

ManufacturingGPS – Sample 2021 Employer Survey

Excellence in Manufacturing Consortium (EMC) is happy to launch its 2021 ManufacturingGPS initiative.

As you may know, EMC has been collecting and updating labour market information and HR benchmarks, such as compensation levels and turnover rates since 2015. This interactive online resource provides key information and benchmarking tools to help manufacturers develop the workforce they need.

To complete the survey, you may need to access your company's administrative data (e.g., number of staff by occupation, turnover rates, salaries/wages).

Confidentiality

The information you share in this survey will remain confidential. We will never identify you or your company, and we will only use aggregate results in our analysis.

How to Complete the survey

Complete the survey online.

If you prefer to complete the survey over the phone or if you require assistance, please contact Ryan Auger by email at r.auger@malatest.com or by phone at 1-855-688-1142.

Next

Please provide your company's name in the space provided below:

SECTION A

Company Profile

This first section deals with the characteristics of your company. All responses will be kept confidential.

What are the first three characters of the postal code of your company's manufacturing location? Please type your postal code and then select from the drop down that appears.

(Format: A1B)

Company Profile

Which of the following industries most accurately reflects your company's manufacturing activities?

- | | |
|--|--|
| <input type="radio"/> Aerospace | <input type="radio"/> Chemical, petroleum & coal |
| <input type="radio"/> Computer & appliances | <input type="radio"/> Fabricated metal |
| <input type="radio"/> Food, beverage & tobacco | <input type="radio"/> Furniture |
| <input type="radio"/> Machinery | <input type="radio"/> Motor vehicle & parts |
| <input type="radio"/> Non-metallic mineral | <input type="radio"/> Plastics & rubber |
| <input type="radio"/> Primary metal | <input type="radio"/> Printing |
| <input type="radio"/> Textiles, clothing & leather | <input type="radio"/> Wood & paper |
| <input type="radio"/> Miscellaneous | |

Workforce Overview

What proportion of your workforce falls within the following categories?

(Please provide the percentage of full-time equivalents - FTEs)

Indicator	Definition	Percent of FTEs	Don't Know/ No Response
Women	Any person who self-identifies as a woman.	<input type="text"/> %	<input type="checkbox"/>
Post-secondary completion	<p>Those whose highest level of educational attainment is:</p> <ul style="list-style-type: none"> Apprenticeship or trades certificate or diploma (including 'centres de formation professionnelle'); College, CEGEP or other non-university certificate or diploma; University certificate or diploma below bachelor level or A university degree (bachelor's degree or higher). 	<input type="text"/> %	<input type="checkbox"/>

Indicator	Definition	Percent of FTEs	Don't Know/ No Response
Foreign trained professional	Someone who has successfully completed a formal credential in a country other than Canada.	<input type="text"/> %	<input type="checkbox"/>
Newcomers (within the last 5 years) to Canada	Any person who has entered Canada within the last five years.	<input type="text"/> %	<input type="checkbox"/>
Indigenous Peoples	Indigenous peoples include persons who are First Nations (status or non-status), Inuit, or Métis.	<input type="text"/> %	<input type="checkbox"/>
Members of a visible minority (or racialized group)	Any person who is non-Caucasian in race or non-white in colour, and who is not an Indigenous person. A “racialized group” is an equivalent term used by some provinces in place of visible minority (e.g. Ontario’s Human Rights Commission uses racialized group).	<input type="text"/> %	<input type="checkbox"/>
Persons with disabilities	<p>Individuals who have:</p> <ul style="list-style-type: none"> • physical, mobility and/or sensory impairments; • cognitive or intellectual disabilities; • mental health issues or illnesses; • neurological disorders; or • other health issues that result in barriers to employment, accessibility or full participation. 	<input type="text"/> %	<input type="checkbox"/>

Employment – see glossary for roll-over definitions

Does your company employ workers in any of the following nine functional groups?

Please check all that apply, including any functional groups and any occupations of interest within each group. These occupations of interest may not account for all your employees.

Functional Group	Employ	Difficult to Hire	
		Yes	No
Production Managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Administration Managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sales and Business Development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping and Receiving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Development, Engineering and Quality Control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industrial and manufacturing engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industrial engineering and manufacturing technologists and technicians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mechanical engineers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mechanical engineering technologists and technicians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintenance Trades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supervisors and erecting trades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Machinists and tool inspectors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Production - Supervisors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Production - Machine Operators and Assemblers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Machining tool operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tool and die makers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Production - Labourers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Employment

The following section asks about your current workforce. You may need to access your company's administrative data to provide answers.

