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TRANSPORTATION MANUFACTURING CAREER PATHWAY

The work of the Talent Pipeline Task Force was inspired by our community's existing assets in the areas of education and workforce. Members consist of a diverse mix of employers, workforce development leaders, chambers of commerce, and postsecondary education and social service providers.

The Talent Pipeline Task Force – with grant support from Lumina Foundation – partnered with the Chicago-based Council on Adult and Experiential Learning (CAEL) to develop career pathways in core occupations and industries of high need in the three targeted sectors. The matching of education supply data and labor market needs were supported by CI:Now, CAEL, and SA2020.

Career pathways are designed from the ground up, with attention to foundational and essential skills at the entry level or in the early stages of the ladder. They also offer multiple entry and exit points, with the intent being that those who seek skills and a job in a pathway can do so while intentionally climbing an explicit career ladder.

Building on these career pathway documents, the Talent Pipeline Task Force recommends the following:

1) Embed career information into college advising; and
2) Align the messaging of K-12, higher education, workforce and community-based organizations, so that multiple audiences receive the same information about demand occupations and key entry points.

For more information and the full Talent Pipeline Task Force Report, visit www.SA2020.org/reports.

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Transportation Equipment Manufacturing: Engineering

Entry Points	Transition Points and Requirements		Wage Range
Bachelor and Above Level (Senior and Above)	Transition Requirements • 5-10 Years of Related Experience • Bachelors Degree • Professional Engineer Certification	**Systems Control Engineer (Mechanical, Electrical)**	$75,000-$95,000
Associate Level (Mid to Senior)	Qualifications: • Associates Degree • Specific certificates obtained for advancement (MSSC, ASE, CMfgE)	**Automotive Engineering Technician** **Manufacturing Production Technician** **Manufacturing Engineering Technologist**	$45,000-$60,000

FOUNDATIONAL SKILL SETS

Basic Math and Science Skills Multi-tasking Equipment Usage/Monitoring	Understanding of Electrical Circuits Highly Organized Quality Control Analysis	Time Management Computer Skills Supervisory Skills	Mechanical Skills Attention to Detail Troubleshooting Skills

ESSENTIAL SKILL SETS

Punctual and Efficient Adaptable and Flexible Responsible	Drug-Free Able to work with teams Self-Motivated	Well-Groomed Able to communicate clearly Honesty and Integrity	Positive Attitude Conflict Resolution Self-Control

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Entry Points	Job Title	Job Description	Education/Training	Wage Ranges
Bachelor and Above Level (Senior and Above)	Aerospace Engineer	Perform engineering duties in designing, constructing, and testing aircraft, missiles, and spacecraft. May conduct basic and applied research to evaluate adaptability of materials and equipment to aircraft design and manufacture. May recommend improvements in testing equipment and techniques.	Bachelors Degree; Associate Value Specialist; Certification in Aerospace Physiology (advanced); Aerospace Fiber Optics Fabricator (advanced)	$98,000
	Electronics/ Electrical Engineer	Responsible for implementing electrical components into devices that require electricity. Design, manufacture, test, and maintain electrical products for consumers. Depending on focus in electronics or electrical, may be involved with high voltage equipment (electrical) or smaller systems (electronics).	Bachelor's Degree in Engineering or Electrical Engineering (Master's degree for advancement).	$75,000
	Industrial Engineer	Manage and develop the human, technological, logistical and materials resources of a production system with an emphasis on efficiency, productivity, and quality. Focus on problem-solving, cost analyses, establishing workplace safety procedures, supply chain management, or modification to the assembly line.	Bachelor's Degree, typically in Engineering, Logistics, or Business Management (Master's degree for advancement).	$74,000
	Mechanical Engineer	Research, design, build, and test mechanical and thermal devices, including tools, engines and machines. Design or redesign mechanical and thermal devices using analysis and computer-aided design. Develop and test prototypes of devices. Oversee the manufacturing process.	Bachelor's Degree in Mechanical Engineering or Mechanical Engineering Technology (Master's degree for advancement).	$74,000

	Systems Control Engineer (Mechanical, Electrical)	Design, integrate, or improve manufacturing systems or related processes. May work with commercial or industrial designers to refine product designs to increase its ability to be produced and decrease costs.	Bachelor's Degree	$55,000 - $94,000
Associate Level (Mid to Senior)	Engineering Technician	Assist engineers in determining the practicality of proposed product design changes, plan and carry out tests on experimental test devices or equipment for performance, durability, or efficiency. Support assembly, validation, installation, repair and maintenance of complex production systems and equipment.	Associate Degree	$48,000
	Manufacturing Engineering Technologist	Develop tools, implement designs, or integrate machinery, equipment, or computer technologies to ensure effective manufacturing processes.	Associate Degree or higher	$58,000
	Manufacturing Production Technician	Set up, test, and adjust manufacturing machinery or equipment, using any combination of electrical, electronic, mechanical, hydraulic, pneumatic, or computer technologies.	Associate Degree; MSSC Certified Production Technician (CPT)	$31,200 - $58,000

