UNDERSTANDING AUTOMATIC GREASING SYSTEMS

Successful companies in the construction industry are constantly seeking new solutions and advanced technology to reduce costs, minimize downtime and maximize productivity. Can lubrication play a role in that? You bet!

In a study conducted by a major component manufacturer, improper lubrication accounts for 53 per cent of all bearing failures, a major cause of equipment downtime and significant, unnecessary maintenance costs including: replacement bearings, labour to repair or replace bearings, unscheduled downtime and the impact on meeting customer delivery commitments. Primarily, these failures are caused by contamination of bushings by dust, dirt and moisture or inadequate amounts of grease applied to bearings.

Lack of lubrication isn't the only problem, however — inefficient manual lubrication practices can often result in over-lubrication of key pivot points, which brings its own indirect, but very real, costs including wasted lube, environmental issues, safety or housekeeping issues and higher labour costs.

Automatic lubrication systems (ALS) also known as autogreasers, autolube or centralized grease systems, help eliminate these unplanned and unnecessary expenses. Created to minimize improper lubrication (both over and under-lubrication), an ALS automatically lubricates multiple points on a machine from a centralized pump/control unit, mounted in an easily accessible location. Specifically for mobile construction equipment, a

system dispenses small measured amounts of grease at frequent intervals, while your equipment is operating, maintaining a uniform supply of grease in the bearing at all times and a consistent grease seal to prevent dirt and contaminants from migrating into bearings. This is in contrast to the feast and famine conditions often associated with manual greasing, where greasing is done "when there's time".

THE KEY BENEFITS OF ALS

1) SAFETY

An ALS helps to reduce or eliminate climbing over and under machinery or into difficult-to-reach areas. Whether you're an owner/operator of a single piece of equipment, or the fleet manager for a large operator, personnel safety in the workplace is a key consideration.

2) EFFICIENT LUBRICATION

An ALS applies grease while the machine is running so you don't have to stop what you're doing or set aside time to lubricate it - in other words, less downtime. Furthermore, because the bearing is turning when it receives the grease, all the surfaces that bear the load are continuously being exposed and you get much better grease coverage on the bearing.

3) BETTER LUBRICATION

Applying grease is often most effective when it is dispensed in small, measured amounts over short, frequent time intervals. Unfortunately, tight deadlines and manpower constraints or in some cases the location of the equipment often make effective manual greasing impossible.

4) BETTER HOUSEKEEPING

How much grease is too much? If you're old-school, you keep pumping it in until you see it oozing out of the bearing. As previously stated, frequent and small, measured amounts will give your bearings the best protection. In addition to no over/under lubrication, this also means that you get less spillage and leakage. The end results are less grease wastage and less mess on your equipment and jobsite.

5) LESS DOWNTIME, REDUCED MAINTENANCE COSTS, & REDUCED BEARING REPLACEMENT

Time and manpower constrains often make it nearly impossible to keep up with the manual greasing requirements of equipment, especially in the harsh Canadian climate. The "preventative maintenance" provided by an ALS is absolutely key to reducing maintenance costs and minimizing downtime by extending the life of the many pivots, bushings and components on the equipment. There are also fewer replacement parts to stock.

6) INCREASED OVERALL PRODUCTIVITY

Resulting from an increase in machine availability and reduction in downtime due to breakdowns or general maintenance.

7) LONGER EQUIPMENT LIFE AND HIGHER RESALE VALUE

Because bearing areas are consistently protected and your machinery in general is better maintained.

8) HELPS THE ENVIRONMENT

For the environment, less premature wear of bearings and other components means less landfill. Also, since you're not over-greasing, you're depleting fewer resources from the environment and you're not contaminating the environment with dripping grease.

AUTOMATIC LUBRICATION SYSTEMS VARY IN QUALITY AND DESIGN BY MANUFACTURER, BUT TYPICALLY CONSIST OF FIVE MAIN COMPONENTS:

