Unit 56: Implementing Engineering Activities

Level: 3

Guided learning hours: 378

Unit overview

This unit of competence has been developed by employers in the Advanced Manufacturing and Engineering Sector and is part of an overall development programme designed to meet the requirements of the Sector.

This unit identifies the training and development required in order that the apprentice can implement engineering activities in accordance with approved procedures. They will be required to apply appropriate methods and procedures to ensure that the resources and systems available to them are used effectively and efficiently. They will also be required to identify any opportunities to improve the engineering activity during the implementation, and to convey this information to the appropriate people and department (such as with a new or changed assembly or manufacturing activity which may involve planning, design or other departments).

Their responsibilities will require them to comply with organisational policy and procedures for the implementation of the engineering activities, and to report any problems that they cannot personally resolve, or are outside their permitted authority, to the relevant people. They will be expected to work with a minimum of supervision, taking personal responsibility for their own actions and for the quality and accuracy of the work that they carry out.

Their underpinning knowledge will provide a good understanding of their work, and will provide an informed approach to implementing engineering activities. They will be expected to have underpinning knowledge that will include resource management principles. They will understand their organisation's methods of operation and quality assurance systems in sufficient detail to enable them to make informed decisions, and to carry out the implementation activities to the required standard.

They will be aware of any company, legislative or regulatory health, safety and environmental requirements applicable to the engineering activity being implemented. They will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

They will be able to apply the occupational behaviours required in the workplace to meet the job profile and overall company objectives, including logical approach, problem solving orientation, quality focus, personal responsibility and resilience, clear communicator, team player, applies lean manufacturing principles, adaptability, self-motivation, willingness to learn and commitment.

Assessment requirements

The assessment requirements for this unit are in the Advanced Manufacturing Engineering Assessment Strategy and can be found in *Annexe A* of the associated qualification specification. These requirements have been developed by employers for Advanced Manufacturing Engineering.

Additional information

Although all of the content and assessment requirements must be met in full, employers can tailor the training outcomes to ensure that the content of the programme is specific to their requirements in terms of products, processes, procedures, tools, equipment, materials, documentation and information systems.

This will allow each organisation to develop their own specific and tailored training programme whilst meeting their own business requirements whilst at the same time ensuring that the overall generic content is to a high standard in terms of depth and breadth to enable progression and/or transferability to other employers.

Performance requirements

The apprentice must be able to:

P1 Demonstrate the required occupational behaviours in line with the job role and company objectives

P2 Confirm that conditions are suitable to implement operational methods and procedures

P3 Obtain accurate information on the operational activities being undertaken

P4 Ensure that engineering support systems are operating correctly

P5 Control the use of resources to achieve the most effective results

P6 Provide clear and accurate instructions to all the relevant people

P7 Ensure that quality assurance systems are correctly implemented

P8 Identify opportunities to improve the operational methods and procedures

P9 Ensure that the implementation of operational methods and procedures complies with all relevant regulations, directives and guidelines

Skills

The apprentice must be able to:

S1 Carry out **all** of the following when implementing the engineering activities:

- 1.1 use the correct issue of company information
- 1.2 check that all essential information and data needed to implement the engineering activity is available
- 1.3 collect relevant information on the engineering and customer requirements, operations and methods
- 1.4 use the information collected to determine an implementation plan
- 1.5 identify potential problems which may influence the implementation of the engineering activity
- 1.6 check that the appropriate resources will be available at the time they are required
- 1.7 ensure that health and safety regulations and safe working practices are taken into account
- 1.8 ensure that the influence of working conditions is recognised and included in the implementation plans

S2 Carry out the implementation of **one** of the following engineering activities:

- 2.1 drawing/design activities (such as mechanical, electrical/electronic, motor vehicle, aerospace, marine)
- 2.2 manufacturing activities (such as machining, detail fitting, fabrication of components, pressing)
- 2.3 material processing activities (such as heat treatment, casting, injection moulding, purification)

Skills

The apprentice must be able to:

2.4 composite manufacture (such as wet lay-up, pre-preg laminating, resin infusion, blow moulding)

2.5 finishing activities (such as stripping finishes, painting, plating, anodising, veneering, lacquering)

2.6 assembly activities (such as mechanical, structural, fluid power, electrical/electronic, woodworking)

2.7 installation activities (such as mechanical, electrical/electronic, avionic, structural, environmental equipment)

2.8 plant and equipment (such as site preparation, plant layout, equipment changeover, equipment replacement)

