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The Positive Displacement Injector (PDI) lubrication delivery system was developed in 1937 by Lincoln Industrial Corporation (now part of SKF's portfolio and known simply as "Lincoln Industrial").

The PDI (which can also be categorized as a Single Line Parallel system) was designed to accurately displace metered quantities of oil or grease in a cyclical manner in small- to medium-sized industrial equipment.

In contrast to Single Line Resistance (SLR) and Progressive divider-type systems, each metering valve—*or point*—of the PDI can be set independently, adjusted or easily changed without affecting the system design. This allows additional injectors (lube points) to be added into the system later, without the need to re-engineer the entire system.

How This System Works

- All PDI systems utilize either a pull-handle manual or automated pump to force oil or grease into the main line and injectors (connected to each other in a single line) to a pressure greater than 800 psi or 55 Bar.
- In fully automated systems, a pressure switch located at the very end of the main line is

set up to shut off the pump once line pressure is achieved. In manual pump systems, a pressure gauge is often employed— *enabling the operator to see the built-up line pressure and discontinue pumping once suitable pressure is achieved.*

- Each lubrication point requires its own injector and is connected directly to the lubrication point via a secondary delivery line. As lubricant is pumped into the injector under pressure, a fixed displacement piston is hydraulically moved against spring pressure to discharge a fixed lubricant amount into the bearing point.
- With line pressure achieved, all injectors have simultaneously discharged, and pumping action ceases. To reset the injectors, pressured lubricant is diverted through a reservoir relief valve and allowed to “backflow” into the pump’s reservoir. As this occurs, the injectors are spring-returned, allowing lubricant to flow from the loading chamber into the firing chamber, ready for the next lubrication cycle. Once a predetermined time has passed, the entire operation repeats itself.

The Pros & Cons

Because it can be used with oil and grease, does not require much system engineering and allows additional points to be added easily, the PDI system has long enjoyed a reputation as both a versatile and universal system.

PDI systems that use fixed injector-displacement caps are preferred over types that permit the user/operator to readily adjust the piston output via an external adjustment wheel or lever on the side of the injector. User/operator adjustable injectors are easily tampered with—*and can lead to over- or under-lubrication conditions unless they are access-controlled.*

Although a main open-line failure can be detected through a time-out switch located at the end, no secondary-line failure device has been available for these systems. Users must perform system-line integrity checks as part of their PM programs.

Coming Up

The July/August issue of LMT will feature Dual Line delivery systems. **LMT**

For more details on centralized lubrication systems, see Ken Bannister’s book, *Lubrication For Industry* ,

published by Industrial Press, or contact him directly. Telephone: (519) 469-9173; email: kbannister@engtechindustries.com

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