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What's Inside?

Front cover photo:
M.Bhandari

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Buried Utility Locations	1 800 242 3447
City Of Calgary (All Departments)	311
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President's Message

I hope this message finds you and yours well and in good health

Summer is ending and the time to prepare the buildings for winter is well underway. I haven't seen the farmers almanac to view the expected winter, but I think it will be a warm one. The effects of El Nino are with us, and it has wreaked havoc throughout the world so far. Fires and flooding have been with us all summer. I hope the autumn will be better.

We have heard from ABSA of the recent changes to the certification examination process as of January this year. The exams for the fifth-class certification have been changed from 150 multiple choice questions to 100. I'm not sure if the testing of knowledge in 15 categories can be judged in such a low percentage of questions. Even if the questions have been given weight, I feel we are stepping back further in the certification process. I am not sure if ABSA is still testing in house or if all testing is continuing to be remote. I understand that this number of questions have continued for the exams for the Fourth and Third class sets of exams.

The Building Operators Association is just starting to get back on its feet. Last year was difficult coming from Covid isolation back to in person meetings. The number of Operators and Associates in attendance was scarce. It is still struggling, and we need your support. We continue to have relevant guest speakers and the opportunity to meet with other Building Operators in a congenial atmosphere of learning and, fellowship has been our only goal. I hope that you will join us at the Danish Canadian Club on the second Tuesday of the month, or to encourage your Operators to come down. The meeting begins at 5pm we have coffee and sandwiches there, if you feel peckish. Meetings last about one and a half hours. It would be nice to see you there. First meeting is September 12th, 2023.

Smiles))

With kind regards,

Les Anderson PE, RPA

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Are you equally adept at troubleshooting problems in the boardroom and the boiler room? As the resident facility guru, there's a lot riding on whether or not you know the difference between sounds control and a sound investment.

Try our monthly Operator IQ challenge...*answers on page 24*

1. Lubrication can be achieved by using:

a. abrasives

b. a gas

c. air

d. grease or oil

e. a vapor

2. Oil additives, designed for a particular oil characteristic:

a. should not adversely affect any other characteristics

b. will always affect the pour point greatly

c. should be used as little as possible

d. are not a component of most lube oils

e. never lose their effect during use of the oil

3. Relative to lubrication, one place where wear is beneficial is:

a. new babbitt bearing surfaces which wear smooth

b. on pump wear rings

c. on the oil pump sealing surfaces

d. on the cylinder walls of internal combustion engines

e. in anti-friction bearings

4. The acidity of the lubricating oil is indicated with a number and named:

a. pH

b. acidity

c. alkalinity

d. neutralization

e. viscosity index

5. The instrument which measures the viscosity of an oil at a certain temperature as it flows through a small diameter tube, is called a/an:

a. orifice late

b. Saybolt Viscosimeter

c. oil meter

d. Thermocouple

e. pyrometer

Before Trouble Strikes

by Thomas A. Westerkamp - Maintenance Solutions

Emergency maintenance can be costly, dangerous and stressful, and it's completely preventable for departments that prepare and plan properly.

Many maintenance and engineering organizations spend more than 50 percent of their labor hours performing emergency work. What is an emergency? Let's define it as a situation in which an unscheduled shutdown of needed equipment has occurred or is imminent due to the danger of injury to personnel, critical harm to operations, or the potential for major equipment damage. This type of situation requires immediate response, and, if needed, overtime would be approved automatically to deal with it.

Not all maintenance work treated as an emergency fits this description. Yet this is the most expensive category of work. And "emergency" work that is done because of someone higher in the organization requests it — not because it truly is an emergency — only worsens the problem.

On the other hand, a growing number of maintenance departments now use planned maintenance programs based on preventive and predictive maintenance that optimize cost and reliability of equipment. In organizations with these techniques in place, less that 10 percent of the maintenance work is emergency, as defined above.

Assessing the situation

In a well-managed maintenance department, all of the supervisors and front-line technicians are used well, which means they are on work assignments when an emergency occurs. So communication with them by means of cell phone, pager, loudspeaker or a signal device is essential.

If a tradesperson already is in the area of the emergency, authorized operations personnel can advise the maintenance supervisor by phone that an emergency exists and that the requester has asked for assistance. The tradesperson does the work while the requester fills out or calls in a work order, which is given to the tradesperson before he or she leaves the job site. The worker completes the job, fills out the rest of the work order and returns it to the supervisor.

If no tradesperson is in the area, the requester advises the maintenance shop via phone that an emergency exists and describes the problem. The maintenance supervisor assigns a worker, and when the worker arrives at the job site, the requester gives him a work order. The work is completed, and the work order is closed in the CMMS as complete.

If the department enforces a "work order for every job" rule, the equipment record will be more

complete, and the performance indices will be more accurate, due to a larger percentage of the work documented in the CMMS.