2.9 equipment capability studies/performance measurement

2.10 movement of materials, components or finished goods

2.11 engineering safety audits or risk assessments

2.12 business improvement activities

2.13 quality control/quality assurance

2.14 maintenance activities

2.15 modification and repair activities

2.16 commissioning/decommissioning

2.17 testing and trialling

2.18 research and development

2.19 engineering support services

S3 Obtain information on the activities and resources required for the engineering activity to be implemented, to include **three** of the following sources:

3.1 design office

3.2 production engineering

3.3 process engineering

3.4 sales department

3.5 quality engineering

3.6 contractor

3.7 planning department

3.8 plant engineering

3.9 customer

3.10 management/directors

3.11 health and safety/environmental engineering

3.12 other specific source

S4 Confirm **all** of the following during the implementation:

4.1 appropriate plant and equipment is available

Skills

The apprentice must be able to:

4.2 health and safety requirements can be met

4.3 materials and components are ready for use

4.4 environmental conditions are suitable

4.5 required resources are available

4.6 work area/site is suitably prepared

4.7 timescales for undertaking the activities are as planned

4.8 relevant people are informed

4.9 quality control systems and procedures are in place

S5 Provide clear and accurate information/instructions to all parties, using the following methods:

5.1 specific company documentation

Plus **one** more method from the following:

5.2 written or typed report

5.3 verbal report

5.4 electronic mail

S6 Ensure that quality assurance systems are implemented correctly, and confirm that support systems are operating effectively, including **one** of the following:

6.1 resource supply (such as materials, equipment and people)

6.2 transport

6.3 logistics

6.4 procurement

6.5 utilities

S7 Carry out **all** of the following on completion of the implementation activities:

7.1 validation and evaluation of the implementation systems and procedures used

7.2 suggested improvements to their process of implementation

7.3 recommendations for improvements or changes to the engineering activities that were implemented

S8 Ensure that implementation methods and procedures used comply with relevant regulations and guidelines, from **one** of the following:

8.1 organisational guidelines and codes of practice

8.2 equipment manufacturer's operation specification/range

8.3 health, safety and environmental requirements

8.4 recognised compliance agency/body's standards

8.5 customer standards and requirements

8.6 BS and/or ISO standards

Knowledge and understanding

The apprentice must:

K1 Explain how to access information on health and safety regulations and guidelines relating to the engineering activities to be implemented

K2 Outline the implications of not taking account of legislation, regulations, standards and guidelines when implementing the engineering processes

K3 Describe the personal protective equipment (PPE) that is required for the work area and process being implemented

K4 Explain the importance of applying the appropriate occupational behaviours in the workplace and the implications for both the apprentice and the business if these are not adhered to

K5 Explain how to obtain information on the engineering requirements, and the type of information that is available (such as customer requirements and instructions, quality control requirements, product specification, manufacturing methods)

K6 Explain how to access and use the appropriate information and documentation systems

K7 Outline the engineering methods and procedures that could be used for different types of engineering activity

K8 Explain how to identify conditions that are suitable, and those not suitable, for different types of engineering activities

K9 Explain how and where to obtain details of the engineering activities being undertaken

K10 Outline the types of data that they will require to implement the engineering activity (such as the activities to be carried out, the sequence in which they must be carried out, timescales, resource requirements, health and safety issues)

K11 Explain how to extract information from drawings, documents and related specifications (to include symbols and conventions to appropriate BS or ISO standards and, where appropriate, regulations) in relation to work being planned

K12 Outline the materials, formats, codes and conventions that are used in the drawings and plans

K13 Outline the factors to be taken into account when implementing the engineering activity, especially those covering working conditions and safety

K14 Outline the main types of resource involved with different types of engineering activity, and the typical timescales for providing them

K15 Explain how to verify that resources are suitable, and are available within or to the organisation

K16 Outline the timescales for carrying out specific engineering activities, and why they must be adhered to

K17 Describe the use of the engineering plans and instructions (to include working instructions, along with their purpose and content)

Knowledge and understanding *The apprentice must:*
K18 Describe the procedures for changing the plans, to take account of changed circumstances or improvements in the process
K19 Explain how to present observations and recommendations, in the appropriate formats
K20 Explain the importance of maintaining records, what needs to be recorded and where records are kept
K21 Outline the quality assurance systems that are being used
K22 Describe the engineering support systems that are available
K23 Explain why contingency plans need to be drawn up
K24 Explain who to inform about changes to the plans
K25 Outline the different ways of presenting information to different people
K26 Explain the importance of providing right information at the right time
K27 Outline the roles and responsibilities of key personnel associated with the engineering activity
K28 Describe problems that can occur during the implementation of the engineering activity, and how these problems can be rectified
K29 Describe the sources of technical expertise if they have problems they cannot resolve
K30 Describe the extent of their own authority, and whom they should report to in the event of problems that they cannot resolve