



Client Profile: Keurig Green Mountain Coffee Roasters

Programmable Logic Controllers (PLC) Course

The Need: Keurig Green Mountain Coffee Roasters (GMCR) approached Invista Performance Solutions (IPS) because they wanted to increase the effectiveness of the technicians on their troubleshooting team by giving them a working knowledge of how PLCs (Program Logic Controllers) work, and how they are implemented into GMCR's manufacturing processes. GMCR had recently bought several new machines which are all controlled by PLCs.

PLCs are industrial computer control systems that continuously monitor the state of input devices and make decisions based upon a custom program to control the state of output devices. At GMCR their technician team needed a better understanding of how to operate and troubleshoot PLCs on the machines that produced their products.

IPS hired Landon Johnson, an instructional designer and trainer, because of his expertise in engineering & technology and his experience with several of our other clients in the technical and manufacturing industries on various projects. Landon conducted a needs analysis that included inventory and close observation of GMCR's new equipment. The needs analysis was a critical part of this process because it helped determine that some of the machines were not operating at full capacity.

In addition, Landon designed a written mathematical assessment for the technicians that included 20 questions about basic math and logic. The results of the assessment demonstrated that the technicians all had different levels of knowledge regarding the programming process of the new machines. The instructor was able to use this information in the program design process.

The Solution: Landon crafted and designed a 40-hour interactive course for the 8 technicians that was conducted over 10-weeks. The training program centered around the following learning objectives:

- Create rudimentary PLC programs to solve real-world problems
- Troubleshoot a PLC program
- Troubleshoot field devices and interconnections
- Describe and understand why and how field devices typically fail
- Sharpen overall troubleshooting skills/own a troubleshooting plan
- Analyze how a PLC program interfaces with production machinery

The interactive training program included a simulated learning environment with the following teaching techniques:

- Weekly quizzes were given to the technicians that included solving practical problems typical to the GMCR work environment
- The training was delivered in a conference room at GMCR directly above the factory floor allowing the technicians to access and view the equipment discussed in class making it more practical and real
- The course utilized PLC textbooks and software that simulated the PLC programming process
- The software was loaded onto mobile laptops, supplied by IPS, and tailored to real situations that the technicians experience in their daily work

The End Results: At the end of the 10-week course, all 8 of the technicians passed the final written exam that included basic mathematical equations and questions based on the simulated software program initially uploaded onto the laptops. All 8 technicians received a certificate of completion by successfully demonstrating the following skill-sets:

- Accurately using the functions of a PLC when performing a diagnostic test to improve functionality
- Increased troubleshooting efficiency
- Faster set-up times
- Enhanced safety techniques

IPS delivered evaluations at the end of the course to all 8 employees that took the PLC Training Course. The following data and results were captured:

- 100% of the participants would recommend the course to someone else
- 100% of the participants rated the instructor as excellent
- 95% of the participants will use what they learned on the job

The instructor submitted a written summary to GMCR relating to the initial intake assessment of the employees with data that represented the starting level of the employees and their knowledge of the PLC process as well as the final outcome of the training.

At the completion of the course, Landon Johnson, the IPS instructor, said:

"At the end of this course it was clear that the ability of the technicians to expand their scope of expertise resulted in increased troubleshooting efficiency, leading to reduced downtime, more effective repairs, and increased throughput."

IPS is proposing to provide a Level 3 Evaluation at GMCR, which involves evaluating the extent to which the training participants have applied their new knowledge and skill back to their work and what effect this has had on their work performance. This level of evaluation is conducted post training and will help establish the "business value" the training has had for GMCR.