Anticipating problems

The only information not predictable about emergency situations is when they will occur. Experienced maintenance managers can predict all of the other factors — location, craft, type of work, tools, equipment and material needed — after giving some thought to the most likely occurrences.

Given these facts, managers can do much ahead of time to prepare for these events to ensure they are handled quickly and with a minimum of downtime and disruption. Here are steps managers can implement that will shorten emergency-response time without producing added costs:

- Post the name and phone number of the maintenance person to be contacted in each requester's work area.
- Post the request checklist (on this page) near each phone.
- Train personnel to notify a supervisor immediately when an emergency occurs and to have required information ready when the supervisor arrives at the workstation.
- Have designated maintenance supervisory and crafts personnel trained to respond quickly with the right diagnostic tools and instruments for the situation at hand.
-

Prepare tool carts with equipment for use in these situations, minimizing the time required to gather them together. Time lost in getting to the job site and in making repeated trips to the shop or storeroom lengthens costly downtime.

Managers also can maximize technician effectiveness by ensuring technicians use good mechanical and electric diagnostic techniques. Managers will save on the related training costs tenfold or more in reduced downtime.

One such technique is to trace problems using functional failure analysis, rather than random troubleshooting. This technique will eliminate wasted time trying to find the component that failed. Functional failure analysis uses decision-tree logic to narrow down choices until the final choice yields the solution. Using the technique can minimize dead ends and backtracking.

Safety during emergencies

Emergency work is less safe than routine maintenance, in part because everyone is in a hurry. But safety should remain the top priority. It must be instinctive, and it and will be if safety reminders are present in all areas of the shop and facility. Even in emergencies, managers can plan technicians' action at the job site. Departments can train workers in advance to practice good safety measures because in the rush to get things back to normal and return facility activities to normal, technicians can resort to dangerous shortcuts. The practices to avoid include but are not limited to:

- using improper tools
- using improper methods, such as not locking out power switches before working on moving equipment
- using improper material handling equipment, such as rigging, blocking or undersized hoisting equipment.

Failing to use safety net, safety lines or adequate safety railings when working overhead are also dangerous

shortcuts that can cost lives. These practices are much more likely to occur when someone is in a hurry than in routine repair situations.

Staffing fallout

The effect of emergency maintenance as a policy invariably will increase costs substantially. Consider this example: The policy of a facility that practices emergency maintenance is that the department must provide immediate response. So if the department receives 40 one-hour emergency requests for mechanical work at the same time, the staffing required is 40 mechanics. On the other hand, if these 40 jobs are identified while they are still minor, routine, non-emergency work that can be spread over one week, they require one mechanic. Among the other adverse effects of emergencies are the following:

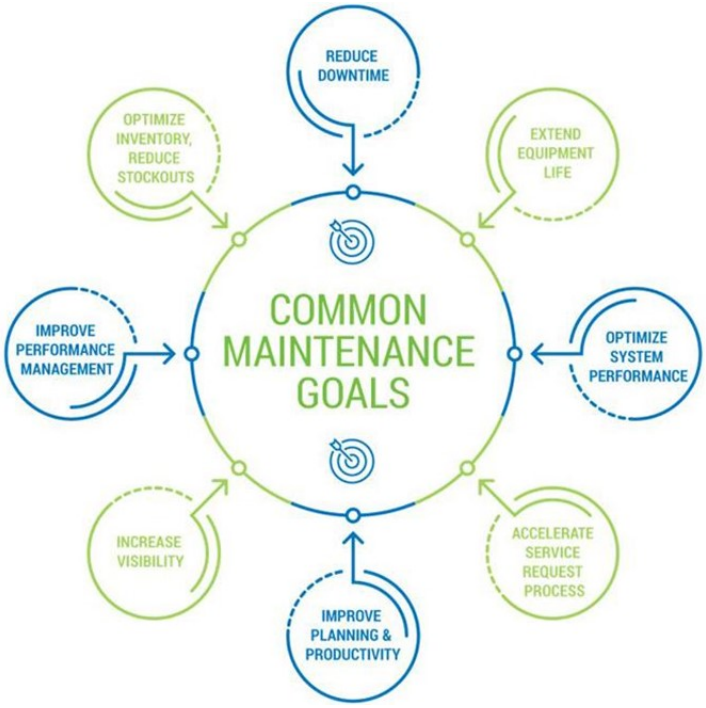
- Technicians take unsafe shortcuts.
- The right craft isn't available right away.
- Technicians lose time interrupting jobs in progress and traveling between sites.
- Other planned work is deferred and causes a domino effect that results in more breakdowns.
- Needed tools and equipment are tied up elsewhere and time is lost getting them to the emergency worksite, or technicians use less efficient tools.

In the end, avoiding the costs associated with emergency maintenance might be the best argument for investments in planned, scheduled maintenance.

Communication that pays

Even though a good preventive maintenance program exists, managers still will face an emergency situation occasionally. One of the most effective types of training for maintenance personnel and requesters addresses effectively requesting maintenance service, in particular emergency service.

