

COMPETENCY PROFILE:

# MANUFACTURING ENGINEER

## ROLE OVERVIEW

Manufacturing engineers are responsible for optimizing efficiency and productivity in manufacturing settings. They conduct studies, develop methods for manufacturing programs, and supervise operations to ensure the best utilization of equipment, human resources, technology, materials, and procedures. Their primary responsibilities involve:

- Analyzing existing manufacturing processes and systems.
- Identifying areas for improvement.
- Implementing strategies to streamline operations and minimize raw material use or waste.

Manufacturing engineers have the technical expertise and knowledge of production equipment, assembly methods, quality control standards, product design, materials, tooling and parts. They are specialists tasked with identifying opportunities and implementing changes to enhance manufacturing processes or products and lower production costs.

Manufacturing engineers are integral to designing and implementing manufacturing materials, methods, and systems. They have a strong understanding of robotics and automation and use this knowledge to improve manufacturing processes. This role works with cross-functional teams to integrate equipment, technology, and resources effectively. Manufacturing engineers aim to achieve high-quality production while maintaining cost-effectiveness and safety.

## ALSO KNOWN AS:

- Manufacturing Engineering Lead,
- Industrial Engineer
- Quality Assurance (QA) Engineer

## NATIONAL OCCUPATIONAL CLASSIFICATION:

- 21321 – Industrial and manufacturing engineers

## EDUCATION AND EXPERIENCE

- A bachelor's degree is mandatory in industrial engineering or a similar field.
- Certain positions might require a master's or doctorate in a related engineering discipline.
- Mandatory licensing through a provincial or territorial association of professional engineers to approve engineering drawings and reports and to qualify as a Professional Engineer (P.Eng.).
- Engineers become eligible for professional registration after completing an accredited educational program, three to four years of supervised engineering work experience, and passing a professional practice examination.
- Manufacturing engineers require comprehensive knowledge and skills in engineering materials, manufacturing processes, design approaches, and quality engineering.

## TECHNICAL



### Quality Assurance and Quality Control

Follows appropriate processes, as directed by organizational best practices, to ensure quality is maintained throughout operations.

- Supervise material handling controls activities and production to ensure that products meet quality standards.
- Creates plans for controlling and responding within quality management systems to identify and prevent quality problems early on.
- Identifies and implements appropriate tools and methods to analyze and respond to quality deviations.
- Assesses products against specifications and quality criteria to ensure they meet customer expectations.

---

### Engineering Design

Organizes and outlines the technical elements of engineering projects to guarantee safe, sustainable, efficient, and successful construction.

- Designs the layout of equipment or workspaces to achieve maximum efficiency.
- Review product designs to assess manufacturability or completeness and ensure they are suitable for efficient and successful manufacturing.
- Proposes technical design or process changes to improve the efficiency, quality, or performance of products, structures, systems, or facilities.
- Works with product designer on value-added engineering by providing input during design review to increase product functionality while maintaining product quality.
- Conduct capability and feasibility studies to assess part(s) flow and handling for processing.
- Technical documents are used in documents and archives to ensure that all process stages are recorded and made available to the appropriate people.

---

## **Troubleshooting**

Detects and reports operational problems and inefficiencies in equipment, processes, or systems to find effective solutions.

- Addresses issues with new or existing products, focusing on design, materials, or processes to enhance manufacturing efficiency.
- Designs, installs, or troubleshoots manufacturing equipment for equipment reliability and maintenance.
- Troubleshoots problems in the manufacturing process and provides solutions to coach build issues.
- Identifies and analyzes manufacturing process issues to develop effective troubleshooting strategies to minimize downtime and improve efficiency.

---

## **Continuous Improvement**

Analyzes, innovates, and refines processes, systems, and practices to drive positive change and optimize performance to improve efficiency and quality.

- Participates in cross-functional teams to identify cost-saving opportunities.
- Uses production methodologies like lean manufacturing and just-in-time (JIT) manufacturing, along with process improvement techniques and tools, to enhance the quality, reliability, and cost-efficiency of manufacturing processes.
- Monitors and assesses the team's performance improves training or takes corrective action to increase productivity.
- Conducts process analysis to identify weaknesses and implement relevant changes that optimize manufacturing processes to reduce product waste.
- Analyzes operational data to evaluate operations, processes, or products to gain insights into current process performance.

