INDUSTRIAL MAINTENANCE MECHANICS PROGRAM STANDARDS

2016

CONTENT STANDARD 1.0: SAFETY

Performance Standard 1.1: Shop Safety

1.1.1 Explain the idea of a safety culture and its importance to industrial maintenance.
1.1.2 Identify causes of accidents and the impact of accident costs.
1.1.3 Review worker's rights and responsibilities.
1.1.4 Recognize hazard recognition and risk assessment techniques.
1.1.5 Explain fall protection and ladder, stair, and scaffold procedures and requirements.
1.1.6 Identify equipment power sources.
1.1.7 Knowledge of lock out and tag out procedures.
1.1.8 Demonstrate safe work procedures to use around electrical hazards.
1.1.9 Demonstrate the use and care of appropriate personal protective equipment (PPE).
1.1.10 Explain the importance of hazard communications (HazCom) and Safety Data.
1.1.11 Identify other construction hazards on your job site, including hazardous material exposures, environmental elements, welding and cutting hazards, confined spaces, and fires.

CONTENT STANDARD 2.0: TECHNICAL DRAWINGS

Performance Standard 2.1: Blueprints and Schematics

2.1.1 Explain the purpose of blueprints.
2.1.2 Explain and interpret machine parts and machine drawings.
2.1.3 Develop sketches.
2.1.4 Read and interpret schematics and symbols (i.e electrical, hydraulic, and welding).

CONTENT STANDARD 3.0: SHOP SKILLS

Performance Standard 3.1: Shop Skills

3.1.1 Apply basic mathematical principles.
3.1.2 Explain techniques of measurement, e.g. motion, fluids, electricity, and temperature.
3.1.3 Explain the mechanical and chemical properties of ferrous and non-ferrous metals.
3.1.4 Understand lean and continuous improvement manufacturing processes.
3.1.5 Determine sequence of work on a specified project.
3.1.6 Determine tolerances and finishes.
3.1.7 Explain the variables that affect job efficiency.
3.1.8 Demonstrate knowledge of record keeping practices.
3.1.9 Complete a work order.
3.1.10 Complete a requisition.

CONTENT STANDARD 4.0: TOOLS

Performance Standard 4.1: Shop Equipment

4.1.1 Demonstrate use and maintenance of basic hand and power tools properly.
4.1.2 Convert English/standard to metric.
4.1.3 Demonstrate the ability to perform layout work.
4.1.4 Demonstrate the use and care of test and safety equipment.

CONTENT STANDARD 5.0: WELDING

Performance Standard 5.1: Gas Welding/Cutting

5.1.1 Set up gas welding and cutting equipment and accessories.
5.1.2 Identify personal protective equipment required for welding and cutting.
5.1.3 Demonstrate proper lighting, adjusting, and shutting down of a gas torch.
5.1.4 Layout and cut mild steel.
5.1.5 Braze/Solder miscellaneous materials.

Performance Standard 5.2: Arc Welding/Cutting

5.2.1 Set up and adjust a variety of arc welders.
5.2.2 Identify and select electrodes.
5.2.3 Weld build-up pads and/or shafts or round surfaces
5.2.4 Hard surface metals with S.M.A.W.
5.2.5 Weld basic joints in flat, horizontal, and vertical positions.

CONTENT STANDARD 6.0: ELECTRICITY & ELECTRONICS

Performance Standard 6.1: Elements of Electricity & Electronics

6.1.1 Define common terms used in electricity and electronics.
6.1.2 Discuss electrical safe work practices and the governing organizations.
6.1.3 Describe theory and the industrial uses of magnets and electromagnets.
6.1.4 Explain the purpose and use of transformers.
6.1.5 Explain and apply Ohm's Law.
6.1.6 Use instruments which measure current, resistance, and potential difference.
6.1.7 Explain the fundamentals and differences between AC/DC circuits.
6.1.8 Demonstrate knowledge of the instruments used to measure electrical circuits.
6.1.9 Know the difference between a single phase and a three phase circuit.
6.1.10 Install, troubleshoot, and maintain electric motors.
6.1.11 Demonstrate knowledge of troubleshooting procedures for electric circuits and control systems.
6.2.12 Understand the differences and properties between series and parallel circuits.