Time is always a precious commodity in maintenance, so the time to communicate requests should be minimized. This is best achieved by standardizing the information required and by training all requesters to get in the habit of always requesting the work in the



same standard manner. Here is a sample checklist managers can use to achieve this goal:

Emergency Maintenance Request Procedure

In an emergency, call extension xxx and give the information in this sequence:

1. Caller name and phone number. Is safety involved?
2. Department where work is needed.
3. Machine or equipment number and location.
4. Describe the part of the equipment causing problem.
5. Describe the work requested and the priority.
6. When can the work be done? Now/This shift/Next shift/Other
7. When must the work be complete?
8. Is the equipment down?
9. What maintenance craft is needed? Electrical/Mechanical/Other
10. How did the problem happen?
11. What was the equipment doing before the problem — noise, smoke, heat, change in speed or operation, etc?

12. If minor, have you tried to fix it? What happened?
13. Are parts needed? If you know, describe the type, size and quantity.
14. Are other materials needed — special tools,
    ladder, portable lights, safety equipment, fire extinguisher, etc?
15. Is any special authorization or charge number required?
16. Are special permits needed for burning, welding, entry, etc.?

Scheduling and emergencies: addressing the myths

Too many managers believe that maintenance work cannot be schedule because emergencies always cause interruptions. While some interruptions occur, they should not deter managers' attempts at daily scheduling. Those who favor the breakdown-maintenance approach often say, "If my maintenance people are idle, I know everything is okay" and "I have people available right away if a breakdown occurs." Here are several myths contained in these arguments:

First, since emergencies occur at random, peaks and valleys in the emergency workload vary greatly. These conditions often result a surplus or shortage of the craft skills required to respond properly, but never the exact number.

Second, if no work is done before a machine breaks down, it perpetuates the breakdowns. Eventually, the frequency increases, further disrupting the operating schedule.

Third, the length of repair increases. In an economy move, a large facility in the southwest discontinued preventive maintenance on roof supply and exhaust fans. The result: Several bearings seized as the grease dried, causing the air-handling system to break down. In the process, blowers were thrown out of alignment and severely damaged by contact with the housing.

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The Enduring Grease vs. Oil Debate

by Jim Fitch

Many who claim to be purists tout that they prefer oil over grease. But then again, there are those die-hard grease advocates who have their own orthodoxy. Indeed, both schools of thought are supported by strong, compelling arguments. It seems for every point in support there is an equally strong counterpoint. As it has been for decades, the grease versus oil debate does not die or even fade away. Let's hear what they are saying today, including several classic arguments along with a couple of new ones.

In Favor of Grease

1. Grease has superior stop-start performance. When a machine is shut down, oil will drain back to sump but grease remains in the component where it is needed, lowering the risk of a dry start.

Oil's Counterpoint. Most bath, splash and circ-oil systems can lubricate almost immediately on restart. Larger volumes of oil (compared to grease in the same application) means a larger supply of additives (extended service life) and the ability to wash contaminants away from the working frictional zones.

2. Worn seals and connectors can retain grease better than oil, which lowers the risk of lubricant starvation and leakage. This also reduces the risk of the lubricant staining or damage to the work product (food, newsprint, textile, etc.).

Oil's Counterpoint. True, grease is less prone to leakage, but then again leakage is a sign of a machine that is exposed (internally) to the environment and needs repair. Worn seals that go unnoticed don't get better over time. This presents risk of a more serious or even catastrophic failure in the future.

3. Surplus grease packed tightly around seals and connectors serves as a sealant, preventing the ingress of particles and water. Periodic regreasing can purge contaminants out and away from the working surfaces of the component.

Oil's Counterpoint. Most industrial machines are not regreased frequently enough to rely on this for displacing contaminants from seals and cavities adjacent to bearings. In fact, the practice of regreasing may actually drive these contaminants directly into the core of the bearing and cause imminent failure.

4. Grease enables the use of solid additives such as graphite, zinc oxide or molybdenum disulfide. These additives would settle or become filtered if used in many oils.

Oil's Counterpoint. Soluble additives that are used in oil formulations today, will provide comparable performance to control both adhesive wear and abrasion in similar applications.

In Favor of Oil

5. Unlike grease, oil flows freely, enabling it to conduct and carry away unwanted heat (thermal convection). This keeps base oil viscosity stable and reduces the risk of heat-induced oxidation and additive depletion.

Grease's Counterpoint. When properly selected for a given application, the temperature of grease will remain reasonably low and out of risk of premature oxidation. Many lubed-for-life grease applications have exceeded ten years of service.

6. Unlike oil, the churning of grease in gears and bearings results in high energy-consumption losses and heat generation. Energy consumed by oil in a similar application may be only a fraction of that of grease.