---

## **Data Management**

Adheres to established organizational best practices for processes to maintain quality in data collection, analysis, and management.

- Analyzes operational data to evaluate operations, processes, or products to ensure efficiency.
- Maintains historical information on operational data to reference and corresponding sources.
- Applies appropriate processes to trace and record the data to understand its movements within the organization.
- Works with environmental/safety teams to ensure manufacturing processes are tracked, necessary data is attached, and proper procedures are known.

---

## **Budget Management**

Creates detailed plans to establish, track, and assess operational budgets and costs, covering all project activities and expenditures to ensure the financial sustainability of operations.

- Organizes the business justification for new assemblies or transformation projects, detailing the operational (OpEx) and capital expenditures (CapEx) within the allocated budget.
- Records and analyzes operational costs and budget metrics to track potential profits and losses.
- Identifies budget gaps between available and required funds to address options for filling gaps.
- Monitors the operating cost and budget metrics to site processes, procedures, and performance to ensure viable operations.

---

## **Project Team Management**

Oversees a team of professionals to effectively and efficiently produce the required output to ensure projects are completed on time and within budget.

- Develops project plans and budgets, with milestones, risk mitigation plans, and financial projections that align with project requirements.
- Determines project requirements, objectives, and deliverables to lay a solid foundation for successful projection.
- Implements corrective actions when projects veer off course by providing technical solutions to deliver projects on time.
- Follow up with customers, vendors, and colleagues during and after project completion to address customer concerns, comments, or objections on time.
- Manages tasks according to the approved scope of work to deliver quality reports on schedule and within budget.

---

## **Manufacturing Process**

Oversees the process of transforming materials into final products, ensuring efficient conversion into high-quality items that fulfill manufacturing objectives and customer needs.

- Utilizes statistical procedures to determine the root causes of failures to identify areas for potential changes in tolerances or manufacturing processing methods.
- Research existing applications and derive benefits, costs, and drawbacks to optimize manufacturing processes.
- Collaborates with quality and sales teams to define the required elements, such as equipment and processes, ensuring efficient planning and successful execution of manufacturing initiatives.
- Works with the quality and sales department to select and analyze tooling, fixturing, and gauging for manufacturing processes to improve productivity and cost-effectiveness.
- Ensures cycle times are monitored to ensure line balancing/manufacturing efficiency.



## Problem-Solving

Identifies problems and uses logic, judgment, and evidence to evaluate alternative scenarios and recommend solutions to achieve a desired goal.

- Conducts root cause analysis to identify issues or failures to develop innovative solutions.
- Analyzes data to evaluate operational challenges to prevent recurrence.
- Consider several possible explanations or alternatives for a situation, anticipate potential obstacles, and develop plans to overcome them.
- Conduct failure mode and effects analysis (FMEA) or process failure mode effect analysis (PFMEA) to prioritize different risks and problems.
- Uses a mix of logical reasoning and creative thinking to develop innovative and well-thought-out solutions.
- Adjusts strategies and tactics to navigate obstacles and capitalize on emerging opportunities.

## Leadership

Promotes and leads cooperation among supervised personnel to achieve a collective outcome.

- Motivates team members to assist one another by contributing their knowledge, expertise, or efforts to achieve objectives.
- Inspires team members to foster a positive work environment.
- Provides clear direction to reduce ambiguity and achieve streamlined operations.
- Allocates duties and informs the team of expected standards of work and behaviour to meet a standard result.

## Communication

Positively directs outcomes by delivering communication that better understands goals and objectives, captures interest, and gains support for immediate action.

- Builds and sustains relationships with stakeholders to guarantee effective communication of technical information.
- Communicates manufacturing capabilities, production schedules, or other information to facilitate production processes.
- Utilizes unambiguous language for communication to aid team members in accomplishing their objectives more efficiently or effectively.
- Strives to be an active and effective listener to focus on messages from others instead of formulating a response.



## Regulatory Compliance

Adheres to specific regulations, codes, and legislation within a defined jurisdiction to ensure the health and safety of others.

- Reviews and applies relevant regulations, legislation, and standards to ensure the project complies with them.
- Stays abreast of regulatory changes to ensure the company complies with them.
- Ensures compliance with regulations during the implementation of new processes
- Ensures documentation and change control measures comply with regulations to reduce company risk.
- Keeps leadership informed about compliance-related changes or issues with relevant regulations.