



Basic Technical Training eLearning Course Catalog

Maintaining a skilled, knowledgeable workforce is a challenge everyone faces. With changing technologies and fluctuations within the mining industry, it can be especially daunting. Whether you need training for a new hire or a veteran, it can be difficult to find training that is engaging, technologically relevant and easy to fit into busy schedules. Product Training and Publications, the technical communication and training group within P&H Mining Equipment, strives to provide you with the knowledge, skills and competencies needed for your employees to achieve their highest performance potential.

Product Training and Publications has identified eLearning as the primary delivery method for the knowledge components of Fundamental and Product Specific Training. eLearning provides several advantages over traditional training methods:

- eLearning content can be accessed on any computer that has Internet access by any individual who has the appropriate login and password credentials.
- Immediate availability of training content. Students receive the training they require right now, when the training is required most. This provides a quicker, more productive workforce.
- Reduces the cost of training by eliminating travel, living, and other expenses associated with Instructor Led Training.
- Provides students with the ability to learn at their own pace and in their own comfortable environment.
- Improved retention of technical and operational content.
- The training content can be delivered to a large contingent of people in varying locations and be technically consistent across the board.
- Training content can be tailored to an individual's personal strengths and weaknesses. This provides a targeted more effective training solution for today's workforce.
- When used as a prerequisite to Instructor Led Training, eLearning can level the playing field between novice and senior personal. This makes the Instructor Led Training more effective by allowing the Instructor to spend more time developing skills rather than knowledge-based components.

This Course Catalog contains descriptions of the eLearning Lessons available to you through Product Training and Publications.

Lesson Duration:

Each eLearning Lesson is designed to be 15 – 45 minutes in duration. However, because eLearning is self-paced training, actual duration may vary per student.

Target Audience:

Operators, Technicians, and Engineers who will operate and/or perform maintenance on P&H and Komatsu Mining Shovels, Drills, and/or Loaders.

Prerequisites:

Students should have a basic working knowledge of computers, and fundamental understanding of electronics, mechanics, pneumatics, hydraulics, operation, etc., as it applies to the systems of a P&H or Komatsu Mining Shovel, Drill, and/or Loader.

Lesson Location:

eLearning content can be accessed on any computer that has Internet access by any individual who has the appropriate login and password credentials.



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Computer Requirements:

It is recommended that all computers accessing eLearning content have the basic minimum requirements:

- Internet Explorer version 7 or better.
- Java version 1.5 or better.
- Latest version of Windows Media Player.
- Adobe Reader version 8 or better.



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Basic Technical Training eLearning

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Lesson 6	Basic Hydraulics Lesson 3
Lesson 7	CAN Bus System Overview
Lesson 8	Failure Analysis Overview
Lesson 9	HVAC Fundamentals
Lesson 10	Precision Measuring Tools
Lesson 11	Tier 4 Emissions

* Denotes Lesson is available in Spanish

Basic Technical Training Lesson Descriptions

Lesson 1 Basic Electrical Lesson 1

Lesson Description: The purpose of this course is to introduce the student to the basic concepts of electricity as they apply to machines in the construction, agriculture, or outdoor power equipment industries. This course assumes that the student has minimal knowledge of electricity. The concepts in this course are presented in a progressive manner.

Objectives:

Upon completion of this Lesson the student will:

- Understand electrical fundamentals
- Identify electrical and electromechanical components

Lesson Outline:

- Topic 1 Electrical Safety
- Topic 2 Electrical Fundamentals
- Topic 3 Electrical Components
- Topic 4 Electromechanical Components

Lesson 2 Basic Electrical Lesson 2

Lesson Description: The purpose of this course is to introduce the student to the basic concepts of electricity as they apply to machines in the construction, agriculture, or outdoor power equipment industries. This course assumes that the student has minimal knowledge of electricity. The concepts in this course are presented in a progressive manner. This course is a continuation of Basic Electrical Lesson 1.

