SEMPEO262

Producing engineering project plans

Overview

This standard covers a broad range of basic competences that you need to produce detailed plans for an engineering project. It will prepare you for entry into the engineering or manufacturing sectors, creating a progression between education and employment, or it will provide a basis for the development of additional skills and occupational competences in the working environment.

You will be expected to prepare for the project planning activity by obtaining all necessary information, drawings, specifications and documentation.

In producing the project plan, you will need to clearly identify what has to be done, the processes required to achieve this, the materials, component or consumables required, detailed instructions/operation sequence required, the estimated timescales and costs involved, the quality control requirements, and how you will evaluate and prove that the finished project has met its aims.

Your responsibilities will require you to comply with health and safety requirements and organisational policy and procedures for the project planning activities undertaken. You will need to take account of any potential difficulties or problems that may arise with the project planning activities, and to seek appropriate help and advice in determining and implementing a suitable solution. You will work under a high level of supervision, whilst taking responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide an understanding of your work, and will enable you to apply appropriate engineering project planning principles. You will understand the project planning techniques and procedures used, and their application, and will know about the engineering equipment, materials and consumables that will be required, to the required depth to provide a sound basis for carrying out the activities and producing project plans that will lead to a successful project outcome.

You will understand the safety precautions required when carrying out the project planning operations. You will be required to demonstrate safe working practices throughout, and will understand your responsibility for taking the necessary safeguards to protect yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety legislation, regulations, directives and other relevant guidelines
2. determine the scope of the project and the processes required to achieve it
3. collect all the information needed to prepare the project plan
4. determine the resources required
5. identify the specific operations to be carried out, and determine their sequence
6. identify health and safety issues, and safe working practices and procedures that must be followed
7. estimate timescales required and costs to complete the project
8. prepare a detailed project plan which accurately reflects the project aims and objectives
9. obtain approval for the project plan from the appropriate people
10. deal promptly and effectively with problems within your control, and seek help and guidance from the relevant people if you have problems that you cannot resolve

Knowledge and understanding

You need to know and understand:

1. how to access information on health and safety regulations and guidelines relating to the engineering activities to be used and project plans being produced
2. the implications of not taking account of legislation, regulations, standards and guidelines when producing the engineering project plans
3. how to obtain information on the engineering requirements, and the type of information that is available (such as customer specifications and instructions, quality control requirements, product drawings/specification, manufacturing methods)
4. how to access and use the appropriate information and documentation systems
5. the types of data that should be included in the engineering project plans (such as aims and objectives of the project, activities to be carried out, sequence in which they must be carried out, timescales, resource requirements, health and safety issues)
6. how to extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS or ISO standards) in relation to work being planned
7. the materials, formats, codes and conventions that are used in preparing the engineering project plans
8. the main project planning methods and techniques in use, and what problems could occur with them
9. the factors to be taken into account when preparing the project plans, especially those covering working conditions and safety
10. the main types of resource involved with the various types of engineering activity (such as raw materials, bought- in components, plant and equipment, lifting and handling equipment, tooling and measuring and test equipment)
11. the obvious (and hidden) costs of resources/activities
12. the normal timescales for carrying out specific engineering activities, and how and why they vary
13. how to arrive at an estimate of timescales for the project, and the need to set milestones for achievement
14. how to estimate the likely costs of the project (including the cost of raw materials, people and overheads)
15. the products (or assets) involved in the activity being planned, and how to

determine their availability
16. the development of the engineering project plans (to include both master documents and working instructions, along with their purpose, content and status)
17. how to write project plans that specify quality, cost and delivery requirements (including allocation of responsibilities and milestone targets)
18. how to prepare the plans (to include the structure, style, clarity and compliance with relevant standards)
19. the process used in the organisation to validate the engineering plans produced
20. the procedures for changing the plans, and why control procedures are used
21. the procedures and process for project plan approval, and why these procedures and processes are used
22. the importance of maintaining records, what needs to be recorded and where records are kept
23. why contingency plans need to be drawn up
24. the different ways of presenting information to different people
25. the importance of providing the right information at the right time
26. typical of problems that can occur during the implementation of the plan, and how these problems can be rectified
27. when to act on your own initiative and when to seek help and advice from others

Scope/range related to performance criteria

1.

