

Unit 35: Familiarisation and Management of Land-based Vehicles

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| Unit code: | F/601/4252 |
| QCF Level 3: | BTEC National |
| Credit value: | 10 |
| Guided learning hours: | 60 |

● Aim and purpose

This unit aims to introduce learners to land-based vehicle management skills and knowledge and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

● Unit introduction

The need to understand and compare the broad range of specialist vehicles available has become more important as land-based businesses analyse their machinery needs and costs. Manufacturers have developed land-based vehicles (LBVs) that are complex in design yet reliable and effective in operation. Those employed in the maintenance, fault diagnosis, operation and repair of LBVs must have the knowledge and skills to undertake potentially costly and complex repair activities.

In this unit learners will develop the knowledge and skills required to operate land-based vehicles safely during service and repair tasks in on- and off-site situations. Health and safety issues related to carrying out service and repair activities will be stressed during the delivery of this unit.

The first part of the unit examines the characteristics and uses of commonly used LBVs. This is then developed into the legal aspects of owning and using these machines. Learners will undertake practical activities to gain operational experiences of LBVs.

Finally, managerial aspects of managing LBVs are examined, with particular reference to the costs involved in their ownership and upkeep. Learners will interpret specifications and costs of LBVs and operate safely them to allow service and repair tasks to be carried out.

● Learning outcomes

On completion of this unit a learner should:

- 1 Understand the specialist features and characteristics of commonly used land-based vehicles
- 2 Know the legal constraints governing the operation and use of land-based vehicles
- 3 Be able to operate land-based vehicles to allow service and repair tasks to be performed
- 4 Understand the managerial aspects of ownership of land-based vehicles.

Unit content

1 Understand the specialist features and characteristics of commonly used land-based vehicles

Specification: machine specifications; suitability for use

Land-based vehicles (LBVs): medium to high powered eg 2WD, 4WD, high visibility, articulated; track laying eg steel tracked, rubber tracked; materials handlers eg telescopic handlers, skid steer loaders, tractor mounted loaders, wheeled loading shovels; specialist eg all-terrain vehicles (ATVs), systems vehicles, tool carriers, high speed (HMTVs), compact LBVs

2 Know the legal constraints governing the operation and use of land-based vehicles

Using LBVs on the road: vehicle size; vehicle weight; speed; special requirements; Highway Code

Operator licensing: age of operators; licence requirements; licence limitations; training and certification

Health and safety: current, relevant codes of practice; training and re-training; roll-over protection; falling object protection; restraining systems

Ergonomics: driver comfort; manufacturers' requirements and obligations; controls; visibility

3 Be able to operate land-based vehicles to allow service and repair tasks to be performed

Preparation for work: instruments and controls; starting; stopping; instrumentation; operator checks; machine condition

Operation: driving in appropriate conditions; operation in confined spaces; post- operational tasks; health and safety; risk assessment

Attachments: commonly used implements/fittings; attachment; detachment

4 Understand the managerial aspects of ownership of land-based vehicles

Maintenance: interpretation of maintenance schedules; service schedules; timing

Costings: purchase options; maintenance; operational eg fuel, tyres; ownership costs; service costs; depreciation

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

| Assessment and grading criteria | | |
|---|--|---|
| To achieve a pass grade the evidence must show that the learner is able to: | To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to: | To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to: |
| P1 explain specialist features and characteristics of selected commonly-used land-based vehicles | M1 identify selection criteria for choosing a machine for a specific application | D1 justify appropriate machines for specific applications using technical data |
| P2 analyse machine specifications for selected land-based machines [IE] | | |
| P3 describe the legal constraints associated with the operation and use of given land-based vehicles | | |
| P4 identify safety features in the design of land-based vehicles | | |
| P5 operate given land-based vehicles in confined spaces to allow service and repair tasks to be performed [EP] | M3 justify control features to minimise hazards in the operation of land-based machinery in confined spaces to allow service and repair tasks to be performed | D2 critically evaluate the management, service and maintenance requirements of given similar land-based vehicles. |
| P6 undertake risk assessment appropriate to vehicle operation [SM] | | |
| P7 explain managerial aspects of land-based vehicle ownership | | |
| P8 discuss service and maintenance planning for selected land-based vehicles. | M4 compare the management costs and produce a maintenance plan for selected land-based vehicles. | |

PLTS: This summary references where applicable in the pass criteria, in the square brackets, the elements of the personal, learning and thinking skills. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

| | | | |
|------------|----------------------------|--------------------------|------------------------------|
| Key | IE – independent enquirers | RL – reflective learners | SM – self-managers |
| | CT – creative thinkers | TW – team workers | EP – effective participators |

Essential guidance for tutors

Delivery

Delivery of this unit will involve practical assessments, written assessment, visits to suitable collections and will link to industrial experience placements.

