Skills Development **Scotland**

Occupation Profile

Modern Apprenticeship in Engineering - Asset Lifecycle & Maintenance Apprenticeship at SCQF Level 7

Approved by: Engineering Technical Expert Group

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Purpose:

This occupation profile consists of 16 work situations routinely carried out in Asset Lifecycle & Maintenance roles. Collectively these describe all the performance requirements and knowledge and understanding requirements apprentices need to demonstrate competence in the occupation. Each work situation has a unique reference number and is set out as follows:

 Work situation title, goal, brief outline, performance requirements and knowledge and understanding requirements

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Mandatory work situations

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To safely perform core engineering activities.

Brief outline:

This involves carrying out core engineering activities in accordance with technical specifications, instructions and organisational requirements.

Performance requirements

- 1. Obtaining clear and detailed information from drawings and other technical documentation to carry out specified engineering activities
- 2. Confirming programmes of work with relevant people in accordance with organisational procedures
- 3. Contributing to developing risk assessments and method statements of risks for specific engineering activities
- 4. Coordinating site services and activities of other trades affected by engineering activities in compliance with industry practices and organisational procedures
- 5. Identifying and using correct PPE in accordance with manufacturers guidance
- 6. Calibrating engineering tools and equipment in accordance with manufacturer's instructions.
- 7. Communicating engineering information to relevant others in accordance with organisational procedures
- 8. Carrying out relevant engineering activities in line with quality requirements
- 9. Checking engineering activities and outputs meet quality requirements
- 10. Carrying out relevant handover procedures in accordance with organisational requirements
- 11. Leaving work sites in appropriate condition in accordance with organisational requirements
- 12. Completing and securely storing relevant engineering documentation in accordance with organisational requirements

- 1. How to access and interpret engineering information from drawings and other technical documentation
- 2. Current legislation, guidelines, policies, procedures, Safe Systems of Work (SSOW) and protocols which are relevant to your working practice and to which you must adhere
- 3. How to contribute to developing risk assessments and method statements for engineering activities
- 4. Importance and correct use of any equipment and PPE required
- 5. Duty to report any acts and omissions that could have a negative impact on yourself, relevant others and your organisation
- 6. How to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
- 7. Principles and practice of communicating in engineering environments
- 8. Organisational procedures for checking resources are fit for purpose
- 9. Principles and practice of metrology and calibration
- 10. What is meant by 'engineering assets'
- 11. Operation, applications, advantages and limitations of different engineering assets
- 12. Principles and practice of handover
- 13. Principles and practice of Management of Change (MOC)
- 14. Importance of Quality requirements associated with engineering operations
- 15. Organisational requirements for completing and securely storing documentation

- 13. Dealing effectively with engineering problems within the scope and limitations of your own competence, responsibilities, and accountability
- 14. Reporting engineering problems which cannot be solved and escalating, where necessary in accordance with organisational requirements
- 15. Disposing of waste materials, substances, and fluids in accordance with legislative and organisational procedures
- 16. Scope and limitations of your own competence, responsibilities and accountability
- 17. Organisational procedures for reporting and escalating problems which cannot be solved
- 18. Organisational procedures for disposing of waste materials, substances and fluids
- 19. Business and commercial considerations associated with engineering activities
- 20. How to keep up to date on technical advances, emerging technologies, and new products in engineering
- 21. Use and importance of digital equipment and data in engineering activities

Developing meta-skills and personal practice

Goal of work situation:

To develop meta-skills and personal practice through self-evaluation, agreeing objectives, reflecting on practice, and actively learning to improve own performance in line with organisational requirements.

Brief outline:

This is about developing meta-skills and personal practice. This involves reflecting on and learning from practice; acting on feedback; agreeing and working towards own objectives for continuous personal and professional development. Individuals will be supported in their development, usually by their line manager.

Performance requirements

- 1. Identifying meta-skills and role specific skills regularly used in own work to assess strengths and improvement needs for personal and professional development
- 2. Discussing and agreeing SMART objectives for personal and professional development and to achieve business objectives
- 3. Discussing and agreeing appropriate development activities to improve own performance and to achieve business objectives
- 4. Completing development activities within agreed timescales to support and progress own performance
- 5. Acting on feedback to improve own performance and development
- 6. Reflecting on performance, meta-skills and specific skills developed in your role to identify and agree future development needs
- 7. Completing mandatory training in line with organisational requirements
- 8. Completing documentation required for personal and professional development in line with organisation policy and procedures

Knowledge and understanding requirements

- 1. The purpose and importance of meta-skills including their definitions and how they relate to own work
- 2. The importance of personal and professional development within own organisation and role
- 3. How to use reflective practice to identify gaps in role specific knowledge, skills and meta-skills
- 4. How to participate effectively in performance reviews
- 5. How to discuss and agree SMART objectives Specific, Measurable, Achievable, Realistic, Time-bound
- 6. The importance of business and personal objectives in own development
- 7. Sources of up-to-date and appropriate information to support own development
- 8. The importance of maintaining well-being in own role and where to get support
- 9. How to use feedback to develop own skills and knowledge
- 10. Different learning models and styles and how to use these for own development

URN: SDS 0223

Knowledge & Understanding Requirements

URN: SDS 0081

Understanding the importance of environmental good practice and sustainability

Goal of work situation:

To understand good environmental practices, the importance of sustainability and how to apply this within your area of responsibility

Brief outline:

This is about individuals understanding the negative impact of their work on the environment and the steps that can be taken to reduce this impact and promote sustainability. This could be local or global impact.

Performance requirements

There are no performance requirements for this work situation. This work situation provides knowledge and understanding requirements only.