Produce detailed engineering project plans for **one** of the following:

1.1 manufacturing operations
1.2 maintenance of equipment
1.3 installation of equipment
1.4 research and development
1.5 testing and trialling
1.6 modification or repair
1.7 cleaning of equipment
1.8 process procedures

2.

Prepare for the project planning activity by carrying out **all** of the following:

2.1 determine and set the aims and objectives of the project
2.2 obtain all essential information and data needed to produce the project plans
2.3 collect relevant information on the engineering requirements, operations, methods and resources
2.4 determine the availability of the resources required
2.5 ensure that health and safety regulations and safe working practices are taken into account
2.6 present the engineering plans in the appropriate formats

3.

Determine the resource requirements, to include **five** of the following:

3.1 people required who have the necessary skills and knowledge
3.2 the raw materials required (such as types of material, forms of material, amounts of material)
3.3 mechanical fasteners required (such as nuts, bolts, rivets, cable clips)
3.4 bought-in standard components required (such as bearings, electrical or electronic components, fluid power components)
3.5 equipment required (such as hand tools, power tools, machinery, lifting and handling equipment)
3.6 measuring or test equipment required (such as mechanical measuring, electrical measuring)
3.7 consumable materials required (such as welding accessories, masking mediums, oil)
3.8 any outside support services required (such as material treatments like hardening or plating)
3.9 special/specific safety equipment required (such as fume extraction)

4.

Produce detailed work instructions of the specific processes required, to include **all** of the following:

4.1 details of the drawing/specification to be used (such as drawing number, maintenance manual)
4.2 specific materials required for this part of the process/operation
4.3 the specific tools and equipment required for each operation being carried out
4.4 the specific operations to be carried out
4.5 the specific sequence in which the operations must be carried out
4.6 the specific time to produce/complete the operations
4.7 quality control checks that need to be implemented

5.

Produce engineering project plans that include **both** of the following:

The use of a Gantt Chart showing estimates of the timeframe for the project, to include **all** of the following:

1. start time of the project
2. outcomes to be achieved at milestones
3. completion date of the project

And an estimate of the likely costs of the project, to include **all** of the following:

4. material costs (to include raw, consumable, bought-in)
5. labour costs (based on the estimated working time and a fixed manufacturing cost figure)
6. overhead costs

1.

Prepare engineering project plans that include **all** of the following:

1.1 the aims and objectives of the engineering project being undertaken
1.2 description of the activities to be carried out
1.3 the sequence in which the activities will take place
1.4 the documentation to be used (such as drawings, specifications, quality assurance)
1.5 tooling requirements (such as jigs, fixtures, cutting tools, moulds)
1.6 resources required
1.7 the timescales to be met
1.8 any special requirements that must be met (such as details of health and safety issues)
1.9 outcomes in terms of quality, cost and delivery (when needed)
1.10 people involved, and their responsibilities (such as decision maker, individuals that must be consulted/informed, people who can give advice)
1.11 how the project will be proved and evaluated

2.

Ensure that project plans include any relevant regulations, standards and guidelines, including **all** of the following:

2.1 health and safety requirements
2.2 BS and ISO standards and procedures
2.3 company policy and procedures

3.

Record and present the plans to the appropriate people, using the following methods:

3.1 verbal report

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

2. written or typed report
3. specific company documentation
4. computer based presentation

Behaviours

Additional Information

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment

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Developed by	Enginuity
Version Number	3
Date Approved	30 Mar 2017
Indicative Review Date	31 Mar 2020
Validity	Current
Status	Original
Originating Organisation	Semta
Original URN	SEMPEO2-62
Relevant Occupations	Engineering, Engineering and Manufacturing Technologies
Suite	Performing Engineering Operations Suite 2
Keywords	engineering; engineering operations; engineering project plans; manufacturing; project planning; drawings; specifications; documentation; materials; timescales