Objectives:

Upon completion of this Lesson the student will:

- Identify basic electrical circuits
- Interpret an electrical schematic
- Interpret a wiring diagram

Lesson Outline:

- Topic 5 Electrical Circuits
- Topic 6 Schematics
- Topic 7 Wire Harness Diagrams
- Topic 8 Examples of Circuits

Lesson 3 Basic Electrical Lesson 3

Lesson Description: The purpose of this course is to introduce the student to the basic concepts of electricity as they apply to machines in the construction, agriculture, or outdoor power equipment industries. This course assumes that the student has minimal knowledge of electricity. The concepts in this course are presented in a progressive manner. This course is a continuation of Basic Electrical Lesson 1 & 2.

Objectives:

Upon completion of this Lesson the student will:

Demonstrate the use of a multimeter

- Understand procedures for repairing electrical connectors
- Understand and demonstrate the electrical troubleshooting process

Lesson Outline:

- Topic 9 Basic Electrical Tools
- Topic 10 Troubleshooting
- Scenario Exercises

Lesson 4 Basic Hydraulics Lesson 1

Lesson Description: The purpose of this course is to introduce the student to the basic concepts of hydraulics as they apply to machines in the construction, agriculture, or outdoor power equipment industries. This course assumes that the student has minimal knowledge of hydraulics. Because of the involved nature of hydraulic systems, this course is not intended to replace advanced, instructor-led, hands-on training, rather it serves as a foundation for additional training. The concepts in this course are presented in a progressive manner.

Objectives:

Upon completion of this Lesson the student will:

- Understand hydraulic fundamentals
- Identify hydraulic components

Lesson Outline:

- Topic 1 Hydraulics Safety
- Topic 2 Hydraulic Fundamentals
- Topic 3 Hydraulic Components

Lesson 5 Basic Hydraulics Lesson 2

Lesson Description: The purpose of this course is to introduce the student to the basic concepts of hydraulics as they apply to machines in the construction, agriculture, or outdoor power equipment industries. This course assumes that the student has minimal knowledge of hydraulics. Because of the involved nature of hydraulic systems, this course is not intended to replace advanced, instructor-led, hands-on training, rather it serves as a foundation for additional training. The concepts in this course are presented in a progressive manner. This course is a continuation of Basic Hydraulics Lesson 1.

Objectives:

Upon completion of this Lesson the student will:

- Identify basic hydraulic circuits
- Interpret a hydraulic schematic

Lesson Outline:

- Topic 4 Hydraulic Circuits
- Topic 5 Schematics
- Topic 6 Examples of Circuits

Lesson 6 Basic Hydraulics Lesson 3

Lesson Description: The purpose of this course is to introduce the student to the basic concepts of hydraulics as they apply to machines in the construction, agriculture, or outdoor power equipment industries. This course assumes that the student has minimal knowledge of hydraulics. Because of the involved nature of hydraulic systems, this course is not intended to replace advanced, instructor-led, hands-on training, rather it serves as a foundation for additional training. The concepts in this course are presented in a progressive manner. This course is a continuation of Basic Hydraulics Lesson 1 & 2.

Objectives:

Upon completion of this Lesson the student will:

- Understand the basic tools used for testing hydraulic systems
- Understand the hydraulic troubleshooting process

Lesson Outline:

- Topic 7 Basic Hydraulic Tools
- Topic 8 Guided Troubleshooting
- Scenario Exercises

Lesson 7 CAN Bus System Overview

Lesson Description: The purpose of this course is to introduce the student to the CAN Bus system and CAN Bus system components as they apply to machines in the construction, agriculture, or outdoor power equipment industries. **CAN** is short for **C**ontroller **A**rea **N**etwork and **Bus** is short for **B**inary **u**nit **s**ystem.