- 1. Why it is important to consider and apply sustainability in everything you do
- 2. The importance of assessing the negative environmental impact that your work could have and what needs to be considered
- 3. Environmental legislation and industry codes of practice that apply to your area of work
- 4. Different ways of working that could be adopted to reduce negative environmental impact and promote sustainability in your area of work
- 5. How to make responsible and sustainable use of natural resources in ways which minimise negative impacts on nature and natural habitats and promotes biodiversity
- 6. How to make responsible use of water, energy and other resources
- 7. The importance of energy efficiency and the ways in which energy usage can be monitored, reduced and replaced with renewable sources
- 8. The importance of making informed decisions on purchases, considering the carbon footprint and adopting the principles of the circular economy
- 9. The ways in which waste can be reduced and the principles of the waste management hierarchy
- 10. How pollution can be avoided in your area of work
- 11. How your work impacts on climate and environmental change and the actions that could be taken to respond to and mitigate the effects of this
- 12. How carbon emissions can be calculated and reduced and mitigated
- 13. The use of targets for reducing carbon emissions and improving environmental performance

- 14. The importance of constantly reviewing environmental performance and taking action to make improvements
- 15. The purpose of environmental management systems and other
- environmental quality marks16. Where to find information and advice on grants, subsidies or other forms of funding or assistance to implement low carbon solutions



Optional work situations

A minimum of 4 optional work situations must be achieved

Maintaining engineering assets	10
Diagnosing and resolving faults in engineering assets	11
Repairing engineering assets	12
Replacing engineering assets	13
Inspecting and testing engineering assets	14-15
Installing engineering assets	16
Commissioning engineering assets	17
Decommissioning engineering assets	18
Producing assemblies and sub-assemblies	19
Manufacturing engineering assets by hand	20
Applying methods and principles in project management	21-22
Providing effective leadership	23
Welding materials	24

To safely carry out maintenance activities to optimise asset performance and life.

Brief outline:

This involves safely carrying out maintenance activities on engineering assets (parts, components, consumables and systems associated with engineering plant and equipment) and the subsequent completion of all relevant documentation and records in accordance with organisational requirements.

Performance requirements

- 1. Selecting and obtaining resources required to undertake specified maintenance activities
- 2. Checking resources are fit for purpose to undertake maintenance activities
- 3. Identifying areas of stored energy and isolating these in accordance with organisational requirements prior to commencing maintenance activities
- 4. Implementing maintenance activities on engineering assets in accordance with industry recognised methods and practices
- 5. Servicing engineering assets in accordance with maintenance organisational requirements
- 6. Returning resources upon completion of work in accordance with organisational requirements
- 7. Contributing to maintenance schedules and monitoring their accuracy and effectiveness
- 8. Checking all maintaining engineering assets work meets quality requirements

- 1. Principles and practice of engineering maintenance
- 2. Different types of engineering maintenance and how and when to apply them
- 3. Resources (equipment, tools and consumables) associated with maintenance of engineering assets and how and when to use them
- 4. Terms used in the maintenance of engineering assets
- 5. Others you need to communicate with regarding maintenance activities
- 6. Escalation processes and procedures
- 7. Principles and practice of condition monitoring as part of predictive maintenance
- 8. How to conduct planned, preventative, and unplanned maintenance
- 9. How to contribute to maintenance schedules in terms of implementation, development, management and contribution of data
- 10. How to monitor the accuracy and effectiveness of maintenance schedules
- 11. Role of digital technology in maintenance activities
- 12. Quality requirements associated with the maintenance of engineering assets

Diagnosing and resolving faults in engineering assets

URN: SDS 0190

Goal of work situation:

To safely diagnose and resolve faults to optimise asset performance and life.

Brief outline:

This involves using approaches and techniques, including available data and digital tools to safely locate, diagnose and rectify faults in machinery. This includes identifying feasibility of rectification options and communicating outcomes and recommendations in accordance with organisational requirements.

Performance requirements

- 1. Selecting and obtaining resources required to undertake diagnosis and resolution of faults
- 2. Confirming resources are fit for purpose to undertake diagnosis and resolution of faults
- 3. Identifying areas of stored energy and isolating these in accordance with organisational requirements prior to commencing fault diagnosis activities
- 4. Collating and analysing evidence of fault from documentation, available data and relevant others in accordance with organisational requirements
- 5. Inspecting and testing engineering assets to diagnose and locate faults in accordance with industry recognised methods and practices
- 6. Identifying feasibility of rectification options and making recommendations in accordance with organisational requirements
- 7. Rectifying faults using techniques in accordance with industry recognised methods and practices
- 8. Testing faults have been rectified and engineering assets are functioning as required in accordance with organisational requirements
- 9. Checking cause of fault has been removed in a practical, safe and sustainable manner
- 10. Returning resources upon completion of work in accordance with organisational requirements
- 11. Checking all diagnosing and resolving faults in engineering assets work meets quality requirements

- 1. Principles and practice of fault diagnosis and resolution
- 2. Principles and practice of data analytics
- 3. Resources (equipment, tools and consumables) associated with diagnosis and resolution of faults and how and when to use them
- 4. Terms used in fault diagnosis and resolution
- 5. Others you need to communicate with regarding fault diagnosis and resolution
- 6. Differences, advantages and disadvantages of remote and in-situ diagnostics
- 7. How to collate and analyse evidence of fault from documentation, available data and relevant others
- 8. Relative advantages and limitations of repair and replace
- 9. Processes for making recommendations on actions
- 10. How to identify situations requiring repair or replacement
- 11. Repair techniques and methods and how to apply them
- 12. Importance of workarounds and when to use them
- 13. How to test faults have been rectified and engineering assets are functioning as required
- 14. How to check the causes of faults have been removed
- 15. Quality requirements associated with fault diagnosis and resolution

To safely repair engineering assets ready for re-use.

