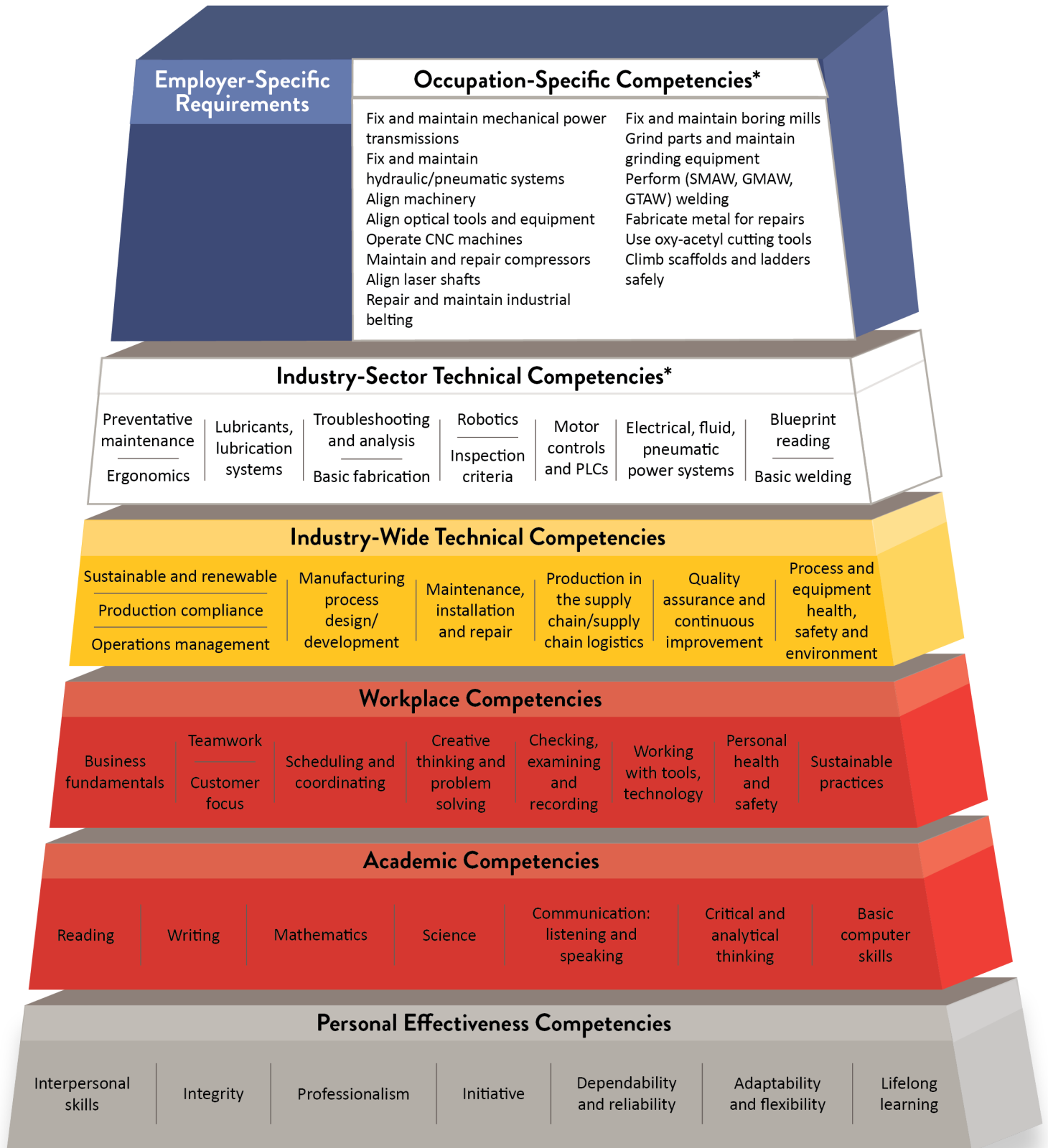


Minnesota Dual-Training Pipeline

Competency Model for Advanced Manufacturing Occupation: Maintenance and Repair Worker



Based on: Advanced Manufacturing Competency Model, Employment and Training Administration, United States Department of Labor, February 2025. For more detailed information about competency model creation and sources, visit dli.mn.gov/business/workforce/advanced-manufacturing.

