

**Issued: September 29, 2015**

**Program: Industrial Mechanic (Millwright)**

**To:** ITA Training Providers  
Articulation Chair  
System Liaison Person  
School Districts

**Subject:** **Industrial Mechanic (Millwright) Program Outline Update**

**OPSN No.:** **OPSN 2015 020**

**Effective Date:** Jan 1, 2016

**Summary of Change:** Please be advised that a new Program Outline has been posted to the Industry Training Authority (ITA) website.

**Rationale:** Employment and Social Development Canada (ESDC) released a new National Occupational Analysis (NOA) in 2013 prompting a review of the BC Program Outline to align the two standards.

**Details:** A Millwright Program Review was conducted by RTO in July, 2014 to align the ITA Industrial Mechanic (Millwright) Program to the 2013 NOA. The review process identified gaps and aligned the Program Outline to the NOA. Program content was also updated to current industry standard. The changes to the Program Outline did not impact the current ITA Standardized Level Exams for Millwright.

In addition to the new Program Outline, an Exam Weighting Chart for Levels 1-3 and an Interprovincial (IP) Exam Table can be found on the ***Industrial Mechanic (Millwright)*** page of the ITA website.

**Attachments:** ***Industrial Mechanic (Millwright) Program Outline Review Details***  
This attachment provides details of the revisions made to the Industrial Mechanic (Millwright) Program Outline during the review process.

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**cc:** All Staff

## MILLWRIGHT PROGRAM OUTLINE REVIEW DETAILS

### MILLWRIGHT – Level 1

LINE	COMPETENCY	REVISION/ADDITION/DELETION
<b>LINE A</b>	<b>Work Practices</b>	
A1	Explain Federal/Provincial Occupational Health and Safety Regulations	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
A2	Explain and Apply Environmental Regulations	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
A3	Use Personal Protective Equipment	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
A4	Follow Safe Working Practices	<ul style="list-style-type: none"> <li>• Added content to Learning Task 1</li> <li>• Removed achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
A5	Use Communication and Teamwork Skills	<ul style="list-style-type: none"> <li>• Added achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
A6	Interpret Plans and Sketches	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> </ul>
A7	Use Reference Resources	<ul style="list-style-type: none"> <li>• Rephrased Learning Task 2</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
<b>LINE B</b>	<b>Trade Science</b>	
B1	Use Trade Math	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> </ul>
B3	Describe Materials	<ul style="list-style-type: none"> <li>• Added fourth objective</li> <li>• Added content to Learning Task 1</li> <li>• Added Learning Task 6 and related content</li> <li>• Updated achievement criteria</li> </ul>
B6	Use Fasteners	<ul style="list-style-type: none"> <li>• Rephrased Objectives 2-4</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>



## MILLWRIGHT PROGRAM OUTLINE REVIEW DETAILS

LINE C	Use Tools	
C1	Use Hand Tools	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
C2	Use Measuring and Layout Tools and Instruments	<ul style="list-style-type: none"> <li>• Added content to Learning Task 4</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
C3	Use Portable Power Tools	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
C4	Use Fixed Shop Machines and Equipment	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
C5	Use Mobile Access Equipment	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
LINE F	Cut, Fit and Fabricate	
F1	Describe Welding Practices	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>
F2	Use and maintain Oxy-Fuel Cutting, Welding, and Heating Equipment	<ul style="list-style-type: none"> <li>• Updated Competency title (included 'and maintain')</li> <li>• Added third objective</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
F3	Use and maintain Shielded Metal Arc Welding (SMAW) equipment	<ul style="list-style-type: none"> <li>• Updated Competency title (included 'and maintain' and 'Equipment')</li> <li>• Added third objective</li> <li>• Added content to Learning Task 3</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
F4	Use and maintain Plasma Arc Cutting Equipment	<ul style="list-style-type: none"> <li>• Updated Competency title (included 'and maintain')</li> <li>• Added third objective</li> <li>• Added content to Learning Task 2</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>

## MILLWRIGHT PROGRAM OUTLINE REVIEW DETAILS

### MILLWRIGHT – Level 2

LINE	COMPETENCY	REVISION/ADDITION/DELETION
<b>LINE B</b>	<b>Trade Science</b>	
B2	Use Trade Science	<ul style="list-style-type: none"> <li>• Added content to Learning Tasks 1 &amp; 5</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
B4	Explain Simple Machines	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>
B5	Use Fits and Tolerances	<ul style="list-style-type: none"> <li>• Rephrased second objective</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
<b>LINE D</b>	<b>Lubricants, Seals and Bearings</b>	
D1	Select Lubricants	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>
D2	Maintain Lubricating Systems	<ul style="list-style-type: none"> <li>• Added content to Learning Task 2</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
D3	Select Seals, Gaskets and Packing	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
D4	Install and Maintain Seals	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
D5	Select Bearings	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
D6	Install and Maintain Bearings	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>