Brief outline:

This involves taking engineering parts and components identified as faulty or non-performing and repairing them and making them ready for testing. This then includes testing functionality and safety for direct re-use or storing as serviceable replacements in accordance with technical specifications, instructions and organisational requirements.

Performance requirements

- 1. Selecting, obtaining resources required to undertake repair of engineering assets
- 2. Confirming resources are fit for purpose to undertake repair of engineering assets
- 3. Identifying areas of stored energy and isolating these in accordance with organisational requirements prior to commencing repair of engineering assets
- 4. Carrying out repair activities on engineering assets in accordance with industry recognised methods and practices
- 5. Testing repaired engineering assets are functioning as required in accordance with organisational requirements
- 6. Checking cause of need for repair has been removed in a practical, safe and sustainable manner
- 7. Returning resources upon completion of work in accordance with organisational requirements
- 8. Checking all repairing engineering assets work meets quality requirements

- 1. Principles and practice of engineering asset repair
- 2. Resources (equipment, tools and consumables) associated with repair of engineering assets and how and when to use them
- 3. Terms used in the repair of engineering assets
- 4. Others you need to communicate with regarding repair of engineering assets
- 5. Relative advantages and limitations of repair and replace
- 6. Situations requiring repair or replacement
- 7. Differences between direct re-use and serviceable replacement
- 8. Repair techniques and methods and how and when to apply them
- 9. How to test repair is successful and sustainable and an engineering asset is functioning as required
- 10. How to check cause of need for repair has been removed in a practical, safe and sustainable manner
- 11. Quality requirements associated with repair of engineering assets

To safely replace engineering assets to optimise asset performance and life.

Brief outline:

This involves replacing engineering assets identified as either faulty, non-performing and lifed in accordance with technical specifications, instructions and organisational requirements.

Performance requirements

- 1. Selecting and obtaining resources required to undertake replacement of engineering assets
- 2. Confirming resources are fit for purpose to undertake replacement of engineering assets
- 3. Identifying areas of stored energy and isolating these in accordance with organisational requirements prior to commencing replacement of engineering assets
- 4. Carrying out replacement activities on engineering assets in accordance with industry recognised methods and practices
- 5. Testing replaced engineering assets are functioning as required in accordance with organisational requirements
- 6. Checking cause of need for replacement has been removed in a practical, safe and sustainable manner
- 7. Returning resources upon completion of work in accordance with organisational requirements
- 8. Checking all replacing engineering assets work meets quality requirements

- 1. Principles and practice of engineering asset replacement
- 2. Resources (equipment, tools and consumables) associated with replacement of engineering assets and how and when to use them
- 3. Terms used in replacement of engineering assets
- 4. Others you need to communicate with regarding replacement of engineering assets
- 5. Relative advantages and limitations of repair and replace
- 6. Situations requiring repair or replacement
- 7. Replacement techniques and methods and how and when to apply them
- 8. How to test replacement is successful and sustainable and engineering assets are functioning as required
- 9. How to check cause of need for replacement has been removed in a practical, safe and sustainable manner
- 10. Quality requirements associated with replacement of engineering assets

URN: SDS 0193

Goal of work situation:

To safely inspect and test engineering assets to ensure safety and functional requirements are met.

Brief outline:

This involves establishing a status of engineering assets by applying appropriate inspection and testing procedures. This includes using available data and digital tools and making recommendations for improvement in accordance with technical specifications, instructions and organisational requirements.

Performance requirements

- 1. Selecting and obtaining resources required to undertake inspection and testing of engineering assets
- 2. Confirming resources are fit for purpose to undertake inspection and testing of engineering assets
- 3. Identifying areas of stored energy and isolating these in accordance with organisational requirements prior to commencing inspection and testing of engineering assets
- 4. Carrying out inspection activities on assets in accordance with organisational requirements
- 5. Setting up and carrying out tests on engineering assets in accordance with industry recognised methods and practices
- 6. Returning resources upon completion of work in accordance with organisational requirements
- 7. Recording and communicating test results and any recommendations in an appropriate format in accordance with organisational requirements
- 8. Reviewing results and carrying out further tests, if necessary, in accordance with organisational requirements
- 9. Checking all inspecting and testing engineering assets work meets quality requirements

- 1. Principles and practice of inspection and testing
- 2. Resources (equipment, tools and consumables) associated with inspection and testing of engineering assets and how and when to use them
- 3. Terms used in inspection and testing of engineering assets
- 4. Others you need to communicate with regarding inspection and testing
- 5. Inspection and testing procedures, adjustment methods, certification processes, formulas and measuring instruments and how and when to use them
- 6. Requirements for test equipment to be maintained, used correctly and calibrated, and importance of retaining appropriate records
- 7. How to contribute to development of testing protocols to analyse products, systems, and components against set standards and specifications
- 8. How to set up and conduct tests of complete units and components with reference to operational and environmental conditions
- 9. Importance of understanding failure, variation and how to conduct root cause analysis
- 10. Limitations of specific inspection and testing techniques and resources and how to recognise when these are reached
- 11. How to identify need for further tests and how and when to implement them
- 12. Importance of impartiality in inspection and testing
- 13. How to communicate test outcomes and suggestions

- 14. Importance of retesting and when to do this15. Quality requirements associated with inspection and testing of engineering assets

To safely install engineering assets to meet a specified requirement.

Brief outline:

This involves using manufacturer instructions and information to prepare for and safely install, position, connect and secure a range of engineering assets (parts, components, consumables and systems associated with engineering plant and equipment) and subsequent completion of all relevant documentation and records in accordance with technical specifications, instructions and organisational requirements.

