

Model Assignment

Issued September 2008

OCR Level 2 Principal Learning in Engineering

Unit F554: Maintenance

Please note:

This OCR model assignment may be used to provide evidence for the unit above. Alternatively, centres may 'tailor' the assignment within permitted parameters (see 'Notes for Tutors'). It is the centre's responsibility to ensure that any adaptations made to this assignment allow learners to meet all the assessment objectives and provide sufficient opportunity for learners to demonstrate achievement across the full range of marks.

The scheme codes for these qualifications are:

OCR Level 2 Principal Learning in Engineering 500/2399/8

The QCA Accreditation Number for this unit is:

Unit F554: Maintenance L/501/18932

This OCR model assignment remains live for the life of these qualifications.

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Model Assignment: Learner Information

OCR Level 2 Principal Learning in Engineering

Unit F554: Maintenance

Model Assignment

Description of Model Assignment.

This unit is assessed using **two** separate assignments.

Assignment 1

OCR Performance Sport Ltd. is a specialist supplier of 'off road' cycles. The company have a number of outlets across the UK. These outlets provide both sales and maintenance facilities for the company's customers.

You are employed by the company to carry out routine maintenance and repair to the customer's cycles. The company recommends that an annual maintenance programme be carried out by its staff and in addition recommends that customers carry out a monthly maintenance program to ensure the cycle functions correctly.

A customer has arranged to deliver their cycle to your workshop for its annual maintenance. You are to carry out the maintenance of the cycle. You will follow the established maintenance procedures that are detailed in the manuals provided by the company.

In addition to your normal duties you will prepare a maintenance plan which will be used by customers when undertaking the monthly maintenance checks.

Assignment 2

The company is reviewing its maintenance procedures. You have been asked to take part in this review process.

You are to carry out a reliability study of an engineered component that is used in the production of the company's products. The study will use statistical methods to analyse failure trends.

Having carried out the reliability study, you will identify an example where a component or system failure can be attributed to poor maintenance. The impact and implications of poor maintenance procedures for both the user and manufacturer should be explained in a report to the directors of the company.

Read through all of the following tasks carefully, so that you know what you will need to do to complete the assignments.

Tasks

Assignment 1

Task: Maintenance procedures of an engineered product or system

Assessment Criteria 1.1, 1.2, 1.3, 1.4

Your task is to:

- carry out the annual maintenance on the cycle. You should:
 - use manuals, manufacturers' information and data to inform the correct procedure
 - undertake the routine maintenance operation and/or use diagnostic routines
 - use appropriate tools and equipment safely and effectively
- produce a maintenance plan which will be used by customers when undertaking the monthly maintenance checks. The plan should detail:
 - maintenance procedures
 - tools and equipment required
 - appropriate safety considerations
- the maintenance plan produced should be tested and modified as necessary.

You will produce a two-part report which contains:

- a) evidence of the routine maintenance of the cycle including reference to the tools, information and procedures used. This should contain photographic evidence along with supporting learner comments relating to each of the procedures undertaken, together with information about the tools and equipment used.
- b) a copy of the maintenance plan produced which should detail the maintenance procedures, tools and equipment required and information relating to appropriate safety considerations. Information relating to the testing and modification of the plan should be included.

Task: Implications of poor maintenance

Assignment 2

Assessment Criteria 2.1, 3.1, 3.2, 3.3

Your task is to:

- carry out a reliability study of an engineered component that is used in the production of the company's products. The product studied should be different to that maintained in assignment 1
- use statistical methods to analyse failure trends for the engineered component you identified. Show by means of calculation:
 - mean time to failure (MTTF)
 - mean time to repair (MTTR)
 - mean time between failure (MTBF)
- identify an example where a component or system failure can be attributed to poor maintenance.
- explain the impact and implications of poor maintenance procedures for both the user and manufacturer.

You will produce a two-part report which contains:

- a) an evaluation of the reliability of the identified component or system. The failure trends for the component should be analysed using statistical methods
- b) an explanation of the impact and implications of poor maintenance procedures for both the user and manufacturer. This should be linked to the identified example where a component or system failure can be attributed to poor maintenance procedures

Model Assignment: Tutor Information

OCR Level 2 Principal Learning in Engineering

Unit F554: Maintenance

Guidance for Centres

1 General

1.1 OCR model assignments are issued free to participating centres and are also available to download from our website: www.ocr.org.uk.

1.2 Centres may choose to:

- use OCR model assignments for formal summative assessment of learners
- tailor OCR model assignments for formal summative assessment of learners

It is intended that this model assignment can be used by centres without modification. However, in order to provide appropriate contextualisation, improve access or increase local relevance, centres may 'tailor' the model assignments within set parameters. Details of the scope of adaptation are provided in the 'Notes for Tutors' section of this document.

1.3 This assignment has been designed to meet the full assessment requirements of the unit. Learners will need to take part in a planned learning programme that covers the underpinning knowledge and skills of the unit.

2 Before carrying out the assignment

2.1 Learners should be provided with a copy of the *Learner Information* section of this assignment or the centre adapted model assignment.

2.2 Learners may carry out preparations prior to undertaking the tasks.

3 When completing the assignment

3.1 All assessment evidence must be produced under **controlled conditions** so that the overall level of permit control secures validity and reliability, provides good manageability for all involved and allows teachers to authenticate the work confidently. Further guidance on **controlled conditions** is provided within the OCR Principal Learning Handbook.

3.2 Learners should be allowed 30 guided learning hours (glh) to complete all of the tasks. The amount of time may vary depending on the nature of the tasks and the ability of individual learners. It is suggested that evidence is produced in several sessions.

