

Trends in Mobile Hydraulics

There are two main trends in today's mobile hydraulics marketplace. One is an initiative by the major component manufacturers to increase market share with their customers through single sourcing. The other trend is to the use of environmentally friendly fluids in hydraulic systems.

Trends in Fluids

In the European market, laws are being enacted to require the use of environmentally friendly fluids. Other terms for these fluids are environmentally safe fluids and biodegradable fluids. Another article in this issue of the *Fluid Power Journal* goes into detail regarding fluid selection for mobile hydraulic systems. Environmentally friendly fluids are covered in that article.

It is expected that the United States will see legislation passed requiring the use of these fluids anywhere where a spill could endanger the environment. The oil companies have already brought many products to market in order to meet government and industry demands. Eaton, Parker, and Bosch-Rexroth, among others, have done extensive testing of their pumps with these fluids. A call to the applications engineering staff at these companies will provide hard data regarding the suitability of these fluids with specific pumps and motors.

To begin with, the agricultural and forestry markets will be pressured to use these fluids. Mobile machinery used in these industries operates in environmentally sensitive areas. If a hose breaks and fluid spews out of the system, there aren't any concrete floors in forests

or corn fields to prevent the leaked fluid from being absorbed into the ground. As result, any spilled fluid is going to have to be biodegradable. Most polyol esters are rated as being 80% biodegradable within 21 days. Vegetable oil based fluids are 100% biodegradable. One key factor in the biodegradability of a fluid is additive package of the fluid. Some anti-wear and anti-oxidation additives present a hazard to the environment; fluids that have additive packages containing these fluids are not environmentally friendly.

Approximately fifteen years ago, the hydrocracking method of processing of crude oil was introduced, resulting in what are termed Group 2 base stocks. Group 2 fluids are biodegradable by virtue of the fact that they are free of many harmful compounds which the old solvent based refining process did not remove from the oil. If the additive package added to a Group 2 base stock is environmentally friendly, the resulting formulation will also be environmentally friendly.

The lubricant manufacturers have also made great strides in the development of vegetable based hydraulic fluids. Early fluids did not have a very broad operating temperature range. Better additives have increased the usefulness of these fluids.

As fluid technology develops and addition legislation is enacted, the use of environmentally friendly fluids will increase.

Trends in Marketing

Two of the largest fluid power manufacturers in the United States, and for that matter, the entire world,

are Eaton Corporation and Parker-Hannifin. Through acquisitions, they have assembled a wide variety of product lines. Both companies offer a comprehensive line of vane pumps, piston pumps, fluid motors, filters, cartridge valves, mobile and industrial valves, hose, fittings and adaptors, as well as industrial NFPA cylinders and the various types of mobile hydraulic cylinders.

The current focus of these companies is to be able to work with a mobile machine manufacturer and provide everything required for the customer's hydraulic system. Not only does this require a broad line of components, it requires breadth within those lines. Because it isn't a "one size fits all" world, it isn't enough to simply make vane pumps. One needs to make little vane pumps, medium sized vane pumps, and big vane pumps. Eaton and Parker have the ability to provide most, if not all, of the components used in a customer's system. This equates to "market share."

There will still be room for other, smaller hydraulic component manufacturers to compete based on product differentiation and service or to serve niche markets. However, the trend for component manufacturers is toward increasing market share with their customers.

Other Trends

"Trends in Hydrostatics" appeared in the 2003 Off-Highway issue of the *Fluid Power Journal*. The trends discussed in the article continue to develop. In short, legislation to reduce exhaust emissions and fuel usage of mobile machinery has spawned the use of microprocessor controlled gasoline and diesel engines. In most cases the microprocessors have leftover processing capacity.

As a result, the resistance to the integration of proportional hydraulic valves has faded. Each year, the use of proportional hydraulics in mobile hydraulic systems increases, thereby increasing the capability, controllability, and efficiency of the machines.

In addition, the introduction of specialized controllers, such as Eaton's Maestro controller, reviewed in the November/December 2003 issue of the *Fluid Power Journal*, will help to accelerate the use of proportional hydraulics on mobile equipment.

A new CAN buss standard was released recently. This standard establishes the protocols for controlling proportional valves over a CAN buss network. Since CAN buss is widely used on mobile machinery, it is only a matter of time before the network is used to control proportional hydraulic valves. Though the few valves on the market that conform to the protocol are oriented toward industrial hydraulics, it is probably only a matter of time before mobile oriented valves are available with on-board-electronics (OBE) that will interface with the network.

In the past year, Command Controls expanded their line of proportional cartridge valves, adding proportional flow controls to their line; Command Controls had offered proportional pressure controls for some time. Early last year Sun Hydraulics released a comprehensive group of proportional pressure and flow control valves. Cartridge valves are used in great numbers, especially in custom manifold circuits, on mobile equipment. It is likely that manufacturers of these valves will continue to expand their offerings, increasing the flow rate capacities

of their lines as well as adding proportional directional controls to the mix. One cartridge valve manufacturer speculated that in the next five years, the cost of proportional directional valves will drop to prices only slightly higher than that of a standard bang-bang directional valve. Perhaps, by that time, cartridge valve manufacturers will have developed a coil assembly that includes CAN buss compliant OBE.

In Summary

Though the fluid power industry is a mature industry, the mobile marketplace continues to slowly evolve, responding to developments in hydraulic and electrical technology and environmental legislation. **FPJ**

