DC Shovel Electrical Systems Training

**Course Duration**
4 days

**Target Audience**
Electricians, Technicians and Engineers who service and maintain P&H Mining shovels.

**Description**
The student is introduced to the operation and maintenance of the P&H Electrical mining shovel. Furthermore the course focuses on critical knowledge and skills required in supporting present day P&H Electrical mining shovels. Topics included are the Centurion DC Shovel Control System. The concepts that are covered in the classroom are reinforced in a laboratory environment that allows the students to load, install and configure application software.

**Prerequisites**
Students should have knowledge of power electronics and computers. It is suggested that students complete Power, Drive and Control System elearning training modules.

**Course Location**
Milwaukee Training Facility

**Course Objectives**
Upon completion of this course the student will be able to:
- Identify and explain the purpose of all the major components utilized.
- Use application software and programs as required.
- Remove and replace faulty components including a failure analysis.
- Explain the inter-relationship of the shovel systems.
- Analyze schematics and control diagrams utilized for troubleshooting and repair.

**Main Concepts**
- DC Power Systems Overview
- Drives Windows overview
- AC800M (Advant Controller 800) Hardware overview
- Control Builder overview
- Auxiliary Systems Operation
- System Maintenance and Troubleshooting
Day 1

Course Introduction
- Pre-assessment
- General safety
- ESD

Electrical System Diagrams
- Systems diagram overview
- Shovel schematics
- Use of the index
- Use of location codes
- Reading P&H Schematics
- Schematic Exercises

Touch Panel & GUI Systems
- Touch panel navigation
- Touch panel software tools and calibration
- Touch Panel Navigation Lab

DC Power Systems

SCR (101)
- Theory of operation
- Basic Troubleshooting Techniques

Converter Operation
- Theory of operation
- Shovel Configuration
- Troubleshooting
- Student lab activities

Diverter Operation
- Theory of operation
- Shovel Configuration
- Troubleshooting
- Student lab activities

RPC Operation
- Theory of operation
- Program Configuration
- Troubleshooting
- Student lab activities

Day 2

Drive System Hardware Overview
- DCS600 Circuit board operation
  Or
- DCS800 Circuit Board Operation

Drive PC Tool Software
- Drives Windows overview
- Student Lab Activities

Advant Controller 800 and Remote I/O
- Advant Controller Components
- Remote I/O Components
- Control builder overview
- Monitoring I/O Status
- Student Lab Activities

Day 3/4

Auto Crowd Belt Tensioning System (4100XPC)
- Theory of operation
- Hardware overview
- Troubleshooting

Student Lab Activities
- AC800 Procedures
- Drive Procedures
- Install I/O stations
- Verify connectivity
- Test Inputs
- Test outputs
- I/O system troubleshooting

Shop Tour

Course Evaluation and Wrap
- Post –assessment
- Course evaluation