
ENGINE REPAIRS
**Analyse engine and components for
mechanical failure and/or potential
failure**

level:	5
credit:	6
planned review date:	December 2008
sub-field:	Motor Industry
purpose:	This unit standard is for people in the automotive machining or automotive engineering industries. People credited with this unit standard are able to: investigate the symptoms of engine failure; examine engine components for signs of failure and/or potential failure; and analyse the cause of engine component failure.
entry information:	Recommended: Unit 11726, <i>Describe engine design factors and machining practices</i> , or demonstrate equivalent knowledge and skills.
accreditation option:	Evaluation of documentation and visit by NZQA and industry.
moderation option:	A centrally established and directed national moderation system has been set up by the NZ Motor Industry Training Organisation.
special notes:	<ol style="list-style-type: none">1 This unit standard refers to any type of two or four stroke petrol, diesel, or alternative fuelled engine installed in running condition.2 The following legislation must be consulted and followed where applicable: Health and Safety in Employment Act 1992.3 Reference to <i>suitable tools and equipment</i> means industry approved tools and equipment that are recognised within the industry as being the most suited to complete the task to a professional and competent manner with due regard to safe working practices.

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Elements and Performance Criteria

element 1

Investigate the symptoms of engine failure.

performance criteria

- 1.1 Customer's explanation of fault symptoms is recorded as an aid to diagnosis.
- 1.2 Safe working practices are observed throughout the task.
- Range: personal safety, safety of others, equipment and vehicle safety.
- 1.3 Suitable tools and equipment are selected and used to enable the symptoms of engine failure to be identified.
- 1.4 Visual inspection is carried out to identify fault symptoms in accordance with the manufacturer's specifications.
- Range: may include but is not limited to – visual damage, exhaust emissions, fuming, lack of power, rough running, oil leakage, overheating, excessive noise.
- 1.5 Running engine tests are carried out to isolate the problem in accordance with the manufacturer's specifications.
- Range: may include but is not limited to – compression test, cylinder leakage test, smoke check, noise check, cooling system check, oil pressure check, crankcase vacuum check, pressure check.
- 1.6 Results of an oil analysis check are evaluated to ascertain engine faults in accordance with the engine manufacturer's specifications.
- 1.7 A report on the feasibility of repair is given to the customer and/or supervisor.
- Range: may include but is not limited to – type of repair required, partial disassembly required to verify suspected faulty parts, cost estimate, repair compared with replacement cost justification.

element 2

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Examine engine components for signs of failure and/or potential failure.

performance criteria

2.1 Safe working practices are observed throughout the task.

Range: personal safety, safety of others, equipment and vehicle safety.

2.2 Suitable tools and equipment are selected and used to enable the engine components to be examined.

2.3 Technical information on the engine is consulted to ensure that the inspection and measurements carried out are according to the engine and/or the vehicle manufacturer's specifications.

2.4 Engine is dismantled to enable an examination of components to be carried out according to the vehicle and/or the engine manufacturer's specifications.

2.5 Components are inspected for signs of failure and/or potential failure according to the symptoms investigated.

Range: may include but is not limited to – visual inspection, cleaning, precision measurement, comparison against new component, crack test, hardness test.

element 3

Analyse the cause of engine component failure.

performance criteria

3.1 Safe working practices are observed throughout the task.

Range: personal safety, safety of others, equipment and vehicle safety.

3.2 Suitable tools and equipment are selected and used to enable the cause of component failure to be analysed.

3.3 Factors causing component failure are determined according to the vehicle or the engine manufacturers' fault diagnostic charts.

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Range: may include but is not limited to – overheating (lack of coolant, lack of air flow, abnormally high engine and oil operating temperature), under-cooling, incorrectly specified coolant, incorrectly specified oil, lack of oil, excessive oil level, oil contamination, incorrect oil pressure, abnormal combustion (detonation, pre-ignition, run-on), combustion gas leakage, incorrect ignition timing, incorrect valve timing, incorrect component clearances and fit, misalignment, fatigue, corrosion, fuel wash, over-revving, wear (abrasive, scuffing, hammering, corrosion, erosion, cavitation, electrolysis), seal failure, incorrect crankcase ventilation, unbalanced components, distortion (mechanical and thermal), faulty air filtration, faulty assembly procedure and practice, incorrect, damaged, and/or defective parts fitted, general wear and tear, general abuse and lack of service.

3.4 The reason for component failure is identified and verified.

Range: may include but is not limited to – logical diagnosis, confirmed by appearance, measurement.

3.5 An analysis on engine component failure is recorded and reported to the supervisor and/or customer.

Comments on this unit standard

Please contact the NZ Motor Industry Training Organisation jlane@mito.org.nz if you wish to suggest changes to the content of this unit standard.

Please Note

Providers must be accredited by the Qualifications Authority or a delegated inter-institutional body before they can register credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be accredited by the Qualifications Authority before they can register credits from assessment against unit standards.

Accredited providers and Industry Training Organisations assessing against unit standards must engage with the moderation system that applies to those standards.

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Accreditation requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for providers wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

This unit standard is covered by AMAP 0014 which can be accessed at <http://www.nzqa.govt.nz/site/framework/search.html>.