Performance requirements

- 1. Selecting and obtaining resources required to undertake installation of engineering assets
- 2. Confirming resources are fit for purpose to undertake installation of engineering assets
- Identifying areas of stored energy and isolating these in accordance with organisational requirements prior to commencing installation of engineering assets
- 4. Measuring and marking out locations for fitting and fixing engineering assets in accordance with drawings and other relevant sources of information
- 5. Fitting, fixing and connecting engineering assets in accordance with drawings and other relevant sources of information
- 6. Performing visual and manual checks to confirm engineering assets have been fixed, fitted and connected in accordance with drawings and other relevant sources of information
- 7. Testing integrity of systems against specification
- 8. Returning resources upon completion of work in accordance with organisational requirements
- 9. Checking all installing engineering assets work meets quality requirements

- 1. Principles and practice of engineering installation
- 2. Resources (equipment, tools and consumables) associated with installation of engineering assets and how and when to use them
- 3. Terms used in installation of engineering assets
- 4. Others you need to communicate with regarding installation
- 5. Methods and techniques for fitting, fixing and connecting engineering assets
- 6. Methods, techniques and procedures used to test integrity of installed assets
- 7. How to obtain acceptance of installed engineering assets and how to deal with cases where acceptance is not received
- 8. Quality requirements associated with installation of engineering assets

URN: SDS 0202

Goal of work situation:

To safely ensure engineering assets are functioning effectively.

Brief outline:

This involves carrying out checks and functionality tests to ensure engineering assets are working in accordance with specifications and client requirements and subsequent completion of relevant documentation and records in accordance with technical specifications, instructions and organisational requirements.

Performance requirements

- 1. Selecting and obtaining resources required to undertake commissioning of engineering assets
- 2. Confirming resources are fit for purpose to undertake commissioning of engineering assets
- 3. Identifying areas of stored energy and isolating these in accordance with organisational requirements prior to commencing commissioning of engineering assets
- 4. Actively commissioning engineering assets adjusting control features in accordance with specifications
- 5. Completing commissioning activity in accordance with industry recognised methods and practices
- 6. Returning resources upon completion of work in accordance with organisational requirements
- 7. Providing information to relevant others about engineering assets
- 8. Contribute to handover procedures in accordance with organisational requirements
- 9. Checking all commissioning engineering assets work meets quality requirements

- 1. Principles and practice of commissioning
- 2. Resources (equipment, tools and consumables) associated with commissioning engineering assets and how and when to use them
- 3. Terms used in commissioning of engineering assets
- 4. Others you need to communicate with regarding commissioning
- 5. Methods and techniques for commissioning engineering assets
- 6. Asset protection requirements and techniques before going live
- 7. Types and purposes of information to be communicated
- 8. Procedures for handling sensitive information
- 9. How to obtain acceptance of commissioned engineering assets and how to deal with cases where acceptance is not received
- 10. Quality requirements associated with commissioning engineering assets

To safely take engineering assets out of active service to meet specified requirements.

Brief outline:

This involves taking engineering assets out of active service including on a permanent and semi-permanent basis, ensuring engineering assets and sites are left in safe conditions. This includes completing relevant documentation and records in accordance with technical specifications, instructions and organisational requirements.

Performance requirements

- 1. Selecting and obtaining resources required to undertake decommissioning of engineering assets
- 2. Confirming resources are fit for purpose to undertake decommissioning of engineering assets
- 3. Identifying areas of stored energy and isolating these in accordance with organisational requirements prior to commencing decommissioning of engineering assets
- 4. Removing engineering assets from active service in accordance with specification
- 5. Completing decommissioning activity in accordance with industry recognised methods and practices
- 6. Returning resources upon completion of decommissioning work in accordance with organisational requirements
- 7. Providing information to relevant others about engineering asset conditions in accordance with organisation requirements
- 8. Contribute to handover procedures in accordance with organisational requirements
- 9. Checking all decommissioning engineering assets work meets quality requirements

- 1. Principles and practice of decommissioning
- 2. Resources (equipment, tools and consumables) associated with decommissioning engineering assets and how and when to use them
- 3. Terms used in decommissioning of engineering assets
- 4. Others you need to communicate with regarding decommissioning
- 5. Methods and techniques for decommissioning engineering assets and how to apply these
- 6. Types and purposes of information to be communicated
- 7. Procedures for handling sensitive information and how to use them
- 8. How to obtain acceptance of decommissioned engineering assets and how to deal with cases where acceptance is not received
- 9. Quality requirements associated with decommissioning of engineering assets

To safely produce engineering assets in form of assemblies and sub-assemblies to meet a specified requirement.

Brief outline:

This involves using appropriate work instructions and information to produce engineering assets in form of assemblies and sub-assemblies in accordance with technical specifications, instructions and organisational requirements.

Performance requirements

- 1. Selecting and obtaining resources required to undertake production of assemblies and sub-assemblies
- 2. Confirming resources are fit for purpose to undertake production of assemblies and sub-assemblies
- 3. Identifying areas of stored energy and isolating these in accordance with organisational requirements prior to commencing production of assemblies and sub-assemblies
- 4. Assembling required product in accordance with organisational requirements
- 5. Manipulating tools, parts and components in line with operational procedures
- 6. Producing assemblies and sub-assemblies to required quality and within specified dimensional accuracy
- 7. Carrying out quality sampling checks at suitable intervals in accordance with organisational requirements
- 8. Returning resources upon completion of work accordance with organisational requirements
- 9. Checking all producing assemblies and sub-assemblies work meets quality requirements

- 1. Principles and practice of assemblies and sub-assemblies
- 2. Resources (equipment, tools and consumables) associated with production of assemblies and sub-assemblies and how and when to use them
- 3. Terms used in production of assemblies and sub-assemblies
- 4. Others you need to communicate with regarding producing assemblies and sub-assemblies
- 5. Purpose of production of assemblies and sub-assemblies.
- 6. What assemblies and sub-assemblies will be used for
- 7. Jigs and how and when to use them
- 8. Methods and techniques for producing assemblies and sub-assemblies and when to use them
- 9. Quality requirements associated with production of assemblies and subassemblies

To safely produce engineering assets using hand tools to meet a specified requirement.