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Transportation Equipment Manufacturing: Installation, Maintenance, and Repair		
Entry Points	Transition Points and Requirements	Wage Range
Certificate Level (Entry to Mid)	Qualifications • High school diploma or equivalent • Moderate to long-term OJT • May require a license upon passing an examination/training	**Mobile Heavy Equipment Mechanic** **Industrial Machinery Installation, Repair & Maintenance** **Outdoor Power Equipment & Small Engine Mech.** **HVAC Mechanics** **Aircraft Structure, Surfaces, Rigging, and Systems Assembler** **Aircraft Mechanic**	$33,000-$58,000

ESSENTIAL SKILL SETS			
Punctual and Efficient Adaptable and Flexible Responsible	Drug-Free Able to work with teams Self-Motivated	Well-Groomed Able to communicate clearly Honesty and Integrity	Positive Attitude Conflict Resolution Self-Control

FOUNDATIONAL SKILL SETS			
Basic Math and Science Skills Multi-tasking Equipment Usage/Monitoring	Understanding of Electrical Circuits Highly Organized Quality Control Analysis	Time Management Computer Skills Supervisory Skills	Mechanical Skills Attention to Detail Troubleshooting Skills

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Entry Points	Job Title	Job Description	Education/Training	Wage Ranges
Certificate Level (Entry to Mid)	Aircraft Structure, Surfaces, Rigging, and Systems Assembler Aircraft Mechanic	Assemble, fit, fasten, and install parts of airplanes, space vehicles, or missiles, such as tails, wings, fuselage, bulkheads, stabilizers, landing gear, rigging and control equipment, or heating and ventilating systems.	High school diploma; Moderate-term OTJ training; specialized training specific to product line Aerospace/Aircraft Assembly Maintenance Certification	$40,000
	Industrial Machinery Installation, Repair & Maintenance	Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems	Long-term OTJ training, formal and informal apprenticeships; post secondary training; Certified Maintenance and Reliability Technician; Certified Maintenance and Reliability Technician; Fluid Power Engineer (advanced)	$31,000. - $58,000
	Mobile Heavy Equipment Mechanic (Except Engines)	Conduct QA/QC review of plant Diagnose, adjust, repair, or overhaul mobile mechanical, hydraulic, and pneumatic equipment, such as cranes, bulldozers, graders, and conveyors, used in construction, logging, and surface mining.	Long-term OTJ training, formal and informal apprenticeships; post-secondary training Oil Monitoring Analyst; Certified Equipment Manager; Fluid Power Master Mechanic; Certified Lubrication Specialist	$43,000
	Diesel Engine, Outdoor Power Equipment and Other Mechanic	Diagnose, adjust, repair, or overhaul, includes diesel engines.	High school diploma; Moderate-term OTJ training Compact Diesel Technician (specialty); Electrical Technician Certification (specialty)	$33,000

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Transportation Equipment Manufacturing: Production Occupations

Entry Points	Transition Points and Requirements		Wage Range
Associate Level (Mid to Senior)	Transition Requirements • Associates Degree • CCSP, CCTM, CDS	**Machine Tool Programmer**	$45,000-$55,000
Certificate Level (Entry to Mid)	Transition Requirements • 2-3 Years of Related Experience (+ OJT) • Specified industry certifications: machining, machine tool operator, electrical, operations	**CNC Operator** **Machine Tool Operator** **Tool and Die Maker** **Machine Tool Assembler** **Electromechanical Equipment Assembler** **Machine Setters, Operators, and Tenders** **Engine and Other Machine Assembler (non- CNC)** **Structural Metal Fabricators and Fitters** **Welders, Cutters, Solderers, and Brazers** **Inspectors, Testers, Sorters, Samplers, & Weighers** **Team Assembler** **Cutting, Punching & Press Machine Setters, Operators & Tenders**	$30,000-$40,000

FOUNDATIONAL SKILL SETS

Basic Math and Science Skills Multi-tasking Equipment Usage/Monitoring	Understanding of Electrical Circuits Highly Organized Quality Control Analysis	Time Management Computer Skills Supervisory Skills	Mechanical Skills Attention to Detail Troubleshooting Skills

