PROGRAM PROGRAMME
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Trade Profile

Industrial Mechanic (Millwright)

INTERPROVINCIAL STANDARD
CANADA
NORME INTERPROVINCIALE

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Structure of the Trade Profile

This profile has two sections that provide a snapshot of the trade's description, and all trade activities as they are organized in the Red Seal Occupational Standard:

Description of the Industrial Mechanic (Millwright) trade: an overview of the trade's duties, work environment, job requirements, similar occupations and career progression

Task Matrix: a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard

Major Work Activity (MWA): the largest division within the standard that is comprised of a distinct set of trade activities

Task: distinct actions that describe the activities within a major work activity

Sub-task: distinct actions that describe the activities within a task

Description of the Industrial Mechanic (Millwright) Trade

“Industrial Mechanic (Millwright)” is this trade’s official Red Seal occupational title approved by the CCDA. This standard covers tasks performed by industrial mechanic (millwright).

Industrial mechanics (millwrights) work on industrial and mechanical equipment and components. This equipment may include mechanical, pneumatic, hydraulic, fuel, lubrication, cooling and exhaust systems. Some components worked on include pumps, gear boxes, fans, tanks, conveyors, presses, generators, prime movers, pneumatic and hydraulic systems, robotics and automated equipment.

Industrial mechanics (millwrights) are responsible for assembling, installing, fabricating, aligning, commissioning, maintaining, repairing, diagnosing, inspecting, dismantling, demolishing, moving and decommissioning equipment and components. Servicing may include diagnosing irregularities and malfunctions, making adjustments, and repairing or replacing parts. Cleaning and lubricating equipment are also important maintenance tasks of the trade.

Other tasks that may be performed include welding, cutting, preparing bases for equipment, rigging and machining as required. In certain jurisdictions, industrial mechanics (millwrights) may assist other trades in troubleshooting and repairing other systems.

Industrial mechanics (millwrights) may refer to schematics, engineered drawings and manuals, both hard copy and electronic, to determine work procedures.

Industrial mechanics (millwrights) work with a wide variety of tools. They may use hand and power tools and access equipment in installation and repair work. Larger machine tools such as lathes, milling machines, drill presses and grinders may be used in the fabrication of machine parts. Rigging, hoisting/lifting and moving equipment such as cranes, jacks and powered mobile equipment (PME) are commonly used to position large machines or machine parts.

Industrial mechanics (millwrights) are employed in all sectors of industry that involve mechanical moving equipment including mining, petrochemical, power generation, manufacturing, forestry, and processing facilities (food, service) among others.

The work environment for industrial mechanics (millwrights) is varied and may involve working in extreme or adverse conditions. They often work shift work. They may work in confined spaces, underground (in mines), at heights, with heavy equipment and around moving equipment. The work often requires considerable standing, kneeling and lifting of materials.

Key skills for people in this trade are mechanical aptitude, problem-solving, communication, job planning and organizing and the ability to use trade-related

calculations. They have the ability to detect malfunctions through sensory tests which are often confirmed by condition-based monitoring. Other important attributes include good coordination, manual dexterity and spatial visualization.

Industrial mechanics/ (millwrights) are not electricians and they are restricted or prohibited from performing electrical work by provincial and territorial regulations. However, in certain jurisdictions they may perform limited work with certain electromechanical components when installing and diagnosing equipment in areas such as hydraulics, pneumatics, and automation. Due to the integration of electromechanical components in many pieces of industrial equipment, an understanding of basic electrical terms and concepts is very important. These may include voltage, amperage, resistance, Ohm's Law, series circuits, parallel circuits, and AC/DC current. Some of the electromechanical components worked with may include switches, fuses, ground fault circuit interrupters (GFCI), relays, solenoids and diodes. Industrial mechanics (millwrights) should know how to use a multimeter to perform functions like voltage, resistance and continuity checks.

Industrial mechanics (millwrights) often possess overlapping skills with other tradespeople such as steamfitter/pipefitters, instrumentation and control technicians, power engineers, welders, machinists or industrial electricians. Industrial mechanics (millwrights) may work in specialized areas of the trade such as vibration analysis, thermography, tribology (fluid analysis) and laser/optical alignment. With experience, they may advance to other positions such as mentor, supervisor, planner, superintendent, manager, instructor or trainer.

