



## DC Shovel Electrical Systems Training

### Course Duration

3 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

Field

### 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 System overview
- Drives Windows overview
- AC800M (Advant Controller 800) Hardware overview
- Control Builder overview
- Auxiliary Systems Operation
- System Maintenance and Troubleshooting

## 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)

- Basic theory of operation
- Basics troubleshooting techniques

### P&H Converter Configuration

- Theory of operation
- Hardware overview
- SCR Troubleshooting 101

### Diverter Circuit

- Theory of operation
- Hardware Overview
- Basic troubleshooting
- *Student worksheets*

### RPC

- Theory of operation
- Hardware overview
- *Student worksheets*

## Drive System (DCS800or DCS600)

- Theory of operation
- Hardware overview
- *Student worksheets*
- *DriveWindows procedures*

## Advant Controller 800 and Remote I/O

- Advant Controller Components
- Remote I/O Components
- Control builder overview
- Monitoring I/O Status
- *Student worksheets*
- *Controller loading procedures*
- *I/O System troubleshooting*

## Air System

- Theory of operation
- Hardware overview
- Troubleshooting
- *Student worksheets*

## Brake System

- Theory of operation
- Hardware overview
- Troubleshooting

## Automatic Lubrication System

- Theory of operation
- Hardware overview
- Troubleshooting
- *Student worksheets*

## DC Motors

- Theory of operation
- P&H Motor Types
- Maintenance inspections/procedures

## Course Evaluation and Wrap

- Post –assessment
- Course evaluation