Brief outline:

This involves using appropriate work instructions and information to manufacture engineering assets using only hand tools in accordance with technical specifications, instructions and organisational requirements.

Performance requirements

- 1. Selecting and obtaining resources required to undertake manufacture of engineering assets by hand
- 2. Confirming resources are fit for purpose to undertake manufacture of engineering assets by hand
- 3. Identifying areas of stored energy and isolating these in accordance with organisational requirements prior to commencing manufacture of engineering assets by hand
- 4. Using hand tools in line with operational procedures and specification
- 5. Producing components to required quality and within specified dimensional accuracy
- 6. Carrying out quality sampling checks at suitable intervals in accordance with organisational requirements
- 7. Returning resources upon completion of work in accordance with organisational requirements
- 8. Checking all manufacturing engineering assets by hand work meets quality requirements

- 1. Principles and practice of using hand tools
- 2. Resources (equipment, tools and consumables) associated with the manufacture of engineering assets by hand and how and when to use them
- 3. Terms used in manufacturing engineering assets by hand
- 4. Others you need to communicate with regarding manufacturing engineering assets by hand
- 5. Methods and techniques for manufacturing engineering assets by hand
- 6. Quality requirements associated with manufacturing engineering assets by hand

Work Situation

Applying methods and principles in project management

Goal of work situation:

This work situation involves using project management tools to plan, organise and monitor the progress of activities to achieve production quality performance indicators.

Brief outline:

This is about applying methods and principles of project management in line with organisational requirements. This includes ensuring activities are delivered in accordance with the business case and safe systems of work, and involves liaising with and reporting progress to stakeholders, ensuring activities contribute to key milestones and deliverables.

Performance requirements

- 1. Providing support to prepare business cases for approval of activities
- 2. Identifying roles, responsibilities and skill sets needed for project activities and resources
- 3. Planning and scheduling projects in line with agreed objectives, timescales, and organisational requirements
- 4. Managing activities in line with plans and to achieve milestones
- 5. Managing change in line with organisational procedures
- 6. Escalating to relevant personnel where there are deviations from plans
- 7. Identifying, agreeing, and implementing contingencies to mitigate problems
- 8. Communicating plan progress in formats to meet the needs of all relevant stakeholders
- 9. Reporting on progress in line with organisational reporting procedures
- 10. Collating and evaluating lessons learned to contribute to the continuous improvement of activities

Knowledge and understanding requirements

- 1. Relevant legislation and codes of practice, safe systems of work, risk and impact assessments for activities
- 2. The principles and approaches to developing good business cases
- 3. Different methodologies to plan and deliver activities and how to apply these
- 4. The tools and processes for identifying and analysing risks and opportunities and how to use them
- 5. Techniques and tools for monitoring and reviewing risks including when and how to escalate to management
- 6. Quantitative and qualitative measures of risk analysis and how to apply these
- 7. The importance of monitoring and controlling project performance including accountability
- 8. Industry specific tools and software for monitoring performance
- 9. The importance of establishing an agreed change control process, and the impact and consequences that changes can have on schedule, resources, and budget
- 10. The type of changes that may affect key performance criteria including time, cost, quality, and business case
- 11. The importance of contingency plans

URN: SDS 0007

12. The importance of evaluating and monitoring the benefits and challenges of activities and how to do this

To provide positive and effective leadership to teams to enable, objectives, goals, and targets to meet organisational requirements

Brief outline:

This involves leading a team to achieve defined outcomes and targets required by the organisation. This includes identifying team members roles and responsibilities, setting individual and collective objectives, and monitoring and reviewing performance.

Performance requirements

- 1. Prioritising and setting realistic and achievable goals and objectives for your team, in accordance with targets set for yourself or for the work area/activity
- 2. Determining and agreeing individual roles and responsibilities
- 3. Empowering team members to work autonomously within agreed boundaries
- 4. Leading your team successfully to meet agreed objectives and goals
- 5. Monitoring the performance of your team against goals and targets set
- 6. Communicating performance and outcomes to relevant people in ways that suit their needs
- 7. Requesting feedback from others and acting on this to improve your leadership practice
- 8. Agreeing and recording actions from meetings in line with organisational requirements

- 1. Leadership models, styles, qualities, and self-awareness and how to select and apply these to different situations and team members
- 2. How team dynamics impact on organisational behaviours, including cultural and values and differences
- 3. How to work cost effectively and efficiently
- 4. How to conduct a team performance review and how to support the team in problem solving/creative thinking activities and taking their own decisions.
- 5. Organisational policies and procedures on fairness and inclusion and the importance of complying with these
- 6. The ways communication may need to be adapted for team members and others
- 7. Listening, questioning and coaching techniques to achieve team outcomes.
- 8. The business targets set for your area of responsibility, and how to prioritise, set personal, individual and team targets to achieve them including action planning
- 9. How to monitor and check that your team is working to identified quality and safety standards
- 10. How to get and make use of feedback from team members and other colleagues on your leadership performance,
- 11. The types of difficulties and challenges that may arise when leading teams and ways of identifying and addressing them
- 12. How to escalate problems with team members performance and relationships in line with organisational processes

To safely join materials using heat, pressure, or both to meet a specified requirement.

Brief outline:

This involves joining materials (typically metals and/or thermoplastics) by the application of a range of welding techniques in accordance with technical specifications, instructions and organisational requirements.