Tutors delivering this unit have opportunities to use as wide a range of techniques as possible. Lectures, discussions, seminar presentations, site visits, supervised land-based vehicle practicals, internet and/or library-based research and the use of personal and/or industrial experience would all be suitable. Delivery should stimulate, motivate, educate and enthuse learners.

Work placements should be monitored regularly in order to ensure the quality of the learning experience. It would be beneficial if learners and supervisors were made aware of the requirements of this unit before any work-related activities so that naturally occurring evidence can be collected at the time. For example, learners may have the opportunity to carry out land-based vehicle operation activities and they should be encouraged to ask for observation records and/or witness statements to be provided as evidence of this. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

Whichever delivery methods are used, it is essential that tutors stress the importance of sound environmental management and the need to manage the resource using approved methods.

Health and safety issues relating to working in repair workshops must be stressed and reinforced regularly, and risk assessments must be undertaken before practical activities.

Tutors should consider integrating the delivery, private study and assessment for this unit with other relevant units and assessment instruments learners are taking as part of their programme of study.

Learning outcomes 1, 2 and 4 are directly linked and are likely to be delivered through formal lectures, discussion, site visits, supervised practical sessions and independent learner research. Learners will be aware of the broad range of land-based vehicles and their uses. They should also develop understanding relating to the ownership and upkeep issues of these vehicles. Visiting expert speakers could add to the relevance of the subject. For example, representatives from an enforcement agency (HSE, police, etc) could talk about their experiences and give advice and guidance to develop learner awareness.

Learning outcome 3 develops the skills needed to operate land-based vehicles to facilitate maintenance and repair. Delivery techniques should be varied and can be linked to the delivery of learning outcomes 1, 2 and 4. It is expected that practical activities will form part of the delivery of this learning outcome. Visiting expert speakers could add to the relevance of the subject for learners. For example, land-based machinery technicians or workshop managers could talk about their work and the techniques they use.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment

Introduction and overview of unit, testing of previous knowledge.

Practical session – examination and comparison of a range of land-based vehicles.

Theory session – review of specialist features of a range of commonly used land-based vehicles.

Assignment 1: Maintenance and LBV Management Selection and Legal Operation (P1, P2, P3, P4, M1, M2, D1)

Tutor introduces assignment brief.

Theory session – review of technical data sheets and manufacturer's leaflets.

Theory session – Legislation, using LBVs on the road.

Theory session – operator licensing.

Theory and practical session – ergonomics.

Practical session – dangers in the workshop.

Theory – risk assessment.

Practical exercise – carry out a risk assessment.

Assignment 2: Safe Maintenance and LBV Management Operation (P5, P6, M3)

Tutor introduces assignment brief.

Practical exercise – instruments and controls, safe starting and stopping, operator checks.

Practical exercise – safely operate LBVs in appropriate conditions/confined space, hitching.

Assignment 3: Maintenance and LBV Management (P7, P8, M4, D2)

Tutor introduces assignment brief.

Theory – understanding maintenance schedules, intervals and timing.

Theory session – obtaining machinery, selection criteria, costings depreciation.

Practical driving assessment.

Assignment and self-study time.

Unit review.

Assessment

For P1, learners must explain the specialist features and characteristics of selected commonly used land-based vehicles. Tutors should identify the vehicles or agree them through discussion with learners. Where possible, to ensure fairness of assessment the size and complexity of the tasks should be the same for all learners. Evidence could take the form of a pictorial presentation with notes, or an annotated assignment. Alternatively, learners could be assessed verbally using appropriate visual aids within a workshop environment.

In P2 learners are required to analyse LBV specifications. They need to compare a range of machines and supporting specifications and manufacturers' leaflets. This could include looking at similar machines from different manufacturers, identifying similarities and differences and evaluating these.

P3 requires learners to describe the legal constraints associated with the operation and use of given land-based vehicles. Tutors should identify the vehicles or agree them through discussion with learners. Where possible, to ensure fairness of assessment the size and complexity of the tasks should be the same for all learners. Evidence could take the form of an annotated assignment. Alternatively, learners could be assessed verbally using appropriate visual aids within a workshop environment.

