



To: NFPA Education Committee
National Fluid Power Association
3333 N. Mayfair Road, Suite 211
Milwaukee, WI 53222-3219

Date: 1/31/08

RE: Status Report on funded Fluid Power Efficiency Student Laboratory

The funds (\$3,900) granted to Montana State University's teaching Fluid Power Laboratory for instrumentation equipment to allow students to study fluid power systems in greater detail, particularly fluid power system efficiencies, were received in August of 2007.

Items purchased from these funds, for the lab, including an Omega handheld data logger, (3) pressure transducers, a flow meter with electronic output, a small power supply, a proportional flow control valve with driver card, and test port quick connect fittings, as well as a few other fittings and hoses, were received shortly after the start of the class in the fall semester of 2007. Additionally, a copy of Automation Studio simulation software was purchased (with other funds) so that students could simulate circuits prior to building and testing. A laptop computer purchased earlier in the summer completed the instrumentation equipment and software which allowed the students to design, simulate, build, and test fluid power circuits.

Lab experiments and tests done with the equipment purchased included:

- Open vs. closed center system pump pressure response time.
- Hydraulic motor efficiency testing under varying loads. (see figure below)
- Hydraulic load control valve (P.O. check vs. counterbalance) response, in the presence of an over-running load. (see figure below)
- Sequence valve and relief valve pressure response.
- Open circuit vehicle transmission flow and pressure characteristics.

Due to the lack of time to prepare additional set-ups and purchase some of the needed fittings and valves for more testing, I feel that the equipment was not utilized as fully as it could have been, however I intend to use this spring and summer to plan new student exercises and acquire the missing items needed. Most tests were conducted on either a hydraulic power unit or a donated Genie lift. Recently, the lab also received a donated skid steer loader which will allow us to test hydrostatic systems in the future.

I believe the students in the class, MET 430 Fluid Power Technology, benefited tremendously from the equipment that you helped to supply. In the process of designing and testing fluid power circuits they were able to record and chart the actual system flow and pressure response in order to understand component response, efficiencies, torques, etc., in a dynamic sense. In comparison to the previous semester during which the course was conducted without the aid of this equipment, student interest, engagement, attitude, and grades all rose markedly.

I am very grateful for the funding assistance, which has been of great benefit to our students. I do apologize for the lack of pictures of students using the lab equipment. Any questions that you may have regarding the lab are always welcome.

**Department of
Mechanical & Industrial Engineering**

P.O. Box 173800
MSU , Bozeman
Bozeman, MT 59717-3800

Tel (406) 994-2203
Fax (406) 994-6292

Regards,

Keith Fisher, P.E.
Assistant Professor
Department of Mechanical and Industrial Engineering
Room 201A Roberts Hall
Montana State University
Bozeman, MT 59717
Ph: 406-994-6288
Email: kfisher@me.montana.edu

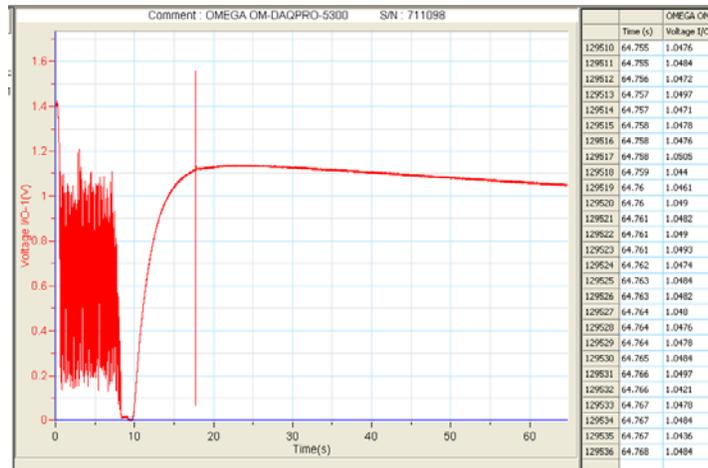


Chart of P.O. Check response to an over-running load captured by the students with the instrumentation.



Chart of Hydraulic motor differential pressure produced by students in the lab.

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