4 Structure

For welded components refer to **section 12-1 Welding**

Page amended **1 August 2014** (see **amendment details**).

4-1 Chassis frame

Certifier categories: **HVEC** | **HMCD** | **HVEK** | **HMKD**

Reasons for rejection

1. A structural member has been so affected by corrosion or weakening of its structure, apparent to visual inspection, that the vehicle is unsafe to operate.

2. The vehicle's frontal impact performance has been reduced below a safe tolerance of when manufactured by:

    a) corrosion, or

    b) modification, or

    c) structural damage, or

    d) repair, or

    e) addition or removal of equipment.

3. The repair to a chassis rail has not returned the rail to within a safe tolerance of when manufactured or modified.

4. The repair method used does not take into account:

    a) manufacturer's recommendations and alternative methods, or

    b) material specifications, or

    c) the compatibility of the intended repair process and material specifications.

5. A fabricated section of the chassis rail or components has:

    a) cracks, or

    b) notches.

6. An attachment has been fastened to the flanges of the chassis in a region of high stress against the manufacturer's practice without due consideration for the consequences.

7. A sliding axle set, a sliding chassis or an outrigger fitted to a vehicle does not have endstops or locking devices at the end of the slideway to prevent the separation of the sliding parts if the primary locking device fails.

8. An equipment locking device cannot be visually identified or verified.

9. A reinforcement is not securely attached to the chassis rail.

10. A chassis rail cut out located behind the rearmost front suspension mounting point does not have suitable reinforcement.

11. A chassis rail that has been straightened shows signs of:

a) buckling, or

b) indentation, or

c) cracking, or

d) elongation of holes, or

e) not being returned to its original profile.

12. The torsional stiffness of additional structural crossmembers is not similar to the original manufacturer's crossmembers.

13. The vertical and horizontal load carrying capacity of additional structural crossmembers is less than that of an original crossmember used for the same application.

14. A hole has been made by means other than by drilling, without due regard for the consequences.

15. A hole has been drilled in a highly stressed region of a chassis rail without due regard for the consequences in:

a) the flanges of the chassis rail or crossmember against the practice of the manufacturer

b) being closer to the upper or lower flanges or closer to vertical bends of the chassis rails than is the manufacturer's practice.

16. Bolts used for a structural purpose are not of an appropriate grade for the application.

17. A bolt used to secure suspension hangers and brackets to the chassis rails is not of an appropriate grade for the application.

18. A bolt used for a structural purpose has not been fitted with suitable washers or doubling plates.

19. The design of a new structure, modification or repair has been undertaken without due regard for appropriate load conditions and appropriate stress limits that should apply to satisfy both legal requirements and safe operating conditions.

20. Specifically a hoist, crane, logging bolster, tipping body or other special equipment that may result in increased stress to a localised area of the chassis or a significant redistribution of the load over the chassis has not had its chassis rating confirmed or had a new chassis rating reflecting the modifications made.

21. A chassis has been modified without taking into account:

a) manufacturer's specifications, or

b) AS 3990 *Mechanical Equipment Steelwork*, or

c) BS7603 *Code of Practice for Fatigue Design and Assessment of Steel Structures*, or

d) BS5400, or

e) That stresses are not higher when the vehicle is loaded to its new GVM, than those on the chassis of the unmodified vehicle loaded to its current GVM.

22. A heritage vehicle, over 40 years old and no longer in commercial service, has not had its corroded or fatigue damaged chassis reinstated to within safe tolerance of original manufacture and has not a had a new chassis rating

issued and a new GVM and certificate of loading obtained to reflect its current condition (see **Technical bulletin 3: Heavy vehicle chassis ratings: modification thresholds to allow a heavy vehicle's GVM to be altered (and its chassis rating to be changed**).

23. A vehicle that has been damaged by immersion in water to the level of the chassis has not had its chassis inspected for corrosion and, where required, repaired to within safe tolerance of original manufacture or most recent certification, and certified appropriately (see **Technical bulletin 1: Heavy vehicle repair thresholds**).

24. A vehicle that has been damaged by immersion in water to the level of the chassis has not had its fitted safety systems both mechanical and electrical/electronic, inspected and, where required, repaired to within safe tolerance of original manufacture or most recent certification, and certified appropriately (see **Technical bulletin 1: Heavy vehicle repair thresholds**).