Grease's Counterpoint. When bearings are properly lubricated with the right amount of grease having the correct consistency, churning losses are negligible. Unneeded amounts of grease will push to the side and away from moving parts (such as rollers and cage). This forms a convenient channel, leaving only the needed amount of grease and oil for lubrication. Oil, on the other hand, will continue to flow back into the pathway of moving parts, causing churning and heat.

7. Because oil doesn't use thickeners there is no risk of incompatible thickeners clashing, causing changes in grease consistency and other problems.

Grease's Counterpoint. True, oils don't employ thickeners in their formulation but there still remains the risk of base oil and additive incompatibility upon accidental mixing. In fact, one could argue that there is no greater security when two oils are mixed compared to mixing two grease products. And unlike some oils, grease additives will not settle out during storage or when machines are at rest.

8. Oil lubricants enable certain contaminants such as water and dirt to be briefly suspended and transported to filters, separators and settling zones. Grease suspends these types of contaminants permanently. In fact, some grease products will suspend 100 percent of their weight in water.

Grease's Counterpoint. Unlike grease, circulating oil carries harmful contaminants to the far reaches of a system, risking wear and corrosion to many surfaces at the same time. Grease keeps most contaminants localized and immobilized and even displaced away from critical surfaces.

9. Oil volume in machine components can be precisely controlled using level gauges and sight glasses. Grease volume is nearly impossible to monitor and control. Over- and undergreasing are common causes of bearing failures.

Grease's Counterpoint. Well-trained lube techs using proper tools and procedures have no problem introducing safe quantities of grease into bearings and similar components.

10.Oil can be changed without dismantling machine hardware. Grease must be repacked

periodically, which involves a considerable cost associated with labor, material and downtime.

Grease's Counterpoint. Many grease-lubed machines can run for years without the need to repack the bearings. Oil compartments, however, sometimes require constant drains and refills.

11. Oil-lubricated machines are easier to sample for laboratory analysis of wear metals, contaminants and fluid properties. A representative sample of an in-service grease is nearly impossible to obtain.

Grease's Counterpoint. Perhaps 90 percent of bearings and components lubricated with grease are noncritical and don't require routine sampling and analysis. However, new methods are being developed to enable grease sampling on the run.

12. Used oils can be safely handled and disposed of with minimal impact to the environment. Most grease-lubricated machines are total-loss systems, meaning there is no environmentally simple way to recover and dispose of degraded or contaminated products.

Grease's Counterpoint. Oil is actually more environmentally problematic than grease. As stated above, it more readily leaks out of machines and contaminates water, soil, plant life, etc.

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Ladder Maintenance Tips

Since all of us will be on our roofs this summer patching that leak that has cost us a fortune in emergency calls. Here are eight basic safety rules to follow when using a ladder.

1. Do not over lap the extension of a 2-piece ladder less than 3 rungs.
2. Set the ladder on even, firm footing.
3. Extend at least 3 rungs up over the eaves of the roof. You want to step from the ladder onto the roof. Do not climb over the eaves and guttering onto the roof. The extension hooks must be hooked. Double Check.
4. Watch out for overhead power/phone lines.
5. Climb the ladder one rung at a time.
6. On the ground, the ladder should slope about one-fourth its length from the side of the house. Example: If the ladder is 16 feet long, it should be pulled out at the bottom 4 feet from the side of the house.
7. Check the rungs for safety by walking on the rungs with the ladder flat on the ground.
8. If the ladder even appears damaged, do not climb it under any circumstances.

Pipe Dreams No More

by Thomas Westerkamp

Once overlooked, plumbing product advances now offer managers opportunities to control costs and enhance user comfort.

The search for savings in facilities is never ending, and now more than ever, maintenance and engineering managers are under pressure to find savings anywhere they can. Traditionally, their efforts have focused largely on the likeliest suspects, primarily HVAC systems.

But, in many cases, a closer look at product specification for and maintenance of plumbing systems reveals opportunities to cut costs, improve system performance and enhance user comfort.

Technology advances

Recent generations of plumbing fixtures and components feature technology designed to reduce water use, extend performance life and minimize maintenance. Consider the following opportunities for savings and improved service:

- Low-flow, aerator-equipped faucets that reduce water use. Urinal and toilet flush valves also are designed for low-flow operation. Adjustable-flow showerheads offer another option for lowering water use.

- Water filters that extend piping and fixture life by removing many of the minerals that cause corrosion and the leaks that shorten product life. They also prevent fouling that causes buildup in the pipe and fitting walls that can reduce capacity.

- No-chemical, ultraviolet water treatment technology that eliminates the use and handling of hazardous chemicals while lowering costs. The systems use bulbs that must be changed once a year.

- Water chillers and drinking water coolers that use R134A CFC-free refrigerant. All leaded parts have been removed, and the piping is soldered with lead-free silver solder.

- Barrier-free products available in the new designs that ensure compliance with the Americans with Disabilities Act requirements. Operating pressures on the fixtures are at or below 5 pounds. Also, hands-free operation and dual-level fixtures for sinks, drinking fountains, toilets and showers improve access.

