SEMAE3205

Trimming aircraft composite mouldings using hand tools

Overview

This standard identifies the competences you need to trim aircraft composite mouldings (such as moulds, components, splashes, jigs) using hand tools, in accordance with approved procedures. It covers both fixed wing and rotary winged aircraft mouldings. You will be required to use appropriate drawings, specifications and documentation to trim various mouldings, using the correct trimming techniques.

You will be expected to select the correct tools and equipment for the trimming activity. You will trim a range of composite mouldings incorporating a variety of features, and using cutting, sanding, drilling and polishing techniques and processes. Mouldings trimmed will include a range of resin and fibre materials.

Your responsibilities will require you to comply with organisational policy and procedures for the trimming activities undertaken, and to report any problems with the trimming activities, equipment or materials that you cannot personally resolve, or 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 composite moulding trimming techniques and procedures. You will understand the trimming techniques used, and their application, 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 trimming activities and when using the associated tools and equipment. 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 relevant specifications for the component to be produced
3. obtain the appropriate tools and equipment for the trimming operations and check they are in a safe and usable condition
4. trim the mouldings using appropriate methods and techniques
5. check that all the required trimming operations have been completed to the required specification
6. deal promptly and effectively with problems within your control and report those that cannot be solved
7. leave the work area in a safe and appropriate condition on completion of the activities
8. complete the relevant documentation, in accordance with organisational requirements

Knowledge and understanding

You need to know and understand:

1. health and safety precautions to be taken and procedures used when working with aircraft composite materials, consumables, tools and equipment in the specific work area
2. 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
3. the hazards associated with carrying out composite trimming activities, and with the composite materials, consumables, tools and equipment used, and how to minimise these and reduce any risks
4. the protective equipment (PPE) that is needed for personal protection and, where required, the protection of others
5. the application of COSHH regulations in relation to the storage, use and disposal of composite materials and consumables
6. the specific environmental conditions the must be observed when producing composite mouldings (such as temperature, humidity, fume/dust extraction systems and equipment)
7. the importance of setting up and using dust control measures including segregated work areas, dust extraction, working practices and use of personal protective equipment (PPE)
8. how to extract and use information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS, ISO or BSEN standards) in relation to work undertaken
9. how to interpret drawings, lay up manuals imperial and metric systems of measurement, workpiece reference points and system of tolerancing
10. quality procedures used in the workplace to ensure production control (in relation to currency, issue, meeting specification) and the completion of such documents
11. conventions and terminology used for trimming activities (such as scribe lines, sanding grades, types of cutting tools, speeds)
12. different types of manual and power tools, and their applications
13. how the type of material being trimmed can affect the selection of cutting media, tools and speeds
14. different types of cutting tools and abrasives, and their merits

15. different types of materials used in cutting tools and abrasives, and their applications
16. different types of resins, fibres, reinforcement, and their applications
17. the visual identification of cured composite materials
18. the identification and rectification of defects in composite mouldings
19. the methods used in the trimming of composite mouldings
20. operations and their sequence when preparing for trimming activities
21. methods for handling composite mouldings throughout the trimming activities
22. tools and equipment used in the trimming activities, and their care, preparation and control procedures
23. 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
24. the care and safe handling of composite mouldings throughout the trimming cycle
25. 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 trimming activities:

1.1 obtain and use the appropriate documentation (such as job instructions, drawings, specifications, planning and quality control documentation)
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 obtain and check that all tools and equipment to be used are correct for the operation to be carried out and are in a safe, tested and usable condition
1.4 provide and maintain a safe working environment for the composite trimming activities
1.5 check that all tools and equipment to be used are in a safe and usable condition
1.6 follow safe practice/approved composite trimming techniques and procedures at all times
1.7 segregate and dispose of waste materials using the correct procedure
1.8 return all tools and equipment to the correct location on completion of the trimming activities

2.

Carry out all of the following activities when preparing for the trimming activity:

2.1 check that moulding is correct and complete
2.2 check for any defects in the moulding
2.3 select the correct equipment for the activity
2.4 check that the equipment is suitable for use
2.5 identify and protect the moulding in the work area
2.6 ensure the cutting tool and media are suitable for the material being trimmed

3.

Mark out mouldings using four of the following :

3.1 scriber
3.2 height gauge
3.3 moulded scribe lines
3.4 centre punch
3.5 trimming templates
3.6 scribing jigs
3.7 other (to be specified)

4.

Cut mouldings using two the following methods

4.1 cutting wheels/discs
4.2 saws
4.3 routers

4.4 trim jigs

5.

Sand mouldings using three of the following methods:

5.1 rubbing blocks
5.2 diamond files
5.3 pencil grinders
5.4 disc sanders
5.5 belt sanders
5.6 orbital sander

6.

Use a hand drill or pedestal drill to drill mouldings, using three of the following methods:

6.1 drill jigs
6.2 hole saws
6.3 counterbores
6.4 countersinks
6.5 drill bits

7.

Polish mouldings using four of the following methods: (where final finish is required)

7.1 wet sanding
7.2 cutting compound
7.3 polishing compound
7.4 rubbing block
7.5 orbital sander
7.6 polisher

8.

Trim mouldings using techniques for two of the following resin types:

8.1 bio resin
8.2 thermoplastic
8.3 polyester
8.4 vinyl ester
8.5 epoxy
8.6 phenolic
8.7 bismaleimide
8.8 cyanate ester
8.9 other (to be specified)

9.

Trim mouldings using techniques for two of the following fibre types:

9.1 natural fibre
9.2 thermo plastic
9.3 glass
9.4 aramid
9.5 carbon
9.6 hybrid

9.7 other specific types

10.

Trim mouldings that require, or incorporate, eight of the following features:

10.1 straight edges
10.2 curved edges
10.3 flat surfaces
10.4 polished surfaces
10.5 shaped surfaces
10.6 radius corners
10.7 returns
10.8 nett edges
10.9 joggle details
10.10 removal of join lines
10.11 multiple holes
10.12 multiple hole sizes
10.13 countersinks
10.14 counterbores
10.15 further lay-up stages
10.16 inserts to be drilled
10.17 inserts to be tapped
10.18 solid cores
10.19 honeycomb cores
10.20 edge filling/sealing

11.

Produce trimmed mouldings which comply with one of the following standards:

11.1 Civil Aviation Authority (CAA)/European Aviation Safety Agency (EASA)
11.2 Ministry of Defence (MoD)
11.3 Military Aviation Authority (MAA)
11.4 Federal Aviation Authority (FAA)
11.5 Aerospace Quality Management Standards (AS)
11.6 BS, ISO or BSEN standards and procedures
11.7 customer standards and requirements
11.8 company standards and procedures
11.9 manufacturers standards and procedures

12.

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

12.1 build records
12.2 job cards
12.3 log cards
12.4 aircraft log
12.5 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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