SEMAE3010

Producing composite and/or metallic aircraft sub-assemblies

Overview

This standard identifies the competences you need to produce composite and/or metallic aircraft sub-assemblies, in accordance with approved procedures. It covers both fixed wing and rotary winged aircraft. You will be required to select the appropriate tools and equipment to use, based on the operations to be performed and type of components to be installed and to check that they are in a safe and serviceable condition. In carrying out the sub-assembly operations, you will be required to follow laid-down procedures and specific assembly techniques in order to assemble the various components into sub-assemblies, such as flaps, ailerons, under-floor structures, side structures, lockers, cabin roof, avionics cabinets, mission consoles, engine nacelle, windows, galleys, hatches, doors, stairs, trunking/ducting and bulkheads. The sub-assembly activities will also include making all necessary checks and adjustments to ensure that components are correctly positioned and where appropriate, have accurate skin lines, that fasteners are tightened to the correct torque and function as per specification and that the sub-assembly is free from damage and has an appropriate cosmetic appearance.

Your responsibilities will require you to comply with organisational policy and procedures for the sub-assembly activities undertaken and to report any problems with the sub-assembly activities that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You must ensure that all tools, equipment and materials used in the sub-assembly are correctly accounted for on completion of the activities and you must complete all necessary job/task documentation accurately and legibly. 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 sub-assembly techniques and procedures. You will understand the structure being assembled and its application and will know about the production techniques, components, equipment, relevant materials and fastening devices, in adequate depth to provide a sound basis for carrying out the activities, correcting faults and ensuring that the finished work is to the required specification.

You will understand the safety precautions required when carrying out the assembly

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.

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. follow the relevant instructions, assembly drawings and any other specifications
3. ensure that the specified components are available and that they are in a usable condition
4. use the appropriate methods and techniques to assemble the components in their correct positions
5. secure the components using the specified connectors and securing devices
6. check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification
7. deal promptly and effectively with problems within your control and report those that cannot be solved
8. complete the relevant documentation, in accordance with organisational requirements
9. leave the work area and assembly 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 to be taken whilst carrying out the assembly (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
2. the health and safety requirements of the work area in which you are carrying out the assembly activities and the responsibility these requirements place on you
3. the personal protective equipment and clothing (PPE) to be worn during the assembly activities
4. the hazards associated with producing composite and metallic aircraft sub-assemblies and how to minimise them and reduce any risks
5. the various types of drawing and specification that are used during the assembly
6. how to identify the components to be used; component identification systems (such as codes and component orientation indicators)
7. preparations to be undertaken on the components prior to fitting them into the assembly
8. the assembly methods and procedures to be used and the importance of adhering to the procedures
9. how the components are to be aligned and positioned prior to securing, and the tools and equipment that are used (including jigs and fixtures)
10. the various mechanical fasteners that will be used and their method of installation (such as open and blind rivets, threaded fasteners, special securing devices)
11. the importance of using the specified fasteners for the assembly and why you must not use substitutes
12. dealing with components or fastening devices incorrectly assembled, damaged or having other faults
13. the application of sealants and adhesives within the assembly activities and the precautions that must be taken when working with them
14. the quality control procedures to be followed during the assembly operations
15. how to conduct any necessary checks to ensure the accuracy and quality of the assemblies produced
16. recognising defects (such as skin blemishes, poor skin lines, ineffective fasteners and foreign object damage)
17. the methods and equipment used to transport, handle and lift the components

into position and how to check that the equipment is within its current certification dates

18. how to check that the tools and equipment to be used are correctly calibrated and are in a safe, tested and serviceable condition

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 importance of ensuring that all tools are used correctly and within their permitted operating range

21. the importance of ensuring that the completed assembly is free from dirt, swarf and foreign objects

22. problems with the assembly operations and the importance of informing appropriate people of non-conformances

23. 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 assembly activities:

1.1 obtain and use the appropriate documentation (such as job instructions, aircraft assembly 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 assembly 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 follow safe practice/approved assembly techniques and procedures at all times
1.6 return all tools and equipment to the correct location on completion of the assembly activities
1.7 dispose of waste materials in accordance with approved procedures

2.

Produce aircraft sub-assemblies which include one of the following:

2.1 flaps
2.2 windows
2.3 mission consoles
2.4 stairs
2.5 ailerons
2.6 galleys
2.7 hatches
2.8 lockers
2.9 trunking/ducting
2.10 under-floor structures
2.11 bulk heads
2.12 doors
2.13 engine nacelle/pylons
2.14 side structures
2.15 avionics cabinets
2.16 cabin roof
2.17 wing box sections
2.18 stringer to skin/cover
2.19 rib to spar
2.20 rib and spar to skin/cover

3.

Apply six of the following sub-assembly methods and techniques:

3.1 applying sealants/adhesives

3.2 finishing holes (such as countersinking, deburring, spot facing)
3.3 ensuring correct part numbers are used
3.4 drilling holes
3.5 electrical bonding of components
3.6 ensuring that the correct hand of components is used (left or right handed)
3.7 positioning and aligning components for cosmetic appearance and skin lines to drawing requirements.
3.8 securing components using mechanical fasteners, threaded devices, liquid shimming, riveting, taperlok, interference/clearance fit and bonding to drawing requirements.
3.9 applying bolt locking methods (such as split pins, wire locking, lock nuts, stiff nuts)

4.

Use four of the following types of component in the sub-assemblies:

4.1 details
4.2 angles
4.3 levers, linkages
4.4 frames
4.5 stringers
4.6 brackets
4.7 ribs
4.8 packers
4.9 spars
4.10 doublers
4.11 skins/covers
4.12 pipes, unions and joints
4.13 jumper braids, bonding clips, earthing straps

5.

Carry out quality and accuracy checks to drawing requirements and/or manufacturers' instructions, which include three of the following:

5.1 cosmetic appearance
5.2 freedom from damage
5.3 electrical bonding and continuity
5.4 accuracy of skin lines
5.5 torque loading checks
5.6 surface finish

6.

Produce sub-assemblies which comply with one of the following standards:

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 Federal Aviation Authority (FAA)
6.5 Aerospace Quality Management Standards (AS)
6.6 BS, ISO or BSEN standards and procedures
6.7 customer standards and requirements

6.8 company standards and procedures
6.9 manufacturers standards and procedures

7.

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

7.1 build records
7.2 job cards
7.3 log cards
7.4 aircraft log
7.5 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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