Please provide information on the expected hires in the next 12 months for each of the functional groups and other specific occupations your company employs.

Functional Group/ Occupation	Expected Hires in the next 12 Months	
	# of FTEs	Don't Know
Production Managers	<input type="text"/>	<input type="checkbox"/>
Administration Managers	<input type="text"/>	<input type="checkbox"/>
Sales and Business Development	<input type="text"/>	<input type="checkbox"/>
Shipping and Receiving	<input type="text"/>	<input type="checkbox"/>
Development, Engineering and Quality Control	<input type="text"/>	<input type="checkbox"/>
Industrial and manufacturing engineers	<input type="text"/>	<input type="checkbox"/>
Industrial engineering and manufacturing technologists and technicians	<input type="text"/>	<input type="checkbox"/>
Mechanical engineers	<input type="text"/>	<input type="checkbox"/>
Mechanical engineering technologists and technicians	<input type="text"/>	<input type="checkbox"/>
Maintenance Trades	<input type="text"/>	<input type="checkbox"/>
Supervisors and erecting trades	<input type="text"/>	<input type="checkbox"/>
Machinists and tool inspectors	<input type="text"/>	<input type="checkbox"/>
Production - Supervisors	<input type="text"/>	<input type="checkbox"/>
Production - Machine Operators and Assemblers	<input type="text"/>	<input type="checkbox"/>
Machining tool operators	<input type="text"/>	<input type="checkbox"/>
Tool and die makers	<input type="text"/>	<input type="checkbox"/>

Functional Group/ Occupation	Expected Hires in the next 12 Months	Don't Know
	# of FTEs	
Production - Labourers	<input type="text"/>	<input type="checkbox"/>

Please provide information on Voluntary and Involuntary Turnover for the past 12 months

	Percentage	Don't Know
Overall Voluntary Turnover Termination initiated by the employee or mutually agreed upon with the employer (ex: resignations, retirement)	<input type="text"/> %	<input type="checkbox"/>
Overall Involuntary Turnover Employer ends employment (ex: dismissal, layoff, downsizing)	<input type="text"/> %	<input type="checkbox"/>

How to calculate Turnover

$$\frac{\text{\# of employees who have left}}{\text{average \# of employees at full staff}} \times 100 = \text{turnover rate}$$

Employment

Please provide the average wage/salary for each functional group and occupation your company employs.

(Please indicate if the amount is an annual salary or an hourly wage)

Functional Group/ Occupation	Average Wage/Salary			Don't Know
	\$	\$/Hour	\$/Year	
Production Managers	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Administration Managers	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Sales and Business Development	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Shipping and Receiving	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Development, Engineering and Quality Control	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>

Functional Group/ Occupation	Average Wage/Salary			
Industrial and manufacturing engineers	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Industrial engineering and manufacturing technologists and technicians	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Mechanical engineers	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Mechanical engineering technologists and technicians	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Maintenance Trades	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Supervisors and erecting trades	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Machinists and tool inspectors	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Production - Supervisors	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Production - Machine Operators and Assemblers	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Machining tool operators	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Tool and die makers	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Production - Labourers	<input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>

Employment

By what percentage do you expect wages to increase next year?

- Decrease
- 0% (No change)
- 1% - 1.9%
- 2% - 2.9%
- 3% - 3.9%
- 4% - 4.9%

- 5% - 5.9%
- 6% or higher
- Don't know/No Response

Workplace Skills Development

Over the past 12 months, how much did your company spend per employee on skills development activities?

Please include amounts spent on non-legislated external courses, internal training staff, salaries for workers while on training and administrative time to organize the activities.

- \$0
- \$1 - \$250
- \$251 - \$500
- \$501 - \$750
- \$751 - \$1,000
- \$1,001 - \$1,500
- \$1500+
- Don't know/No Response

Recruitment

What are the causes of hard-to-fill vacancies?

(Please check all that apply)

- | | |
|---|--|
| <input type="checkbox"/> Applicants lack the skills required | <input type="checkbox"/> The skilled labour we need are located in other regions |
| <input type="checkbox"/> Applicants lack the work experience required | <input type="checkbox"/> Lack of good work ethic and job commitment |
| <input type="checkbox"/> Not enough people trained / applicants lack the educational qualifications | <input type="checkbox"/> Other reasons (please specify): |
| <input type="checkbox"/> Low number of applicants | <input type="checkbox"/> Don't know/No Response |
| <input type="checkbox"/> Competition from other employers | |
-

What recruitment method has been most successful at your organization when advertising job vacancies?

