Overview

This standard identifies the competences you need to support colleagues in carrying out condition monitoring of engineering plant and equipment, in accordance with approved procedures.

You will be required to obtain the appropriate monitoring equipment to use, based on the type of plant or equipment being monitored and the conditions that you need to monitor. You will be expected to check that the monitoring equipment is in a suitable condition to use (such as undamaged, correctly calibrated, appropriate range), and to assist in setting up the equipment ready for use. You will then use this equipment to carry out diagnostic condition monitoring (fault diagnosis or prognosis) on a range of equipment such as mechanical, electrical, process controller, fluid power or integrated systems.

Your responsibilities will require you to comply with organisational policy and procedures for the condition monitoring activities undertaken, and to report any problems with the diagnostic equipment or monitoring activities that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will be expected to work to instructions, either alone or in conjunction with others, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will be sufficient to provide a sound basis for your work, and will enable you to adopt an informed approach to applying the appropriate condition monitoring techniques to engineering plant and equipment. You will have an understanding of the monitoring methods and procedures used, and their application, and will know about the various monitoring units and peripheral components, in adequate depth to provide a sound basis for carrying out the monitoring activities to the required standard.

You will understand the safety precautions required when carrying out the monitoring activities, especially those involved with moving machinery/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.
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. correctly set up and check-calibrate the equipment required for the monitoring being carried out
3. carry out the monitoring activities effectively with minimal disruption to normal activities
4. record and review the outcomes and take appropriate actions
Knowledge and understanding

You need to know and understand:

1. the specific health and safety precautions needed to be applied during the monitoring procedure, and their effects on others
2. the health and safety requirements of the area in which the monitoring activity is to take place, and the responsibility these requirements place on you
3. hazards associated with carrying out condition monitoring activities on engineering plant and equipment (such as electrical supplies, moving machinery, process controller interface, using damaged or badly maintained tools and equipment, not following laid-down procedures), and how they can be minimised
4. the importance of wearing protective clothing and other appropriate safety equipment (PPE) during the condition monitoring activities
5. the basic principles of condition monitoring, and how it helps prevent equipment failure
6. the different types of monitoring component or sensor (such as temperature, force, pressure, vibration, rotational, voltage, current), their fittings, and their application
7. the various monitoring systems and the methods that can be employed to make test measurements for the purposes of machinery protection or predictive maintenance
8. methods of attaching monitoring components to different parts of the plant, equipment or system
9. the need to check that monitoring instruments are fit for purpose, undamaged, and have a suitable monitoring range and value
10. the need to set up and operate condition monitoring equipment correctly
11. care and control procedures for condition monitoring equipment
12. the problems that can occur during the monitoring activity, and how they can be overcome
13. recording the results from conditioning monitoring, and the documentation to be used
14. control procedures for reporting the results from condition monitoring
15. the extent of your own authority and whom you should report to when you have a problem you cannot resolve
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Scope/range related to performance criteria

1. Carry out all of the following during the monitoring activities:
   1. plan the condition monitoring activities so as to minimise any disruption to normal working
   2. adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
   3. obtain the appropriate condition monitoring equipment for the intended purpose
   4. check that the monitoring equipment is within current calibration dates, before using
   5. set up the monitoring equipment in accordance with the appropriate procedures
   6. check that the monitoring equipment is functioning correctly
   7. carry out the monitoring activities, using appropriate techniques and procedures
   8. apply safe working practices and procedures at all times

2. Assist in using appropriate monitoring techniques, to set up machinery protection systems, or predictive maintenance system monitoring techniques, on two of the following types of equipment:
   1. engines (such as piston or turbine)
   2. rotating or reciprocating machinery (such as pumps, compressors)
   3. mechanical equipment (such as cyclic and rotational devices, gearboxes, drives and linkages)
   4. production machinery (such as machine tools, presses, transfer mechanisms)
   5. process equipment (such as furnaces, chemical treatment equipment)
   6. rotating electrical machinery (such as generators, motors)
   7. stationary electrical equipment (such as transformers, switchgear)
   8. stationary plant and equipment (such as air receivers, accumulators, tanks, piping)
   9. emergency standby or alarm/warning systems and equipment
   10. fluid power equipment (such as air receivers, pipework, valves, cylinders and actuators and pumps)
   11. instrumentation and control equipment (such as for
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- temperature, pressure, level, flow, weight, speed
- process control equipment (such as program controller, robots, input/output interfacing, wiring/cabling, monitoring sensors)
- electrical equipment (such as power supplies, switchgear and distribution panels, control systems)
- electronic equipment (such as control units, visual display or indicating devices)
- environmental systems (such as air conditioning, heating and ventilation, fume extraction)

3. Assist in using **two** of the following condition monitoring methods:
   1. off-line/portable monitoring
   2. protection monitoring
   3. sampled monitoring
   4. human sensory monitoring (sight, sound, touch, smell)
   5. continuous monitoring

4. Assist in using **two** of the following monitoring techniques:
   1. vibration analysis
   2. leak detection analysis
   3. radio telemetry analysis
   4. temperature analysis
   5. humidity analysis
   6. thickness analysis
   7. flow analysis
   8. pressure analysis
   9. oil analysis
   10. particle analysis
   11. voltage/current analysis
   12. corrosion detection
   13. crack detection analysis
   14. environmental pollutant analysis

5. Use monitoring systems in **one** of the following situations:
   1. equipment operating under the effects of weather, natural hazards, temperature or pressure
   2. equipment operating in environments with potential flammable or explosive conditions (such as dust, vapours, liquids or gases)
3. equipment working in wet, dirty, dusty or corrosive conditions
4. equipment operating in a benign or clean room environment

6. Record clear and accurate information, using one of the following, to all the relevant people:
   1. specific company documentation
   2. written or typed report
   3. verbal report
   4. predictive maintenance log or report
   5. electronic mail
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