- Water softening products that reduce scale and enable water beaters, washers, fountains and other fittings and piping to operate properly over a longer useful life, while reducing the use of soap and other cleaning products.

- Commercial food disposals that handle soiled dishes for 175-200 diners per meal can reduce trash container loads and lower removal costs.

- New fixture-surface coatings that provide longer, lower maintenance life, even in brass fittings.

- High-efficiency water heaters that save on water heating costs with improved coil design, better materials and more insulation to decrease heat loss.

Flow rate and totalizer meters that are used to compare water use by zone within buildings, or between buildings or areas. The meters highlight high-use areas and water reduction opportunities.

They also provide information to identify leaks and peaks by comparing usage from one month to another.

Specifying for savings

Maintenance and engineering managers should look for and specify products that contribute to less water use, less maintenance and lower-cost design and construction.

Installing the new low-flow fittings is a good way to start a water-conservation program. The cost of water use, especially hot water, is rising rapidly. In fact, the cost to heat hot water in some facilities can be greater than space-heating costs. Consequently, a modest reduction in water use can result in much lower costs.

Then multiply these savings from these products by the number of patients in a hospital, students in a school, or employees in a commercial or government office building. The result often is impressive savings. And at the same time, the use of well-designed plumbing products adds to the health and comfort of users.

Managers should consider the applicability of these water-saving products and technology:

Water filters.

Water filters can reduce stains on fixtures and corrosion in piping. Stains result from minerals or other chemicals in the water, such as iron, sulfur, chlorine and help alleviate low pH and turbidity. Iron leaves a rust-colored stain on sinks and toilets. Sulfur causes a strong odor and can corrode pipes, drains and appliances that use water. Low-pH water often leaves a bluish-green stain on copper pipes and corrodes pipes and drains. Turbidity, or suspended solids in water, can make it cloudy and foul pipes and drains.

If testing reveals the presence of any of these contaminants in a facility's water, it is wise to invest in a filter system customized to facility needs. It will pay for itself in improved performance, longer piping-system life and lower cost.

Low-flow fittings.

Investing in low-flow aerator nozzles for sinks reduces water use. The volume consumed varies widely from fixture to fixture. For example, up-to-date sink faucets with low-flow aerators can cut water flow rate in half to 0.5 gallons per minute (gpm).

Also, specifying battery -operated, no-hands faucets not only lowers water use. It also creates a healthier environment by eliminating the possible transfer of germs by handling the faucets. No-hands faucets deliver water only when a user places hands under the faucet and breaks a sensor beam that turns on the water. When the beam is restored, the sensor turns off the flow.

Low-flow flush valves.

Low-flow designs for urinals and toilets are also available in flush valves with battery-operated, no-hands operation. Urinal flush-valve volume varies from 1- 1.5 gpm, a 50 percent variation. Toilet flush-valve volumes vary from 1.6-4.5 gallons per minute, a 180 percent variation. By sizing the valves' flow rates for optimum performance, managers can save significantly on the water bill.

A cautionary note: the goal is optimum flow, not minimum flow. A common complaint heard is that low-flow fixtures are not strong enough and, in fact, can cause stoppages by failing to flush completely.
Pending legislation would remove mandatory low-flow rates, so managers should check local codes and talk to building inspectors before finalizing specifications.

Managers can save water and improve cleanliness at the same time by retrofitting existing valves with the automatic, battery-operated, vandal-resistant type, or replacing the old manual valves with the new automatic type.

If the concern is that batteries will fail, causing the units to fail, don't worry. Battery-operated automatic valves continue to operate several thousand cycles after the low-battery warning light comes on, allowing plenty of time to replace batteries.

Water leak awareness.

An often overlooked but effective way to conserve water is to repair leaks in faucets, toilet valves, fittings and pipes right away. Even a slowly dripping faucet or fitting can waste hundreds of gallons. Here is a way to measure the loss and get management's support to upgrade fixtures: Place a 1 -gallon container under the leak and measure the time it takes to fill. There are 8,760 hours in a year, so if it takes one hour to fill, then the leak wastes 8,760 gallons a year. To calculate the cost of this leak, multiply this number by the cost per gallon rate.

Lower energy use.

Energy-efficient water heaters also save money. In facilities that haven't replaced the water heater recently, managers might be in for a surprise because new models are more energy efficient than existing models. External water-heater insulation can further lower energy use.

Also, if a system uses a 140-degree temperature setting, lowering it to 120 degrees can produce more energy cost savings with no impact on users, especially if this is done by replacing or retrofitting plumbing fixtures with the low flow products that reduce hot water demand.

A Manager's Role

Managers can support the plumbing program by providing sufficient labor and material budgets for the proper specification and upgrading of plumbing products. In addition, there are two other ways that management can provide support - including all plumbing in the preventive maintenance program and scheduling frequent inspections to ensure proper maintenance and custodial care.