(Please select one)

- | | |
|---|---|
| <input type="radio"/> Employee Referral program | <input type="radio"/> LinkedIn |
| <input type="radio"/> Newspaper ads | <input type="radio"/> Career Fairs |
| <input type="radio"/> Employment Agencies | <input type="radio"/> College/University Job Boards |
| <input type="radio"/> Canadian Job Bank | <input type="radio"/> Company Website – Careers |
| <input type="radio"/> Indeed | <input type="radio"/> Other, please specify: |

How important is the shift to Advanced Manufacturing in your organization? If not important or don't know/unsure are selected the more detailed questions on the individual AM skills do not populate.

- Important
- Not important
- Don't Know/Unsure

For each skill, please indicate whether the skill is in current demand and/or a future need, as well as the importance on a Likert Scale of 1 to 5 (with 5 being most critical and 1 being least critical / not needed)? [See glossary for roll-over definitions of the skills below](#)

Skills				
	Current	Future	Don't Know/No Response	
AI / Machine Learning (Integration / Operation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Automation (Integration / Operation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Blockchain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Computer Numerical Control (CNC)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Continuous Improvement (Lean, Six Sigma, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Cybersecurity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Digital Transformation / Digital Skills (may include hardware, software, computer skills)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Data Analytics and Collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Foundational / Essential Skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Information and Communication Technologies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Machine Operating Skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1

Skills				
				5
ERP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
New Technology Skills (Emerging Technologies)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Robotics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Software Development / Programming / Coding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
3D Printing / Additive Manufacturing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5
Other 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 5

Do you plan to hire any of the following groups in the next 12 months? (Select all that apply)

- Unpaid student interns
- High School co-op students
- College or university co-op students
- High school students for summer employment (non-co-op)
- College or university students for summer employment (non-co-op)
- None of the above
- Don't know/No response

Does your organization have a workforce succession plan in place to deal with projected growth or retirements over the next 3 to 5 years?

- Yes
- No
- Don't Know/Unsure

Has your company participated in workplace training programs in the past 12 months?

- Yes
- No
- Don't Know/Unsure

Reasons for not investing in training

Investment in skills development programs is lower in manufacturing than some other sectors of the Canadian economy. Listed below are some reasons why firms may not invest in training.

Please indicate your level of agreement with each statement below.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The costs of workplace training programs are too high	<input type="radio"/>				
Manufacturing plants are not equipped to deliver training programs on-site	<input type="radio"/>				
There are no relevant training programs available	<input type="radio"/>				
There is not enough evidence demonstrating the effectiveness of training programs	<input type="radio"/>				
Governments already provide the necessary funding for training programs	<input type="radio"/>				
Workers in the manufacturing sector already have the skills they need to do their work well	<input type="radio"/>				
Manufacturers cannot afford to pull workers off the production line for training	<input type="radio"/>				
Workers who get training are more likely to look for work elsewhere	<input type="radio"/>				
Employers who don't invest in training will poach trained workers from companies who pay for training	<input type="radio"/>				
It is not the responsibility of the employer to train workers	<input type="radio"/>				
Workplace training programs do not always align with the training needs of employers	<input type="radio"/>				
Our company had negative experiences with workplace training programs in the past	<input type="radio"/>				

Next

Can you think of any other reasons for not investing in workplace training programs?

On a scale from 1 to 5, to what extent would the following **program elements** increase your motivation to invest in training? (1 = Would not motivate you at all; 5 = Would be a deciding factor)

	Would not motivate at all 1	2	3	4	Would be a deciding factor 5
Workforce Competitiveness					
Being recognized as a company that invests in its workforce	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing workplace flexibility by offering cross-training opportunities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effect on participants					
Increased engagement with work among participants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased knowledge and skills of participants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased productivity of workers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced absenteeism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced <u>Presenteeism</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More collaboration among workers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business Impact					
Improved health and safety outcomes in the workplace	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More efficient workforce	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved quality of products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Greater worker retention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Greater worker promotion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Federal, provincial, and territorial governments across Canada provide financial support to employers who deliver training programs in their workplace. The next question asks about the appeal of different types of these incentives for Canadian manufacturers.

How important would the offer of the following **financial incentives** be in your decision to invest in workplace training programs?

	Not important	Not very important	Moderately important	Important	Very important
Financial compensation for productivity loss during training sessions	<input type="radio"/>				
Wage subsidies for workers over the course of the training	<input type="radio"/>				
Tax credits for employers who enroll in workplace training programs	<input type="radio"/>				
Outcomes-based, or performance-based funding of training costs	<input type="radio"/>				
Per worker grants—up to a lifetime maximum—to be spent on training	<input type="radio"/>				

Are there any other **financial incentives** that could potentially increase investment in workplace training programs?