## MILLWRIGHT PROGRAM OUTLINE REVIEW DETAILS

LINE E	Install Equipment	
E1	Use Safe Rigging Practices	<ul style="list-style-type: none"> <li>• Added content to Learning Task 7 &amp; 8</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
E2	Describe Layout and Securing of Equipment	<ul style="list-style-type: none"> <li>• Added content to Learning Task 3</li> <li>• Updated achievement criteria</li> </ul>
E3	Describe Equipment Foundations	<ul style="list-style-type: none"> <li>• Added content to Learning Task 1</li> <li>• Removed achievement criteria</li> </ul>
E4	Explain Levelling and Alignment Procedures	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>
LINE F	Cut, Fit and Fabricate	
F3	Use and maintain Shielded Metal Arc Welding (SMAW) equipment	<ul style="list-style-type: none"> <li>• Updated Competency title (included 'and maintain')</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
F5	Use and maintain Gas Metal Arc Welding (GMAW / MIG) and Gas Tungsten Arc Welding (GTAW (TIG)	<ul style="list-style-type: none"> <li>• Updated Competency title (included 'and maintain' as well as and Gas Tungsten Arc Welding (GTAW (TIG) equipment')</li> <li>• Updated Learning Tasks 1,2 &amp; 3</li> <li>• Removed content from Learning Task 1</li> <li>• Removed and added content to Learning Task 2</li> <li>• Removed content from Learning Task 3</li> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
LINE H	Service Power Transmissions	
H7	Service Drive Shafts	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
LINE I	Service Fluid Power	
I1	Explain Hydraulic Theory	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>
I2	Interpret Hydraulic Schematics	<ul style="list-style-type: none"> <li>• Updated achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
I3	Describe Hydraulic Components	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>
I4	Identify Hydraulic Pumps	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>



## MILLWRIGHT PROGRAM OUTLINE REVIEW DETAILS

### MILLWRIGHT – Level 3

LINE	COMPETENCY	REVISION/ADDITION/DELETION
<b>LINE E</b>	<b>Install Equipment</b>	
E5	Level, Align and Secure Equipment	<ul style="list-style-type: none"> <li>• Rephrase Learning Task 2</li> <li>• Add content to Learning Task 4</li> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
<b>LINE H</b>	<b>Service Power Transmissions</b>	
H1	Describe Power Transmission Theory	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>
H2	Service Couplings	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
H3	Service Gear Drives	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
H4	Service Belt Drives	<ul style="list-style-type: none"> <li>• Update second objective</li> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
H5	Service Clutches and Brakes	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
H6	Service Chain Drives	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
<b>LINE I</b>	<b>Service Fluid Power</b>	
I5	Describe, Assemble and Maintain Hydraulic Circuits	<ul style="list-style-type: none"> <li>• Add objective (placed as first)</li> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
<b>LINE K</b>	<b>Service Pumps</b>	
K1	Explain Pump Theory	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>
K2	Identify Types of Pumps	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>
K3	Maintain and Troubleshoot Positive Displacement Pumps	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
K4	Maintain and Troubleshoot Non-Positive Displacement	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>

## MILLWRIGHT PROGRAM OUTLINE REVIEW DETAILS

LINE L	Service Material Handling Systems	
L1	Explain Material Handling Theory	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>
L2	Maintain Fans and Blowers	<ul style="list-style-type: none"> <li>• Add content to Learning Task 2 &amp; 4</li> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
L3	Identify Types of Conveyors	<ul style="list-style-type: none"> <li>• Removed achievement criteria</li> </ul>
L4	Describe Methods of Conveyor Loading and Unloading, and Types of Process Tanks and Storage	<ul style="list-style-type: none"> <li>• Updated Competency title (included 'and Types of Process Tanks and Storage Containers)</li> <li>• Added four objectives</li> <li>• Rephrased Learning Task 2</li> <li>• Added Learning Tasks 3-5 and related content</li> <li>• Removed achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
L5	Maintain Conveyor Systems	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>



