the imagination and memory of lubrication personnel.

What's done is done. Or is it? Mark a work order as completed and the entire block of lubrication points share the same status. A PM system unable to function below the work-order level can't remember the relevant—all outstanding lubrication points must somehow be remembered over subsequent weeks until completed. It's not hard to see this problem will compound week after week. With such reliance upon human memory to ensure proper lubrication, it's no surprise a recent search across popular CMMS/EAM Websites for the term "lubrication" returned zero pertinent results.

#4. Customizing CMMS/EAM products...

The fourth and by far the most costly approach is customization of the CMMS/EAM product for lubrication. Gaining rudimentary lubrication capability through this type of customization can consume hundreds of man hours—as was the case with an organization that reportedly spent nearly \$1,000,000 USD to modify a management-specified, corporate-wide enterprise management system PM for lubrication- point level of functionality. Even if successful, such customizations can be difficult and expensive to update, with personnel doing original work that often is otherwise assigned or no longer part of the organization. With corporations working to eliminate maintenance of in-house legacy systems, why should lubrication be any different?

Taking a better approach

In reliability-focused facilities, the old "oil is oil" mentality should no longer suffice. Whatever the case, however, in too many plants lubrication points are still being incorrectly maintained—or worse—missed entirely.

When asked, lubrication managers often say things are going well. With the aforementioned approaches 1-4, though, lube points are being missed no matter

how well things are going. Regrettably, you don't get immediate feedback when a lube point is missed. Often times, it may take months or even years to learn the results of such an oversight—which may come in the form of costly, if not catastrophic, equipment failure and unplanned downtime. If this weren't so, over 50% of all equipment failures wouldn't be traced back to poor lubrication practices.

So, this begs the question: Why are the previously described four approaches to lubrication so often employed? Organizations use them for one of three reasons:

1. The complexities of a well-run lubrication reliability program are misunderstood.
2. Management fails to calculate the cost of poor lubrication practices.
3. There is a lack of awareness of preferred alternatives.

What is the net result of primarily relying on human memory? It all boils down to significant cost and loss. This includes unplanned downtime, capital equipment replacement, poor use of human resources and environmental risk—all of which are in addition to poor production quality and excessive energy consumption.

What are the features and benefits of a well-designed lubrication reliability software solution? Headaches and complexities are resolved. All lubrication-specific details are clearly presented to lubrication personnel, ensuring lubrication is done right. That means:

- The right lubricant is applied in the right place, at the right time, using the right procedure.
- Abnormal machine conditions are noted, recorded and tracked until such conditions improve.
- Other important capabilities include consumption tracking and trending, shutdown/outage planning and equipment lockout/tagout.

A good system will incorporate an automatic lube-point/ lube-task-based work release, with individual tasks released as needed, not as blocks of work. It also will automatically push lubrication work assignments to those responsible. This frees maintenance planners from the detail of lubrication so they can focus on PMs and corrective work. In addition, this type of a lubrication reliability system will provide automatic backlog management. Individual lube-tasks, if not

complete, are automatically marked past-due and brought forward each week until they are done—with no user intervention required.



Fig. 2. Lubrication management software and rugged handheld computers put information literally at the finger tips of today's lubrication specialists.

The best systems also provide for routes on rugged Windows Mobile™ handheld computers (similar to the one shown in Fig. 2). This brings a great deal of efficiency to the system, with information literally at the fingertips of the lubrication specialist. There are no clipboards and no paperwork. Fingertip data collection includes work accomplished, consumption volume and equipment problems and issues, all with no keyboard data entry. Mobile routes also include provisions for positive verification via Bar-Codes or RFID, as desired.

Equally important is a detailed history for each lubepoint and lubrication-specific reporting. Detailed history is required for KPI oversight, as well as for process improvement and failure analysis. This builds accountability with regard to international standards and audit accountability. Lubrication-specific reporting brings forth information at both detailed and management overview levels. Reports are both tabular and graphical, providing instant understanding of program status.

Capturing the benefits

The benefits of using an effective lubrication management software tool are many. One of the most important to a company—especially in an era of dwindling resources and skyrocketing energy costs—can be seen in the area of energy management. Experts note that proper lubrication of equipment can be a major component in reducing energy demands within industrial facilities—by as much as 20%. That's because using the right lubricant in the right amount consistently reduces friction, thereby lowering the amount of energy required to run the equipment.

Furthermore, by thoroughly addressing improper lubrication—the number one cause of equipment failure—reactive maintenance work decreases and overall

plant reliability increases. Plants gain a focused and efficient lubrication reliability program, including footstep reducing lubrication routes. Each route directs the lubrication specialist point-to-point, showing needed information, including detailed procedures. This eliminates the need for numerous PMs and an ongoing, often overwhelming array of printed work orders—resulting in increased reliability and productivity.

In short, a lubrication reliability software solution can:

- Help cut soaring energy costs
- Help reduce unplanned downtime
- Help schedule and direct personnel efficiently
- Help retain the corporate knowledge asset when trained and experienced employees leave (and they always will)

Best of all, any one of these can quickly save more than the costs of the lubrication reliability solution. With these types of benefits and rapid ROI, it is hard to understand why corporations continue to ignore this profound opportunity for increased competitiveness and profit that an effective lubrication program can provide.

Eric Rasmusson is the president of Generation Systems, Inc., based in Issaquah, WA. E-mail: ericr@generationsystems.com

About Generation Systems, Inc.

From a scrappy start-up in a Seattle-area garage to a real player on today's stage...

Founded in 1984, Generation Systems' primary—and relentless—focus continues to be on enhancing the profit and operational excellence of its customers through the reduction of inadequate lubrication practices. According to the company, its flagship product, LUBE IT, is among the most widely used lubrication reliability software tools available today.