For P4, learners must identify safety features in the design of LBVs. This can be achieved by investigating a real machine and using manufacturers' leaflets and other information sources such as sales literature.

P5 requires learners to operate given land-based vehicles in confined spaces to allow service and repair tasks to be performed. They must perform pre-use checks, start and operate a range of land-based vehicles and perform post- operational checks before maintenance is carried out. Where possible, to ensure fairness of assessment the complexity of these should be the same for all learners. Appropriate attachments should be used and in all cases a risk assessment must have been performed.

P5 could be assessed directly by the tutor during practical activities. If this format is used then suitable evidence from guided activities would be detailed observation records completed by learners and the tutor. If assessed during a work placement, witness statements should be provided by a suitable representative and verified by the tutor.

P6 requires learners to carry out a risk assessment relevant to the operations being undertaken. This can be a real life situation and should be produced in a format agreed with the tutor. This could also be achieved in the workplace.

For P7, learners must explain the managerial aspects of the ownership of land-based vehicles. They need to interpret service schedules, machine specifications and requirements as well as establish ownership and operational costings. Evidence could be in the form of written reports or a presentation.

In P8 learners need to discuss service and maintenance planning for selected land-based vehicles as agreed with the tutor. Evidence is likely to be in the form of a written report or possibly a presentation to the group.

For M1, learners must identify machine specifications and suitability of given land-based machines. Tutors should identify the vehicles or agree them through discussion with learners. Where possible, to ensure fairness of assessment the size and complexity of the tasks should be the same for all learners. Learners should indicate whether the machine is suitable for the job it is being asked to perform. Evidence could be in the same format as for P1.

For M2, learners must justify legal constraints and given safety features incorporated into the design of land-based vehicles. Evidence could be in the same format as for P1 or P2.

M3 requires learners to justify control features to minimise hazards in the operation of land- based vehicles. This can be a development of P6. The control features should be applicable to the place of work- either work placement or college based. Evidence could take the form of a written report.

For M4, learners must compare the management costs for the selected land-based vehicles. The costs must include purchase options, maintenance, operational such as fuel, and depreciation. Tutors should identify the vehicles or agree them through discussion with learners. Where possible, to ensure fairness of assessment the size and complexity of the tasks should be the same for all learners. Evidence could be in the form of a project or report.

For D1, learners must justify appropriate machines for specific applications using technical data. Where possible, to ensure fairness of assessment the size and complexity of the tasks should be the same for all learners. It is expected that, as a minimum, learners will provide evidence covering two current land-based vehicle applications. Evidence could be in the format of tabulated data, notes from discussions and written reports.

D2 requires learners to critically evaluate the management, service and maintenance requirements of a given, similar land-based vehicles. Tutors should identify the vehicles or agree them through discussion with learners. Where possible, to ensure fairness of assessment the size and complexity of the tasks should be the same for all learners. Evidence could be a written assignment or generated through oral questioning by a tutor.

Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

| Criteria covered | Assignment title | Scenario | Assessment method |
|----------------------------|---|--|--|
| P1, P2, P3, P4, M1, M2, D1 | Maintenance Management, Selection and Legal Operation | You are the manager of a unit which needs to invest in new LBVs. Produce a report identifying and analysing the unique factors of a range of LBVs and the requirements for safe and legal operation. | Written evidence. |
| P5, P6, M3 | Safe Maintenance and LBV Management Operation | Carry out a risk assessment of and operate LBVs safely in a confined space including safe starting, stopping and parking. | Practical operation. Presentation of written risk assessment. |
| P7, P8, D2 | Maintenance and LBV Management | Produce a report reviewing the managerial and safe maintenance requirements of a range of LBVs. | Presentation of report on management and maintenance requirements. |

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit links with many units in this specification and has particular links with:

| Level 2 | Level 3 |
|--|---|
| Service and Repair of Clutches, Fluid Flywheels and/or Torque Convertors | Undertake and Review Work Related Experience in the Land-based Industries |
| Service and Repair Mechanical Transmissions on Land-based Equipment | Understanding Land-based Vehicle Chassis Systems |
| Service and Repair Braking Systems on Land-based Equipment | Understanding and Servicing Mechanical Power Transmission Systems |
| LEO4 Core Land-based Engineering Principles – Mechanical Principles | |
| LEO5 Core Land-based Engineering Principles – Tools and Equipment | |
| LEO8 Core Land-based Engineering Principles – Servicing and Maintenance | |

Essential resources

Learners will need access to an appropriate range of land-based vehicles and related equipment to support practical investigation and accurate evaluation of their ability and knowledge.

