

Versatile Test Rig

Automatizing testing of pneumatic valves designed for train brakes.

The tests can be more reliable, cheaper and up to 60 times faster by automatizing the testing of the pneumatic valves. This was achieved in a master thesis done at Faiveley Transport by modifying an existing test rig, called the Delhi Metro Rail Cooperation Test Rig (the DMRC Test Rig). A method to test the pneumatic valves was developed.

Improvements

Currently every valve has to undergo a long process of testing before it can be delivered to the customers. Each valve has its own specific test rig which is manually operated by employees. For some valves it can take up to 2 hours just to check if a valve is properly working. Using this new developed method for testing the valves can reduce the time down to 2 minutes for the same test and also replace most of the existing test by one.

In the endurance test, the test rig is manually built and designed for the specific valve. When a valve change occurs the rig has to be rebuilt. During the test no data is saved. In the DMRC Test Rig the data from every cycle is digitally stored, which can be reviewed and compared. This leads to a more reliable result. When a valve change occurs in the DMRC Test Rig, it does not need to be rebuilt

The DMRC Test Rig

The DMRC Test Rig has several pneumatic valves and transducers built in used for controlling and measuring the testing valves. The built in valves are connected to the PLC system which is run by ladder code. The whole test rig is then controlled by the PC connected to the PLC system. The operating program in the PC is written in Java which

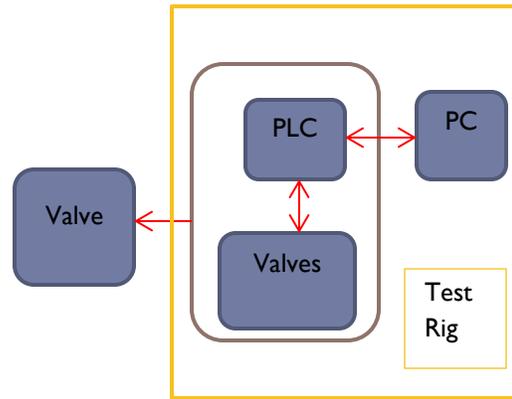


Figure 1 Rig Setup

is a relatively easy programming language. Figure 1 presents an overview over the complete system.

To add new valve tests to the DMRC Test Rig it is required to add new code to the existing Ladder and Java code. This can be done fast once it has been done before. Comparing to the existing method, a complete new rig has to be built which is costly and time consuming.

Benefits & Further Development

The DMRC Test Rig has several advantages such as cost efficient, space saving, faster, flexible and reliable. The stored data can be used in many applications such as improving the design of the valve, benchmarking etc. It opens a wide variety of possibilities to test the valves, which the old rigs are not even close by doing.

However, there are still many parts on the DMRC Test Rig that needs to be improved and further developed for this to become complete. Figure 2 presents the DMRC Test Rig at Faiveley Transport. During the development some valves have been tested which showed a positive results.



Figure 2 The DMRC Test Rig