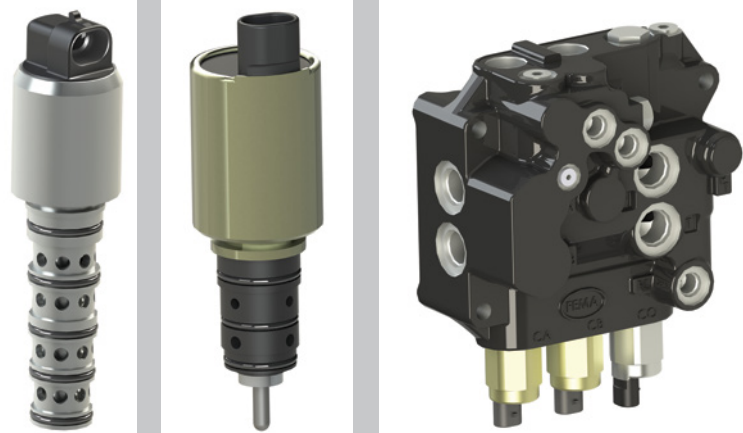


With a heritage in aerospace engineering, FEMA Corp. has developed a growing niche as a supplier of hydraulic components, such as (from left) direct-drive five-way valves, low-frequency proportional valves and electrohydraulic steer-by-wire units.



A GROWING FORCE IN HYDRAULICS

With an aerospace pedigree, FEMA Corp. takes high-tech approach to electrohydraulic valve development

While modern fluid power systems often exhibit a high degree of technical sophistication, seldom are they thought of as Newtonian in scope or complexity.

Yet a company with just that kind of inspiration has been carving out a growing niche in the mobile hydraulics markets as a supplier of electrohydraulic systems and, more recently, a range of standard and customizable hydraulic valves for construction, mining, agriculture, transportation and marine applications.

FEMA Corp. was founded in 1968 by Robert T. Banfield, an aerospace engineer in Southern California and a contributor to NASA's space program. The company's name references Newton's second law of motion — force equals mass times acceleration — and was intended to emphasize the strong technical focus Banfield sought to bring to the hydraulics markets.

Relocating the business to its current location in Portage, Mich., in the 1970s, the company began to make inroads in the fluid power markets with the development of control valves for off-highway powershift transmissions. Later came an electrohydraulic transmission control for a military application along with latching valves for on-highway powershift transmissions, turbine controls and fuel controls. Other developments included brake-by-wire and traction assist systems, electrohydraulic proportional valves, power take-off (PTO) controls and hydraulic sectional valves.

FEMA said a key differentiator for several of its valve products is the suspended armature design derived from aerospace servo valves and refined to meet the durability and reliability demands of the mobile machine market. Similarly, the company's on/off EH (electrohydraulic) valve family incorporates an integrated coil design engineered to deliver high force output in a small package that allows for easier installation in tight machine spaces, FEMA said.

