PROMPR23
Maintaining mechanical equipment

Overview

This standard identifies the competences you need to carry out corrective maintenance activities on mechanical equipment, in accordance with approved procedures. You will be required to maintain a range of mechanical equipment, such as gear boxes, pumps, machine tools, conveyor systems, workholding arrangements, engines, processing plant and equipment, and other organisation-specific equipment. This will involve dismantling, removing and replacing faulty equipment at component or unit level on a variety of different types of mechanical assemblies and sub-assemblies.

You will be expected to apply a range of dismantling and assembling methods and techniques, such as proof marking to aid reassembly, dismantling components requiring pressure or expansion/contraction techniques, setting, aligning and adjusting components, torque loading components and making 'off-load' checks before starting up the maintained equipment.

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 or the tools and 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 a good understanding of your work, and will provide an informed approach to applying mechanical maintenance procedures. You will understand the dismantling and reassembly methods and procedures, and their application. You will know how the equipment functions, and the purpose of the individual components and associated defects, in adequate depth to provide a sound basis for carrying out the maintenance activities, correcting faults and ensuring the repaired equipment functions to the required specification and remains compliant with all standards and regulations. 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, especially those for isolating the equipment. You will also understand your responsibilities for safety and the importance of taking the necessary safeguards to protect yourself and others in the workplace.

PROMPR23
Maintaining mechanical equipment

Performance criteria

You must be able to:

P1 work safely at all times, complying with health and safety and other relevant regulations and guidelines

P2 follow the relevant maintenance schedules to carry out the required work

P3 carry out the maintenance activities within the limits of your personal authority

P4 carry out the maintenance activities in the specified sequence and in an agreed timescale

P5 report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule

P6 complete relevant maintenance records accurately and pass them on to the appropriate person

P7 dispose of waste materials in accordance with safe working practices and approved procedures

PROMPR23
Maintaining mechanical equipment

Knowledge and understanding

You need to know and understand:

K1 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
K2 the isolation and lock-off procedures or permit-to-work procedure that applies
K3 the specific health and safety precautions to be applied during the maintenance procedure, and their effects on others
K4 hazards associated with carrying out mechanical maintenance activities (such as handling oils, greases, stored pressure/force, misuse of tools, using damaged or badly maintained tools and equipment, not following laid-down maintenance procedures), and how to minimise these and reduce any risks
K5 the importance of wearing protective clothing and other appropriate safety equipment during maintenance process
K6 how to obtain and interpret drawings, specifications, manufacturers' manuals and other documents needed in the maintenance process
K7 the procedure for obtaining replacement parts, materials and other consumables necessary for the maintenance activities
K8 company policy on repair/replacement of components during the maintenance process
K9 the sequence to be adopted for the dismantling/re-assembly of various types of assemblies
K10 the methods and techniques used to dismantle/assemble mechanical equipment (such as release of pressures/force, proof marking, extraction, pressing, alignment)
K11 methods of checking components are fit for purpose, and how to identify defects and wear characteristics
K12 the basic principles of how the equipment functions, operation sequence, the working purpose of individual units/components and how they interact
K13 the identification, application, fitting and removal of different types of bearings (such as roller, ring, thrust)
K14 methods and techniques of fitting keys and splined components
K15 identification, application, fitting and removal of different types of gears
K16 how to correctly tension belts and chains
K17 the identification and application of different types of locking devices
K18 methods of checking that removed components are fit for purpose, and the need to replace 'lifed' items (such as seals and gaskets)
K19 the uses of measuring equipment (such as micrometers, verniers, run-out devices and other measuring devices)
K20 how to make adjustments to components/assemblies to ensure they

function correctly (such as setting working clearance, setting travel, setting backlash in gears, preloading bearings)

K21 the importance of making ‘off-load’ checks before running the equipment under power

K22 how to check tools and equipment are free from damage or defects, are in a safe and usable condition, and are configured correctly for the intended purpose

