SEMME3035

Overhauling and repairing marine communication equipment and systems

Overview

This standard identifies the competences you need to carry out overhauling activities on marine communication equipment and systems, in accordance with approved procedures. The equipment to be overhauled will include intercom clear, intercom secure, medium/high frequency (MF/HF), very high frequency (VHF) and ultra high frequency (UHF) radio systems, voice recorders, satellite communications (SATCOM), digital data links, inboard entertainment systems, selective calling (SELCAL), rationalised integrated communication equipment (RICE) and telephone exchanges.

This will involve dismantling, removing and replacing faulty equipment, at component or unit level, on different types of assemblies, including transmitters and aerials. You will be expected to apply a range of dismantling and reassembly methods and techniques, such as removing and replacing mechanical fasteners, soldering/de-soldering, crimping, harnessing and securing cables and components, as well as aerial feeders and waveguides.

Your responsibilities will require you to comply with organisational policy and procedures for the overhaul of the marine communication equipment and to report any problems with the overhauling activities that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You must ensure that all tools, equipment and materials used in the overhaul are removed from the work area on completion of the activities and that all necessary job/task documentation is completed accurately and legibly. You will be expected to work with a minimum of supervision, taking personal responsibility for your 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 overhauling procedures to marine communication equipment and systems. You will understand the dismantling and re-assembly methods and procedures used and their application. You will know about the marine communication equipment being worked on, component properties, functions and associated defects, in adequate depth to provide a sound basis for carrying out the overhauling activities, correcting faults and ensuring that the overhauled equipment functions to the required specification.

You will understand the safety precautions required when carrying out the overhauling activities, 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. follow the relevant maintenance schedules to carry out the required work
3. carry out the maintenance activities within the limits of your personal authority
4. carry out the maintenance activities in the specified sequence and in an agreed time scale
5. report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule
6. complete relevant documentation in line with organisational procedures, and pass them on to the appropriate person
7. dispose of waste materials in accordance with safe working practices and approved procedures

Knowledge and understanding

You need to know and understand:

1. the specific safety practices and procedures that you need to observe when overhauling marine communication equipment and systems (including any specific legislation, regulations/codes of practice for the activities, equipment or materials)
2. the health and safety requirements of the area in which the marine communication overhaul activity is to take place and the responsibility these requirements place on you
3. the hazards associated with the overhauling of marine communication equipment and with the tools, extraction/filtering and metering equipment used and how they can be minimised
4. how to recognise and deal with emergencies and the procedures to be followed (such as methods of safely evacuating and closing down of compartments in the case of fire or other major incident, first aid, fire fighting and resuscitation of personnel)
5. the isolation and lock-off procedure or permit-to-work procedure that applies to the overhauling activities (to include electrical isolation, locking off switchgear, removal of fuses, placing maintenance warning notices, proving that isolation has been achieved and secured)
6. the protective equipment that you need to use for both personal protection (PPE) and protection of the overhauled item/system
7. the precautions to be taken to prevent electrostatic discharge (ESD) damage to circuits and sensitive components (such as use of earthed wrist straps, anti-static mats, special packaging and handling areas)
8. what constitutes a hazardous voltage and how to recognise victims of electric shock
9. how to reduce the risks of a phase to earth shock (such as insulated tools, rubber matting and isolating transformers)
10. how to obtain and interpret drawings, circuit and physical layouts, electronic schematic diagrams, charts, specifications, manufacturers' manuals, history/maintenance reports, graphical electrical symbols, wiring regulations and

other documents needed in the overhauling process
11. how to carry out currency/issue checks of the specifications you are working with
12. the items to be overhauled and their function within their associated system
13. the operating principles of electronic circuits and components (such as passive components, semiconductors, power supply units, circuit protection, combinational logic circuits, displays, AC, DC and RF transmission
14. the basic principles of RF and acoustic propagation
15. the methods of operating the unit/equipment using standard and emergency operating procedures
16. the importance of using the specified fasteners and terminations for the particular overhauling process and why you must not substitute others
17. the different types of cabling and feeders used in marine communication systems, and their application (such as multicore cables, single core cables, steel wire armoured (SWA), mineral insulated (MI), screened cables, flat, ribbon, flexi cables)
18. the application and use of a range of electrical components (such as plugs, switches, sockets, indicators)
19. the different types of wiring enclosures that are used (to include conduit, trunking and traywork systems)
20. the care, handling and application of ohmmeters, multimeters and other electrical metering or dummy load injection instruments
21. company policy on the repair/replacement of components and the procedure for obtaining replacement parts, materials and other consumables necessary for the overhauling process
22. how to check that the replacement units meet the required specification/operating conditions (values, tolerance, current carrying capacity, voltage rating, power rating, ambient temperatures)
23. the techniques used to remove, dismantle, dimensionally measure, inspect, reassemble, align, adjust and secure the components in the equipment/unit
24. the different types of circuit boards and their applications (such as ceramic and flexible, flame retardant
25. the factors to consider if leaded and unleaded solder and adhesives have been used
26. the techniques used for removing, replacing and reworking of through hole and surface mount components
27. methods of removing and replacing cables, feeders, and wires in wiring

enclosures, without causing damage to existing cables
28. the factors to take into account when deciding if a component/module can be repaired or not
29. the different types and methods of repair that can be used
30. methods of lifting, handling and supporting the components/equipment during the overhauling activities
31. why unit electrical bonding, earth prevention and continuity are critical and why earth bonding must be both mechanically and electrically secure
32. the use of regulations when selecting wires and cables and when carrying out tests on electrical equipment and systems
33. methods of attaching identification marks/labels to removed components or cables/feeders to assist with re-assembly
34. the tools and equipment used in the overhauling activities (including the use of cable stripping tools, crimping tools, soldering irons, gland connecting tools)
35. the types and uses of test equipment that can be used (such as oscilloscopes, communication analysers, signal generators, electronic diagnostics, reprogramming software, digital multi meters
36. methods of checking that components are fit for purpose and the need to replace 'lifed' items
37. how to make adjustments to components/assemblies to ensure that they function correctly
38. the importance of making 'off-load' checks before proving the equipment with the electrical supply on
39. the generation of documentation and/or reports following the overhauling activity
40. the problems that can occur during the marine communication system overhaul activity and how they can be overcome
41. the extent of your own authority and whom you should report to if you have a problem that you cannot resolve

Scope/range related to performance criteria