ESSENTIAL SKILL SETS

Punctual and Efficient Adaptable and Flexible Responsible	Drug-Free Able to work with teams Self-Motivated	Well-Groomed Able to communicate clearly Honesty and Integrity	Positive Attitude Conflict Resolution Self-Control

Entry Points	Job Title	Job Description	Education/Training	Wage Ranges
Associate Level (Mid to Senior)	CNC Programmer	Develop programs to control machining or processing of metal or plastic parts by automatic machine tools, equipment, or systems.	Associates degree; post-secondary certificates	$31,000 - $72,000
Certificate Level (Entry to Mid)	CNC Operator	Operate computer-controlled machines or robots to perform one or more machine functions on metal or plastic work pieces.	High school diploma; Moderate-term OTJ training; post-secondary certifications ISA Certified Control Systems Technician; Machining Level I-CNC Milling: Programming Setup & Operations; Machining Level I-CNC Turning: Programming Setup & Operations (advanced)l NIMS Certifications	$25,000 – $40,000
	Cutting, Punching & Press Machine Setters, Operators & Tenders	Measure completed workpieces to verify conformance to specifications. Load workpieces, plastic material, or chemical solutions into machines. Set up, operate, or tend machines to saw, cut, shear, punch, bend or straighten material. Test, adjust, clean and secure machines, tools, and workpieces.	High school diploma; Short-term OTJ training; post-secondary certifications	$25,000- $30,000
	Electromechanical Equipment Assembler	Assemble or modify electromechanical equipment or devices, such as servomechanisms, gyros, dynamometers, magnetic drums, tape drives, brakes, control linkage, actuators, and appliances.	High school diploma; Short-term OTJ training; post-secondary certifications IPC J-STD-001 Requirements for Soldered Electrical & Electronic Assemblies; PMMI Mechatronics: Programmable Logic Controllers; MSSC	$25,000 - $58,000

	Engine and Other Machine Assembler (non-CNC)	Construct, assemble, or rebuild machines, such as engines, turbines, and similar equipment used in such industries as construction, extraction, textiles, and paper manufacturing.	High school diploma; Short-term OTJ training; post-secondary certifications Master Engine Machinist (advanced); Machine Building Level II-Mechanical Assembly (advanced); Machine Building Level III-Mechanical Assembly (advanced)	$33,000
	Inspectors, Testers, Sorters, Samplers, and Weighers	Inspect, test, or measure materials, products, installations, or work for conformance to specifications. Measure dimensions of products to verify conformance, read blueprints, data, manuals, or other materials to determine specifications, record inspection or test data, such as weights, temperatures, grades, or moisture content and quantities inspected or graded.	High school diploma or equivalent; post-secondary training (MSSC). 2-5 years relevant experience.	$30,000-$40,000
	Machine Setters, Operators and Tenders	Set up, operate, or tend machines to extrude or draw thermoplastic, plastic or metal materials into tubes, rods, hoses, wire, bars, or structural shapes.	High school diploma; Moderate-term OTJ training Machine Tool Operator Certificate	$32,000
	Structural Metal Fabricators and Fitters	Fabricate position, align, and fit parts of structural metal products.	High school diploma; Moderate-term OTJ training Certified Metalworking Fluids Specialist; Welding Certificate; Certified Welding Fabricator	$34,000

	Team Assembler	Perform quality checks on products and parts. Package finished products and prepare them for shipment. Review work orders and blueprints to ensure work is performed according to specifications. Maintain production equipment and machinery.	High school diploma or equivalent; post-secondary vocational training or apprenticeship programs, MSSC	$25,000-$40,000
	Tool and Die Maker	Read blueprints, sketches, specification or CAD and CAM files for making tools and dies. Compute and verify dimensions, sizes, shapes, and tolerances of pieces. Set up, operate, and disassemble conventional, manual and CNC machine tools. File, grind, adjust, smooth, and polish parts and surfaces of tools and dies.	High school diploma or equivalent; post-secondary vocational training or apprenticeship programs (MSSC and NIMS). At least 5 years experience working with high volume progressive dies.	$33,000-$66,000
	Welders, Cutters, Solderers, and Brazers	Use hand-welding, flame-cutting, hand soldering, or brazering equipment to weld or join metal components or to fill holes, indentation, or seams of fabricated metal products.	High school diploma; Post-secondary vocational training; some occupations may require a license upon passing an examination/training; certifications Welding Certificate; Certified Welding Fabricator	$35,000 and higher