

Unit 74: Vehicle Fault Diagnosis

Unit code: H/601/1375

QCF level: 4

Credit value: 15

- **Aim**

This unit will develop learners' understanding of vehicle fault diagnosis and will give them the practical skills needed to diagnose vehicle faults and assess serviceability.

- **Unit abstract**

This unit will provide learners with an advanced understanding of vehicle fault diagnosis and will enhance their ability to diagnose faults and select appropriate equipment from given data in a number of disciplines. They will also learn about techniques of measurement when determining the performance of a vehicle system.

Learning outcome 1 will enable learners to increase their knowledge of fault diagnostic techniques and the interpretation of fault symptoms. Learning outcome 2 considers the principles of measurement and testing to determine the performance of vehicle systems. Learning outcome 3 is concerned with the evaluation and presentation of test results and the production of a fault location guide for a given vehicle.

- **Learning outcomes**

On successful completion of this unit a learner will:

- 1 Understand vehicle systems fault diagnosis criteria and techniques
- 2 Be able to use fault diagnostic techniques and equipment to determine the performance of vehicle systems
- 3 Be able to evaluate and present findings of a vehicle fault diagnostic test and produce a fault location guide.

Unit content

1 Understand vehicle systems fault diagnosis criteria and techniques

Diagnosis specifications: prioritised list of technical and non-technical requirements for carrying out fault diagnosis; symptoms; repair recommendations eg for mechanical, electrical, electronic or computer-based vehicle systems

Diagnostic techniques: eg symptom-fault-cause-location diagnostic sequence, historical knowledge of system faults, application of problem solving techniques

Factors: factors that contribute to diagnosis eg logical process, diagnostic and specialist equipment required, on-board computer-based and telemetry diagnostic systems, equipment costs, likely time saving, ability to upgrade, ease of use, manufacturers' back-up, workshop manuals, technical (phone/fax/email/internet, technical bulletins)

2 Be able to use fault diagnostic techniques and equipment to determine the performance of vehicle systems

Test equipment: equipment eg cylinder leakage tester, exhaust gas analyser, electronic meter, fuel pressure gauge, engine analyser, computer based and telemetric devices

Fault diagnosis: diagnosis on the agreed vehicle systems; diagnostic aids

Symptoms: fault symptoms eg loss of power, high fuel consumption, poor acceleration

Repair recommendations: type of repair eg adjustment, replacement, repair; justification of solution(s) eg based on cost, serviceability, reliability, safety

3 Be able to evaluate and present findings of a vehicle fault diagnostic test and produce a fault location guide

Technical report: word-processed technical report including nature and setting of the fault eg vehicle, symptoms, setting (road side or workshop), suspected system or systems, description of techniques and equipment used, test results, interpretation of results, conclusions and known data for that system, references used

Present findings: presentation eg to peers and/or supervisor/tutor; use of suitable visual aids eg sketches, graphs, charts, drawings, spreadsheets; use of presentation packages where appropriate

Fault location guide: prepared for a given vehicle system and including expected test readings, description of the system with an explanation of its use, theory of operation, instruments and special tools required, test instructions, step-by-step fault location guide to fault diagnostic procedure

Learning outcomes and assessment criteria

Learning outcomes On successful completion of this unit a learner will:	Assessment criteria for pass The learner can:
LO1 Understand vehicle systems fault diagnosis criteria and techniques	1.1 identify and justify a diagnosis specification for a mechanical or an electrical or an electronic vehicle system 1.2 use, explain and record the results of at least two suitable vehicle systems diagnostic techniques 1.3 compare the factors that contribute to quick and effective diagnosis of a given vehicle system
LO2 Be able to use fault diagnostic techniques and equipment to determine the performance of vehicle systems	2.1 select and use appropriate test equipment 2.2 carry out a systematic fault diagnosis 2.3 interpret faults from given symptoms and justify repair recommendations
LO3 Be able to evaluate and present findings of a vehicle fault diagnostic test and produce a fault location guide	3.1 produce a written report of the test results 3.2 interpret and justify the test results in terms of the known data for that system 3.3 create an effective fault location guide for a mechanical or an electrical or an electronic system.

Guidance

Links

This unit has links with *Unit 25: Engine and Vehicle Design and Performance*, *Unit 75: Vehicle Systems and Technology* and *Unit 79: Vehicle Electronics*.

Essential requirements

A number of suitable diagnostic aids are essential for the delivery of this unit including a compression tester, cylinder leakage tester, engine analyser and multimeters. Access to manufacturers' manuals and vehicle data is also required.

Employer engagement and vocational contexts

Delivery of this unit would benefit from guest speakers from industry and visits to motor industry test facilities.