KenKen Puzzle

How to solve the Kenken puzzle:

(Answers on page 24)

- Fill in the numbers from 1 –6
- Do not repeat the number in any row or column
- The numbers in each heavily outlined set of squares, called cages, must combine (in any order) to produce the target number in the top corner using the mathematical operation indicated
- Cages with just one square should be filled in with the target number in the top corner
- A number can be repeated within a cage as long as it in the same or column

1	6			7		3	2	
5	4				8		9	1
			2		4		6	
2	3		7		6	8		9
	9	7						
		5	4		9	1		3
8							3	7
		3		6	7			
	1	6		4	3		8	2

This management support provides motivation for staff to specify improved products, keep plumbing products and systems well maintained and in good condition, and look for ways to continuously improve product technology and lower costs.

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Preventative Maintenance - What is it all about?

Smart shop maintenance can be approached several different ways:

- **Reactionary Maintenance** - The equipment has failed, and you have to fix it right now! If you have an installed spare it helps, but you must fix it immediately because you cannot afford to run without a spare. This is the "norm" in most plants.
- **Preventative Maintenance** - You will take appropriate actions and thereby prevent the unit from failing. Most companies are still trying to figure out what those appropriate actions are.
- **Predictive Maintenance** - By taking selected readings we hope to be able to predict an impending problem and calculate how much longer the unit will run before failure. A lot of information is being collected, but the concerned parties are still trying to figure out how to use it. Most predictive maintenance calls for shutting down the equipment when some arbitrary limit has been reached and this puts you back to reactive maintenance again.
- **Continuous Diagnostic Maintenance** - You will take constant readings and note any significant change in these readings. Hopefully you will then be able to predict impending failure. This is very similar to reading the instruments on the dashboard of your automobile.

Machinery History - By keeping good records we hope to predict the life of the unit or its' individual components. This system assumes that the life of the previous unit somehow relates to the present one.

The problem with most of these systems is that we collect more data than the operator or anyone else can deal with. The result is that Reactionary Maintenance is a "reality" in most plants today.

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The Changing Face of Maintenance

by Dan Hounsell

You dont need the latest census report to understand how the nation's population is changing. More specifically, to see the impact that growing ethnic diversity is having on maintenance and engineering departments in institutional and commercial facilities, just take a look at the front-line technicians at work in these facilities.

As every manager knows all too well, it is getting tougher by the day to find qualified, trained maintenance technicians. To fill vacancies in their departments most managers, if not all, have responded by expanding their searches beyond what might be considered traditional candidates.

One result of this change is that more Spanish-speaking technicians — as well as other non-English-speaking workers — are joining maintenance departments across the country.

Two conversations with manufacturers last month offer a glimpse at the changing face of facilities maintenance, as well as how some manufacturers are responded to the change.

A manufacturer of large HVAC equipment described the control panel for his company's new product, pointing out that error messages now appear in plain English, not as error codes that an operator has to look up.

I asked him if the codes also appear in Spanish.

Silence.

He was caught off guard, then seemed a bit embarrassed that the designers — or anyone else involved in the process — hadn't thought of that feature.

Providing error messages in Spanish "really wouldn't be that hard to do, either" he said.

The conversation with the second manufacturer confirmed the basis of my question. While the second manufacturer said his company would remain focused on selling large pieces of equipment that have been its bread and butter for decades, he also said that because the company senses a slowdown in sales in the next two years, the company also will expand its offerings of post-installation services and in-house technician training.

And yes, he made a point of saying, that training would be offered in both Spanish and English.

Given the changing population in all areas of the country — and in small towns and big cities — it should come as no surprise that maintenance and engineering departments are feeling the impact.

What matters most now is the way that managers — and manufacturers — respond to this ongoing evolution in the work force. Their actions probably will go a long way in determining how successful their organizations will be.

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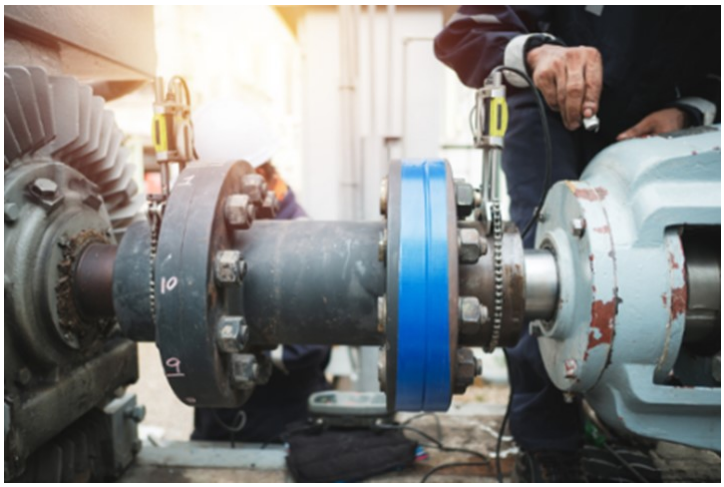
What Exactly is a Lubrication Failure?

by Mark Barnes

If you ask anybody who's been around maintenance why precision lubrication is important, nine times out of 10 he or she will answer "to prevent failures." While this basic statement cannot be argued, let's stop to consider the actual meaning of a failure. The two most common types of failure are catastrophic and functional.