Next

You have now finished all of the questions. Please select “Submit” below to complete your survey.

Thank you for participating in the ManufacturingGPS survey.

Roll-overs Glossary

EMPLOYMENT ROLL-OVERS (PAGE 4)

Production Managers: These occupations include senior and middle management involved with production; however, it does not include supervisory positions. *

*Function-specific supervisors, such as sales manager or production supervisor, are counted within other functional groups. Production supervisors (e.g., foremen/women) are assigned their own functional group.

Sample Occupations: Automobile Production Managers; Distillery Managers; General Manager; Planning/Scheduling Manager; Plant Manager; Procurement Manager; Textile Mill Managers.

Administration Managers: This category includes administrative managers not associated with the production or sale of goods. Administrative managers included in this functional group include: finance, IT*, health & safety, human resources,

*Information Technology roles not directly related to development or production tasks.

Sample Occupations: Accountants; Office Administrators; Bookkeepers; Health & Safety Managers; HR Managers; IT Managers.

Sales and Business Development: These occupations are to include those responsible for engaging in selling goods to customers, as well as the development of relationships with new customers domestically and internationally.

Sample Occupations: Brand Managers; Customs, Ship and Other Brokers; Market Researchers; Regional Managers; Retail and Wholesale Buyers; Sales Managers; Salespersons; Technical Sales Specialists - Wholesale Trade

Shipping and Receiving: These occupations are to include those responsible for engaging in transactions and deliveries within the company and with other firms that are upstream/downstream in the supply chain.

Sample Occupations: Dispatchers; Import Freight Clerk; Logistics personnel; Purchasing and Inventory Control Workers; Shippers and Receivers; Truck Drivers; Warehouse supervisors.

Development, Engineering and Quality Control: These occupations include those involved in the development of production lines, development of new products, redesign of existing products, as well as troubleshooting production issues. These positions usually require post-secondary education at either a college or university.

Sample Occupations: Chemical Engineers; Continuous Improvement Managers; Industrial Designer; Mechanical Technologists; Quality Assurance Managers; Quality Control Technicians.

Industrial and manufacturing engineers: Industrial and manufacturing engineers conduct studies, and develop and supervise programs to achieve the best use of equipment, human resources, technology, materials and procedures to enhance efficiency and productivity.

Examples of Job Titles: Industrial engineer; Production engineer; Quality control engineer; Safety engineer; Systems engineer.

Industrial engineering and manufacturing technologists and technicians: Industrial engineering and manufacturing technologists and technicians may work independently or provide technical support and services in the development of production methods, facilities and systems, and the planning, estimating, measuring and scheduling of work.

Examples of Job Titles: CNC and CAM programmers; Loss prevention technologist; Planning technician; Quality assurance technologist; Scheduling technician.

Mechanical engineers: Mechanical engineers research, design and develop machinery and systems for heating, ventilating and air conditioning, power generation, transportation, processing and manufacturing. They also perform duties related to the evaluation, installation, operation and maintenance of mechanical systems.

Examples of Job Titles: Automotive engineer; Design engineer; HVAC engineer; Robotics engineer; Tool engineer.

Mechanical engineering technologists and technicians: Mechanical engineering technologists and technicians provide technical support and services or may work independently in fields such as the design, development, maintenance and testing of machines, components, tools, utilities systems, manufacturing plants and equipment.

Examples of Job Titles: HVAC technologist; Machine designer; Mould designer; Thermal station technician; Tool and die designer.

Maintenance Trades: These occupations include those involved in the setup, repair, and maintenance of equipment. These positions usually require post-secondary education at either a college or university.

Sample Occupations: Electricians; Mechanics; Millwrights; Pipefitters; Technicians; Welders.

Supervisors and erecting trades: The group includes supervisors who supervise and co-ordinate the activities of workers involved in machining, tool and die making, sheet metal, boiler making, metal fabrication, welding and related machine operations, and other associated fields.

Examples of Job Titles: Foremen/women - automotive machine shop, boilermakers, machinists, tool and die makers; Supervisors - machine shop, metal mould and metal patternmakers, tool and die inspectors, sheet metal workers, welders.

Machinists and tool inspectors: Machinists set up and operate a variety of machine tools to cut or grind metal, plastic or other materials to make or modify parts or products with precise dimensions. Tooling inspectors inspect machined parts and tooling in order to maintain quality control standards.

Examples of Job Titles: Automotive machinist; General machinist; Machine shop inspector; Machined parts inspector; Machinist apprentice.

Production - Supervisors: These occupations include supervisors, foremen/women and other workers who oversee and co-ordinate workers involved with the production of goods.

