
VEHICLE BODYWORK
**Demonstrate knowledge of vehicle body
and structural design principles**

level:	5
credit:	6
final date for comment:	December 2008
expiry date:	December 2009
sub-field:	Motor Industry
purpose:	People credited with this unit standard are able to demonstrate knowledge of: vehicle body design concepts; factors influencing body and structural design; and manufacturer's testing requirements, regulatory environment, and marketability factors in the design of vehicle bodies.
entry information:	Open.
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 The following regulation and rules must be consulted and followed where applicable: Transport (Vehicle Standards) Regulations 1990; Land Transport Rules, Land Transport New Zealand. These rules are available online at http://www.landtransport.govt.nz.

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- 2 Further information on overseas requirements influencing body and structural design can be found at these website addresses:
International Organisation for Standardization, Switzerland, <http://www.iso.org>;
Federal Motor Vehicle Safety Standards and Regulations, U.S. Department of Transportation, www.nhtsa.dot.gov;
National Institute of Standards and Technology, http://www.nist.gov/public_affairs/automotive.htm;
United Nations Economic Commission for Europe, Switzerland, www.unece.org/trans;
Australian Design Rules, Department of Transport and Regional Services, Australia, http://www.dotars.gov.au/transreg/str_adrindx.htm;
Japan Industrial Standards, Japanese Standards Association, Tokyo, www.jsa.or.jp;
Japan Automobile Standards Internationalization Center, <http://www.jasic.org>.

- 3 Other industry manufacturing organisations that may assist research into vehicle body and structural design:
Alliance of Automobile Manufacturers; American International Auto Dealers Association; Association of International Automobile Manufacturers; National Automotive Dealers Association; Society of Automotive Analysts; Society of Automotive Engineers; United Auto Workers; United States Council for Automotive Research (USCAR); Women Motorists; International Motor Vehicle Program at MIT; Japan Automotive Manufacturers Association (JAMA); Automotive Industry Action Group; GERPISA Ward's Communications; International Car Distribution Program Home Page; Automotive Research Center.

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- 4 Vehicle manufacturers that may assist research into vehicle body and structural design:
United States – Chrysler, General Motors, Ford Motor Company, Freightliner;
Japan – Honda, Isuzu, Mazda, Mitsubishi, Nissan, Toyota;
Europe – BMW, Daimler-Benz, Fiat, Volkswagen, Audi, Volvo, Saab, Peugeot, Opel, Ferrari, Porsche, Lancia, Jaguar, Vauxhall, Lotus, Scania;
Korea – Hyundai, Kia, Daewoo, SsangYong Motor Company.

Elements and Performance Criteria

element 1

Demonstrate knowledge of vehicle body design concepts.

performance criteria

- 1.1 Principles of design are explained in the context of vehicle bodies.
- Range: includes but is not limited to – balance, contrast, economy, emphasis, proportion, unity, visual importance, usability, performance.
- 1.2 Design considerations are explained in the context of the vehicle body applications.
- Range: includes but is not limited to – cost, appearance, appeal, marketability, use and/or purpose, styling, manufacturability, economy, environmental, trade-offs, future trends.

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1.3 Vehicle body design concepts are explained according to the vehicle manufacturers' specifications.

Range: includes but is not limited to – constraints; functionality; aesthetic appeal and integrity; safety; mass weight; materials – steels, aluminium, composites, glass; body-in-white structural considerations; vehicle crashworthiness; ergonomics, economy.

element 2

Demonstrate knowledge of factors influencing body and structural design.

performance criteria

2.1 Materials used in the construction of vehicle bodies and structures are described in terms of their uses and performance.

Range: may include but is not limited to – use of natural resources; mechanical properties; deformation processing and fracture; effects of corrosion on materials performance; high strength; light weight; use of composites, steels, and aluminium; impact standards; systems integration; component replacement supplies; recycling ability.

2.2 Vehicle body design constrictions are explained in terms of their influence on material selection and overall design.

Range: includes but is not limited to – vehicle mass weight, aerodynamics, materials and their availability, mechanical and dimensional measurements, manufacturing processes, legislation and standards, passenger safety, customer demands and/or competition, features, vehicle intended purpose, acoustics, fuel economy, propulsion means, road safety, manufacturing and assembly cost.

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element 3

Demonstrate knowledge of manufacturer's testing requirements, regulatory environment, and marketability factors in the design of vehicle bodies.

performance criteria

- 3.1 Analysis identifies vehicle manufacturer's testing requirements in the design of vehicle bodies consistent with New Zealand legislation and overseas requirements.
- Range: includes but is not limited to – materials and component testing, structural design tests, stress and vibration analysis, crash energy management, corrosion tests, occupant protection and injury biomechanics, acoustics, wind tunnel tests, water and dust ingress tests, road worthiness.
- 3.2 Description identifies the purpose of overseas standard setting bodies relating to vehicle body and structural manufacture.
- Range: may include but is not limited to – Federal Motor Vehicle Safety Standards and Regulations (FMVSS), United Nations Economic Commission for Europe Regulations (UN/ECE), International Organization for Standardization (ISO), Australian Design Rules, (ADR), Japan Industrial Standards (JIS), Japan Automobile Standards Internationalization Center (JASIC).
- 3.3 New Zealand vehicle body and structural safety regulations are defined according to Land Transport New Zealand (Land Transport New Zealand) rules.
- Range: includes but is not limited to – repairs, frontal impact, door retention, interior impact, steering systems, seat and seat anchorages, external projections, head restraints, rear view mirrors, glazing, replacement parts, airbags, seatbelts and seatbelt anchorages, vehicle dimensions and mass.

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3.4 The analysis identifies the marketability factors in the design of vehicle bodies consistent with the manufacturers' promotional material.

Range: includes but is not limited to – financial, replacement components, component strength and durability, safety features, weight reduction, occupant protection, aerodynamics, impact and scratch resistant, crash energy absorbing features, styling and packaging, visibility, comfort, exterior and interior colour coordination, noise level, aesthetic appeal, ergonomic layout.

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.

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>.