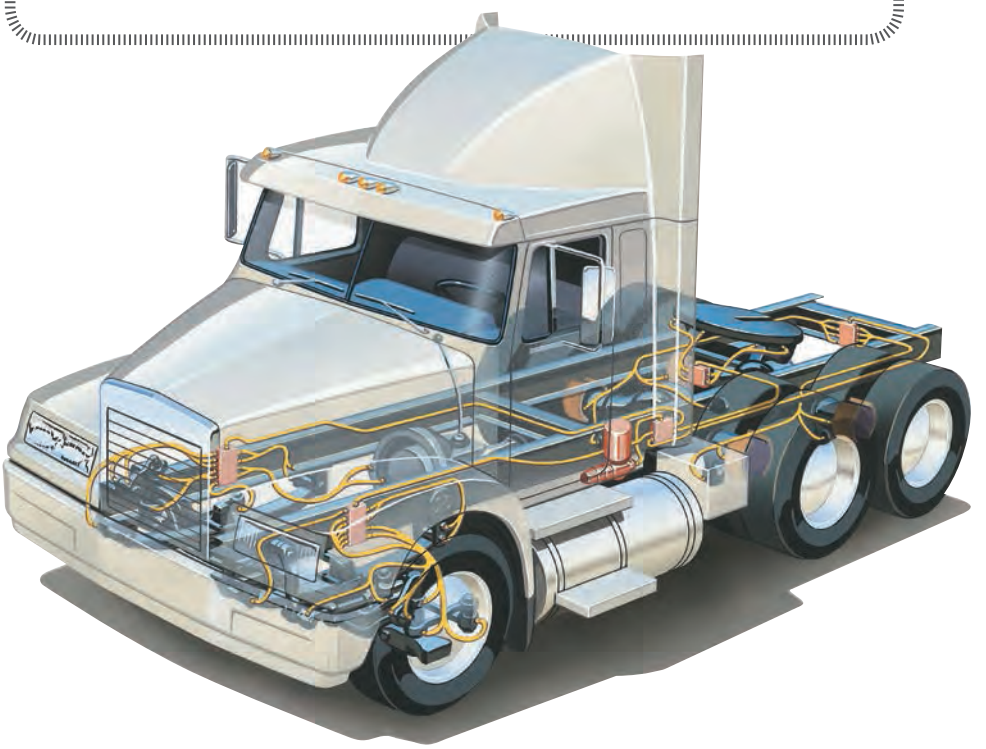
Controller/Timer – activates the system.

Pump & Reservoir – stores and provides the lubricant to the system.

Supply Line – the line (typically stainless steel or nylon material) through which lubricant is transferred from the pump to the metering valves.

Metering Valves – component that measures/dispenses the lubricant to the application points.

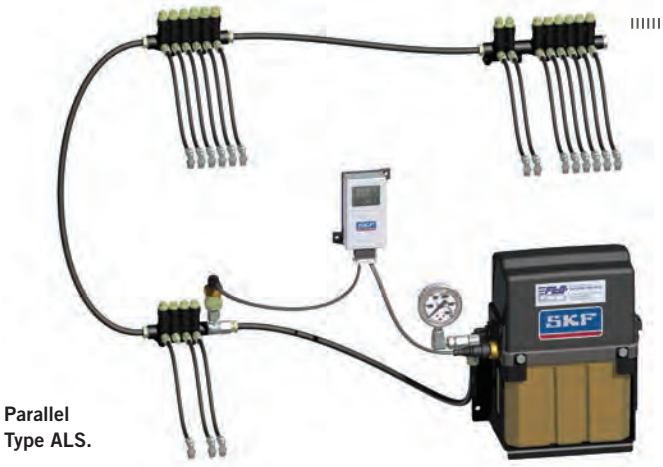
Feed Lines - lines that connects the metering valves to the application points (typically stainless steel or nylon material).



Operation begins when the controller/timer sends a signal to the pump starting the lube cycle. The pump station automatically delivers lubricant through a supply line to multiple metering valves that then measure and dispense a predetermined amount of lubricant through feed lines, to the individual lubrication points.

ALS are used on machines in a wide range of applications including construction, road building, mining, aggregates and all types of on-road trucks. As an example, on a wheel loader, a typical system would service: steer cylinders, oscillating axles, upper and lower articulation, lift cylinders, boom top frame pins, tilt cylinders, tilt link pivot, pushrods and boom to bucket pivot. On a truck, a system typically services the king pins, tie rods, steering drag link, slacks, spring pins, transmission cross shaft, brake shafts and fifth wheel if applicable.

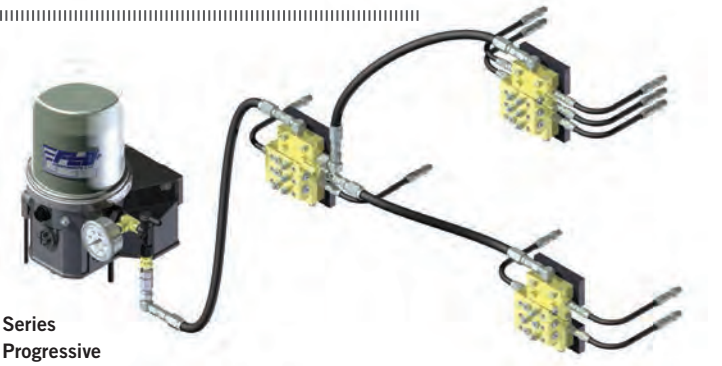
There are several manufacturers offering automatic lubrication systems in the industry today, so when sourcing a system, it's important to make sure you're comparing apples to apples and asking the right questions, so you can get the system that's right for you. The first thing to know is that there are different operating principles by which ALS are designed. The two most common types of ALS used on mobile equipment are Series Progressive and Parallel.