Competency Model for Maintenance and Repair Worker

Maintenance and repair worker – Individual who works in manufacturing whose job it is to maintain and repair manufacturing equipment and other industrial machinery, such as conveying systems, production machinery, and packaging equipment.

*Pipeline recommends the Industry-Sector Technical Competencies as formal training opportunities (provided through related instruction) and the Occupation-Specific Competencies as on-the-job (OJT) training opportunities.

Industry-Sector Technical Competencies

Related Instruction for dual training means the organized and systematic form of education resulting in the enhancement of skills and competencies related to the dual trainee's current or intended occupation.

- **Ergonomics** – Knowledge of how to modify machines so operation is safe and productive for operator.
- **Preventative maintenance** – Training to anticipate and prevent potential malfunction of tools and machinery.
- **Lubricants/lubrication systems** – Understanding of why lubricants and lubricant systems are used and when it is most beneficial to use them.
- **Troubleshooting and analysis** – Training in troubleshooting issues with machinery using tools and knowledge of machinery.
- **Robotics** – Understand how to maintain and repair robotic devices.
- **Inspection criteria** – Know how to do proper machine inspection.
- **Motor controls and PLCs** – Understanding of how to program motor controls and PLCs and how to use them for interfacing, operation, and programming.
- **Blueprint reading** – Training on how to interpret blueprints and use those blueprints to build reliable and serviceable objects.

- **Electrical, fluid, pneumatic power systems** – Understand how electrical, fluid, and pneumatic power systems function, and know how to maintain them.
- **Basic welding** – Know how to operate welding equipment to safely perform welds that repair and maintain manufacturing machines and equipment.
- **Basic fabrication** – Demonstrate an understanding of metal fabrication by cutting, altering, and shaping steel or other materials through use of different tools, techniques, and processes prior to welding.

Occupation-Specific Competencies

On-the-Job Training is hands-on instruction completed at work to learn the core competencies necessary to succeed in an occupation. Common types of OJT include job shadowing, mentorship, cohort-based training, assignment-based project evaluation and discussion-based training.

- **Fix and maintain mechanical power transmissions** – Demonstrate machine operation with mechanical power transmissions to know how to maintain and repair them.
- **Fix and maintain hydraulic/pneumatic systems** – Demonstrate function and operation of manufacturing hydraulic and pneumatic systems to know how to maintain and repair them.
- **Align machinery** – Ability to make repairs and adjustments that align manufacturing machinery for proper operation.
- **Align optical tools and equipment** – Ability to make repairs and adjustments to optical tools and equipment that align advanced manufacturing optical systems.
- **Operate CNC machines** – Know how to operate a CNC machine to be able to perform maintenance and repair on the CNC machine.
- **Maintain and repair compressors** – Understand how to operate compressors in order to be able to perform repair and maintenance on factory compressors.
- **Align laser shafts** – Know how to demonstrate proper alignment principles and practices including troubleshooting by use of a laser shaft alignment tool.
- **Repair and maintain industrial belting** – Understand how to operate industrial belting equipment to know how to maintain and repair these types of assembly systems.
- **Fix and maintain boring mills** – Understand how to operate boring mills to be able to maintain and repair them in the manufacturing production facility.
- **Grind parts and maintain grinding equipment** – Know how to perform grinding on parts as needed, as well as know how to maintain the grinding equipment.

- **Perform (SMAW, GMAW, GTAW) welding**— Exhibit knowledge and ability to perform shielded metal arc welding (SMAW), gas metal arc welding (GMAW), and gas tungsten arc welding (GTAW) in a safe manner to conduct repairs to manufacturing machines and equipment.
- **Fabricate metal for repairs** – Know how to perform metal fabrication to repair manufacturing machines and equipment.
- **Use oxy-acetyl cutting tools** – Know how to safely use tools that perform oxy-acetyl cutting.
- **Climb scaffolds and ladders safely** – Demonstrate how to safely ascend and perform job functions while using a scaffold and/ or ladder when working on manufacturing machines that are tall and need use of scaffolds/ ladders to reach to perform repairs and maintenance.

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