

Overview

This standard identifies the competences you need to carry out overhauling activities on a range of marine systems, plant and equipment, in accordance with approved procedures. The equipment to be overhauled will have been removed from the vessel or craft and the overhauling activities may take place in a shipyard or manufacturer's workshops. The marine systems, plant and equipment covered by this standard include areas such as propulsion, power transmission, fuel, hydraulic, pneumatic, auxiliary power, mechanical control, steering gear, lifting equipment, weapons equipment, ancillary plant, steam, liquid ballast, fire, refrigeration, air conditioning, pantry and galley. The overhauling activities will involve stripping the equipment down to component level, cleaning and inspecting the components for wear, replacing all defective and 'lifer' components and rebuilding the equipment in line with the overhauling specification.

The overhauling activities will include making all necessary checks, adjustments or tests to ensure that components are correctly replaced, positioned, aligned, adjusted, torque loaded, locked and fastened and that the correct joints, seals, gaskets and sealants are used.

Your responsibilities will require you to comply with organisational policy and procedures for the marine systems, plant and equipment to be overhauled, the activities undertaken and to report any problems with these activities, or with the tools and equipment used 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 overhauling 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 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 overhauling procedures to marine systems, plant and equipment. You will understand the dismantling and reassembly methods and procedures used and their application. You will know how the equipment functions, the purpose of the individual components and associated defects, in adequate depth to provide a sound basis for carrying out the overhauling activities, correcting faults and

ensuring that the repaired equipment functions to the required specification. In addition, you will have sufficient in-depth knowledge of these components to ensure that they are fit for purpose and meet the specifications, thus providing a sound basis for carrying out and completing the overhauling activity.

You will understand the safety precautions required when carrying out the overhauling activities and 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, both ashore and afloat.

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 maintenance records accurately and pass them on to the appropriate person
7. dispose of waste materials in accordance with safe working practices and approved procedures
8. complete relevant documentation in line with organisational procedures

Knowledge and understanding

You need to know and understand:

1. the health and safety requirements of the area in which the overhauling activity is to take place and the responsibility they place on you
2. the specific health and safety precautions needed to be applied during the overhauling procedure and their effects on others
3. hazards associated with carrying out overhauling activities on marine systems, plant and equipment (such as using lifting and handling equipment, handling oils and greases, releasing stored pressure/fluids, misuse of tools, using damaged or badly maintained tools and equipment, not following laid-down overhauling procedures)
4. the importance of wearing protective clothing and other appropriate safety equipment (PPE) during the overhaul
5. how to obtain and interpret drawings, charts, circuit and physical layouts, specifications, manufacturers' manuals, history/maintenance reports, symbols used in documents needed in the overhauling process
6. how to carry out currency/issue checks of the specifications you are working with
7. the procedure for obtaining replacement parts, materials and other consumables necessary for the overhaul
8. company policy on the repair/replacement of components during the overhauling process
9. how to check that tools and equipment are free from damage or defect, are in a safe and usable condition and are configured correctly for the intended purpose
10. the equipment operating and control procedures to be applied during the overhauling activity
11. the sequence to be adopted for the dismantling/reassembling of various types of equipment, assemblies and components
12. the methods and techniques used to dismantle/reassemble marine systems, plant and equipment components (such as release of pressures/force, proof-marking, extraction, pressing, alignment)
13. methods of checking that components are fit for purpose, how to identify defects and wear characteristics and the need to replace 'lived' items (such as filters, seals and gaskets)

14. the process used to identify any contaminants in the equipment/system
15. the damage that can be caused if any contaminants or foreign objects are not removed
16. how to make adjustments to components/assemblies to ensure that they function correctly (such as setting working clearance, bedding in new components, setting travel, alignment)
17. the importance of ensuring that fasteners are tightened to the required torque
18. the basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
19. the identification and application of different types of locking and securing devices
20. how to identify the different types and uses of different system components (such as shafts, bearings, gears, keys, belts, pumps)
21. the uses of measuring equipment (such as micrometers, verniers, expansion indicators and other measuring devices)
22. how to use lifting and handling equipment in the overhaul activity
23. the problems associated with the overhauling of marine systems plant and equipment and how they can be overcome
24. the generation of technical documentation and/or reports following completion of the overhauling activity
25. the organisational procedure to be adopted for the safe disposal of waste of all types of materials
26. the extent of your own authority and to whom you should report if you have a problem that you cannot resolve

Scope/range related to performance criteria

1.

Carry out all of the following during the overhaul of the marine systems, plant and equipment:

- 1.1 use the correct issue of company and/or manufacturers' drawings and overhaul documentation
- 1.2 adhere to risk assessment, COSHH and other relevant safety standards
- 1.3 ensure the safe isolation of equipment (such as mechanical, electricity, gas, air or fluids, steam)
- 1.4 provide safe access and working arrangements for the overhauling area
- 1.5 use lifting and handling equipment, in accordance with health and safety guidelines and procedures
- 1.6 carry out the overhauling activities using appropriate techniques and procedures
- 1.7 comply with organisational requirements with regard to renewal or replacement of existing components
- 1.8 ensure that the overhauled components meet the required specification
- 1.9 ensure that there are no foreign objects left in the completed equipment
- 1.10 re-instate the work area on completion of the overhaul

2.

