Unit 18: Maintenance Engineering

Unit code K/615/1492
Unit level 4
Credit value 15

Introduction

Plant and equipment are one of the biggest assets for any business, costing huge sums of money to replace when things go wrong. Without regular maintenance business owners could see an increase in costly breakdowns, often incurring downtime and significant loss of earnings. Inspection and maintenance are therefore vital to detect and prevent any potential equipment issues or faults that would prevent operation at optimum efficiency. Good maintenance proves itself on a day-to-day basis.

This unit introduces students to the importance of equipment maintenance programmes, the benefits that well-maintained equipment brings to an organisation and the risk factors it faces if maintenance programmes and processes are not considered or implemented. Topics included in this unit are: statutory regulations, organisational safety requirements, maintenance strategies, safe working and maintenance techniques.

On successful completion of this unit students will be able to explain the importance of compliance with statutory regulations associated with asset maintenance, illustrate maintenance techniques adopted by the industry, work safely whilst performing maintenance tasks in an industrial environment and identify inspection and maintenance techniques.

Learning Outcomes

By the end of this unit students will be able to:

1. Analyse the impact of relevant statutory regulations and organisational safety requirements on the industrial workplace.
2. Differentiate between the merits and use of different types of maintenance strategies in an industrial workplace.
3. Illustrate competence in working safely by correctly identifying the hazards and risks associated with maintenance techniques.
4. Apply effective inspection and maintenance techniques relative to a particular specialisation e.g. mechanical or electrical.
Essential Content

LO1 Analyse the impact of relevant statutory regulations and organisational safety requirements on the industrial workplace

Statutory regulations:

Organisational safety requirements:
The responsibility of the employee with regard to organisational safety requirements such as the role of the HSE and the power of inspectors, right of inspection, improvement notices and prohibition notice

LO2 Differentiate between the merits and use of different types of maintenance strategies in an industrial workplace

Maintenance strategies:
Definition of, and need for, maintenance
Component failure, bathtub curve
Equipment design life and periodic maintenance (e.g. belt adjustment, lubrication etc.)
Reactive, preventive, predictive and reliability centred maintenance
Comparison of the presented maintenance programmes

LO3 Illustrate competence in working safely by correctly identifying the hazards and risks associated with maintenance techniques

Working safely:
Life-saving rules for employee safety, such as safety devices and guards, lock out, tag out, electrical work, arc flash, fall protection and permit required confined space working
Development and implementation of safe schemes of work
Lone working
Permit to work (PTW)
Emergency Procedures
Hazard identification and assessment of risk associated with identified hazard
Use of control measures (ERIC SP)
Production of a Risk Assessment & Method Statement for a maintenance procedure

LO4 **Apply effective inspection and maintenance techniques relative to a particular specialisation, such as electrical or mechanical**

*Maintenance techniques:*
Importance of isolation and making safe before undertaking maintenance
Adherence to PTW process and shift changeover procedures
In-service (live) preventative maintenance e.g. thermographic survey, partial discharge inspection
Compliance with manufacturer’s recommended inspection and maintenance procedures, using manufacturer’s data as case studies
Look, listen and feel philosophy. Visual inspections
Measurements: electrical and mechanical. Mechanical operations test
Functional tests e.g. exercise switching mechanisms
Recording data and maintenance records
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<th>Learning Outcomes and Assessment Criteria</th>
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<td><strong>Pass</strong></td>
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<tr>
<td><strong>LO1</strong> Analyse the impact of relevant statutory regulations and organisational safety requirements in the industrial workplace</td>
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<td><strong>P1</strong> Describe the key features of health and safety regulations in the workplace</td>
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<td><strong>P2</strong> Explain the role of the Health and Safety Executive in health and safety in the workplace</td>
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<td><strong>LO2</strong> Differentiate between the merits and use of different types of maintenance strategies in an industrial workplace</td>
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<td><strong>P3</strong> Describe the methods used to complete engineering maintenance in an industrial workplace</td>
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<td><strong>P4</strong> Discuss the advantages and disadvantages of different strategies to complete maintenance in an industrial workplace</td>
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<td><strong>LO3</strong> Illustrate competence in working safely by correctly identifying the hazards and risks associated with maintenance techniques</td>
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<td><strong>P5</strong> Describe methods used to identify risks and their associated hazards</td>
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<td><strong>P6</strong> Carry out a risk assessment on a typical maintenance technique</td>
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<td><strong>LO4</strong> Apply effective inspection and maintenance techniques relative to a particular specialisation such as mechanical or electrical</td>
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<td><strong>P6</strong> Apply effective inspection and maintenance techniques in an industrial or simulated environment, recording the appropriate sequence of procedures</td>
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Recommended Resources

Textbooks

Websites
http://www.soe.org.uk/ SOE Society of Operations Engineers
IplantE (General Reference)
http://www.imeche.org/ The Institution of Mechanical Engineers (General Reference)

Links
This unit links to the following related units:
Unit 30: Operations and Plant Management
Unit 4: Managing a Professional Engineering Project