SEMAER218

Making modifications to aircraft cableforms and looms

Overview

This standard identifies the competences you need to modify aircraft cableforms and looms, in accordance with approved procedures. You will be required to change, modify and update cableforms and looms, in accordance with modification leaflets, latest issue drawings and standards. You will be expected to remove and replace cables, add cables, change breakout points, and change the routeing of cables. This will involve cutting the appropriate cables to the required lengths, stripping the appropriate amount of cable insulation, and soldering and crimping the appropriate connectors to the cable ends, using the specified or appropriate techniques and fastening devices.

The cableforms and looms will include co-axial cable assemblies, heavy duty cable assemblies, aircraft system cable assemblies, secure speech cable assemblies, aircraft lighting assemblies, automatic flying control systems (AFCS) cable assemblies, and headset leads (mic-tel leads).

Your responsibilities will require you to comply with organisational policy and procedures for the cableform/loom modification activities undertaken, and to report any problems with the activities, materials or equipment used that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will need to ensure that all tools, equipment and materials used in the modification of the cableforms 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 either with a high level of supervision or as a member of a team, and you will take personal responsibility for your own actions and for the quality and accuracy of the work that you carry out. Where team working is involved, you must demonstrate a significant personal contribution during the team activities in order to satisfy the requirements of this standard, and you must demonstrate competence in all the areas required by the standard.

Your underpinning knowledge will be sufficient to provide a sound basis for your work, and will provide an informed approach to applying the appropriate cableform modification techniques and procedures. You will understand the procedures and techniques for modifying the aircraft cableforms and looms, and will know about the tools and techniques, 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 cableform/loom modification activities. You will be required to demonstrate safe working practices throughout, and will understand the responsibilities you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

P1 work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines

P2 obtain and follow the relevant modification specifications and job instructions

P3 confirm and agree what modifications are to be carried out to meet the specification

P4 prepare the cableforms and looms for the required modification

P5 carry out the modification using approved materials, methods and procedures

P6 complete the modification within the agreed timescale

P7 ensure that the modified cableforms and looms meet the specified operating conditions

P8 produce accurate and complete records of all modification work carried out

P9 deal with problems within your control and report those that cannot be solved

Knowledge and understanding

You need to know and understand:

K1 how to work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines

K2 the hazards associated with modifying aircraft cableforms and looms, and how they can be minimised

K3 the importance of wearing the appropriate personal protective equipment (PPE), and of keeping the work area clean and tidy

K4 the various types of drawing and specifications that are used during the cableform and loom modification

K5 how to identify the components to be used; component identification systems

K6 preparations to be undertaken on the cableform/loom, prior to modification

K7 how to take electrostatic discharge (ESD) precautions, and why are they needed

K8 the methods and techniques to be used for soldering and de-soldering, and the importance of adhering to them

K9 the methods and techniques to be used for crimping and heat shrinking, and the importance of adhering to them

K10 the methods and techniques to be used for the assembly of screened and unscreened plugs and sockets

K11 how to identify the difference between composite and metal plugs and sockets

K12 the different types of cable protection, the reasons why each type would be used, and when

K13 the importance of using the specified cables and cable end fittings for the modification, and why you must not use substitutes

K14 the quality control procedures to be followed during the cableform/loom modification operations

K15 how to conduct the necessary checks to ensure the accuracy and quality of the modification

K16 the importance of ensuring that the completed and modified cableform/loom is free from damage

K17 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

K18 the issues that can occur with the modification operations, and how these can be overcome

K19 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

K20 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 ensure that you have the correct documentation for the cableform/loom modification operations (such as drawings, job instructions, aircraft standards)
   1.2 adhere to procedures or systems in place for risk assessment, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
   1.3 ensure that all tools and equipment used are within current calibration dates
   1.4 maintain safe access and working arrangements for the area in which the modification activities take place
   1.5 dispose of waste items in a safe and environmentally acceptable manner, in line with company procedures
   1.6 return all tools and equipment to the correct location on completion of the activities
   1.7 leave the work area in a safe condition and free from foreign object debris
2. Carry out modifications to cableforms/looms for two of the following aircraft electrical systems:
   2.1 co-axial cable assemblies
   2.2 aircraft lighting cable assemblies
   2.3 circuit breaker/switch panels
   2.4 heavy duty cable assemblies
   2.5 headset leads (mic-tel leads)
   2.6 flightdeck/cockpit panels
   2.7 aircraft system cable assemblies
   2.8 aircraft flying control systems (AFCS) cable assemblies
   2.9 control/relay panels
   2.10 secure speech cables assemblies
   2.11 databus looms
   2.12 avionic trays
   2.13 fibre-optic cables/assemblies
   2.14 amalgamated system looms
   2.15 other specific cableform or loom
3. Carry out four of the following modifications:
   3.1 replacing cables of different type or length
   3.2 making changes to looms
   3.3 changing or adding components to panels or sub-assemblies
   3.4 adding looms
   3.5 changing position or angle of breakout points
   3.6 removing cables
   3.7 changes to component/connector on end of cable
   3.8 adding cables
   3.9 changing routeing of cables
4. Carry out seven of the following cable end termination processes:
   4.1 stripping the outer coating without damage to conductor insulation
   4.2 stripping off an appropriate length of cable conductor insulation/protection

4.3 removing and replacing mechanical/screwed/clamped cable end connections
4.4 removing and replacing crimped cable end connections (such as spade end, loops, tags and pins)
4.5 removing and replacing snap/push on cable end connections
4.6 soldering and de-soldering cable end connections
4.7 removing and remaking an unscreened plug and socket assembly
4.8 removing and remaking a screened plug and socket assembly
4.9 removing and remaking a co-axial cable connection
4.10 removing and reapplying heat shrink devices/boots
4.11 removing and replacing cable protection

5. Carry out modifications in compliance with one of the following standards:
5.1 Civil Aviation Authority (CAA)/European Aviation Safety Agency (EASA)
5.2 Ministry of Defence (MoD)
5.3 Military Aviation Authority (MAA)
5.4 customer standards and requirements
5.5 Aerospace Quality Management Standards (AS)
5.6 Federal Aviation Authority (FAA)
5.7 organisational standards and procedures
5.8 BS, ISO or BSEN standards and procedures
5.9 manufacturers standards and procedures

6. Complete the relevant paperwork, to include one from the following, and pass it to the appropriate people:
6.1 build records
6.2 log cards
6.3 job cards
6.4 aircraft flight log
6.5 other specific recording method

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