SEMAE3014

Modifying airframes

Overview

This standard identifies the competences you need to modify airframes, in accordance with approved procedures. You will be required to select the appropriate tools and equipment to use, based on the modification operations required and to check that they are in a safe and serviceable condition. In carrying out the modification operations, you will be required to follow laid-down procedures and to use specific modification leaflets or service bulletins. This standard covers both fixed wing and rotary winged aircraft and the modification requirements will include such items as fuselage sections, under- floor structures, floors, flaps/ailerons, wings, fins, nose areas, tail sections, doors, cockpit/cabin areas, hatches, windows, bulkheads, mission consoles, galleys, stairs, trunking/ducting, engine nacelles, box sections and avionics cabinets. The modification activities will also include making all necessary checks.

Your responsibilities will require you to comply with organisational policy and procedures for the modification activities undertaken and to report any problems with the modification activities that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will be expected to work with minimal 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 the appropriate modification techniques and procedures. You will understand the airframe structure being modified and will know about the components, modification methods and techniques and fastening devices used during the modification activities, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when carrying out the modification operations. You will be required to demonstrate safe working practices throughout and will understand the responsibility you owe to yourself and others in the workplace.

Note

This standard is intended to cover airframe modifications of a significant or complex nature, involving the use of a range of techniques and a number of different components. The nature of the complexity will take into account the class of structure, primary, secondary, the size and timescale of the modification, the tolerances required

and the difficulty of access. This standard should not be used solely for simple modifications, such as changes to, or the addition of, simple platework or brackets.

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. obtain and follow the relevant modification specifications and job instructions
3. confirm and agree what modifications are to be carried out to meet the specification
4. prepare the airframe for the required modification
5. carry out the airframe modification, using approved materials, methods and procedures
6. complete the modification within the agreed timescale
7. ensure that the modified airframe meets the specified operating conditions
8. produce accurate and complete records of all modification work carried out
9. deal promptly and effectively with problems within your control and report those that cannot be solved
10. complete the relevant documentation, in accordance with organisational requirements
11. leave the work area and airframe in a safe and appropriate condition, free from foreign object debris on completion of the activities

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions and procedures to be observed whilst carrying out the modifications (such as any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
2. the importance of maintenance on and impact upon extended twin operations procedures (ETOpS) systems, legislation and local procedures
3. the health and safety requirements of the work area in which you are carrying out the modification activities and the responsibility these requirements place on you
4. the hazards associated with modifying airframes and systems and with the tools and equipment used and how to minimise them and reduce any risks
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. the personal protective equipment and clothing (PPE) to be worn during the modification activities
7. the various types of drawing and specification that are used during the modification
8. how to identify the components to be used; component identification systems (such as codes and component orientation indicators)
9. preparations to be undertaken on the airframe or structure, prior to modification
10. the methods and procedures to be used for removing and replacing components and the importance of adhering to these procedures
11. the various mechanical fasteners that will be used and their method of installation (such as open and blind rivets, threaded fasteners, special securing devices)
12. the importance of using the specified fasteners for the modification and why you must not use substitutes
13. the application of sealants and adhesives within the modification activities and the precautions that must be taken when working with them
14. the quality control procedures to be followed during the modification operations
15. how to conduct any necessary checks to ensure the accuracy and quality of the modification
16. how to recognise defects (such as skin blemishes, poor skin lines, ineffective

fasteners, foreign object damage)

17. the methods and equipment used to transport, handle and lift the structures into position and how to check that the equipment is within its current certification dates

18. the tools and equipment used in the modification activities and their calibration/care and control procedures

19. why tool/equipment control is critical and what to do if a tool or piece of equipment is unaccounted for on completion of the activities

20. the problems that can occur with the modification operations and how these can be overcome

21. the recording documentation to be completed for the activities undertaken and where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation

22. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

1.

Carry out all of the following during the modification activities:

1.1 obtain and use the appropriate documentation (such as job instructions, aircraft modification drawings, planning and quality control documentation, aircraft procedures and specifications)
1.2 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
1.3 provide and maintain a safe working environment for the modification activities
1.4 obtain the correct tools and equipment for the activity, and check that they are in a safe, tested and usable condition and within current calibration date
1.5 obtain clearance to work on the aircraft and observe the power isolation and safety procedures
1.6 ensure that correct part numbers are used, including (where appropriate) left or right handed parts
1.7 follow safe practice/approved modification techniques and procedures at all times
1.8 return all tools and equipment to the correct location on completion of the modification activities
1.9 dispose of waste materials in accordance with approved procedures

2.

Modify airframes from one of the following types of aircraft:

2.1 commercial aircraft
2.2 light aircraft
2.3 military aircraft
2.4 helicopters

3.

Modify an airframe/structure, to include at least three from:

3.1 fuselage sections
3.2 fin
3.3 hatches
3.4 stairs
3.5 under-floor structures
3.6 nose
3.7 windows
3.8 trunking/ducting
3.9 floor
3.10 tail
3.11 bulkheads
3.12 engine nacelle

3.13 slats/flaps/ailerons
3.14 doors
3.15 mission consoles
3.16 box sections
3.17 wing
3.18 cockpit/cabin
3.19 galleys
3.20 avionics cabinets

4.

Use five of the following methods and techniques during the modification activities:

4.1 making holes in airframe materials
4.2 securing and locking components
4.3 marking out
4.4 assembling
4.5 deburring
4.6 cutting
4.7 profiling

5.

Use three of the following types of joining method during the modifications:

5.1 adhesives/sealants
5.2 locking devices
5.3 rivets
5.4 threaded fasteners
5.5 special fasteners

6.

Produce modifications which comply with one of the following:

6.1 Civil Aviation Authority (CAA) / European Aviation Safety Agency (EASA)
6.2 extended twin operations procedures (ETOpS) (where appropriate)
6.3 Ministry of Defence (MoD)
6.4 Military Aviation Authority (MAA)
6.5 Aerospace Quality Management Standards (AS)
6.6 customer standards and requirements
6.7 Federal Aviation Authority (FAA)
6.8 company standards and procedures
6.9 BS, ISO or BSEN standards and procedures
6.10 aircraft manufacturer's requirements

7.

Complete the relevant paperwork, to include one from the following and pass it to the appropriate people:

7.1 modification records
7.2 aircraft log book
7.3 aircraft flight log
7.4 log cards
7.5 job cards
7.6 other specific recording method

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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