

JULY 2002

# **OEM** Off-Highway

*Product development solutions for the off-road market*

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***While most of the environmental regulatory efforts have been focused on reducing engine emissions, hydraulic systems have also become much more environment friendly.***

**I**n many cases this continued mechanization has been in direct response to a reduced labor force. There are simply fewer and fewer people to do the work. A steady migration of people off the farm and into urban and suburban areas has left only a fraction of the people producing food for an ever-expanding population of nonfood producers. Also a steady drop in the number of people entering the skilled and unskilled labor force has meant fewer and fewer people to build our roads, office buildings and homes. More and more, efficient and productive machines are replacing people.

Concerns about the effect of people and technology on the environment began in earnest in this country in the late '60s and early '70s with the passing of the Environmental Protection Act and creation of the

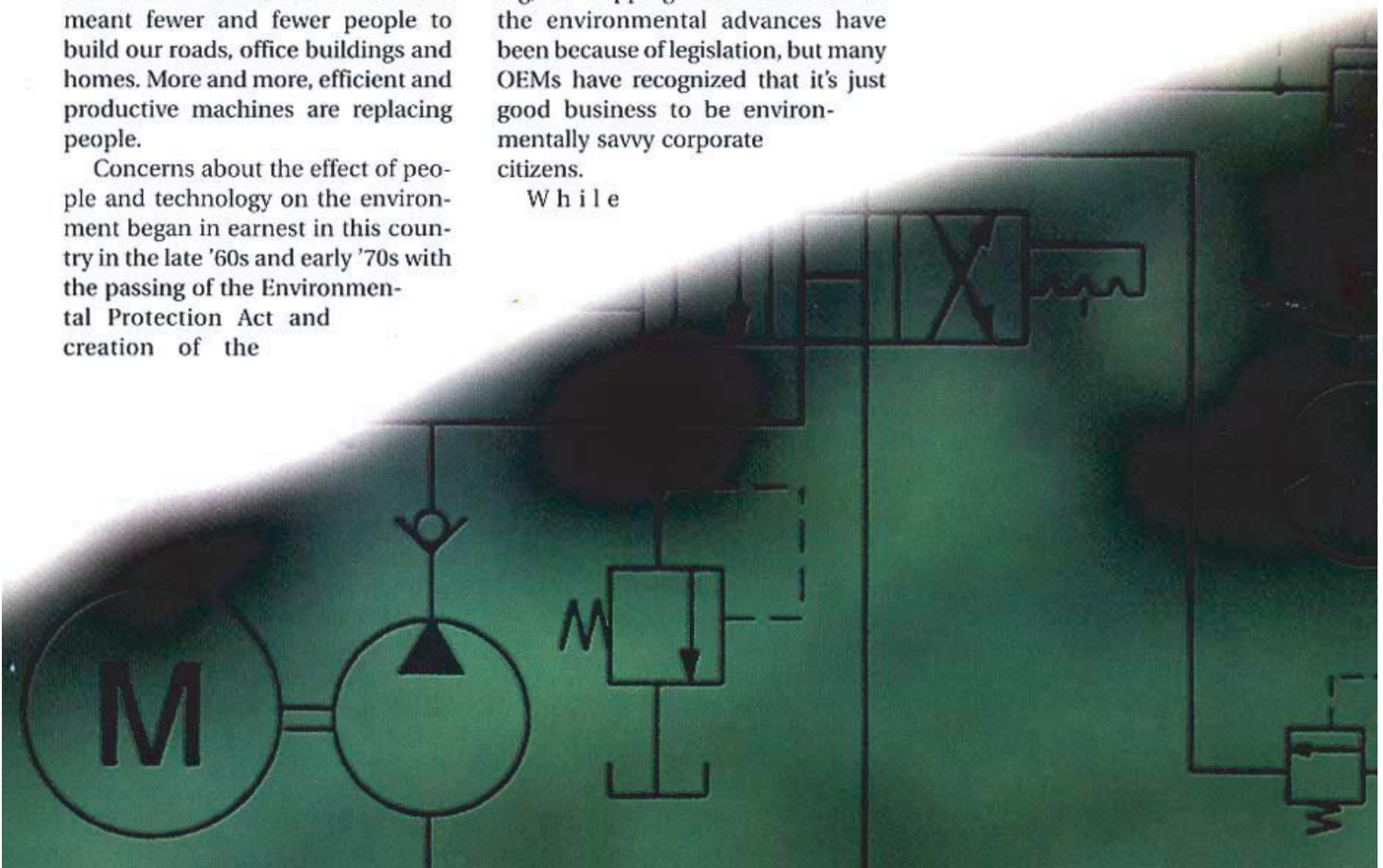
Environmental Protection Agency.

When compared to cars, the contribution of off-road equipment to the pollution of the environment is arguably small, but that has not been the public perception. That is changing. There has been a steady evolution through the past 10 or 15 years toward more environmentally friendly pieces of construction and agricultural equipment. Gone are the days of excessively loud, black-smoke belching, oil dripping machines. Most of the environmental advances have been because of legislation, but many OEMs have recognized that it's just good business to be environmentally savvy corporate citizens.

While

most of the attention lately has been focused on the engine, the hydraulic system has also been an area that has had detrimental environmental effects. For the most part, that is no longer the case.

There are three main areas of hydraulic system design where advances have taken place: noise reduction, leak elimination and hydraulic fluid.





## No more leaks

**O**ver the past decade or so there has been significant improvements in reducing hydraulic system leakage.

"Ten or 15 years ago, hydraulic leakage was considered to be the nature of the beast; it wasn't necessarily acceptable, but it was tolerated. Companies used to build machines with drip pans underneath them. It was just the way it was," says Scott Kane, technical services manager, Parker Hannifin, Cleveland, OH.

This is certainly not the case today. End users are not tolerating any sort of leak in their hydraulic systems. What happened 10 or 15 years ago to spur this change? The answer is pretty simple. Competition. The Japanese were building leak-free machines and North American users were spec'ing that equipment because it didn't leak.

"It made U.S. manufacturers look at the situation and see that we had better get on the ball and do something about it," says Kane.

So what has been done about it? A lot of advances in seal and connector technology, not to mention a general mindfulness to design hydraulic systems and components with the fewest leak points possible, says Marcel Schrage, Parker Hannifin.

An evolution from hydraulic over hydraulic systems to electronic over hydraulic systems has improved the leakage situation. Hydraulic systems deliver high horsepower relative to their weight. With environmental tolerance advances in electronic control and since hydraulic system control is a low horsepower demand we've seen more electronic control in the marketplace

thereby  
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The Aeroquip division of Eaton also has made advances in connector technology. The company's "Snap to Connect" connector technology is designed to eliminate leakage. The threadless connector is designed as an alternative to threaded-type fitting commonly used in fluid power systems with working pressures up to 6,000 psi.



Improved elastomeric seal technology has helped ensure machine reliability and provide better leak prevention. Parker Hannifin's integrated piston, from its Seal Group, combines piston, bearing and seal in a self-contained package. The design helps reduce side load effects in aerial lifts, excavators and other equipment where safety and prolonged service are critical.

the system's potential leak points," says Schrage.

Controlling leaks also goes directly to the bottom line for end users. "Many of the synthetics and fire-resistant fluids used in the industry today can cost \$20, \$30, \$40 a gallon. So it's not only an environmental issue when you talk about leaks, it's extremely expensive for the end users. If you've got several machines that are leaking a couple hundred gallons a month, that's really going to add up," says Kane.