Sample Occupations: Foremen/women; Supervisors.

Production - Machine Operators and Assemblers: These occupations include those involved with the production of goods through the operation of machines or tools that are required for the production of goods (final or intermediary). These positions usually require extensive (multi-month) on-the-job training to perform occupational duties.

Sample Occupations: Capsule Machine Operators; Cement Millers; Industrial Line Maintainers; Pulp Press Tenders; Steel Rollers.

Machining tool operators: Machining tool operators set up and operate or tend metal-cutting machines designed for repetitive machining work.

Examples of Job Titles: CNC machining tool operator; Aircraft parts etcher; Lathe machining operator; Production gear cutter; Radial drill operator.

Tool and die makers: Tools and die makers make, repair and modify custom-made, prototype or special tools, dies, jigs, fixtures and gauges using various metals, alloys and plastics which require precise dimensions.

Examples of Job Titles: Tool and die finishers and makers; Metal patternmakers; Mould makers; Related apprentices.

Production - Labourers: These occupations include those involved with the production of goods (final or intermediary) that require little education or on-the-job training.

Sample Occupations: Brick and Tile Kiln Cleaners, Glass Packers, Box Packer.

PAGE 10 ADVANCED MANUFACTURING ROLL-OVERS:

AI / Machine Learning (Integration / Operation): AI (Artificial Intelligence) is intelligence demonstrated by machines and refers to a broader idea where machines can execute tasks “smartly” – it applies machine learning to solve actual problems. Machine Learning is based on the idea that machines should be able to learn and adapt through experience.

Automation (Integration / Operation): the creation and application of processes and technologies to produce and deliver goods and services with optimized or minimal human intervention. These technologies or processes improve the efficiency, reliability and/or speed of many tasks.

Blockchain: a system of recording information in a way that makes it extremely difficult to change, hack or cheat the system. Manufacturers are developing blockchain implementations that have the potential to help them streamline operations, gain greater visibility into supply chains and track assets with unprecedented precision. Blockchain has potential to revolutionize how manufacturers design, engineer and scale their products.

Computer Numerical Control (CNC): the automated control of machining tools by means of a computer. A CNC machine processes a piece of material to meet specifications by following a coded programmed instruction and without a manual operator directly controlling the machining operation. This is a vast improvement from non-computerized machining that must be manually controlled (i.e. using devices such as hand wheels or levers).

Continuous Improvement (Lean, Six Sigma, etc.): an ongoing effort to improve products, services or processes. Following the Lean Model, continuous improvement seeks to improve every process in your company by focusing on enhancing the activities that generate the most value for your customer while

removing as many waste activities as possible. Six Sigma is a disciplined, data-driven approach to continuous improvement.

Cybersecurity: the protection of internet-connected systems such as hardware, software and data from cyberthreats. The practice is used by individuals and enterprises to protect against unauthorized access to data centres and other computerized systems.

Digital Transformation / Digital Skills (may include hardware, software, computer skills): the adoption of digital technology to transform services or businesses, through replacing non-digital or manual processes with digital processes or replacing older digital technology with newer digital technology.

Data Analytics and Collection: Data collection is the gathering of information from various sources and data analytics is to process the data looking for useful insights from it.

Foundational / Essential Skills: These skills are used in nearly every job and at different levels of complexity. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Information and Communication Technologies: ICT stresses the role of unified communications and the integration of telecommunications and computers plus software that enable users to access, store, transmit, understand and manipulate information. ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form (i.e. personal computers including smartphones, digital television, email or robots).

Machine Operating Skills: able to read blueprints, schematics and manuals, as well as possess the ability to work with many types of machinery.

ERP: Enterprise Resource Management is the consolidated process of gathering and organizing business data through an integrated software suite. This software has applications which automate business functions like production, sales quoting, accounting, etc.

New Technology Skills (Emerging Technologies): Technologies whose development or practical applications are still largely unrealized – as they are emerging into prominence from a background of nonexistence.

Robotics: whether it be independent robots (work all by themselves), cobots (robots that work collaboratively with humans) or dependent robots (programmed robots) – these are often used to help with tasks humans already do or for repetitive or dangerous tasks.

Software Development / Programming / Coding: the process of conceiving, specifying, designing, programming, documenting, testing and bug fixing involved in creating and maintaining applications, frameworks or other software components.

3D Printing / Additive Manufacturing: the construction of a three-dimensional object from a CAD (computer-aided design) model or a digital 3D model.

PAGE 13 ROLL-OVER:

Presenteeism: otherwise known as “working while sick”, presenteeism refers to employees who come to work but are underperforming because of an illness.