



77XR Blasthole Drill – Electro/Mechanical Systems Training

Course Duration

Five days, 40 hours (Additional one day (8) for none English speaking customers allowing time for translation).

Target Audience

This training is targeted for Electrical and Mechanical Maintenance and Supervisory personnel responsible for preventive and corrective maintenance, troubleshooting and servicing of P&H 77XR Blasthole drill.

Description

The course introduces the technicians to the operation, troubleshooting and maintenance of P&H 77XR Blasthole drill. It focuses on critical knowledge and skills required in supporting 77XR Blasthole drill. All electrical and mechanical systems and adjustments are discussed. Recommended preventive and corrective maintenance procedures and practices are also covered.

Prerequisites

Technicians should have a basic knowledge of electrical and mechanical terminology and practical experience with maintenance equipment.

Course Location

Field.

Course Objectives

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

- Recognize safety hazards associated with inspection, repair and maintenance of blasthole drill electrical and mechanical systems.
- Identify controls in the cab.
- Identify and describe general purpose of all electrical and mechanical systems.
- Use machine and automation GUI screens to locate relevant information.
- Identify and use available P&H reference material, such as Maintenance Manuals and Schematics to troubleshoot, repair and maintain the Blasthole drill.
- Describe the relationship between the LINCS II control system (PLC) and the machine hardware (Sensors, IO Modules, Hydraulics, Mechanical systems and etc.). Describe and troubleshoot drill automation systems.
- Conduct preventive maintenance inspections.
- Perform maintenance adjustments and repairs.

Main Concepts

- Review of relevant P&H reference material
- Blasthole drill motions and major components
- Cab controls and GUI
- Power module and mechanical systems
- Automatic lubrication system
- Main air system, water injection
- Main hydraulic systems (propel, rotary and pull down), Auxiliary hydraulic systems, cooling fan hydrostatic drive
- Electrical control systems, CAN bus, CAN components
- Drill automation
- Preventive and corrective maintenance procedures

Day 1**Course Introduction**

- Instructor and participants introduction
- Course objectives
- General, on site safety
- Knowledge evaluation

Sources of information

- Maintenance and operator manual
- Schematics and diagrams
- Service bulletins and notices

Safety overview

- Safety decals and signs
- Electrical and mechanical hazards
- Stored energy

Drill overview

- Blasthole drill orientation
- Major systems overview

Controls in the cab

- Describe every button, joystick and display in the cab
- Touch screens and GUI. LINC screens navigation.

Preventive maintenance

- Schedules, documentation

Power unit

- Engine
- PDT (lubrication)
- Torque convertor (oil circulation, cooler, relief valves)
- Air compressor

Day 2**Main air system and compressor****lubrication**

- Air compressor lubrication
- Air compressor regulation (displacement and pressure)
- Air tank and oil separators
- Oil cooler
- Butterfly valve, ball valve

Water injection system

- Water tank, water pump
- Relief valve
- Water heaters (optional)

Main hydraulic system

- Hydraulic tank and pressurization
- Main pumps description, adjustments, troubleshooting
- Propel system description, adjustments, troubleshooting. Propel brakes. Tracks, propel transmission.
- Rotary system description, adjustments, troubleshooting. Rotary transmission,.
- Pull down system description, adjustments, troubleshooting. Pull down brakes. Rack and pinion, rotary carriage adjustment. Pull down transmission.

Day 3**Auxiliary hydraulic system**

- Hydraulic tank and pressurization
- Auxiliary hydraulic pump description
- Pilot system, load sense configuration
- Valve bank 1, mast geometry
- Valve bank 2, pipe carousel swing, indexing and pipe positioner
- Valve bank 3, breakout wrench geometry
- Valve bank 4, bit/pipe handling
- Valve bank 5, bit handling
- Head brake, Water injection, bit air valve, HVAC
- Left and right leveling systems description, adjustments, troubleshooting
- Leveling system, valves, jacks

Hydrostatic cooling system

- Cooling pump (tandem)
- Oil cooler fan motor, air system oil cooler fan motor

OGL lubrication

- Description, operation

Automatic lubrication

- Grease tank, pump and components, grease injectors

Dry air dust collector (optional)

- Description, pulse valves, hydraulic motor, filters

Day 4

Electrical system

- Schematic overview, labels, symbols, reference pages
- 24VDC batteries and battery charger
- Stand-by generator (optional)
- Operator cab component layout
- Main control cabinet layout
- 24VDC supply circuitry
- Emergency stop relay
- Key switch
- Controllers description, troubleshooting
- CAN bus networks
- CAN bus components description, addressing, troubleshooting: Joysticks, pressure/temperature sensors, I/O modules (200A, CR2032, CR2031, and CR2016), Encoders, Graphical displays and etc.)
- CAN bus component programming

Day 5

Us of LINCS screens for diagnostic

- Continue from day 4.
- Use of LINCS system for problems troubleshooting, alarms, warnings events, charting, downloading logs.
- Updating LINCS software

Drill advanced automation (optional)

- Hardware (controller, sensors, CAN bus)
- LINCS advanced automation screen navigation

Prevail system

- System description
- HMI, data logger

Filed trip

- If drill is available, visit the drill to show components and systems discussed in the classroom

Course Evaluation and Wrap

- Post –assessment
- Course evaluation