Performance requirement

- 1. Selecting and obtaining resources required to undertake welding of materials
- 2. Confirming resources are fit for purpose to undertake welding of materials
- 3. Identifying areas of stored energy and isolating these in accordance with organisational requirements prior to commencing welding of materials
- 4. Preparing and supporting a joint in accordance with organisational requirements
- 5. Checking a joint for condition and accuracy before welding
- 6. Welding a joint to specified quality, dimensions and profile using appropriate methods in accordance with industry practices and organisational procedures
- 7. Returning resources upon completion of work in accordance with organisational requirements
- 8. Checking all welding materials work meets quality requirements

- 1. Principles and practice of welding
- 2. Resources (equipment, tools and consumables) associated with welding of materials and how and when to use them
- 3. Terms used in welding of materials
- 4. Materials suitable for welding and how to do this
- 5. Others you need to communicate with regarding welding
- 6. Range of welding techniques and when to use them
- 7. Coding and certification schemes relevant to welding
- 8. Quality requirements associated with welding of materials

The relationship between meta-skills and work situations

	Meta skills alignment											
Work situation	Adapting	Collaborating	Communicating	Creativity	Critical thinking	Curiosity	Feeling	Focussing	Initiative	Integrity	Leading	Sense making
Performing core engineering activities	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark			\checkmark	\checkmark		\checkmark
Developing meta-skills and personal practice	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark		\checkmark			
Understanding importance of environmental good practice	\checkmark		\checkmark			\checkmark	\checkmark		\checkmark	\checkmark		
Maintaining engineering assets		\checkmark	\checkmark		\checkmark			\checkmark		\checkmark		\checkmark
Diagnosing and resolving faults	\checkmark		\checkmark		\checkmark	\checkmark		\checkmark	\checkmark			\checkmark
Repairing engineering assets		\checkmark	\checkmark		\checkmark			\checkmark	\checkmark	\checkmark		\checkmark
Replacing engineering assets		\checkmark	\checkmark		\checkmark			\checkmark	\checkmark	\checkmark		\checkmark
Inspecting and testing engineering assets	\checkmark		\checkmark		\checkmark	\checkmark		\checkmark	\checkmark			\checkmark
Installing engineering assets	\checkmark		\checkmark		\checkmark			\checkmark	\checkmark	\checkmark		\checkmark
Commissioning engineering assets	\checkmark	\checkmark	\checkmark		\checkmark			\checkmark		\checkmark		

The table above indicates where there are opportunities to develop and evidence meta-skills in each work situation within the occupation profile. Please note, this information is for guidance, and indicates where meta-skills are explicit rather than an exhaustive list. There may be opportunities for individuals to develop and evidence other meta-skills when carrying out their role.

The relationship between meta-skills and work situations

	Meta skills alignment											
Work situation	Adapting	Collaborating	Communicating	Creativity	Critical thinking	Curiosity	Feeling	Focussing	Initiative	Integrity	Leading	Sense making
Decommissioning engineering assets	\checkmark	\checkmark	\checkmark		\checkmark			\checkmark		\checkmark		
Producing assemblies and sub-assemblies			\checkmark	\checkmark	\checkmark				\checkmark	\checkmark		\checkmark
Manufacturing engineering assets by hand	\checkmark		\checkmark	\checkmark				\checkmark	\checkmark			\checkmark
Applying methods and principles in project management	\checkmark	\checkmark	\checkmark		\checkmark				\checkmark		\checkmark	\checkmark
Providing effective leadership	\checkmark	\checkmark	\checkmark				\checkmark		\checkmark	\checkmark	\checkmark	
Welding materials			\checkmark	\checkmark		\checkmark			\checkmark	\checkmark		\checkmark

The table above indicates where there are opportunities to develop and evidence meta-skills in each work situation within the occupation profile. Please note, this information is for guidance, and indicates where meta-skills are explicit rather than an exhaustive list. There may be opportunities for individuals to develop and evidence other meta-skills when carrying out their role.

Work situation	National Occupational Standards Alignment							
Performing core engineering activities	 Supporting Activities in Engineering Construction (ECITB) ECICM03 Performing Engineering Operations Suite 2 (Enginuity) ECIOSM03 	 Land-based Engineering Operations (Lantra) LANCS10 Core Mandatory Suite (Engineering) (Enginuity) SEMEM386 	Common NOS (ECITB) ECIEXP03					
Maintaining engineering assets	 Engineering Maintenance Suite 3 (Enginuity) SEMSEC302 Electrical and Electronic Engineering Suite 3 (Enginuity) SEMADM306 Condition Monitoring (ECITB) ECICM05 Non Destructive Testing (ECITB) ECINDT06 Maintaining Plant and Systems - Electrical (ECITB) ECIOSM02 Maintaining Plant and Systems - Instrumentation and Control (ECITB) ECICM05 Maintaining Plants and Systems - Mechnical (ECITB) ECIICESE07 Aeronautical Engineering Suite 3 (Enginuity) SEMCOMP312 Automotive Engineering Suite 3 (Enginuity) SEMMAN2303 	 Mechanical Manufacturing Engineering Suite 3 (Enginuity) SEMRETRS306 Rail Engineerig Signalling Suite 3 (Enginuity) SEMRES217 Rail Engineering Traction & Rolling Stock Suite 3 (Enginuity) SEMRETRS319 Rail Engineering Telecomms Suite 3 (Enginuity) SEMRET324 Rail Engineering Signalling Suite 3 (Enginuity) SEMRE217 Engineering Toolmaking Suite 3 (Enginuity) SEMRE217 Engineering Toolmaking Suite 3 (Enginuity) SEMAE303 Installation and Commissioning Suite 3 (Enginuity) SEMAE3196 Advanced Manufacturing (Enginuity) SEMADM306 Marine Engineering Suite 3 (Enginuity) SEMADM303 	 Land-based Engineering Operations (LAntra) LANCS10 Food and Drink (NSAFD) IMPHS307 Electricity Power Utilities (EU Skills) EUSPTD002 Gas Network Construction (EU Skills) EUSMUNC2 Wind Turbines (EU Skills) EUSWT10 Engineering Maintenance in Food Manufacture (NSAFD) IMPEM107 Bulk Liquid Operations (COgent) COGBL08 Wind Turbines (EU Skills) EUSW10 					