K23 the importance of maintenance documentation and/or reports following the maintenance activity, and how to generate them

K24 the equipment operating and control procedures to be applied during the maintenance activity

K25 how to use lifting and handling equipment in the maintenance activity

K26 the problems associated with the maintenance activity, and how they can be overcome

K27 the organisational procedure(s) to be adopted for the safe disposal of waste of all types of materials

K28 the extent of your own authority and to whom you should report if you have a problem that you cannot resolve

PROMPR23
Maintaining mechanical equipment

Additional Information

Scope/range

The numbers of scope items specified (below) indicate the minimum requirements for this occupational standard. You must:

1 Carry out all of the following during the maintenance activity:

1.1 plan and communicate the maintenance activities to cause minimal disruption to normal working
1.2 obtain and use the correct issue of company and/or manufacturer's drawings and maintenance documentation
1.3 adhere to procedures or systems in place for risk assessment, coshh, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
1.4 ensure the safe isolation of equipment (such as mechanical, electricity, gas, air or fluids)
1.5 provide and maintain safe access and working arrangements for the maintenance area
1.6 carry out the maintenance activities using appropriate techniques and procedures
1.7 re-connect and return the system to service on completion of activities
1.8 dispose of waste items in a safe and environmentally acceptable manner and leave the work area in a safe condition

2 Carry out maintenance activities on three of the following types of equipment:

2.1 gearboxes
2.2 machine tools
2.3 lifting and handling equipment
2.4 processing plant
2.5 engines
2.6 pumps
2.7 process control valves
2.8 compressors
2.9 transfer equipment
2.10 mechanical structures
2.11 workholding devices
2.12 company-specific equipment

3 Carry out all of the following maintenance techniques, as applicable to the equipment being maintained:

3.1 dismantling equipment to unit/sub-assembly level
3.2 dismantling units to component level
3.3 proof marking/labelling of components

3.4 checking components for serviceability
3.5 replacing all lifed items (such as seals, bearings, gaskets)
3.6 replacing damaged/defective components
3.7 setting, aligning and adjusting replaced components
3.8 tightening fastenings to the required torque
3.9 making 'off-load' checks before starting up
3.10 replenishing oils and greases
3.11 safety system checks
3.12 functionally testing the completed system

4 Replace/refit a range of mechanical components, to include ten of the following:

4.1 shafts
4.2 couplings
4.3 gears
4.4 clutches
4.5 valves and seats
4.6 pistons
4.7 splined components
4.8 brakes
4.9 bearing and seals
4.10 fitting keys
4.11 springs diaphragms
4.12 cams and followers
4.13 chains & sprockets
4.14 pulleys and belts
4.15 levers and links
4.16 slides
4.17 rollers
4.18 wire ropes/cables
4.19 housings
4.20 actuating mechanisms
4.21 structural components
4.22 locking & retaining devices (such as circlips, pins, lift nuts)
4.23 other specific components

5 Maintain mechanical equipment which complies with one of the following:

5.1 organisational guidelines and codes of practice
5.2 equipment manufacturer's operation range
5.3 BS, ISO and/or BSEN standards

6 Complete the relevant paperwork, to include one from the following,

and pass it to the appropriate people:

6.1 job cards
6.2 permit to work/formal risk assessment and/or sign-on/off procedures
6.3 maintenance log or report
6.4 company-specific documentation

PROMPR23
Maintaining mechanical equipment

Developed by	Proskills
Version number	1
Date approved	June 2010
Indicative review date	April 2014
Validity	Current
Status	Original
Originating organisation	Semta
Original URN	Unit 6
Relevant occupations	Originators compositors and print preps; Printers; Screen printers; Printing machine minders and assistants; Bookbinders and print finishers; Graphic designers
Suite	Master Printer
Key words	Master Printer; Print Management; Print Production; Processes and Engineering Management