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Fluid Power

University Group Pushes for Fluid Power Research

NFPA joins schools in push for new center

Charles J. Murray
Design News
March 7, 2005

Chicago —An influential group of institutions is proposing creation of an ambitious new research center that could transform the fluid power industry by developing a new generation of compact, efficient components.

The institutions—which include the University of Minnesota, Georgia Institute of Technology, Purdue University, the University of Illinois, Vanderbilt University, the National Fluid Power Association, and others—hope that their effort will reduce hydraulic noise and vibration, eliminate leakage, improve fuel efficiency of vehicles, and even spawn whole new industries.

"This will expand fluid power beyond its current uses in heavy equipment, and bring it into portable, self-powered applications, such as wearable tools and rescue robots," notes Kim Stelson, a professor in the department of mechanical engineering at the University of Minnesota.

Stelson and others in the group have sent a proposal to the National Science Foundation (Arlington, VA) asking for funding to support the Engineering Research Center for Compact and

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Efficient Fluid Power, which would work directly with industry to create technology for a new breed of fluid power components. Engineers in the group say they want to overcome technical barriers—such as excessive weight, bulkiness, noise, vibration, and leakage—that today prevent fluid power from reaching its full potential. With better components, they say, systems that use fluid power could vastly improve fuel efficiency, thus saving billions of dollars a year in crude oil consumption in this country. They point to field tests showing trucks saving 25 to 35 percent by using hydraulic-based regenerative braking systems, and to additional research showing that passenger vehicles could similarly save on fuel costs by employing high-power-density accumulators, which the center would build.

The group proposes to improve fluid power components by developing a new generation of pumps with actively controlled tribological surfaces and with new controls that replace valve throttling techniques. Also, by using composites and integrating components into unified systems, engineers from the group believe weight and volume of fluid power systems can be dramatically reduced.

Ultimately, such advancements could allow the creation of all-new industries, Stelson says. More efficient fluid power systems could be used for space and underwater exploration, as well as for rescue operations and manipulation of nuclear materials.

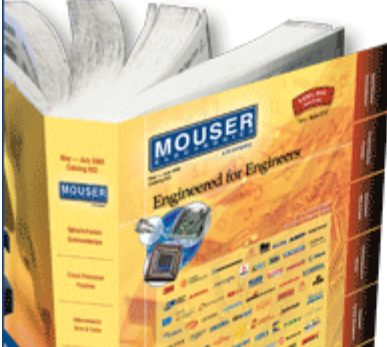
Stelson says that government support is critical in preventing fluid power from going the same way as the U.S. steel and machine tool industries.

"In Europe and Asia, industry works more closely with government, and university research is funded explicitly with the goal of supporting those industries," Stelson says. "In the U.S., there isn't a close tie between industry and government. Research is often sponsored on the basis of who can tell the most exciting story."

The group's initial proposal calls for the Engineering Research Center for Compact and Efficient Fluid Power to be headquartered at the University of Minnesota. Satellite facilities would also be located at Purdue, Vanderbilt, and Georgia Tech. In addition to those schools and the **NFPA**, the center is also being supported by such "Affiliate Outreach Institutions" as North Carolina A&T University, Milwaukee School of Engineering, and the Science Museum of Minnesota.

In March, the university group expects to hear from the National Science Foundation on whether the proposal has drawn interest. If so, group members will be invited to submit a final proposal by mid-June and the center could ultimately be targeted for funding beginning July 1, 2006.

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Central Command: The proposed Engineering Research Center for Compact and Efficient Fluid Power would be headquartered at the University of Minnesota.