Work situation	National Occupational Standards Alignment						
Diagnosing and resolving faults in engineering assets	 Engineering Maintenance Suite 3 (Enginuity) SEMSEC302 Electrical and Electronic Engineering Suite 3 (Enginuity) SEMADM306 Condition Monitoring (ECITB) ECIIESE07 Non Destructive Testing (ECITB) ECINDT06 Maintaining Plant and Systems - Electrical ECIOSM02 Maintaining Plant and Systems - Instrumentation and Control (ECITB) ECICM05 Maintaining Plant & Systems - Mechnical (ECITB) ECIICESE07 Aeronautical Engineering Suite 3 (Enginuity) SEMCOMP312 Automotive Engineering Suite 3 (Enginuity) SEMMAN2303 	 Mechnical Manufactruing Engineering Suite 3 (Enginuity SEMADM306 Rail Engineering Signalling Suite 3 (Enginuity) SEMRES217 Rail Engineering Traction & Rolling Stock Suite 3 (Enginuity) SEMRETRS319 Rail Engineering Telecomms Suite 3 (Enginuity) SEMRET324 Rail Engineering Signalling Suite 3 (Enginuity) SEMRES217 Engineering Toolmaking Suite 3 (Enginuity) SEMRES217 Engineering Toolmaking Suite 3 (Enginuity) SEMMAN2303 Installation & Commissioning Suite 3 (Enginuity) SEMAE3196 Advanced Manufacturing (Enginuity) SEMADM306 	 Marine Engineering Suite 3 (Enginuity) SEMMAN2303 Land-based Engineering Operations (Lantra) LANCS10 Electricity Power Utilities (EU Skills) EUSPTD002 Gas Network Construction (EU Skills) EUSMUNC2 Wind Turbines (EU Skills) EUSWT10 Food and Drink (NSAFD) IMPHS307 Engineering Maintenance in FOod Manufacture (NSAFD) IMPEM107 Bulk Liquid Operations (Cogent) COGBL08 				

Work situation	National Occupational Standards Alignment						
Repairing engineering assets	 Engineering Maintenance Suite 3 (Enginuity) SEMSEC302 Electrical and Electronic Engineering Suite 3 (Enginuity) SEMADM306 Condition Monitoring (ECITB) ECICM05 Maintaining Plants and Systems - Electrical (ECITB) ECIOSM02 Maintaining Plant and Systems - Instrumentation and Control (ECITB) ECICM05 Maintaining Plant and Systems - Mechanical (ECITB) ECIICES07 Aeronautical Engineering Suite 3 (Enginuity) SEMCOMP312 Automotive Engineering Suite 3 (Enginuity) SEMMAN2303 	 Mechanical Manufactruing Engineering Suite 3 (Enginuity) SEMADM306 Rail Engineering Signalling Suite 3 (Enginuity) SEMRES217 Rail Engineering Traction & Rolling Stock Suite 3 (Enginuity) SEMRETRS319 Rail Engineering Telecoms Suite 3 (Enginuity) SEMRET324 Rail Engineering Signalling Suite 3 (Enginuity) SEMRES217 Engineering Toolmaking Suite 3 (Enginuity) SEMMAN2303 Insallation and Commissioning Suite 3 (Enginuity) SEMAE3196 Advanced Manufactruing (Enginuity) SEMADM306 	 Marine Engineering Suite 3 (Enginuity) SEMMAN2303 Land-based Engineering Operations (Lantra) LANCS10 Electricity Power Utilities (EU Skills) EUSPTD002 Gas Netwrok Construction (EU Skills) EUSMUNC2 Food and Drink (NSAFD) IMPHS307 Engineering Maintenance in Food Manufacture (NSAFD) IMPEM107 Bulk Liquid Operations (Cogent) COGBL08 				

Work situation	National Occupational Standards Alignment						
Replacing engineering assets	Engineering Maintenance Suite 3 (Enginuity) SEMSEC302	 Rail Engineering Signalling Suite 3 (Enginuity) SEMRES217 Pail Engineering Traction & 	Land-based Engineering Operations (Lantra) LANCS10 Ecod and Drink (NISAED)				
	• Electrical and Electronic Engineering Suite 3 (Enginuity) SEMADM306	Rolling Stock Suite 3 (Enginuity) SEMRETRS319	 FOOD and DITIK (NSAFD) IMPHS307 Electricity Power Utilities (EU 				
 Maintaining Plants and Systelectrical (ECITB) ECIOSMO Maintaining Plant and Systelectrical (ECITB) ECICMO5 Maintaining Plant and System (ECITB) ECICMO5 Maintaining Plant and System Mechanical (ECITB) ECIICE Aeronautical Engineering Statements (Enginuity) SEMCOMP312 Automotive Engineering Statements (Enginuity) SEMMAN2303 	Maintaining Plants and Systems - Electrical (ECITB) ECIOSM02	 Rail Engineering Telecoms Suite 3 (Enginuity) SEMRET324 	Skills) EUSPTD002Gas Netwrok Construction (EU				
	 Maintaining Plant and Systems Instrumentation and Control (ECITB) ECICM05 	Rail Engineering Signalling Suite 3 (Enginuity) SEMRES217	 Skills) EUSMUNC2 Wind Turbines (EU Skills) 				
	 Maintaining Plant and Systems - Mechanical (ECITB) ECIICES07 	 Engineering roomaking suite s (Enginuity) SEMMAN2303 Insallation and Commissioning 	 Engineering Maintenance in Food Manufacture (NSAFD) 				
	Aeronautical Engineering Suite 3 (Enginuity) SEMCOMP312	 Suite 3 (Enginuity) SEMAE3196 Advanced Manufactruing 	IMPEM107Bulk Liquid Operations (Cogent)				
	Automotive Engineering Suite 3 (Enginuity) SEMMAN2303	(Enginuity) SEMADM306Marine Engineering Suite 3	COGBLO8				
	 Mechanical Manufactruing Engineering Suite 3 (Enginuity) SEMADM306 	(Enginuity) SEMMAN2303					

