

PETROLEUM TECHNOLOGY

December 2013 Newsletter

The end of the second fall semester is upon us. Students studied for and took finals, and the weather is cold.

In order to continue to provide the best possible education, the faculty attended an IDEC-sponsored 2-day training event on Programmable Logic Controllers (PLC), in Andrews, Texas. The PLC training also used the IDEC manufactured PLC units. The PLC training used a specialized training unit (illustrated below), giving the faculty opportunities to work with elements used in phases of the Petroleum Technology field as well as the Process Technology field. The various control and feedback elements which were covered in the course included motor control and motor feedback, temperature sensors, timing, light and switch controls, arranging control elements on a touch screen control panel, and data collection and transmission. The concept of data collection into the PLC memory and transmission via an email or radio signal is an essential element of the present state of industrial controls throughout industry. With the ability to send data via an email, the PLC becomes indispensable for use in remote locations.

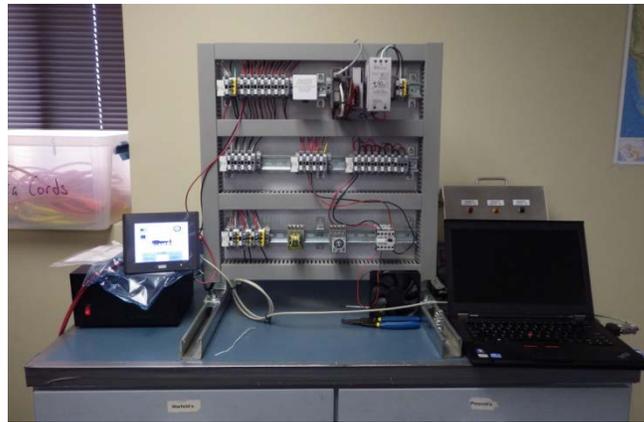
The trainers used for the IDEC course were a more compact unit than those built by the students.



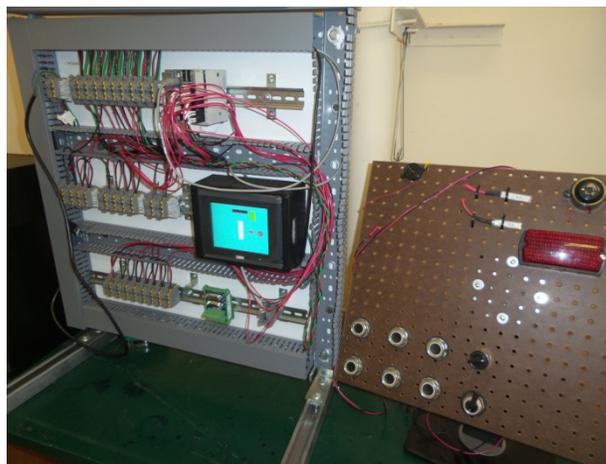
(Left) this is the type of unit used in the PLC training course by IDEC. Note, the two pulleys on the left hand side; these are a motor and a counter. The lights, buttons, and motor are items programmed by the PLC unit which is just above the small pulley. Remember a PLC is like a small computer.

The students performed the steps to fabricate the complete unit layout: drilling of holes, tapping the holes for 1/4" x 20 bolts through the 3/16" thick panel; installing the wire channel (grey tracks across the perimeter), installing the 'din' rail supports and the "din" rail (the din rail is a metal track onto which PLC components are mounted); placing the PLC components including fuses, connector blocks, wires; and testing the completed unit. Repairs were made where needed to address loose wires, incomplete junctions, etc.

The initial models for the design were the PLC trainers used at the Midland, Texas Chevron facility. The Petroleum program went a step further to reduce the footprint of these units by incorporating the visual control element, the Human Machine Interface (HMI) into the actual trainer panel (lit screen on the second illustration below).



(Above) this is the PLC trainer with the HMI (Human Machine Interface) in place, which is how one can "talk" to the PLC. Compare this with BELOW, which is the PLC trainer used by Chevron. To the left of the PLC trainer is the HMI as a separate component on the desk.



(Above) Student fabricated PLC trainer. The grey channels are the locations where the wiring is located, keeping the panel neat. The HMI is the lighted panel on the right hand middle of the panel. With the HMI, which features a touch screen, students are able to control functions right on the trainer. Controls (switches, buttons, lights, and buzzer) are located to the right of the unit on a section of "PEG Board", allowing easy change of functions.