Carry out overhauling activities on four of the following types of marine systems/plant/equipment:

- 2.1 propulsion systems
- 2.2 power transmission systems
- 2.3 fuel system and equipment
- 2.4 hydraulic systems and equipment
- 2.5 pneumatic systems and equipment
- 2.6 mechanical control systems and equipment
- 2.7 steering gear, control systems and equipment
- 2.8 auxiliary power units
- 2.9 lifting equipment
- 2.10 weapons systems and equipment
- 2.11 ancillary plant and equipment (such as laundry, garbage, osmosis, hospital)
- 2.12 steam plant and equipment
- 2.13 liquid ballast arrangements
- 2.14 fire main systems and equipment
- 2.15 refrigeration and air conditioning systems and equipment
- 2.16 pantry and galley equipment

3.

Carry out eighteen of the following activities on the marine systems, plant and equipment being overhauled:

Overhauling marine systems, plant and equipment

- 3.1 de-pressurising the system/equipment
- 3.2 draining system/equipment/component fluids
- 3.3 dismantling equipment to unit/sub-assembly level
- 3.4 dismantling equipment to component level
- 3.5 flushing out and cleaning the system/equipment/components
- 3.6 proof-marking/labelling of components
- 3.7 checking components for wear and/or serviceability
- 3.8 replacing all 'lived' items (such as seals, filters, gaskets)
- 3.9 recording information on lived components
- 3.10 applying gaskets and sealants/adhesives
- 3.11 replacing all damaged or defective components
- 3.12 setting, aligning and adjusting replaced components
- 3.13 bedding in any new components
- 3.14 balancing components
- 3.15 chocking/supporting equipment/components
- 3.16 disconnecting and removing hoses and pipes
- 3.17 blanking pipes/hoses/components to prevent contamination or to provide isolation
- 3.18 replenishing oils and greases
- 3.19 filling and re-pressurising the system
- 3.20 adding preservation fluids
- 3.21 electrical bonding of components
- 3.22 re-assembling sub-assemblies to unit level
- 3.23 re-assembling components to sub-assembly level
- 3.24 electrical bonding of equipment
- 3.25 securing components using mechanical fasteners and threaded devices
- 3.26 applying bolt locking methods (such as split pins, wire locking, lock nuts, stiff nuts, swage nuts)
- 3.27 tightening fastenings to the required torque
- 3.28 making 'off-load' checks before starting up
- 3.29 carry out any required tests or checks before powering up
- 3.30 functionally testing the completed system

4.

Remove and replace a range of marine systems, plant and equipment components, to include twenty of the following:

- 4.1 shafts
- 4.2 pumps
- 4.3 cams and followers
- 4.4 static/dynamic seals
- 4.5 couplings
- 4.6 spools
- 4.7 chains and sprockets
- 4.8 housings
- 4.9 gears
- 4.10 bearings
- 4.11 pulleys, belts or cables
- 4.12 actuating mechanisms

- 4.13 clutches
- 4.14 pipes/hoses and unions
- 4.15 levers and linkages
- 4.16 structural components
- 4.17 brakes
- 4.18 housings
- 4.19 bushes
- 4.20 wire thread inserts
- 4.21 valves and seats
- 4.22 keys
- 4.23 slides
- 4.24 sensors
- 4.25 pistons
- 4.26 springs
- 4.27 rollers
- 4.28 regulators
- 4.29 splines
- 4.30 diaphragms
- 4.31 receivers
- 4.32 switches and trips
- 4.33 cylinders
- 4.34 rams
- 4.35 bladders
- 4.36 backing rings
- 4.37 gaskets
- 4.38 lubricators/filters
- 4.39 reservoirs
- 4.40 accumulators
- 4.41 locking and retaining devices (such as circlips, pins)
- 4.42 seats
- 4.43 gauges/instrumentation
- 4.44 site glasses
- 4.45 connecting rods
- 4.46 rack/pinion
- 4.47 lubricators
- 4.48 shackles
- 4.49 cranks
- 4.50 rods
- 4.51 struts
- 4.52 mounts
- 4.53 doors/shutters
- 4.54 glands
- 4.55 bellows
- 4.56 venturis
- 4.57 manifolds
- 4.58 strainers
- 4.59 guards/safety devices
- 4.60 flanges

Overhauling marine systems, plant and equipment

- 4.61 impellers
- 4.62 chambers
- 4.63 burners
- 4.64 other specific components

5.

Overhaul marine systems, plant and equipment, in compliance with one of the following standards:

- 5.1 BS or ISO standards and procedures
- 5.2 customer (contractual) standards and requirements
- 5.3 company standards and procedures
- 5.4 specific system requirements
- 5.5 recognised compliance agency/body's standards
- 5.6 other accepted international standards

6.

Complete the relevant documentation in line with organisational procedures, to include one of the following and pass it to the appropriate people:

- 6.1 job cards
- 6.2 permit to work/formal risk assessment
- 6.3 maintenance/overhaul log or report
- 6.4 chart of dimensional inspection
- 6.5 other specific reporting method

Behaviours

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

SEMME3286



Overhauling marine systems, plant and equipment

Developed by	Enginuity
Version Number	2
Date Approved	31 Mar 2019
Indicative Review Date	29 Apr 2021
Validity	Current
Status	Original
Originating Organisation	Semta
Original URN	SEMME3286
Relevant Occupations	Marine Engineering Trades
Suite	Marine Engineering Suite 3
Keywords	Engineering; marine; overhaul; systems; equipment; plant; remove; replace; checks; tests; adjust