Work situation	National Occupational Standards Alignment							
Inspecting and testing engineering	Engineering Maintenance Suite 3 (Enginuity) SEMSEC302	Non Destructive Testing (ECITB) ECINDT06	Bulk Liquid Operations (Cogent) COGBL08					
assets	Aeronautical Engineering Suite 3 (Enginuity) SEMCOMP312	Maintaining Plant and Systems - (ECITB) ECIOSM02	 Electricity Power Utilities (EU Skills) EUSPTD002 					
	Automotive Engineering Suite 3 (Enginuity) SEMMAN2303	 Land-based Engineering Operations (Lantra) LANCS10 	 Gas Netwrok Construction (EU Skills) EUSMUNC2 					
	Condition Monitoring (ECITB) ECICM05	 Food and Drink (NSAFD) IMPHS307 	Water Network Construction (EU Skills) EUSWNC2					
Installing engineering assets	Installing Plant and Systems (ECITB) ECIICESE01	Composite Engineering Suite 3 (Enginuity) SEMCOMP312	 Electricity Power Utilities (EU Skills) EUSPTD002 					
	 Supporting Activities in Engineering Construction (ECITB) ECICM03 Land-Based Engineering 	 Wind Turbines (EU Skills) EUSWT10 	 Wind Turbines (EU Skills) EUSWT10 					
		 Food and Drink (NSAFD) IMPHS307 	 Water Network Construction Operations (EU Skills) 					
	 Operations (Lantra) LANCS10 Rail Engineering Signalling Suite 3 (Enginuity) SEMRES217 	Gas Network Construction (EU Skills) EUSMUNC2	EUSWNC2					
Commissioning engineering assets	 Installation, Testing and Commissioning (ECITB) ECIICESE07 Installation and Commissioning Suite 3 (Enginuity) SEMAE3196 	 Advanced Manufacturing (Enginuity) SEMADM306 Bulk Liquid Operations (Cogent) COGBL08 	 Water Network Construction Operations (EU Skills) EUSWNC2 					
	 Gas Network Construction (EU Skills) EUSMUNC2 							

Work situation	National Occupational Standards Alignment						
Decommissioning engineering assets	 Mechanical Manufacturing Engineering Suite 3 (Enginuity) SEMADM306 Advanced Manufacturing (Enginuity) SEMADM306 	 Bulk Liquid Operations (Cogent) COGBLO8 Electricity Power Utilities (EU Skills) EUSPTD002 	 Gas Network Construction (EU Skills) EUSMUNC2 Water Network Construction Operations (EU Skills) EUSWNC2 				
Producing assemblies and sub-assemblies	 Composite Engineering Suite 3 (Enginuity) SEMCOMP312 Supporting Activities in Engineering Construction (ECITB) ECICM03 Installing Plant and Systems (ECITB) ECIICESE01 	 Welding Plate & Pipework (ECITB) ECIW08 Constructing Capital Plant Steel Structures – Erecting (ECITB) ECICCPSS07 	 Fabricate Steel Structures Plating (ECITB) COSVR687 Mechanical Manufacturing Engineering Suite 3 (Enginuity) SEMADM306 				
Manufacturing engineering assets by hand	 Supporting Activities in Engineering Construction (ECITB) ECICM03 Installing Plant and Systems (ECITB) ECIICESE01 	 Maintaining Plant and Systems (ECITB) ECIOSM02 Composite Engineering Suite 3 (Enginuity) ECIIPSM01 	 Mechanical Manufacturing Engineering Suite 3 (Enginuity) SEMADM306 Land-Based Engineering Operations (Lantra) LANCS10 				
Applying methods and principles in project management	 Engineering and Manufacture Suite 4 (Enginuity) Project Management (ECITB) 	 Engineering Leadership and Management Suite 4 (Enginuity) 	 Industrial Design (Creative and Cultural Skills) 				
Providing effective leadership	 Business Improvement Techniques Suite 2 (Enginuity) 	 Management and Leadership (Instructus) 					

Work situation	National Occupational Standards Alignment					
Welding materials	 Supporting Activities in Engineering Construction (ECITB) ECICM03 Welding Plate & Pipework (ECITB) ECIW08 Fabrication and Welding Engineering Suite 3 (Enginuity) SEMAE3225 Aeronautical Engineering Suite 3 (Enginuity) SEMCOMP312 	 Automotive Engineering Suite 3 (Enginuity) SEMMAN2303 Marine Engineering Suite 3 (Enginuity) SEMMAN2303 Mechanical Manufacturing Engineering Suite 3 (Enginuity) SEMADM306 Water Network Construction (EU Skills) EUSWNC2 	 Electricity Power Utilities (EU Skills) EUSPTD002 Gas Network Construction (EU Skills) EUSMUNC2 Land-Based Engineering Operations (Lantra) LANCS10 			