When referring to a catastrophic failure, we are usually talking about a sudden failure to a machine that causes it to cease operation. Catastrophic failures can cause damage not just to the specific component in question but also collateral damage. Take, for example, a piston ring seizing while an engine is operating causing the rod to push through the cylinder wall, or an ID fan bearing that failed due to lack of lubrication forcing the fan housing and motor to be ripped from the base and literally thrown across the plant. By anyone's definition, these two real-world examples would constitute catastrophic failures. A catastrophic failure may then be considered an event that causes significant collateral damage, production interruption and/or the occurrence of a safety hazard. Needless to say, catastrophic failure should be eliminated through reliability engineering, root-cause failure analysis and predictive tools, designed to reduce the severity of an event.

The second category to consider is functional failure. In my experience, a functional failure is often misunderstood. To obtain a better grasp of this subject, consider a pump designed to pump at 1,000 gallons per minute that is losing pumping capacity down to 800 gallons per minute. Assuming the lower pumping rate does not meet the process requirements for this pump, one might consider it to have functionally failed - the machine is still operating, but cannot function according to the required design specifications and likely needs to be shut down to correct the problem.



But it's a third type of failure that, in my experience, is the least understood and/or to a large extent ignored when it comes to lubrication-related failure. This type of failure is sometimes called premature failure. Typically, this term is associated with a catastrophic or functional event; however, this may not always be the case. To illustrate my point, consider the design life of a rolling element bearing. While several variants can be used to describe the expected life a rolling element bearing, the most commonly used is the L10 life. The L10 life, which is typically given in years, is the life expectancy of the bearing with a probability of 90 percent under given stressing conditions (load, speed, etc.), before the bearing fails due to fatigue. In other words, out of a population of 100 bearings, at least 90 of those bearings should reach their L10 life.

Now think about your plant. How many bearings

actually reach their L10 life? While this will vary based on circumstances such as application and environment, a senior engineer from a major bearing company suggested that on average, fewer than 10 percent of bearings actually reach their L10 life, compared to the predicted 90 percent - an opinion I often hear validated by in-plant maintenance and reliability personnel.

Lubrication-related Failure?

Now consider that as many as 60 to 80 percent of all bearing failures (catastrophic, functional and premature) are lubrication-related, whether it's poor lubricant selection, poor application, lubricant contamination or lubricant degradation. Then you can start to understand the tremendous cost saving opportunities of eliminating not only catastrophic and functional failures which impact production, but to extend the life of many oil- and grease-wetted components through precision lubrication.

So, why is this often overlooked as a lubrication-related failure? In my opinion, the problem lies in the fact that predictive maintenance programs (vibration analysis, thermography and wear debris analysis) are so effective in finding problems that can be resolved during a scheduled outage, we lose sight of the fact that many components are failing early because lubrication best practices (right lubricant, right time, right quantity, clean, dry and cool) have not been established. Surely it makes sense, given the number of bearings and other oil- and grease-wetted components in a typical plant, that if the life expectancy of every component can be increased by just 10 to 20 percent, this will have a significant impact on maintenance costs. Call it the hidden cost of lubrication malpractice.

So, the next time you or someone else in your plant claims "we really don't have any lubrication-related failure," consider the underlying facts of this statement. Are you truly stating that every single bearing, gear, valve and guide lasts as long as can be expected based on it's design specifications, or is there an opportunity to reclaim some of the remaining useful life of oil- and grease-lubricated assets that may be squandered due to a less-than-ideal approach to lubrication?