Industrial Mechanic (Millwright)
Task Matrix and Weightings

Major Work Activity A—Performs common occupational skills 16%

Task A-1 Maintains safe and healthy workplace 13%	Sub-task A-1.01 Uses personal protective equipment (PPE) and safety equipment	Sub-task A-1.02 Maintains safe work environment	Sub-task A-1.03 Protects environment
	Sub-task A-1.04 Performs lockout/tagout (LOTO) and zero energy procedures	Sub-task A-1.05 Participates in healthy and respectful work environment and practices	
Task A-2 Uses tools and equipment 21%	Sub-task A-2.01 Uses hand tools and portable power tools	Sub-task A-2.02 Uses shop tools and equipment	Sub-task A-2.03 Uses access equipment
Task A-3 Organizes tasks 11%	Sub-task A-3.01 Plans tasks	Sub-task A-3.02 Interprets codes, standards and regulations	Sub-task A-3.03 Uses drawings and schematics
	Sub-task A-3.04 Uses documentation and reference material		
Task A-4 Performs trade tasks 20%	Sub-task A-4.01 Fabricates workpiece	Sub-task A-4.02 Lubricates systems and components	Sub-task A-4.03 Performs levelling and aligning of components and systems
	Sub-task A-4.04 Uses fastening and retaining devices	Sub-task A-4.05 Performs material identification	Sub-task A-4.06 Performs heat treatment of metal

Task A-5 Performs measuring and layout 19%	Sub-task A-5.01 Prepares work area, tools and materials	Sub-task A-5.02 Measures materials and components	Sub-task A-5.03 Lays out components
	Sub-task A-5.04 Maintains precision measuring, layout and levelling tools		
Task A-6 Performs cutting and welding operations 16%	Sub-task A-6.01 Cuts material with oxy-fuel, plasma arc and air carbon arc cutting equipment	Sub-task A-6.02 Joins material using oxy-fuel welding equipment	Sub-task A-6.03 Welds material using arc welding (SMAW) equipment
	Sub-task A-6.04 Welds material with gas metal arc welding (GMAW) equipment and flux core arc welding (FCAW) equipment	Sub-task A-6.05 Welds material with gas tungsten arc welding (GTAW) equipment	Sub-task A-6.06 Maintains welding equipment
Task A-7 Maintains continuous learning 0%	Sub-task A-7.01 Upskills in new trade practices and procedures	Sub-task A-7.02 Upskills in emerging technologies	
Task A-8 Uses communication and mentoring techniques 0%	Sub-task A-8.01 Uses communication techniques	Sub-task A-8.02 Uses mentoring techniques	

Major Work Activity B—Performs rigging, hoisting/lifting and moving 14%

Task B-9 Plans rigging, hoisting/lifting and moving 51%	Sub-task B-9.01 Determines load	Sub-task B-9.02 Selects rigging equipment	Sub-task B-9.03 Selects hoisting/lifting and moving equipment
	Sub-task B-9.04 Secures area		
Task B-10 Rigs, hoists/lifts and moves load 49%	Sub-task B-10.01 Sets up rigging, hoisting/lifting and moving equipment	Sub-task B-10.02 Performs hoist/lift and move	Sub-task B-10.03 Maintains rigging, hoisting/ lifting and moving equipment

Major Work Activity C—Services mechanical power transmission components and systems 22%

Task C-11 Services prime movers 16%	Sub-task C-11.01 Installs prime movers	Sub-task C-11.02 Diagnoses prime movers	Sub-task C-11.03 Maintains prime movers
	Sub-task C-11.04 Repairs prime movers		
Task C-12 Services shafts, bearings and seals 18%	Sub-task C-12.01 Installs shafts, bearings and seals	Sub-task C-12.02 Diagnoses shafts, bearings and seals	Sub-task C-12.03 Maintains shafts, bearings and seals
	Sub-task C-12.04 Repairs shafts, bearings and seals		

