SEMETS343

Resolving engineering or manufacturing support problems

Overview

This standard identifies the competences you need to resolve engineering or manufacturing support problems, in accordance with approved procedures. You will be required to investigate the problems, obtaining all the necessary information from the relevant sources to enable you to establish a clear picture of the situation, to identify and evaluate potential corrective actions, and to select the most appropriate and effective solution. Your proposed solution will take into account the effects on both the business processes and on the people involved.

Your responsibilities will require you to comply with organisational policy and procedures during the rectification of the problem, and to report any problems that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will be expected to work with a minimum of supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to applying problem solving techniques and procedures in the relevant business environment. You will understand the relevant business process, and will know about the company procedures and systems of operation, in adequate depth to provide a sound basis for carrying out the activities to the required standard.

You will be aware of any company/customer, legislative or regulatory health, safety and environmental requirements applicable to the engineering activities being investigated. You will understand the specific safety precautions required when carrying out the investigation, especially those for isolating equipment and for taking the necessary safeguards to protect yourself and others in the work area. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to 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 and other relevant regulations, directives and guidelines
2. take prompt action to diagnose and rectify the operational problems and keep all relevant people informed of progress
3. obtain all relevant information relating to the problems
4. identify correctly the nature and extent of the problems
5. consider all realistic solutions to rectify the problems
6. identify the most effective solution for rectifying the problems
7. resolve the problem ensuring that solutions are implemented correctly and promptly
8. ensure that the rectification complies with all relevant regulations, directives and guidelines

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 or work area in which the problem exists
2. the implications of not taking account of legislation, regulations, standards and guidelines when determining solutions to the problems
3. how to obtain and the type of information that is available (such as customer requirements and instructions, quality control requirements, product specification, manufacturing methods)
4. how to access and use the appropriate information and documentation systems
5. how to obtain and interpret drawings, charts, specifications, manufacturers' manuals, history/maintenance reports and other documents needed in the problem solving process
6. which organisation procedures are affected where the problem exists
7. the business need for problem identification and removal
8. the effects problems may have on associated activities
9. the communication techniques used to obtain information
10. the principles of effective problem solving, the main problem solving methods and techniques in use, and how to apply them
11. the benefits of adopting a formalised problem solving process
12. how to involve the user/customer in the problem solving process
13. the importance of collecting as much relevant information as possible, and of collating such information in a way which facilitates decision making, and the methods to achieve this
14. action planning (to include risk analysis, testing decisions, determining time-scales and protecting the user/customer)
15. the importance of analysing problems from a variety of perspectives
16. how to define and verify root cause of a problem
17. the importance of involving a range of relevant people in generating possible solutions
18. the importance of developing a range of possible options in solving problems
19. the factors to be taken into account when resolving problems and determining suitable solutions (especially those covering working conditions and safety)
20. the methods and techniques for evaluating information
21. how to present possible solutions in a way which helps relevant people to reach

an informed and realistic judgement

22. how to determine and select permanent corrective actions (to include decision making, assessing the criteria and determining the risks, costs and generating alternatives)
23. the process used in the organisation to validate the solution to the problem
24. how to prevent recurrence of the problems (to include proposed changes to management systems, operating systems and procedures, and identification of opportunities for improvements)
25. the importance of customer care and satisfaction
26. the importance of maintaining records of the problem solving activities; what needs to be recorded, and where records are kept
27. the organisation procedures that apply to the rectification of problems
28. the organisation reporting procedures, documentation and their application
29. the different ways in which the solutions can be reported back
30. who to inform of actions taken, and by what means
31. the extent of your own responsibility, and whom you should report to if you have problems that you cannot resolve
32.

the sources of technical expertise if you have problems that you cannot resolve

Scope/range

1.

Carry out all of the following during the problem solving activity:

1.1 discuss/consult with the relevant people about the extent of the problem and its impact on the activity
1.2 gather all appropriate information to help identify or clarify the problem
1.3 evaluate possible solutions, considering temporary, short term and long term solutions
1.4 consider cost implications for each solution
1.5 select the most appropriate solution to rectify the problem
1.6 communicate the proposed solution to the relevant people, obtaining feedback where appropriate
1.7 prepare a plan of action for implementation of the agreed solution
1.8 ensure that the agreed solution is implemented correctly and promptly
1.9 monitor outcomes of the rectification activity, and make any necessary revisions to the plan of action
1.10 ensure that the problem is rectified to the agreed level of acceptability
1.11 ensure that all information is documented to provide an audit trail
1.12 identify the root cause of the problem, using a standard technique
1.13 implement preventive measures, where applicable, to ensure that there is no recurrence of the problem

2.

Resolve problems associated with one of the following engineering disciplines:

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)
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/storage 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
2.20 new product or component introduction (NPI) to the business operation
2.21 launch of an engineered product to the market
2.22 logistic operations

3.

Rectify problems arising from two of the following:

3.1 component/assembly failure
3.2 scheduling/planning
3.3 production control
3.4 equipment malfunction
3.5 product over budget
3.6 contractor related
3.7 design related
3.8 project slippage
3.9 quality related
3.10 ergonomically related
3.11 safety related
3.12 customer request
3.13 deviation from component/product specification
3.14 lack of resources/materials
3.15 material or component handling/storage/movement
3.16 environmental/compatibility
3.17 utilities supply (gas, electricity, water, air)
3.18 deviation from departmental procedure(s)
3.19 product/service over lead time
3.20 other specific situations

4.

Use information obtained from three of the following sources to help evaluate the problem:

4.1 statistical data
4.2 fault diagnostics
4.3 historical records
4.4 operational procedures/manufacturing manuals
4.5 quality audits
4.6 health and safety information
4.7 external sources
4.8 environmental documents
4.9 feedback from user/customer
4.10 development tests
4.11 condition monitoring
4.12 manufacturer's data

5.

Determine and implement the solution for two of the following:

5.1 temporary (interim solution)
5.2 long term (permanent solution)
5.3 short term (will require further action)

Taking into account both of the following:

4. safety/environmental considerations
5. associated costs

1.

Ensure that the solution complies with relevant regulations, standards and guidelines, from one of the following:

1.1 organisational guidelines and codes of practice
1.2 organisational guidelines and procedures
1.3 customer standards and requirements
1.4 relevant standards or directives
1.5 recognised compliance agency/body's standards, directives or codes of practice
1.6 health, safety and environmental requirements
1.7 variations in regional/global product specification and compliance (such as language, units of measure and currency)

2.

Complete documentation and pass to appropriate people, using the following methods:

2.1 specific organisation documentation

Plus one more from the following:

2. written or typed report
3. verbal report
4. electronic mail
5. computer based presentation
6. other appropriate media

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