CONTENT STANDARD 7.0: PREVENTIVE AND PREDICTIVE MAINTENANCE

Performance Standard 7.1: Maintenance Scheduling

7.1.1 Explain the function of lubricants.
7.1.2 Explain the factors determining the selection of lubricants.
7.1.3 Describe lubricating systems, including the charts and methods used.
7.1.4 Demonstrate proper grease application.
7.1.5 Practice lubrication on various equipment.
7.1.6 Preventative maintenance scheduling and maintaining records.
7.1.7 Know the preventive maintenance techniques of various equipment.
7.1.8 Perform preventive maintenance on drive components.
7.1.9 List rules for good bearing lubrication.

CONTENT STANDARD 8.0: DRIVE COMPONENTS

Performance Standard 8.1: Drive Component Installation and Maintenance

8.1.1 Identify and understand various drive component couplings.
8.1.2 Understand different type of power transfer methods.
8.1.3 Understand use of shaft alignment techniques.
8.1.4 Explain the function of gear boxes.
8.1.5 Explain the function of drive sprockets and chains.
8.1.6 Explain the function of sheaves and pulleys.

CONTENT STANDARD 9.0: BEARINGS

Performance Standard 9.1: Bearing Installation, Inspection, and Repair

9.1.1 Identify various bearing types and their applications.
9.1.2 Identify and select bearing seals.
9.1.3 Explain bearing load, wear patterns, and maintenance.

CONTENT STANDARD 10.0: PUMPS

Performance Standard 10.1: Pump Maintenance and Repair

10.1.1 Determine pump capacity and system requirements.
10.1.2 Identify packing and seal requirements.
10.1.3 Explain the operating principles of various types of pumps, e.g. centrifugal, propeller and turbine rotary, reciprocating and metering pumps.

CONTENT STANDARD 11.0: PIPING SYSTEMS

Performance Standard 11.1: Piping Systems and Accessory Maintenance

11.1.1 Identify the components of a piping system.
11.1.2 Explain the maintenance features of piping systems.
11.1.3 Explain valve operation and maintenance.
11.1.4 Explain the use and maintenance of strainers, filters, and traps in piping systems.

CONTENT STANDARD 12.0: HYDRAULIC SYSTEMS

Performance Standard 12.1: Hydraulic Component Maintenance and Repair

12.1.1 Explain laws and principles of hydraulic systems.
12.1.2 Explain the characteristics and components of a hydraulic system.
12.1.3 Identify hydraulic system components.
12.1.4 Troubleshoot hydraulic systems.

CONTENT STANDARD 13.0: PNEUMATIC SYSTEMS

Performance Standard 13.1: Pneumatic Component Maintenance and Repair

13.1.1 Identify schematic symbols and diagrams used in pneumatic systems.
13.1.2 Diagram an air supply system.
13.1.3 Identify pneumatic system components.
13.1.4 Explain pneumatic system maintenance techniques.
13.1.5 Demonstrate pneumatic system troubleshooting procedures.

CONTENT STANDARD 14.0: RIGGING SYSTEMS

Performance Standard 14.1: Rigging

14.1.1 Estimate the weight of a load.
14.1.2 Find the center of gravity.
14.1.3 Identify the rigging and slings used in maintenance work.
14.1.4 Explain safety inspection procedures for rigging, ropes, and slings.

CONTENT STANDARD 15.0: PROGRAMMABLE LOGIC CONTROLLERS

Performance Standard 15.1: Programmable Logic Controllers

15.1.1 Describe the function and purpose of a programmable logic controller (PLC).
15.1.2 Analyze a binary logic network.
15.1.3 Construct input/output (I/O) circuits.
15.1.4 State the characteristics of the different types of memory.
15.1.5 Identify and explain the features of relay ladder logic instruction categories.
15.1.6 Explain the use and function of electrical and electronic control equipment.
15.1.7 Explain the function of variable frequency drive (VFD).

CONTENT STANDARD 16.0: MACHINE SHOP OPERATIONS

Performance Standard 16.1: Turning

16.1.1 Identify the principal parts of a lathe.
16.1.2 Demonstrate the use of a lathe and attachments.
16.1.3 Bore and drill holes with a lathe.
16.1.4 Cut threads with a lathe.

Performance Standard 16.2: Milling

16.2.1 Identify types of milling machines and tooling.
16.2.2 Select and set feeds and speeds for milling work.
16.2.3 Perform a variety of milling operations.