Objectives:

Upon completion of this Lesson the student will:

- Understand the benefits of a CAN Bus System
- Identify the components of a CAN Bus System
- Understand the inputs and outputs of a CAN Bus System
- Identify common CAN Bus symptoms

Lesson Outline:

- Topic 1 CAN Bus System
- Topic 2 CAN Bus System and Components
- Topic 3 CAN Bus System Theory of Operation
- Topic 4 Common CAN Bus Symptoms

Lesson 8 Failure Analysis Overview

Lesson Description: The purpose of this course is to introduce the student to the basic concepts of failure analysis as they apply to machines in the construction, agriculture, or outdoor power equipment industries. This course assumes that the student has minimal knowledge of failure analysis. The concepts in this course are presented in a progressive manner.

Objectives:

Upon completion of this Lesson the student will:

- Understand safety practices to follow
- Distinguish differences between failure, failure mode, and root causes
- Use probing questions to collect evidence and history of the machine
- Follow a systematic process of analysis to determine cause of failure
- Recognize different causes of failure

Lesson Outline:

- Topic 1 Safety
- Topic 2 Failure Analysis Overview
- Topic 3 Failure Analysis Process
- Topic 4 Engine Failure Analysis

Lesson 9 HVAC Fundamentals

Lesson Description: The purpose of this course is to introduce the student to the basic concepts of Heating, Ventilation, and Air-Conditioning (HVAC) as they apply to machines in the construction, agriculture, or outdoor power equipment industry. It assumes that the student has minimal knowledge of HVAC systems. This course does not constitute authorization or approval of the United States Environmental Protection Agency (US EPA) for the certification of technicians. The concepts in this course are presented in a progressive manner.

Objectives:

Upon completion of this Lesson the student will:

- Understand basic principles of heating and refrigeration
- Understand HVAC fundamentals
- Identify HVAC components as they apply to machines in the construction, agriculture, or outdoor power equipment industry

Lesson Outline:

- Topic 1 Safety
- Topic 2 HVAC Fundamentals
- Topic 3 HVAC Systems and Components

Lesson 10 Precision Measuring Tools

Lesson Description: The purpose of this course is to introduce the student to the basic precision measuring tools, how they are used, and proper adjustments as they relate to the construction, agriculture, or outdoor power equipment industries. This course assumes that the student has minimal knowledge of precision measuring tools.

Objectives:

Upon completion of this Lesson the student will:

- Recognize safety issues involved with precision measuring tools
- Identify basic precision measuring tools
- Comprehend the various types of each precision measuring tool
- Understand the fundamentals of proper use of precision measuring tools
- Understand proper care techniques of precision measuring tools

Lesson Outline:

- Topic 1 Safety
- Topic 2 Introduction to Precision Measuring Tools
- Topic 3 Torque
- Topic 4 Distance
- Topic 5 Velocity
- Topic 6 Weight/Force
- Topic 7 Temperature
- Topic 8 Pressure/Flow Tools
- Topic 9 Volume
- Topic 10 Electricity
- Topic 11 Safe Use
- Topic 12 Tool Care

Lesson 11 Tier 4 Emissions

Lesson Description: The purpose of this course is to introduce the student to the concepts of Final Tier 4 diesel exhaust emissions and aftertreatment systems as they apply to machines in the construction, agriculture, or outdoor power equipment industries. This course assumes that the student has minimal knowledge of diesel exhaust emissions and aftertreatment systems. The concepts in this course are presented in a progressive manner.

Objectives:

Upon completion of this Lesson the student will:

- Understand basic exhaust emission requirements and tier ratings
- Identify common Final Tier 4 aftertreatment components as they apply to machines in the construction, agriculture, or outdoor power equipment industries
- Understand Final Tier 4 diesel exhaust emission aftertreatment operation

Lesson Outline:

- Topic 1 Safety
- Topic 2 Tier 4 Emissions Overview
- Topic 3 Aftertreatment Systems and Components
- Topic 4 Tier 4 Theory of Operation