



## Blast Hole Drill - Mechanical Systems Course

### Course Duration

The duration is 3 days (24 hours), and accommodates 7-8 students per session.

### TARGET AUDIENCE

This course is targeted to Mechanics, Technicians and Engineers who will service and maintain P&H Mining Blast Hole Drills.

### Description

The course participants are introduced to the operation and maintenance of the P&H Electrical Blast Hole Drills. All Structural, Mechanical and Hydraulic systems are covered. Cab controls are discussed in detail.

Each class covers a system or a subsystem. After each class, real life or potential problems are discussed.

### Prerequisites:

Students should have a basic knowledge of hydraulics and mechanics.

### Course Location

On site, Mine Pro or customer location.

### Course Objectives

Upon completion of this course the student will be able to:

- Identify and explain the purpose of all the major components utilized.
- Identify controls in the cab
- Locate information about the Preventive and Regular Maintenance procedures in the Mechanical Systems Manual.
- Explain the relationship between PLC and the rest of the Drill systems.
- Analyze schematics and control diagrams utilized for troubleshooting and repair.

### Main Concepts

- Machine structural components (mast, main deck, crawler frame)
- Power Unit
- Main Air and Auxiliary Air Systems
- Main, Auxiliary and Low Pressure Hydraulic Systems
- Water Injection System
- Rotary Carriage and Pipe Handling
- Automatic Lubrication.
- Auxiliary Winch



<b>Course Plan</b>		
<b>(Day 1)</b>	<b>(Day 2)</b>	<b>(Day 3)</b>
<p><b><u>Course Introduction (1/2h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Introductions</li> <li>▪ Class Objectives</li> <li>▪ General on site safety</li> </ul>	<p><b><u>Module 6.00 Main Air System and Compressor Lubrication (4h)</u></b></p> <ul style="list-style-type: none"> <li>▪ All components including PLC involved with main air system are discussed.</li> <li>▪ Air compressor lubrication</li> <li>▪ Air inlet valves (GD Only)</li> <li>▪ Pump relief valve, Oil cooler, T-Tank</li> <li>▪ Butterfly valve,</li> </ul>	<p><b><u>Module 8.20 Low Pressure Hydraulic System (1h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Electric motor, piston pump</li> <li>▪ Valve bank #4</li> </ul>
<p><b><u>Module 1.00 Drill Safety and Drill Systems Introduction (1h)</u></b></p> <ul style="list-style-type: none"> <li>▪ General information, safety web sites</li> <li>▪ Safe operating practices</li> <li>▪ Safety decals and signs</li> <li>▪ Drill systems description</li> </ul>	<p><u>Lunch</u></p>	<p><b><u>Module 9.00 Automatic Lubrication (1h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Description, AC drive motor, grease pump, injectors, logic of operation.</li> </ul>
<p><b><u>Module 2.00 Preventive Maintenance (1h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Preventive maintenance intervals and procedures</li> </ul>	<p><b><u>Module 7.00 Water Injection System (1/4 h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Water tank, pump, valves, plumbing, PLC</li> </ul>	<p><b><u>Module 10 Rotary Carriage Assembly (1h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Motors, transmissions, resolver, drive pinion, eccentric bushing, pull down brake ...</li> </ul>
<p><b><u>Module 3.00 Controls in the Cab (1h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Describe every button, lever and display in the Cab</li> <li>▪ Touch panel and GUI</li> </ul>	<p><b><u>Module 8.00 Main Hydraulic System (2h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Main pumps, motors</li> <li>▪ Propel transmission, brakes</li> <li>▪ Optional tow package</li> </ul>	<p><b><u>Module 11 House pressurization (1/2h)</u></b></p> <p><b><u>Module 12 Auxiliary winch (1/2h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Hydraulic motor, winch, brake</li> </ul>
<p><u>Lunch</u></p>		<p><u>Lunch</u></p>
<p><b><u>Module 3.00 Controls in the cab continued</u></b></p> <ul style="list-style-type: none"> <li>▪ Brief description of hole drilling techniques</li> </ul>	<p><b><u>Module 8.10 Auxiliary Hydraulic System (4h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Auxiliary pump, valve banks</li> <li>▪ PLC, Unloader/Diverter, Pipe Racks, Dust Curtain, Mast Hoist, Auxiliary Winch, Mast Anchor Pins, Back Brace Lock, Deck Wrench, Breakout wrench, Leveling Jacks</li> </ul>	<p><b><u>Module 13 Air Conditioner (1/4h)</u></b></p> <ul style="list-style-type: none"> <li>▪ General description</li> </ul> <p><b><u>Module 14 Top off System (1/4h)</u></b></p>
<p><b><u>Module 4.00 Cable reel (1/2)</u></b></p> <ul style="list-style-type: none"> <li>▪ Description</li> <li>▪ Hydraulics, adjustments</li> </ul>		<p><b><u>Module 15 Optional Equipment (1/2h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Hydraulic boarding ladders</li> <li>▪ Jib crane</li> </ul>
<p><b><u>Module 5.00 Power Unit (1/2h)</u></b></p> <ul style="list-style-type: none"> <li>▪ Main Motor</li> <li>▪ PDT</li> <li>▪ Main air compressor</li> </ul>		<p><b><u>Course Evaluation and Wrap up (2h)</u></b></p>