Task C-13 Services couplings, clutches and brakes 18%	Sub-task C-13.01 Installs couplings, clutches and brakes	Sub-task C-13.02 Diagnoses couplings, clutches and brakes	Sub-task C-13.03 Maintains couplings, clutches and brakes
	Sub-task C-13.04 Repairs couplings, clutches and brakes		
Task C-14 Services chain and belt drive systems 17%	Sub-task C-14.01 Installs chain and belt drive systems	Sub-task C-14.02 Diagnoses chain and belt drive systems	Sub-task C-14.03 Maintains chain and belt drive systems
	Sub-task C-14.04 Repairs chain and belt drive systems		
Task C-15 Services gear systems 15%	Sub-task C-15.01 Installs gear systems	Sub-task C-15.02 Diagnoses gear systems	Sub-task C-15.03 Maintains gear systems
	Sub-task C-15.04 Repairs gear systems		
Task C-16 Performs shaft alignment procedures 16%	Sub-task C-16.01 Performs rough alignment	Sub-task C-16.02 Performs dial alignment	Sub-task C-16.03 Performs laser alignment

Major Work Activity D—Services material handling/process systems 20%

Task D-17 Services robotics and automated equipment 9%	Sub-task D-17.01 Installs robotics and automated equipment	Sub-task D-17.02 Diagnoses robotics and automated equipment	Sub-task D-17.03 Maintains robotics and automated equipment
	Sub-task D-17.04 Repairs robotics and automated equipment		
Task D-18 Services fans and blowers 16%	Sub-task D-18.01 Installs fans and blowers	Sub-task D-18.02 Diagnoses fans and blowers	Sub-task D-18.03 Maintains fans and blowers
	Sub-task D-18.04 Repairs fans and blowers		
Task D-19 Services pumps 21%	Sub-task D-19.01 Installs pumps	Sub-task D-19.02 Diagnoses pumps	Sub-task D-19.03 Maintains pumps
	Sub-task D-19.04 Repairs pumps		
Task D-20 Services compressors 20%	Sub-task D-20.01 Installs compressors	Sub-task D-20.02 Diagnoses compressors	Sub-task D-20.03 Maintains compressors
	Sub-task D-20.04 Repairs compressors		

Task D-21 Services process piping, tanks and containers 13%	Sub-task D-21.01 Installs process tanks and containers	Sub-task D-21.02 Installs process piping	Sub-task D-21.03 Diagnoses process tanks and containers
	Sub-task D-21.04 Diagnoses process piping	Sub-task D-21.05 Maintains process tanks and containers	Sub-task D-21.06 Maintains process piping
	Sub-task D-21.07 Repairs process tanks and containers	Sub-task D-21.08 Repairs process piping	
Task D-22 Services conveying systems 21%	Sub-task D-22.01 Installs conveying systems	Sub-task D-22.02 Diagnoses conveying systems	Sub-task D-22.03 Maintains conveying systems
	Sub-task D-22.04 Repairs conveying systems		

Major Work Activity E—Services fluid power systems 15%

Task E-23 Services hydraulic systems 53%	Sub-task E-23.01 Installs hydraulic systems	Sub-task E-23.02 Diagnoses hydraulic systems	Sub-task E-23.03 Maintains hydraulic systems
	Sub-task E-23.04 Repairs hydraulic systems		
Task E-24 Services pneumatic and vacuum systems 47%	Sub-task E-24.01 Installs pneumatic and vacuum systems	Sub-task E-24.02 Diagnoses pneumatic and vacuum systems	Sub-task E-24.03 Maintains pneumatic and vacuum systems
	Sub-task E-24.04 Repairs pneumatic and vacuum systems		

Major Work Activity F—Performs maintenance, testing, commissioning and decommissioning methods 13%

Task F-25 Performs maintenance and testing 70%	Sub-task F-25.01 Performs preventative maintenance activities	Sub-task F-25.02 Performs vibration analysis procedures	Sub-task F-25.03 Performs balancing procedures
	Sub-task F-25.04 Performs non-destructive testing (NDT) procedures	Sub-task F-25.05 Performs fluid analysis procedures	Sub-task F-25.06 Performs predictive maintenance activities
Task F-26 Commissions and decommissions equipment 30%	Sub-task F-26.01 Commissions systems and components	Sub-task F-26.02 Decommissions systems and components	