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Use of the Pneumatic Hydraulic Hybrid Module in the Technical Training of Students of IFRJ – campus Duque de Caxias

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Abstract: The hybrid Hydraulics and Pneumatics Module (HDP) at the Process Laboratory of the [1]Instituto Federal de Educação, Ciência e Tecnologia do Rio de Janeiro - campus Duque de Caxias, was presented. Before the presentation of the module above to students of technical courses at IFRJ – campus Duque de Caxias, there was the restoration of several parts belonging to the module that are essential for carrying out work activities. The exhibition was aimed at students at the institution studying chemistry, plastics, oil and gas; and information technology and open to the external public in general with an approach to both functional and operational aspects, informing the handling and conditions necessary to carry out the proposed activities. In the preparation stage of the training, its scope included everything from the project to the execution of the activities, as well as knowledge of safety standards relevant to the good use of all parts of the equipment. It is important to highlight that the module includes activities related to various disciplines of technical courses such as automation, hydraulics, metrology, and electrical, which is of great importance in the training profile of students in the various technical courses on campus.

Keywords: Hydraulics and Pneumatics Module; Industrial Processes.

Adherence to the BJEDIS' scope: This work is based on an industrial training module for students that provides subsequent data analysis and creates a work checklist.

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1. PRESENTATION

The hybrid module is capable of integrating pneumatic, electromechanical, and hydraulic products, filtration, seals, and components for fluid conduction and control. It was designed to allow technology to be learned easily, and quickly. The teaching kits made up of magnetic symbols that accompany the equipment are an excellent pedagogical tool for creating diagrams of the processes that will be carried out in the module.

All existing courses at IFRJ - campus Duque de Caxias are considered with the potential that the bench offers in associating practice and theory simply and punctually, playing an important role in training students and future professionals (Figure 1).

Figure 1. HDP Pneumatic and Hydraulic Module Equipment in the Industrial Processes Laboratory.

Among the various subjects that can be explored in the module, we can highlight knowledge related to hydrostatics which is part of physics, nomenclature of valves and pumps which is part of hydraulics, pneumatics and automation, units, measurement conversion, and calibration which is covered in metrology among others. Practically all technical courses on the Duque de Caxias campus are covered by the use of the module.

Some points related to the maintenance of the hybrid Hydraulics and Pneumatics module were extremely important for the recovery of the equipment that was inoperative. It started with the external cleaning of the bench due to the accumulation of dirt, reconnecting the circuit breakers and the electric motor thermal decoupling the gear pumps to check the alignment and direction of rotation, and testing the electric motor.

In addition, the motor pump set was assembled and tested with load, bleeding the circuit to remove all air from the system, analyzing the quality of the ISO VG 32 oil using the instrument called Oil Check, and checking the oil level in the reservoir.

Finally, it was necessary to monitor the pressure regulating valves (system safety) and the regulating valve and flow rate (actuator speed). All tests were satisfactory and met expectations regarding the perfect use of the equipment.

2. CONCLUSION

The module proves to be an excellent teaching tool in the technical training of students at the IFRJ - Duque de Caxias campus, even though it still has more potential to be explored. There are plans to install a compressed air line that will be very useful in the future more specific training related to the assembly of pneumatic circuits and addressing the benefits and costs of operation/maintenance.

CONFLICT OF INTEREST

There is no conflict of interest.

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