

Title	Demonstrate knowledge of heavy combination vehicle dynamics and handling for safe driving		
Level	3	Credits	4

Purpose	People credited with this unit standard are able to describe: heavy combination vehicle dynamics; the effects of loads on heavy combination vehicle dynamics and handling; and safe practices for driving heavy combination vehicles. They are also able to demonstrate knowledge of heavy combination vehicle stability and handling characteristics.
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Classification	Commercial Road Transport > Commercial Road Transport Skills
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Available grade	Achieved
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Guidance Information

- Legislation, regulations, references and/or industry standards relevant to this unit standard includes but are not limited to the:
 - Health and Safety at Work Act 2015;
 - Land Transport Act 1998;
 - Land Transport (Road User) Rule 2004;
 - Land Transport Rule: Vehicle Dimensions and Mass 2016 (VDAM);
 - Land Transport Rule: Heavy Vehicle Brakes 2006;
 - Land Transport Rule: Heavy Vehicles 2004;
 - MITO. (2021). *The Truck Book - Professional Skills for Driving Trucks*. Available from <https://www.mito.org.nz/> and public libraries.

Any new, amended or replacement Acts, regulations, standards, codes of practice, guidelines, or authority requirements or conditions affecting this unit standard will take precedence for assessment purposes, pending review of this unit standard.

- Definitions

Handling characteristics refer to how a vehicle behaves as a result of its design and the dynamics present at the time.

Heavy combination vehicle dynamics refer to the motion of the vehicle, and the interaction of the various physical forces that affect that motion.

SRT refers to the static roll threshold which is the measure of the likelihood of the vehicle rolling over sideways. Vehicles with a low SRT are more likely to roll over when going around sharp bends and in sudden emergency manoeuvres.

The system of vehicle control refers to placing the vehicle in the correct place on the road, at the right speed and in the right gear in all driving situations but particularly when approaching and negotiating hazards.

Truck:trailer mass ratio as defined by VDAM, refers to the maximum mass on the axles of a heavy trailer, which must not be more than fifty percent higher than the mass of the vehicle which tows it.

Workplace procedures refer to organisation policies and procedures that are documented in memo, electronic, or manual format and available in the workplace. They may include but are not limited to – standard operating procedures, site specific procedures, site safety procedures, equipment operating procedures, quality assurance procedures, product quality specifications, manufacturer’s requirements, references, approved codes of practice, housekeeping standards, environmental considerations, on-site briefings, supervisor’s instructions, and procedures to comply with legislative and local body requirements relevant to the commercial road transport sector.

3 Assessment information

Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable service information, workplace procedures and legislative requirements.

Outcomes and performance criteria

Outcome 1

Describe heavy combination vehicle dynamics.

Performance criteria

- 1.1 The effects of speed on vehicle stability are identified.
- 1.2 The effect of vehicle weight on acceleration, deceleration, and braking are described.
- 1.3 The relationship between vehicle speed, weight and kinetic energy are described.

Range includes – effects on braking, cornering; the consequences of an impact.
- 1.4 The position of a vehicle centre of gravity and the effect it has on vehicle handling is described.
- 1.5 How friction can assist vehicle control is described.

Range includes – at least two friction examples.
- 1.6 The effects of centrifugal force on vehicle handling are described.

Range vehicle weight, speed, centre of gravity.

Outcome 2

Demonstrate knowledge of heavy combination vehicle stability and handling characteristics.

Performance criteria

- 2.1 The number of pivot points, types of trailer connection and stability rating of vehicles are identified.
- Range rigid truck and trailer, prime mover and semi-trailer, B-Train.
- 2.2 Truck:trailer mass ratio is described.
- Range rigid vehicle towing a single vehicle; rigid vehicle towing two vehicles.
- 2.3 The effects of vehicle wheelbase and the position and number of trailer hitch points are described.
- Range swept path (low and high speed), trailer yaw, steering amplification.
- 2.4 The influences of road camber, road surface, and lateral wind on vehicle handling are described.

Outcome 3

Describe the effects of loads on heavy combination vehicle dynamics and handling.

Performance criteria

- 3.1 The practical application of SRT is described.
- 3.2 The effects of load placement on vehicle dynamics and handling are described.
- 3.3 Techniques used to minimise the height of the centre of gravity are described.
- 3.4 Managing the effects of live loads on vehicle stability are described.
- 3.5 Techniques used to minimise load shift are described.

Outcome 4

Describe safe practices for driving heavy combination vehicles.

Performance criteria

- 4.1 Techniques for reducing the likelihood of loss of control situations are described.
- Range 4-second rule, 12-second rule, vehicle inspections (including on-road checks), the system of vehicle control.
- 4.2 Safe cornering techniques are described.
- Range cornering line, observing safe cornering speed.
- 4.3 Techniques for descending steep grades are described.

Planned review date	31 December 2027
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	12 February 2001	31 December 2016
Review	2	22 March 2005	31 December 2016
Review	3	22 October 2010	31 December 2016
Review	4	16 April 2015	31 December 2017
Review	5	16 June 2016	31 December 2020
Review	6	28 March 2019	31 December 2025
Review	7	29 June 2023	N/A

Consent and Moderation Requirements (CMR) reference	0014
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.