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Every moving part on a machine benefits from timely and effective lubrication to help reduce wear, minimize lubricant consumption and maximize efficiency. These benefits can be more fully realized by introducing centralized lubrication technology to deliver the right lubricant at the right time in the right quantity to the right point of use.

All types of standard and specialized machines can run with centralized lubrication systems. Applications encompass equipment used in a wide range of industries, including automotive, machine tool, metals, printing, paper, food and beverage, mining, chemical, plastics, hydrocarbon processing, refinery and wind energy, among many others. (Commercial vehicles, off-road equipment and rail systems represent viable candidates, too.)

Fig. 1. A centralized lubrication station

In all cases, centralized lubrication feeds lubricant from a central source to the points on a machine or machining system where friction occurs. The goal is to reduce friction and dissipate some of the heat generated by friction. With centralized lubrication, every bearing receives the proper lubricant in an exact amount to minimize wear and promote longer service life. The problems associated with excessive lubrication can vanish, lubricant consumption can fall over time (in some applications by as much as 50% compared with inexact manual methods) and maintenance time, energy and costs can diminish. The only requirements: Refill the lubrication reservoir and occasionally inspect the connected lubrication points.

The potentially staggering number of on-site (and sometimes hard-to-access) lubrication points makes perhaps the most compelling case for implementing centralized (vs. manual) lubrication technology. A customer census, for example, has identified 7500 individual lubrication points for

a paper mill; 5500 for an automotive assembly plant; 4000 for a steel mill; 3500 for a refinery; 2000 for a cement mill; 1500 for a plastics plant; and 1000 for a frozen foods facility. Regardless of the number, centralized lubrication systems foster opportunities to improve productivity and profitability by increasing machinery uptime and keeping maintenance issues in check.

System profiles

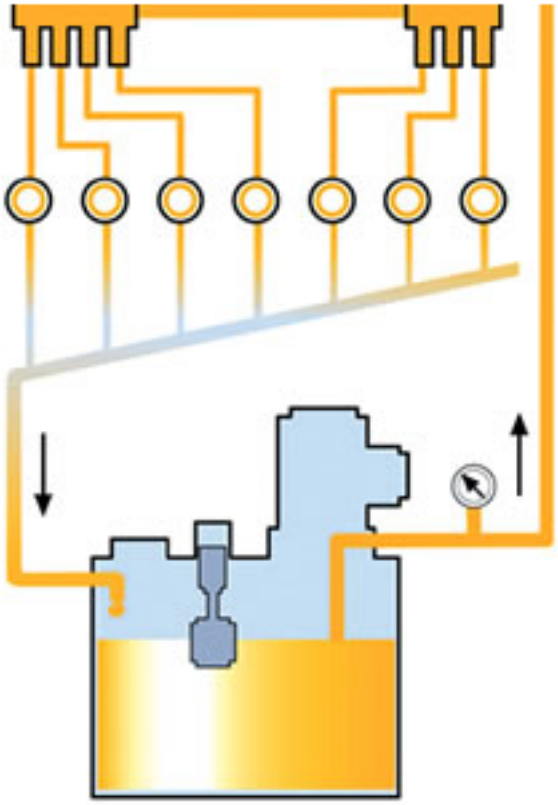

Fig. 2. Typical circulation oil system

Centralized lubrication technology generally falls under two broad "umbrella" categories: *total-loss and circulating-oil* systems.

In total-loss systems friction points are always supplied with fresh lubricant (oil, fluid grease or grease) at specific intervals (time or machine-cycle dependent) during the lubricating cycle (such as pump run time). The lubricant is furnished in the proper quantity at friction points to allow for buildup of an adequate film of lubricant during the subsequent idle period. Over time, the forces of aging, evaporation, bleeding and leaks will contribute to partial depletion of the lubricant at the friction point.

Circulating-oil lubrication systems provide for the lubricant to flow back into the lubricant

reservoir for reuse after passing through the friction points. In this way, the lubricant carries even more benefits as it transfers forces and damps vibrations; removes abrasion particles from friction points; stabilizes the temperature (cooling or heating) of friction points; prevents corrosion; and removes condensate and process water.

Within the total-loss and circulating-oil categories, primary types of installations include single-line, dual-line, progressive feeder and minimal-quantity lubrication systems. Their profiles are as follows:

