

Overhauling marine hydraulic systems and equipment

Overview

This standard identifies the competences you need to carry out a complete overhaul of marine hydraulic systems 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 hydraulic systems and equipment covered by this standard include items such as davits, weapon hoists, stores lifts, hatches, planes, cranes, aerials, periscopes, stabilisers, vehicle ramps, ramp locking systems and steering gear. The overhauling activities will involve stripping the equipment down to component level, cleaning and inspecting the components for wear, replacing all defective and 'lived' components and rebuilding the equipment in line with the overhauling specification.

The marine hydraulic systems and equipment to be overhauled will include pipework, hoses, control valves, cables, pulleys, actuating mechanisms, stops, lubrication systems, indication, mechanical and electrical controls, safety devices and other associated mechanical equipment. The overhauling activities will include making all necessary checks and adjustments to ensure that components are correctly replaced, positioned, aligned, adjusted, torque loaded, locked and fastened and that the correct sealants are used.

Your responsibilities will require you to comply with organisational policy and procedures for the marine hydraulic systems and equipment overhauling 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 hydraulic systems 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 reassembly.

You will understand the safety precautions required when carrying out the maintenance activities associated with marine hydraulic systems and equipment, especially those for lifting and handling the equipment. You will be required to demonstrate safe working

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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 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

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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 hydraulic systems and equipment (such as using lifting and handling equipment, handling hydraulic oils, 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 fluid power and other 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. the sequence to be adopted for the dismantling/reassembling of various types of assemblies
10. the methods and techniques used to dismantle/reassemble marine hydraulic systems and equipment (such as release of pressures/force, proof-marking, extraction, pressing, alignment)
11. 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)
12. how to make adjustments to components/assemblies to ensure that they function correctly (such as setting working clearance, setting travel)
13. the basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
14. the selection of hydraulic fluids for the system
15. how to determine pressure settings and their effect on the system
16. the different types of pipework, fittings and manifolds and their application
17. the identification and application of different types of valves (such as

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- poppet, spool, piston, disc)
18. the identification and application of different types of sensors and actuators (such as rotary, linear, mechanical, electrical)
 19. the identification and application of different types of cylinders (such as single acting, double acting)
 20. the identification and application of different types of pumps (such as positive and non-positive displacement)
 21. the application and fitting of static and dynamic seals
 22. recognition of contaminants and the problems they can create; the effects and likely symptoms of contamination in the system
 23. the identification and application of different types of locking devices
 24. the uses of measuring equipment (such as micrometers, verniers, expansion indicators and other measuring devices)
 25. 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
 26. the generation of technical documentation and/or reports following completion of the overhauling activity
 27. the equipment operating and control procedures to be applied during the overhauling activity
 28. how to use lifting and handling equipment in the overhaul activity
 29. the problems associated with the overhauling of marine hydraulic systems and equipment and how they can be overcome
 30. the organisational procedure to be adopted for the safe disposal of waste of all types of materials
 31. the extent of your own authority and to whom you should report if you have a problem that you cannot resolve

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Scope/range related to performance criteria

1. Carry out all of the following during the overhaul of the marine hydraulic systems and equipment:
 1. use the correct issue of company and/or manufacturers' drawings and overhaul documentation
 2. adhere to risk assessment, COSHH and other relevant safety standards
 3. ensure the safe isolation of equipment (such as mechanical, electricity, gas, air or fluids, steam)
 4. provide safe access and working arrangements for the overhauling area
 5. use lifting and handling equipment, in accordance with health and safety guidelines and procedures
 6. carry out the overhauling activities using appropriate techniques and procedures
 7. comply with organisational requirements with regard to renewal or replacement of existing components
 8. ensure that the overhauled components meet the required specification
 9. ensure that there are no foreign objects left in the completed equipment
2. Carry out overhauling activities on one of the following types of marine hydraulic systems and equipment:
 1. electro-hydraulic (such as davit, crane, capstan, windlass, aerial, winch, weapon hoist, derrick, vehicle ramp)
 2. manual-hydraulic (such as davit, hatch, vehicle ramp, steering mechanism)
 3. mechanical-hydraulic (winch, hoist, gantry)
3. Carry out overhauling activities on four of the following marine hydraulic system and equipment components:
 1. davit
 2. gangway
 3. weapon hoist
 4. derrick
 5. platform
 6. crane
 7. planes
 8. hatch hoist
 9. vehicle ramp
 10. periscope

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11. capstan
 12. aerial hoist
 13. aircraft lift
 14. gantry
 15. windlass
 16. winch
 17. steering gear
 18. weapons systems
 19. compactors (such as waste management)
 20. lifts (such as goods, dumb waiter)
 21. other specific hydraulic system
4. Carry out eighteen of the following activities on the hydraulic equipment being overhauled:
1. chocking/supporting cylinders/rams/components
 2. disconnecting and removing hoses and pipes
 3. de-pressurising the system
 4. draining system fluids
 5. flushing out and cleaning the system
 6. electrical bonding of components
 7. dismantling equipment to unit/sub-assembly level
 8. visually checking components for serviceability
 9. filling and re-pressurising the system
 10. adding preservation fluids
 11. dismantling units to component level
 12. making 'off-load' checks before starting up
 13. proof-marking/labelling of components
 14. replenishing oils and greases
 15. checking components for serviceability
 16. recording information on lifed components
 17. applying gaskets and sealant/adhesives
 18. replacing all damaged or defective components
 19. tightening fastenings to the required torque
 20. setting timings and adjusting replaced components
 21. lapping in valves
 22. re-assembling sub-assemblies to unit level
 23. re-assembling components to sub-assembly level
 24. replacing all 'lifed' items (such as piston seals, dust caps, filters, gaskets)
 25. securing components using mechanical fasteners and threaded devices
 26. applying bolt locking methods (such as split pins, wire locking, lock nuts, stiff nuts, swage nuts)
 27. functionally testing the completed system

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5. Replace a range of marine hydraulic systems and equipment components, to include sixteen of the following:

1. shafts
2. pumps
3. cams and followers
4. static and dynamic seals
5. couplings
6. spools
7. chains and sprockets
8. housings
9. gears
10. roller or ball bearings
11. pulleys and belts
12. actuating mechanisms
13. clutches
14. pipes/hoses and unions
15. levers and links
16. structural components
17. brakes
18. bearing housings
19. shims and packing
20. wire thread inserts
21. valves and seats
22. keys
23. slides
24. sensors
25. pistons
26. springs
27. rollers
28. regulators
29. splines
30. diaphragms
31. receivers
32. switches and trips
33. cylinders
34. rams
35. bladders
36. backing rings
37. banjo bolts
38. spring mechanisms
39. gaskets
40. lubricators/filters
41. reservoirs
42. accumulators
43. locking and retaining devices (such as circlips, pins)
44. other specific hydraulic components

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6. Overhaul marine hydraulic systems and equipment, in compliance with one of the following standards:
 1. BS or ISO standards and procedures
 2. customer (contractual) standards and requirements
 3. company standards and procedures
 4. specific system requirements
 5. recognised compliance agency/body's standards
 6. other accepted international standards
7. Complete the relevant documentation in line with organisational procedures, to include one of the following and pass it to the appropriate people:
 1. job cards
 2. permit to work/formal risk assessment
 3. maintenance log or report
 4. chart of dimensional inspection
 5. other specific reporting method

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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

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