SEMAE3194

Rectifying aeronautical engineering problems

Overview

This standard identifies the competences you need to rectify aeronautical engineering 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 aeronautical engineering process and on the people involved.

Your responsibilities will require you to comply with organisational policy and procedures during the rectification of the aeronautical engineering problems, and to report any aspects 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 to aeronautical engineering situations. You will understand the relevant engineering 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, legislative or regulatory health, safety and environmental requirements applicable to the aeronautical engineering activities being investigated. You will understand the specific safety precautions required when carrying out the investigation, especially those for isolating the equipment. 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 and other relevant regulations, directives and guidelines
2.
take prompt action to solve engineering problems and keep all relevant people informed of progress
3. obtain all relevant information relating to the engineering problems
4. identify correctly the nature and extent of any engineering problems that arise
5. evaluate all realistic engineering solutions to solve the engineering problems
6. identify the most effective engineering solution for solving the engineering problems
7. ensure that engineering solutions are implemented correctly and promptly
8. ensure that solutions to engineering problems comply with all relevant regulations and guidelines

Knowledge and understanding

You need to know and understand:

1. how and where to obtain the appropriate legislative and regulatory documentation
2. how to access information on health and safety regulations and guidelines relating to the engineering activities or work area in which the problem exists
3. the health, safety and environmental requirements of the area in which the problem exists
4. the implications of not taking account of legislation, regulations, standards and guidelines when determining solutions to the engineering problem
5. the requirements and importance of understanding and applying human factors as defined by the regulatory requirements and the potential impact if these are not adhered to
6. how to obtain information on the engineering requirements, and the type of information that is available (such as customer order requirements and instructions, quality control requirements, product specification, manufacturing methods)
7. how to access and use the appropriate information and documentation systems
8. how to obtain and interpret drawings, charts, specifications, manufacturers' manuals, history/maintenance reports and other documents needed in the problem solving process
9. the aeronautical engineering processes and operating procedures of the area in which the problem exists
10. the business need for problem identification and rectification
11. the effects of engineering problems on associated activities
12. the communication techniques used to obtain information
13. the main problem solving methods and techniques in use, and how to apply them
14. the benefits of adopting a formalised problem solving process
15. how to establish and select the team to be used, and what will be their roles and responsibilities
16. why there must be clearly defined roles within the team and what these roles are (such as facilitator, scribe, time keeper)
17. how to establish a problem profile and the involvement of the customer in the problem solving process
18. containment action planning (to include process risk, action planning, testing

decisions, determining time- scales and protecting the customer)
19. how to define and verify the root cause of a problem (such as the use of brainstorming)
20. the factors to be taken into account when resolving problems and determining suitable solutions, especially those covering working conditions and safety
21. the methods and techniques for evaluating information
22. how to determine and select permanent corrective actions (such as decision making, identifying criteria for givens and wants, assessing the criteria and determining the risks, generating alternatives)
23. the process used in the organisation to validate the solution to the engineering problem
24. how to implement the permanent corrective actions identified (to include implementation planning, protecting the plan, contingency planning, process monitoring and formalising changes)
25. how to prevent recurrence of the problems (such as changes to management systems, operating systems and procedures and identification of opportunities for improvements)
26. the importance of maintaining records of the problem solving activities, what needs to be recorded and where records are kept
27. the company procedures that apply to the rectification of problems
28. the company reporting procedures, documentation and their application
29. the different ways in which the solutions can be reported back
30. who should be informed of actions taken and by what means
31. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve
32. the sources of technical expertise if you have problems that you cannot resolve

Scope/range related to performance criteria

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 engineering 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 select the most appropriate solution to rectify the problem
1.5 communicate the proposed solution to the relevant people, obtaining feedback where appropriate
1.6 prepare a plan of action for implementation of the agreed solution
1.7 ensure that the agreed solution is implemented correctly and promptly
1.8 monitor outcomes of the rectification activity and make any necessary revisions to the plan of action
1.9 ensure that the problem is rectified to the agreed level of acceptability
1.10 ensure that all information is documented to provide an audit trail
1.11 identify the root cause of the problem using a standard technique
1.12 implement preventive measures where applicable to insure no reoccurrence

2.

Resolve engineering problems from within two of the following engineering disciplines:

2.1 manufacturing activities (such as machining, detail fitting, fabrication of components, moulding)
2.2 material processing activities (such as heat treatment, annealing)
2.3 finishing activities (such as stripping finishes, painting, plating, anodising)
2.4 assembly activities (such as mechanical, structural, fluid power, electrical/electronic)
2.5 installation activities (such as mechanical equipment installation, electrical/avionic installation)
2.6 modification and repair activities
2.7 operational activities (such as movement of materials, quality systems and audit, scheduled safety audits and risk assessments)
2.8 equipment capability/performance measurement
2.9 commissioning/decommissioning
2.10 lifting and moving large components/assemblies (including transportation/delivery)
2.11 materials handling (such as movement of materials, materials storage, removal of waste)
2.12 plant and equipment (such as plant layout, equipment changeover, equipment replacement)
2.13 maintenance activities

2.14 research and development
2.15 testing and trialling
2.16 business improvement

3.

Rectify engineering problems arising from three of the following:

3.1 component/assembly
3.2 lack of resources/materials
3.3 deviation from component/product specification
3.4 environmental /compatibility
3.5 equipment malfunction
3.6 design related
3.7 scheduling
3.8 deviation from departmental procedure(s)
3.9 safety related
3.10 product/service over lead time
3.11 product over budget
3.12 other specific reason

4.

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

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

5.

Obtain consent to implement the agreed solution, considering two of the following:

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

6.

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

6.1 Civil Aviation Authority (CAA)/European Aviation Safety Agency (EASA)
6.2 Ministry of Defence (MoD)
6.3 Military Aviation Authority (MAA)
6.4 Aerospace Quality Management Standards (AS)
6.5 Federal Aviation Authority (FAA)
6.6 BS, ISO or BSEN procedures

6.7 company policy and procedures
6.8 customer policy and procedures
6.9 aircraft manufacturer's requirements

7.

Communicate the solution to appropriate people using the following methods:

7.1 verbal report

Plus one more from the following:

2. electronic mail
3. computer-based presentation
4. written or typed report
5. specific company form
6. other appropriate media

Behaviours

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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