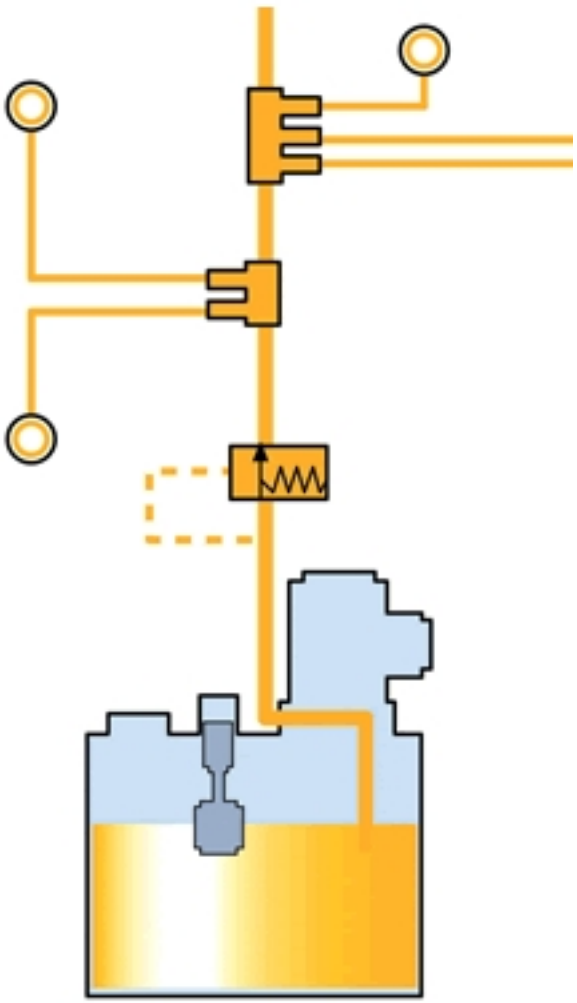

Fig. 3. Typical single-line system

Single-line. . .

These total-loss lubrication systems supply machinery lubrication points with relatively small

amounts of lubricant (oil or fluid grease up to NLGI grade 2) to cover precisely the amount consumed. As such, they operate intermittently as required. Lubricant can be delivered by manually, mechanically, hydraulically or pneumatically operated piston pumps or by electrically driven gear pumps. In single-line systems, lubricant is metered out by piston distributors installed in the tubing system. Exchangeable metering nipples on the distributors make it possible to supply every lube point with the requisite amount of lubricant per stroke or pump work cycle. Metered quantities can range from .01 to 1.5 ccm per lubrication pulse and lube point. The amount of lubricant to be fed to the lube points can also be influenced by the number of lubrication pulses.

The standard layout of a single-line total-loss lubrication system incorporates a pump and spring-loaded piston distributor; main line (connecting to pump and distributor) and secondary line (connecting to distributor and lube point). Performing as a total-loss lubrication system, an oil return line from the lube point to the oil reservoir is unnecessary.

Dual-line. . .

These systems can deliver oil or grease (up to NLGI grade 2) to as many as 1000 lube points (and distribution points can be easily added or removed). They can be configured to run either as total-loss or circulating-oil versions.

Dual-line layouts consist of two main lines with their respective secondary lines and fittings; an electrically driven pump with reservoir; dual-line feeders; reversing valve and control unit.

All the distributors of a dual-line system are pressurized at the same time— resulting in low pressure losses—and the "reset" of the delivery piston is simultaneously the second delivery stroke, which takes place at full pump pressure. This is what makes dual-line versions especially suitable for extended systems and more viscous types of grease. Assemblies with or without compressive seals can be specified to accommodate light and heavy-duty operating conditions.

Progressive feeder…

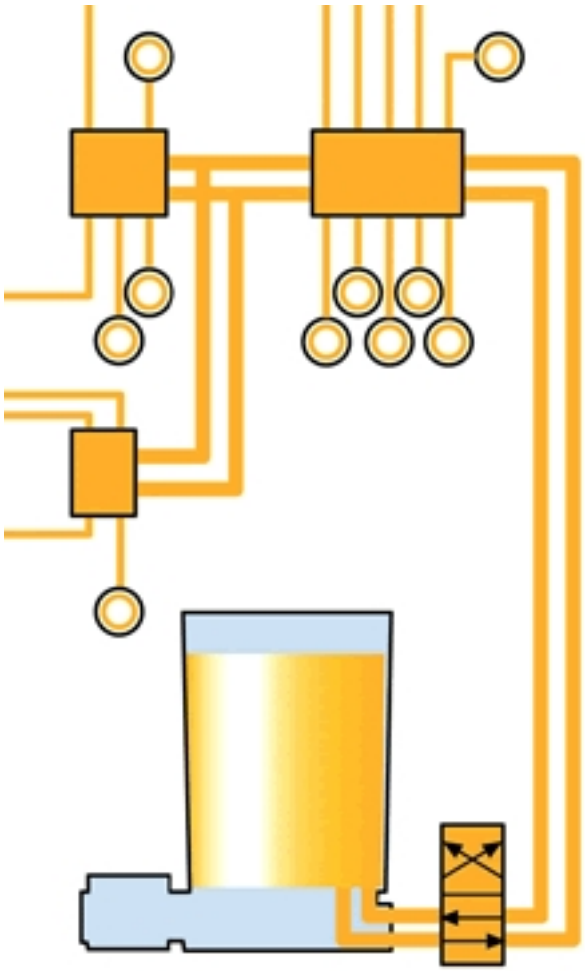

Fig. 4. Typical dual-line system

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