Project organizer: Dr. Qin Zhang
Telephone: (217) 333-9419 Fax: (217) 244-0323
E-mail: qinzhang@uiuc.edu

Development of an educational tool for hydraulic pump maintenance and fault diagnosis

A fault diagnosis test stand was designed and built before the start of this work in Septemer 2004. During fall 2004, data was collected from this hydraulic pump test stand for use in evaluating fault detection methods. A diagram of the hydraulic circuit is illustrated in Figure 1. This test stand was designed to record system pressure, flow, vertical and horizontal vibration of the pump, temperature of the fluid in the return line, and temperature of the reservoir fluid during pump failure tests using the National Instruments LabView software for data acquisition. Pump failure was accelerated using silica sand added to the reservoir fluid. When contamination was added to the system, the filter in location G of Figure 1 was removed. Two fixed displacement vane pumps (V10-1P1P-A20, Vickers, Eden Prairie, MN) were tested and the data collected from these pump failures was used to develop a vane pump fault detection technique. Vane pumps were used for this study; however, the test stand can be used to record the operating parameters during failure of other pump types.