Parallel Type ALS.

In a Parallel type system, grease flows from the pump through a single supply line to multiple branches of injectors. The injec-tors operate simultaneously but are independent of each other. Each injector serves only one grease point and may be accurately adjusted to deliver the precise amount of grease or oil required. The nature of a parallel type system is such that only main line pressure is monitored, so if any feed line or bearing is not taking grease, the remainder of the system will continue to function normally, but the grease-starved bearing may be lost.

In a Progressive system, a pump delivers the grease to the grease points via progressive metering valves custom-sized for each application point. Grease flows through a primary valve which redirects to multiple secondary valves, and finally through feed lines to the ultimate application points. The nature of this system is such that if any line/bearing is not taking grease the entire system shuts down and there is (in a properly designed system) visual indication to the operator that there is a problem. This allows the operator an opportunity to take action before any damage occurs to the bearing.



Series Progressive ALS.

ONCE YOU'VE DECIDED ON THE TYPE OF SYSTEM YOU WANT, OTHER QUESTIONS YOU WOULD WANT TO ASK COULD INCLUDE THE FOLLOWING:

1. DOES THE PUMP PACKAGE INCLUDE A HIGH-PRESSURE, INLINE, GREASE FILTER?

A filter prevents the introduction into the distribution lines of contaminants that can cause system failure and costly component replacement and labour costs. For many system manufacturers, a filter IS NOT supplied as standard - it must be specified.

2. ARE THE HOSE AND FITTINGS STANDARD NPT THREAD?

Some system manufacturers use metric hose ends and fittings. Adapters are required to adapt to NPT bearing inlets, causing increased costs and labour and possible delays during servicing if you are not prepared with the proper replacement fittings.

3. DOES THE SYSTEM INCLUDE A PRESSURE GAUGE?

A pressure gauge allows for visual monitoring of the system pressure during regular maintenance inspections. For most system manufacturers, a pressure gauge IS NOT supplied as standard - it must be specified. →

4. DO THE METERING VALVES INCORPORATE HIGH-PRESSURE, MANUAL GREASE FITTINGS?

Having a manual grease fitting at every metering valve allows for easier troubleshooting, servicing, priming and flushing of grease lines. Not having a manual grease fitting means lines have to be disconnected to perform many of these tasks, substantially increasing labour costs. Many manufacturers either DO NOT include grease fittings, or use standard grease fittings which leak when faced with the high back pressure of a blocked line. Alternatively, using high-pressure grease fittings specifically designed to handle high back pressure, on every metering valve ensures that in the unlikely event of a blocked line, the only leak will occur where the machine operator will see it - at the pressure relief valve on the pump package.

5. HOW DO YOU KNOW IF A BEARING IS NOT GETTING GREASE?

With a progressive system, the metering valves work in series to each other. Some systems incorporate a cycle indicator pin (CIP) at the master valve assembly to provide visual confirmation of system cycling every time. If any line/bearing is not taking grease the entire system shuts down and there is visual indication (CIP) to the operator that there is a problem, allowing the operator an opportunity to take action before any damage occurs.

In a parallel type system, as previously mentioned, the metering valves operate simultaneously but are independent of each other and only main line pressure is monitored, so there is no indication (related to pressure) if each individual feed line is operating. For some manufacturers' systems, if any feed line or bearing is not taking grease, the only visual indication is the lack of grease at the bearing point. In a properly designed system, there are indicator pins on every injector which move in and out as grease is dispensed to visually confirm each individual feed line is operating.

6. DOES THE SYSTEM REQUIRE SPECIAL GREASE?

Some systems typically used for on-road vehicles have a low maximum operating pressure, with small diameter hose/tubing and can only handle grease 000 through 0 (consistency of honey). In addition, if temperatures fall below -10°C, the #0 grease becomes too hard to pump and thinner grease must be used. Alternatively, in warmer climates, the thinner grease will drip away, causing potential damage to the bearings and environmental issues. Systems with higher maximum operating pressures will take any grease 000 through EP2 and can use any #2 chassis grease rated to perform down to -25°C. Also important to note, some manufacturers require you to purchase grease directly from them in order to warranty the system. Others have no restrictions on the brand of grease, which allows you to use your standard in-shop grease and considerably reduce inventory and costs.

In closing, an automatic lubrication system is a valuable tool in reducing the direct and indirect costs resulting from inadequate lubrication, but you need to understand how it works, the different types of systems available and which type best suits your (or your company's) operation style. Most important of all, when sourcing an ALS, ask the questions outlined in this article and you'll be on your way to purchasing a tool that will help maintain your equipment, reduce your costs and increase productivity for years to come. ☐

Mike Deckert, VP of FLO Components, is an instructor of the Lubrication School at Mohawk College and sits on the Conestoga College Advisory Council, Faculty and Board of Directors.