## MILLWRIGHT PROGRAM OUTLINE REVIEW DETAILS

### MILLWRIGHT – Level 4

LINE	COMPETENCY	REVISION/ADDITION/DELETION
<b>LINE A</b>	<b>Work Practices</b>	
A5	Use Communication and Teamwork Skills	<ul style="list-style-type: none"> <li>• Add content to Learning Task 1</li> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
A8	Plan Job Requirements	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
<b>LINE B</b>	<b>Trade Science</b>	
B7	Describe Theory of Electricity and Electronics	<ul style="list-style-type: none"> <li>• None</li> </ul>
<b>LINE E</b>	<b>Install Equipment</b>	
E6	Describe Procedures for Commissioning Equipment	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
E7	Commission Equipment	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
<b>LINE G</b>	<b>Maintain Prime Movers</b>	
G1	Explain Prime Mover Theory	<ul style="list-style-type: none"> <li>• None</li> </ul>
G2	Describe Electric Motors	<ul style="list-style-type: none"> <li>• None</li> </ul>
G3	Maintain Electric Motors	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
G4	Describe Internal Combustion Engines	<ul style="list-style-type: none"> <li>• None</li> </ul>
G5	Describe the Maintenance of Internal Combustion Engines	<ul style="list-style-type: none"> <li>• None</li> </ul>
G6	Describe Turbines	<ul style="list-style-type: none"> <li>• None</li> </ul>
G7	Describe the Maintenance of Turbines	<ul style="list-style-type: none"> <li>• None</li> </ul>
G8	Describe Power Turbines	<ul style="list-style-type: none"> <li>• Rephrase Learning Task 3</li> <li>•</li> </ul>



## MILLWRIGHT PROGRAM OUTLINE REVIEW DETAILS

LINE I	Service Fluid Power	
I6	Explain Pneumatic Theory	<ul style="list-style-type: none"> <li>• Add objective (placed as first)</li> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
I7	Describe Pneumatic Components	<ul style="list-style-type: none"> <li>• None</li> </ul>
I8	Interpret Pneumatic Schematics	<ul style="list-style-type: none"> <li>• None</li> </ul>
I9	Identify Pneumatic Pumps	<ul style="list-style-type: none"> <li>• None</li> </ul>
I10	Assemble, Maintain and Troubleshoot Pneumatic Circuits	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
I11	Explain the Theory of Vacuum and Vacuum Systems	<ul style="list-style-type: none"> <li>• None</li> </ul>
I12	Interpret Vacuum Symbols	<ul style="list-style-type: none"> <li>• None</li> </ul>
I13	Identify Vacuum System Components	<ul style="list-style-type: none"> <li>• None</li> </ul>
I14	Describe Vacuum Systems	<ul style="list-style-type: none"> <li>• None</li> </ul>
I15	Maintain and Troubleshoot Vacuum Systems	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>
LINE J	Service Compressors	
J1	Explain Compressor Theory	<ul style="list-style-type: none"> <li>• None</li> </ul>
J2	Identify and Describe Types of Compressors	<ul style="list-style-type: none"> <li>• None</li> </ul>
J3	Service Compressors	<ul style="list-style-type: none"> <li>• Update achievement criteria</li> <li>• Removed workplace criteria</li> </ul>



## MILLWRIGHT PROGRAM OUTLINE REVIEW DETAILS

LINE M	Operational Equipment Effectiveness	
M1	Describe Operational Equipment Effectiveness Processes	<ul style="list-style-type: none"><li>• Add content to Learning Task 5</li></ul>
M2	Describe Use of Predictive Maintenance Tools	<ul style="list-style-type: none"><li>• Add content to Learning Task 2 &amp; 4</li><li>• Update achievement criteria</li><li>• Removed workplace criteria</li></ul>
M3	Identify Equipment and Process Deficiencies	<ul style="list-style-type: none"><li>• None</li></ul>
M4	Perform Vibration Analysis and Rotating Equipment Balancing	<ul style="list-style-type: none"><li>• Update achievement criteria</li><li>• Removed workplace criteria</li></ul>

## MILLWRIGHT PROGRAM OUTLINE REVIEW DETAILS

### MILLWRIGHT – Miscellaneous

SECTION	TITLE	REVISION/ADDITION/DELETION
4	Tools and Equipment – Measuring and Layout Tools	<ul style="list-style-type: none"> <li>• Added builder's level (dumpy) and rotary laser level</li> </ul>
4	Tools and Equipment – Information Materials	<ul style="list-style-type: none"> <li>• Added:</li> <li>• IPT handbooks (strongly recommended)</li> <li>• rotating equipment</li> <li>• safety</li> <li>• rigging</li> <li>• hydraulics</li> <li>• industrial fasteners and fittings</li> <li>• power transmissions</li> </ul>