LANLEO12

Service and repair clutches and other transmission controlling devices on land-based equipment

Overview

This standard covers the service and repair of clutches and other transmission controlling devices on land-based equipment. It includes the removal, dismantling, repairing and reassembly of transmissions and their component parts, and also the testing, diagnosis and repair practices required for both simple and complex transmissions.

The standard also includes the techniques used to engage and disengage, drive and limit the torque being transmitted through drive lines.

When working with machinery or equipment you should be trained and hold current certification, where required, in accordance with the relevant legislation.

When working on high voltage (hazardous voltage/HaV) electric vehicles, de-energising must be done by a person who has been trained in accordance with the manufacturer's procedures.

This standard is for those who work in land-based engineering under supervision.

Performance criteria

You must be able to:

1. be aware of hazards and assess the risks associated with the activity and the location where it is to be carried out
2. be aware of the potential environmental impact associated with the activity and the ways in which this can be controlled
3. select and wear suitable clothing and personal protective equipment (PPE)
4. select, prepare, use, maintain, and store the tools and equipment required to carry out the activity in accordance with the relevant legal requirements, manufacturer's instructions and company practices
5. check that the land-based equipment requiring service and repair is safe, prepared and isolated from power sources, where required, before work commences
6. take the necessary precautions to prevent the escape of chemicals, gases and other substances and minimise dangers from contamination and hazards, where required
7. use a variety of methods to collect diagnostic information to identify defects and faults and assess reasons for failure
8. determine the requirements for service and repair
9. identify and establish the availability of replacement components required for the activity
10. remove and replace clutches and other transmission controlling devices on land-based equipment
11. dismantle, service/repair clutches and other transmission controlling devices to manufacturer’s specifications and standards, where required
12. remove and replace worn and damaged components in accordance with instructions and specifications
13. confirm that equipment is correctly set or calibrated following service and repair
14. use suitable testing methods to assess the performance of the reassembled system on completion of the activity, and confirm that it performs to operating specification prior to returning the eqipment to the customer
15. recycle or sustainably dispose of the different types of waste, including hazardous and non-hazardous, caused by the activity, in accordance with the relevant legal and environmental requirements and company policy
16. complete records as required by the relevant legislation, warranty requirements

and company procedures

Knowledge and understanding

You need to know and understand:

1. how to identify hazards and assess risks when preparing to service and repair land-based equipment
2. the type of clothing and personal protective equipment (PPE) suitable for the activity
3. the tools and equipment required to carry out the activity and how to select, prepare, use, maintain and store these safely and correctly, in accordance with the manufacturer's instructions and company practices
4. the relevant legal requirements for the preparation and use of work equipment
5. how land-based equipment should be prepared for service and repair
6. the dangers created by stored energy and how to respond to these during the preparation stage
7. the hazardous chemicals, gases and other substances that may be present and how they should be dealt with
8. the different methods that can be used for the assessment of defects and faults with clutches and other transmission controlling devices and for the identification of the root cause
9. the common causes and symptoms of failure in clutches and other transmission controlling devices on land-based equipment
10. the factors that determine whether it is worthwhile carrying out the service and repair, such as cost, estimated working life or urgent need for the equipment
11. the components required for the service and repair and the company procedure for obtaining replacements
12. how to remove and replace clutches and other transmission controlling devices, including internally and externally mounted units
13. the types, construction, working principles and actuation of different clutches and other transmission controlling devices
14. how to dismantle, repair, recondition and reinstate clutches and other transmission controlling devices in line with the manufacturer’s specifications and standards
15. the methods of sequencing clutch engagement and take up
16. the methods of testing clutches and other transmission controlling devices on completion of the activity to confirm that that they perform to operating specifications prior to returning the equipment to the customer

17. how to recycle or sustainably dispose of the different types of waste, including hazardous and non-hazardous, caused by the activity, in accordance with the relevant legal and environmental requirements and company policy
18. the potential impact that the activity could have on the environment and the ways in which this can be controlled
19. the information that needs to be recorded, the company procedure for maintaining records and the requirements of data protection legislation

Scope/range

Work on at least three of the following 6 groups of devices:

1. overrun clutches, dog clutches, torque limiting or slip clutches
2. dry single, dual clutches, damper plates and vibration limiting components
3. wet plate clutches
4. fluid flywheels, torque convertors
5. mechanical centrifugal clutches, cone type clutches
6. electromagnetic clutches

Carry out the following methods:

1. stall tests
2. slipping point of torque limiting clutches tests
3. pressure tests
4. measurement of components

Know and understand the types, construction, working principles and actuation of the following devices used to engage and disengage drive:

Mechanical devices:

1. overrun clutches
2. torque limiting or slip clutches
3. dry single
4. dual clutches
5. cone type clutches
6. damper plates and vibration limiting components
7. dog clutches
8. mechanical centrifugal clutches

Hydraulic devices:

1. wet plate clutches
2. fluid flywheels and
3. torque convertors

Electrically activated device:

1. electromagnetic clutches

Glossary

Hazardous chemicals and substances could include:

- fuels
- oils
- fluids
- gases
- dust
- compressed air

Instructions and specifications:

- drawings/plans
- schedules
- method statements
- Standard Operating Procedures (SOPs)
- manufacturer's instructions
- customer requirements
- verbal instructions

Methods of diagnosis:

- visual inspections
- functional and operational tests
- diagnostic equipment
- remote electronic control and monitoring systems
- reviewing technical data

Stored energy:

- springs
- belt tension

- hydraulic pressure
- electrical discharge
- accumulator discharge

Links to other NOS

Refer to LANLEO4 Apply core land-based engineering principles:
mechanical principles, for setting bearings, the relationship of gears and pinions to one another, and methods of lubrication.

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