

## SOLVING THE PROCESS TECHNOLOGIES SKILLS-GAP IN TEXAS' UPPER PANHANDLE

Companies in Texas' upper panhandle are in dire need to fill a skills-gap and train employees in various disciplines, especially process technologies and instrumentation due to the strong presence of refineries. A local institution, Frank Phillips College of Borger, Texas, applied for and received a JET grant to purchase equipment for their Career and Technical Education Program, including a Process Technology program. The learning systems were purchased from Amatrol, the world's leader in skills-based, interactive technical learning. In the past calendar year, 250 students have received process technologies training and the program is lauded by local companies. In fact, Phillips 66 has been so impressed with the program that they have brought in components from their plant, interfaced Amatrol's units with banana jacks, and showed plant specific devices and PLCs.

### INTRODUCTION AND PROBLEM DEFINITION



Frank Phillips College in Borger, Texas, named after the founder of Phillips 66, is a community college that serves the ten northernmost counties of the Texas Panhandle. These counties are home to 85,481 residents (2015 US Census estimate) spread across 10,000 square miles. This sparse population density (8.5 citizens per square mile versus 79.6 per square mile in the rest of Texas) makes higher education and training opportunities difficult due to the inconvenient distances between residents and training centers. In fact, when these ten counties are compared against the US average, the population has a drastically lower percentage of High School graduates or higher (78.8% versus 86.7%) and Bachelor Degree or higher (19% versus 29.8%) (2010 US Census). Speaking to this problem, the College has stated that, “(Local) Individuals possess a solid work ethic, but low levels of education attainment and income characterize the service area. Frank Phillips College is the only hope many area residents have of breaking the cycle of poverty and unstable employment.” (Department of Education Grant Application 2003)

This same area is home to several companies such as Chevron Phillips Chemical, Hilmar Cheese, North Plains Electric Cooperative, and others. Speaking to the needs of these companies, David Carr, Dean of Career and Technology at Frank Phillips College, stated, “This new generation of technical workers is required to know more than ever and be proficient in a variety of skills. Locally, there is a growing petrochemical industry with refineries, oil and gas process facilities, and dairies and cheese processing facilities.”

### SOLUTION

Working with local companies like Chevron Phillips Chemical, Hilmar Cheese, Phillips 66, and Solvay, Frank Phillips College discovered a need for additional skilled workers, especially in the oil and gas industry and specifically hands-on instrumentation and process technology skills. Additionally, in the words of Tim Fangman, an instructor at the College, “These companies informed us that these skilled workers needed specific hands-on training that Amatrol equipment could provide.”

In order to fill the needs of local industries, Frank Phillips College applied for a Jobs and Education for Texans (JET) grant and received funding. According to an article from the Borger News-Herald, “the grant will be used to purchase equipment for Frank Phillips College’s Career and Technical Education Program,” which included, “a large set of equipment to train for Process Technology.”

This Process Technology equipment was purchased from Amatrol, a Jeffersonville, Indiana-based developer and manufacturer of technical education curriculum and industrial simulators. Specifically, the equipment included:



**Level / Flow Process Control Learning System (T5552):** Hands-On simulator with interactive multimedia curriculum that teaches users two of the most common types of process control systems, flow and liquid level, and the basic concepts on which other systems are based



Figure 1: Level / Flow Process Control Learning System (T5552)

**Temperature Process Control Learning System (T5553):** Hands-On simulator with interactive multimedia curriculum that allows users to practice calibrating, adjusting, installing, operating, and tuning thermal process control systems in industrial applications



Figure 2: Temperature Process Control Learning System (T5553)

**Analytical Process Control Learning System (T5554):** Hands-On simulator with interactive multimedia curriculum that covers controlling and modifying the chemical properties of a substance, which is important to industries such as pharmaceutical companies, beverage companies, and refineries



Figure 3: Analytical Process Control Learning System (T5554)