Manufacturers' training videos, operator manuals and periodicals will make a significant contribution to learner achievement.

Employer engagement and vocational contexts

It is essential that this unit is delivered in an applied and vocational context. Work-based experience will also be important. The unit will be enhanced by contact with employers. Centres are encouraged to develop links with local businesses, manufacturers and machinery dealers, who can support the breadth and application of this unit. Employers provide real work practical exercises and guest speakers and experts to support the learning experience. Employer engagement will ensure the use of technically up-to-date information and processes.

Indicative reading for learners

Textbooks

Hathaway L and Riney L – *Machinery Maintenance, 3rd Edition* (John Deere Publishing, 1991)
ISBN 0866911308

HSE – *Essentials of Health and Safety at Work* (HSE Books, 2006) ISBN 0717661792

Hunt D – *Farm Power and Machinery Management, 10th Edition* (Wiley-Blackwell, 2001) ISBN 0813817560

Landers A – *Resource Management: Farm Machinery* (Farming Press, 2002) ISBN 0852365403

Nix J – *Farm Management Pocketbook, 37th Edition* (The Andersons Centre, 2006) ISBN 0954120159

Soffe R – *The Agricultural Notebook, 20th Edition* (Wiley-Blackwell, 2003) ISBN 0632058293

Witney B – *Choosing and Using Farm Machines* (Land Technology, 1995) ISBN 0952559609

Journals

Crops

Farm Contractor

Farmers Guardian

Farmers Weekly

Landwards

Websites

www.bagma.com

British Agricultural and Garden Machinery Association

www.dardni.gov.uk

Department of Agriculture and Rural Development

www.defra.gov.uk

Department for Environment, Food and Rural Affairs

www.howstuffworks.com

HowStuffWorks

www.hse.gov.uk

Health and Safety Executive

www.iagre.org

Institution of Agricultural Engineers

www.lantra.co.uk

Lantra Sector Skills Council

www.sac.ac.uk

Scottish Agricultural College

Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

| Skill | When learners are ... |
|--------------------------------|---|
| Independent enquirers | identifying safety features in the design of land-based vehicles analysing machine specifications explaining specialist features and characteristics describing legal constraints associated with the operation and use of given land-based vehicles |
| Self-managers | undertaking risk assessment appropriate to vehicle operation operating given land-based vehicles |
| Effective participators | operating given land-based vehicles. |

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

| Skill | When learners are ... |
|--------------------------------|---|
| Reflective learners | analysing their own performance whilst participating in a presentation either individually or as a group or when giving a verbal report |
| Team workers | participating in exercises and/or practical tasks as a group |
| Self-managers | operating given land-based vehicles undertaking risk assessment appropriate to vehicle operation |
| Effective participators | participating in feedback to an individual or group presentation. |

● Functional Skills – Level 2

| Skill | When learners are ... |
|--|--|
| ICT – Use ICT systems | |
| Select, interact with and use ICT systems independently for a complex task to meet a variety of needs | designing a risk assessment |
| Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used | |
| Manage information storage to enable efficient retrieval | |
| Follow and understand the need for safety and security practices | |
| ICT – Find and select information | |
| Select and use a variety of sources of information independently for a complex task | carrying out research for their report on the unique features of LBVs |
| Access, search for, select and use ICT-based information and evaluate its fitness for purpose | |
| ICT – Develop, present and communicate information | |
| Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> • text and tables • images • numbers • records | producing a presentation on the managerial and safe maintenance requirements of LBVs |
| Bring together information to suit content and purpose | |
| Present information in ways that are fit for purpose and audience | |
| Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists | |
| Mathematics | |
| Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations | |
| Identify the situation or problem and the mathematical methods needed to tackle it | |
| Select and apply a range of skills to find solutions | calculating costs associated with LBVs calculating depreciation costs |

| Skill | When learners are ... |
|---|---|
| Use appropriate checking procedures and evaluate their effectiveness at each stage | |
| Draw conclusions and provide mathematical justifications | |
| English | |
| Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts | delivering a presentation on the managerial and safe maintenance requirements of LBVs |
| Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions | |
| Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively | producing a report on the unique features of LBVs. |