Most recently, FEMA has developed a range of products for general mar-

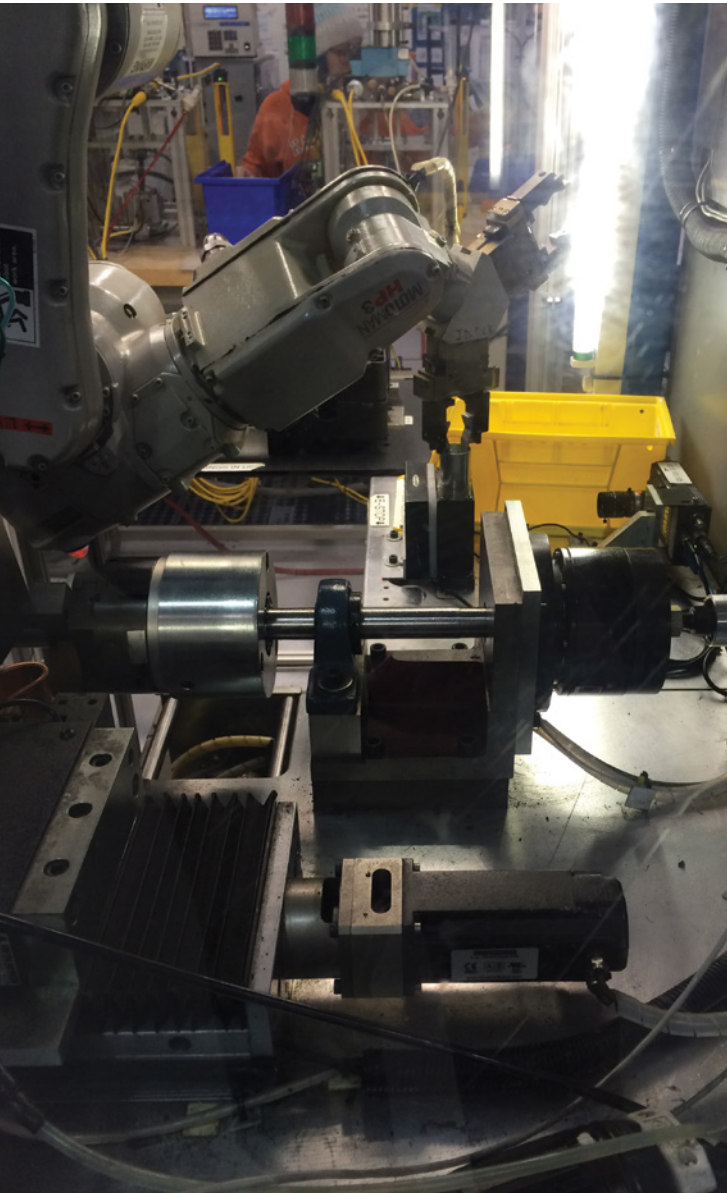
ket applications. These include direct-drive solenoid valves, direct-drive proportional valves, proportional cartridge valves and steering and braking valves actuated by wire only. Many of these can be packaged in aluminum, steel or cast-iron monoblock or sectional valves.

One example is an on/off direct drive solenoid valve available in two positions and two-, three-, four- or five-port configurations. This valve is designed to allow precise spool control, which in turn can be utilized in a number of applications, such as fan drives, transmissions and brake controls.

The direct-drive family is available as normally closed or normally open with an operating temperature up to 248°F. Standard operating pressures can range to 3045 psi with higher pressures available, the company said. Actuating voltage ranges are 12 and 24 Vdc nominal and engineered to actuate in extreme environments. The direct-drive valves can be specified with and without filters, diodes and mounting clamps.

Other products in FEMA's standard portfolio include frictionless modulating valves driven by high-frequency — or straight analog — signals, including pilot valves, PTO valves and two-stage proportional cartridge valves. Valves driven by lower frequency cycle rates of 40 to 300 Hz can be configured as direct-drive proportional valves that are typically used for transmissions, PTOs, brake and sectional control valves and brake cooling as well as direct-drive and pilot control on/off valves.

Customized packages include valves for



powershift transmissions, manifolds, logic valves, precision machining of turned and milled parts, brake-by-wire and full steer-by-wire assemblies.

Along with its product line, FEMA takes a different approach when it comes to sales, as its Application Engineering group is its customer-facing organization rather than a sales or account management team. "The key to success is early involvement in a development process where cost savings can be proposed in the initial design stage," said Jason Schutter, senior manager of Application Engineering at FEMA. "This is a proven strategy that provides long-term benefits to both parties."

FEMA has also taken care to groom its next generation of engineers via a scholarship program through which mechanical and electrical engineers are developed from as early as the high school level through bachelor's, master's and even doctorate levels. Graduates of the program are already proven and experienced employees, FEMA said, and ready to contribute. Approximately 30% of the company's employees are degreed or technical engineers, and approximately 60% of the current engineering staff went through the scholarship program, FEMA said.

These approaches appear to have paid dividends in the marketplace, as the employee-owned company has seen its business grow and has earned high marks by some of its most significant customers. FEMA recently earned its second consecutive Platinum-level certification through Caterpillar's Supplier Quality Excellence Process (SQEP) and was named a Partner-level supplier for 2015 by John Deere as part of Deere's Achieving Excellence Program.

"The aim of our company is to exceed the expectations of our customers," FEMA CEO Jeff Huffman said. "We accomplish this by providing consistently high levels of engineering support and manufacturing excellence." **dp**

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FEMA's Portage, Mich., manufacturing facility incorporates advanced technology, such as robotic manufacturing cells (top) and automated valve assembly stations.