3.3 Each learner must produce individual and authentic evidence for each task within the assignment.

3.4 Centre staff may give support and guidance to learners. This support and guidance should focus on checking that learners understand what is expected of them. It is not acceptable for presenters to provide model answers or to work through answers in detail.

- 3.5 Learners may use information from any relevant source to help them with producing evidence for the tasks.
- 3.6 Learners must be guided on the use of information from other sources to ensure that confidentiality is maintained at all times.

4 After completing the assignment

- 4.1 Learners' evidence is assessed by the centre's assessor against the qualification specification contained in the Principal Learning Handbook. When marking learners' work, centres **must** use the descriptors provided within the unit. For further information about assessment please refer to the section on Assessment and Moderation in the Principal Learning Handbook.
- 4.2 Assessors' decisions should be quality assured across the centre through internal moderation. For further information about internal moderation please refer to the section on Assessment and Moderation in the Principal Learning Handbook.

5 Presentation of work

- 5.1 Centres may wish to discourage learners from excessive use of plastic wallets for presentation of their evidence as this may hinder the assessment process. Instead centres may wish to encourage learners to present their work so that it is easily accessible, e.g. spiral bound, stapled booklet, CD-ROM..

6 Acceptable evidence

- 6.1 For guidance on generation and collection of evidence please refer to the section on Assessment and Moderation in the Principal Learning Handbook.

7 Plagiarism and unauthorised collaboration

- 7.1 Centres should have adequate procedures in place to ensure that plagiarism and unauthorised collaboration are identified and responded to.
- 7.2 When supervising tasks, teachers are expected to:
- offer learners advice about how best to approach such tasks
 - inform learners of the ramifications of unfair practice
 - exercise continuing supervision of work in order to monitor progress and to prevent plagiarism
 - ensure all copied materials is suitably acknowledged
 - ensure copied material is not given credit in the assessment process
- 7.3 As with all controlled assessments, the teacher/tutor presenter must be satisfied that the work submitted for assessment is the learner's own work.

Notes for Tutors

Introduction to the Tasks

The tasks have been designed to enable learners to demonstrate their knowledge and understanding of basic principles and techniques of engineering maintenance. Whilst working safely learners will experience carrying out maintenance and diagnostic procedures using manufacturers' information and data sheets.

The learner will also have opportunity to learn about the methods used to analyse failure trends and develop knowledge and understanding of the implications if products or equipment are not properly maintained.

Learners need to be given opportunity to consider:

- personal injury
- inconvenience
- user responsibilities
- financial impact
- legal issues
- damage to reputation
- damage to personnel
- damage to equipment
- damage to property
- loss of production through downtime

Learners will also need to understand the factors that contribute to the failure of mechanical and electrical systems and know their causes e.g.:

- maladjustment
- mal-operation
- run to failure
- stress fracture
- fatigue, wear
- embrittlement
- overloading
- seizure
- anodic and chemical corrosion
- lubrication failure
- fouling
- vibration
- poor implementation of the method statement

These guidance notes should be used in conjunction with the unit specification and Principal Learning Handbook.

Scope of permitted Model Assignment modification

The model assignment is self-contained in its present form. The set of tasks form a coherent whole addressing all the assessment criteria.

It is permissible to contextualise or carryout modification of this model assignment in order provide appropriate contextualisation, improve access or increase local relevance. However, centres must take great care when 'tailoring' tasks to ensure that modifications do not result in the over direction of learners, devalue the applied nature of the work or deny the learner the opportunity to generate evidence for all the assessment criteria at all levels of outcome.

No changes to the assessment criteria are allowed.

The model assignments can be changed in terms of the following:

- the products that are chosen for study
- the range of information/resources students have access to
- each specific task linked to a particular assessment criteria may be appropriately contextualised.

When completing this model assignment it may be possible to generate evidence for completing a task in a variety of formats. This list is not exhaustive and will depend on the approach taken to complete the task or model assignment. In some cases the task or model assignment will require a specific format for the outcome and this will be clearly marked in the table.

Depending on the approach taken to the model assignments it may also be possible to demonstrate additional PLTS coverage and some additional opportunities have been listed below.

Task activity	Nature of evidence generated	Potential Assessment Criteria coverage
<p>Assignment 1 Task Maintenance procedures of an engineered product or system</p>	<ul style="list-style-type: none"> • evidence of use of manuals, manufacturer's information and data to inform the correct procedure for the routine maintenance of an engineered product or system. • carry out routine maintenance operations and/or diagnostic routines on an engineered product or system. • use appropriate tools and equipment safely and effectively. • evidence of development of a maintenance procedure for an engineered product or system. Testing of the procedure, making any necessary modifications and re-testing. 	<p>Assessment Criteria</p> <ul style="list-style-type: none"> • 1.1, 1.2, 1.3, 1.4 <p>PLTS</p> <ul style="list-style-type: none"> • SM3 • SM4
<p>Assignment 2 Task Implications of poor maintenance</p>	<ul style="list-style-type: none"> • evidence of the carrying out of a reliability study of an engineered component that is used in the production of the company's products. (The product examined should be different to that examined in task 1) • the use of statistical methods to analyse failure trends for the engineered component. Showing by means of calculation: <ul style="list-style-type: none"> ○ mean time to failure (MTTF) ○ mean time to repair (MTTR) ○ mean time between failure (MTBF) <p>identification of an example where a component or system failure can be attributed to poor maintenance. The impact and implications of poor maintenance procedures for both the user and manufacturer should be explained.</p>	<p>Assessment Criteria</p> <ul style="list-style-type: none"> • 2.1 • 3.1, 3.2 , 3.3, 3.4 <p>PLTS</p> <ul style="list-style-type: none"> • IE2 • RL2 • RL5