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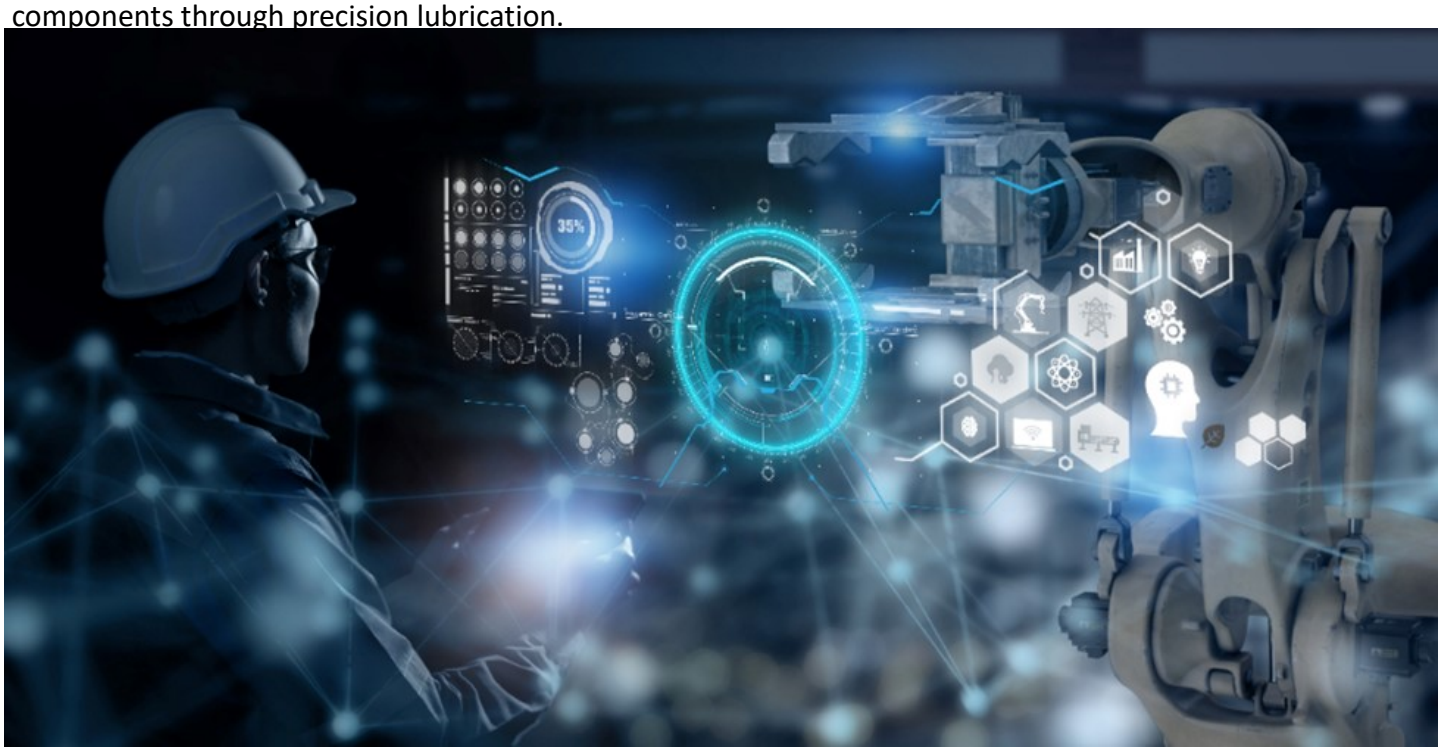

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Kenken Puzzle Answer

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5	4	2	6	3	8	7	9	1
3	7	9	2	1	4	5	6	8
2	3	1	7	5	6	8	4	9
4	9	7	3	8	1	2	5	6
6	8	5	4	2	9	1	7	3
8	5	4	1	9	2	6	3	7
9	2	3	8	6	7	4	1	5
7	1	6	5	4	3	9	8	2

TEST YOUR OPERATOR IQ ANSWERS

Answers: 1) d 2) a 3) a 4) d 5) b

Trolleybus next to Hudson's Bay Company store in Calgary in 1971

Calgary trolleybus No. 428 (a 1947 CCF-Brill T44), followed by a GM New Look diesel bus, next to the Hudson's Bay Company store. The view is looking north on First Street SW from Stephen Avenue (8th Avenue SW). Calgary's trolleybus system closed in 1975. (Photo taken on Kodachrome on 14 Oct 1971.)

Credit: 1971 CALGARY TROLLEY BUS

Author: lindsaybridge from Sydney, Australia

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Presenter: Nathan Novak

Brief:

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Venue:

Danish Canadian Club 727 11 Ave SW

Nathan Novak Bio:

Nathan Novak is the Alberta Sales Director for Voltus. Voltus is the leading local aggregator connecting large industrial and commercial power users to the Operating Reserves market. Essentially this pays your team to utilize the flexibility within your operations to dial back or shut off equipment during grid emergencies. With a 12-year operations background as a First-Class Power Engineer, Nathan's passion is to fill this bucket for the Alberta Electric Systems Operator, but his passion is delivering this win to operations groups, finding them a NEW revenue source.

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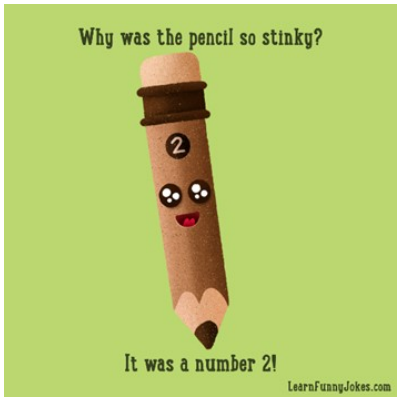

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Please visit the Building Operators Association of Canada YouTube Channel to watch the Speakers.

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