**Pressure Process Control Learning System (T5555):** Hands-On simulator with interactive multimedia curriculum that covers the ability to control liquid level and tank pressure simultaneously using a human machine interface (HMI), programmable automation controller (PAC), and variable frequency drive (VFD) that are found in real-world industrial fields such as pharmaceutical, bio-technology, and power generation



Figure 4: Pressure Process Control Learning System (T5555)

**Portable PLC Combined Troubleshooting – Allen-Bradley CompactLogix L32 Learning System (990-PAB53F):** Hands-On simulator with interactive multimedia curriculum that covers PLC-based skills and troubleshooting for thermostatic temperature control, analog temperature control, reversing constant-speed motor control, variable speed motor control with feedback, and stepper motor homing and commissioning



Figure 5: Portable PLC Combined Troubleshooting – Allen-Bradley CompactLogix L32 Learning System (990-PAB53F)

**PLC Process Control – Allen-Bradley CompactLogix L32 Learning System (99-PCAB53):** Hands-On simulator with interactive multimedia curriculum that allows users to perform skills designed to teach the basics of PLC-based process control and its various applications; this system covers on/off and open loop control methods by connecting the 990-PAB53F to the T5552

Additionally, Frank Phillips College utilizes the following expansions to these learning systems: Proportional–Integral–Derivative (PID) Controller Module; Orifice Plate Flow Transducer; and Smart Flow Transmitter.

Frank Phillips College also uses Amatrol’s highly-detailed curriculum, which has been endorsed by several organizations, such as the National Institute for Metalworking Skills (NIMS) and the Manufacturing Skill Standards Council (MSSC), to prepare for their nationally-recognized certifications like MSSC’s Certified Production Technician certification and NIMS’ Industrial Technology Maintenance and CNC Machine Operator certifications. Amatrol’s learning content is created using the best instructional design practices to provide successful training outcomes. Amatrol’s learning systems utilize a learn-then-do approach that curriculum uses text, narration,

stunning animations, and video to appeal to a wide range of learners.

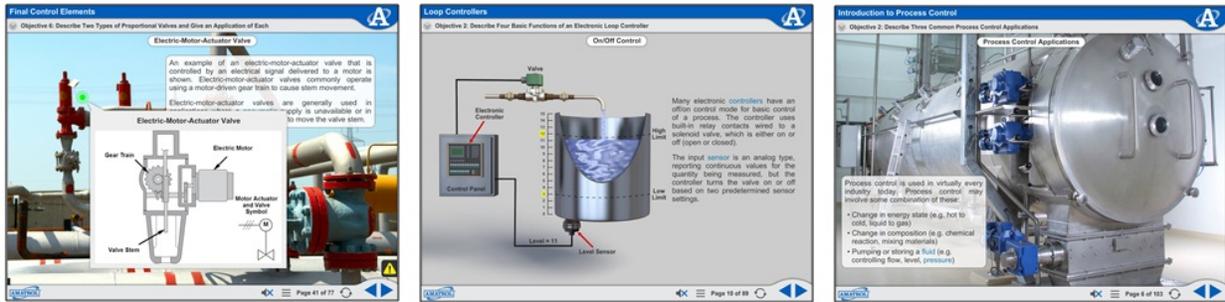


Figure 6: Amatrol's Process Control Multimedia Curriculum

## OUTCOMES

The above-listed systems and curricula combine to form Frank Phillips College's Process Technology Certificate program, which has been, "praised by industry for the quality of students graduating from (this) program." Specifically, Fangman stated, "The four companies involved (Chevron, Solvay, Hilmar, and Phillips 66) have praised us for highly technical hands-on training in the instrumentation and process technology field."

Over the past year, 250 students and employees from local companies have completed the Process Technology Certificate program. Fangman said, "This is a very significant number of people going through our training program compared to the average of 100 students that we normally have. We have seen a significant number of current, local industry employees enrolling in our programs."