

Overview

This standard identifies the competences you need to lead maintenance activities by carrying out corrective maintenance activities on electrical equipment within an engineered system, in accordance with approved procedures. You will be required to maintain a range of electrical equipment, such as single and three-phase power supplies, motors and starters, switchgear and distribution panels, electrical plant, control systems and equipment, and luminaries, which are working in an integrated system involving two or more of the following interactive technologies: mechanical systems, fluid power or process controllers. You will also be required to identify and implement a systematic approach to improving the equipment maintenance activities undertaken and ensure that the maintenance team have to appropriate skills, knowledge and understanding to maintain the equipment efficiently, effectively and safely.

You will be expected to isolate and disconnect items and components of the interactive technologies, in order to gain access to and remove the electrical units and components that require replacing or repair. This will involve dismantling and reassembling a variety of different types of electrical equipment which, in some instances, will need to be dismantled to component level.

Your responsibilities will require you to comply with organisational policy and procedures for the maintenance activities undertaken, and to report any problems with the maintenance activities, tools or equipment used 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 maintenance activities 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 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 an in depth understanding of your work, and will provide an informed approach to applying electrical maintenance procedures. You will also know about the integrated technology assemblies and sub- assemblies, their properties, functions and associated defects, in adequate depth to provide a sound basis for carrying out the dismantling and reassembly process effectively. You will understand the maintenance methods and procedures used, and their application

within an engineered system, in sufficient depth to be able to carry out the maintenance activities, correct faults, and ensure that the repaired equipment functions to specification and remains compliant with all standards and regulations. You will also know about the interaction of the other associated integrated technologies and have sufficient knowledge to carry out the dismantling and reassembly safely and effectively.

You will understand the safety precautions required when carrying out the maintenance activities, especially those for isolating the equipment and for taking the necessary safeguards to protect yourself and others in the workplace. You will be required to demonstrate safe working practices throughout.

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. produce and update relevant maintenance schedules and plans
3. lead maintenance activities within the limits of your personal authority
4. carry out the maintenance activities in the specified sequence and in an agreed timescale
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 maintenance documentation accurately
7. dispose of waste materials in accordance with safe working practices and approved procedures
8. identify and lead on making improvements to maintenance processes and procedures
9. update management information and systems to support the activities of the maintenance department

Knowledge and understanding

You need to know and understand:

1. the health and safety requirements of the area in which the maintenance activity is to take place, and the responsibility these requirements place on you
2. how to prioritise your own and your team's workload to ensure that targets are met
3. how to communicate effectively, listen, question, support and coach others to work towards the departmental targets
4. the importance of ensuring that teams have the required skills, knowledge and understanding in order to maintain equipment to the required standards
5. how to complete a skills audit of team members
6. how maintenance teams can access the appropriate training and development programmes once a need training need has been identified
7. the isolation and lock-off procedure or permit-to-work procedure that applies to the system
8. the specific health and safety precautions to be applied during the maintenance activity, and their effects on others
9. how to recognise and deal with victims of electric shock (to include methods of safely isolating the power source and methods of first aid resuscitation)
10. the importance of wearing protective clothing and other appropriate safety equipment during the maintenance activities
11. hazards associated with carrying out electrical maintenance activities on an integrated system (such as handling fluids, stored pressure/force, electrical supplies, process controller interface, using damaged or badly maintained tools and equipment, not following laid-down maintenance procedures), and how to minimise these and reduce any risks
12. how to obtain and interpret drawings, charts, specifications, manufacturers' manuals, history/maintenance reports, graphical electrical symbols, BS7671/IET wiring regulations and other documents needed for the maintenance activities
13. the basic principles of how the system functions, its operation sequence, the working purpose of individual units/components, and how they interact
14. the procedure to be adopted to establish the background of the fault
15. how to evaluate the various types of information available for fault diagnosis
16. how to use the various aids and reports available for fault diagnosis
17. how to use various items of fault diagnostic equipment to investigate the

problem

18. the various fault finding techniques that can be used, and how they are applied (such as half-split, input-to-output, emergent problem sequence, six point technique, function testing, unit substitution, injection and sampling techniques and equipment self-diagnostics)

19. how to evaluate sensory information (sight, sound, smell, touch)

20. how to analyse evidence and evaluate possible characteristics and causes of specific faults/problems

21. how to evaluate the likely risk of running the equipment with the displayed fault, and the effects the fault could have on health and safety, and on the overall process or system

22. how to relate previous reports/records of similar fault conditions

23. the different types of cabling and their application (such as multi-core cables, single-core cables, steel wire armoured (SWA), mineral insulated (MI), screened cables)

24. the different types of electric motors and motor starters

25. the different types of control systems and their various components

26. the application and use of a range of electrical components (such as plugs, switches, sockets, lighting and fittings, junction boxes, consumer units)

27. the various lighting systems used including tungsten, sodium, mercury vapour, LED, low energy and fluorescent

28. the different types of wiring enclosures that are used (to include conduit, trunking and traywork systems)

29. the care, handling and application of ohmmeters, multimeters and other electrical measuring instruments

30. the procedure for obtaining replacement parts, materials and other consumables necessary for the maintenance activities

31. company policy on repair/replacement of components during the maintenance activities

32. the techniques used to dismantle/assemble integrated equipment (such as release of pressures/force, proof marking to aid re-assembly, plugging exposed pipe/component openings, dealing with soldered joints, screwed, clamped and crimped connections)

33. methods of removing and replacing cables and wires in wiring enclosures, without causing damage to existing cables

34. the use of BS7671/IET and other regulations when selecting wires and cables, and when carrying out tests on systems

35. methods of attaching identification marks/labels to removed components or cables, to assist with re-assembly
36. methods of checking that components are fit for purpose, and the need to replace 'lived' items (such as motor brushes, seals and gaskets, and overload protection devices)
37. how to make adjustments to components/assemblies to ensure they function correctly
38. how to check that tools and equipment are free from damage or defects, are in a safe and usable condition, and are configured correctly for the intended purpose
39. the importance of making 'off-load' checks before proving the equipment with the electrical supply on
40. the generation of maintenance documentation and/or reports on completion of the maintenance activity
41. the equipment operating and control procedures to be applied during the maintenance activity
42. how to use lifting and handling equipment in the maintenance activity
43. the problems that can occur during the electrical maintenance activity, and how they can be overcome
44. the organisational procedure to be adopted for the safe disposal of waste of all types of materials
45. how to conduct a systematic plan, do, check, act (PDCA) approach to problem-solving and business improvement
46. how to evaluate improvement ideas in order to select those that are to be pursued
47. how improvements to the process are achieved by engaging the knowledge and experience of the people working on the process
48. how to create or update Standard Operating Procedures (SOP's) maintenance schedules and plans.
49. the techniques required to communicate information using visual control systems (such as card systems, colour coding, floor footprints, graphs and charts, team boards, tool/equipment shadow boards)
50. the extent of your own authority and to whom you should report if you have a problem that you cannot resolve

SEMEM446

Carrying out maintenance activities on electrical equipment within an engineered system



Scope/range related to performance criteria