25. A vehicle that has been damaged by fire has not had the structural components of its chassis or body inspected to ensure that heat has not reduced its structural strength or damaged fitted safety systems and they have not been reinstated to within safe tolerance of original manufacture or most recent certification and certified appropriately (see **Technical bulletin 1: Heavy vehicle repair thresholds**).

26. A vehicle that has been damaged in a crash has not had the structural components of its chassis or body inspected to ensure that damage has not occurred to structural or fitted safety systems, and they have not been reinstated to within safe tolerance of original manufacture or most recent certification and certified appropriately (see **Technical bulletin 1: Heavy vehicle repair thresholds**).

27. A modification to an axle, the steering or the suspension that may affect the brakes has not been referred to a HV certifier with the brakes category (HVEK).

28. The brake system of an air braked heavy vehicle does not have priority of the supply of air from the air compressor.

29. An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes without protecting the brake circuit.

30. An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the external diameter of the supply hose or pipe is larger than 8mm.

31. An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the device operates when the vehicle is moving.

32. An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the vehicle manufacturer does not allow it.

33. A vehicle that is modified by fitting an additional axle, removing an axle, replacing an axle with one that is not of the same make and model, or replacing the brake of an axle with one that is not of the same make and model has not been referred to a HV certifier with the brakes category (HVEK).

34. A powered vehicle with an hydraulic service brake has been fitted with an additional rear axle that does not have the same type of braking system as the original axle or an air operated disc brake as a service brake (HVEK).

35. A vehicle has been modified in such a way that the braking or braking system may have been affected and it has not been referred to a certifier with the Brakes category unless the modification is covered in the vehicle's body builders manual and the manufacturer has supplied written evidence that the vehicle remains within its original brake certification (refer to **Technical Bulletin 7**).

36. A vehicle, whether modified or not, has had its vehicle identification number (VIN) removed modified or altered without specific approval by the Transport Agency (see **Technical bulletin 19: Rebirthing**).

Note 1

Major reworking of the design of the vehicle relates to subsequent major modification of the standard vehicle as produced and tested by the vehicle manufacturer and includes:

a) fitting of different types of engines and the relocation of an engine and/or transmission

b) addition or removal of axles

c) alteration of wheelbase by:

i. moving axles on chassis rails

ii. extending or shortening the chassis

iii. replacement of the original chassis rails by a structure of different form

d) addition of heavy duty equipment for special purpose operations, for example hydraulic hoists which may place extra

stress on localised areas of the chassis and/or other equipment

e) conversion to left-hand drive dual steering (in special purpose vehicles only).

Note 3

When extending a chassis, it is recommended that the axles be slid rearward and the rear of the chassis be extended, unless the manufacturer specifies otherwise.

Note 4

When shortening a chassis, it is recommended that the axles are slid forward and the rear of the chassis is cut off, unless the manufacturer specifies otherwise.

Note 5

Change of engine or transmission certification as described is only necessary when there is a substantial change in characteristics, for example a significant increase in weight, power or torque, or where powerpack is being replaced to meet emissions requirements at entry, in such cases the repower must:

a) meet the applicable emissions standard

b) meet the specification of the powerpack manufacturer or be an approved alternative of the vehicle manufacturer

c) include alterations to the transmission, final drive or other conditions specified by the manufacturer, and

d) all changes to be noted in the certification.

Note 6

As a guide when altering a heavy vehicle's GVM, use the following:

a) an HV certifier recommends and justifies the rating against all of the below criteria. Use as a guide for maximum limits, percentage (over GVM) increases of:

i. twin steer – add 10% to manufacturer's GVM

ii. lazy axle using front axle plus front axle springs or equivalent – add 10% to manufacturer's GVM

iii. lazy axle and tag axle using rear axle plus rear axle springs or equivalent and single tyres – add 20% to manufacturer's GVM

iv. lazy axle and tag axle using rear axle plus rear-axle springs or equivalent or extra-drive axle and dual tyres – add 40% to manufacturer's GVM

v. trailing axle fitted behind tandem axles (designated as a tri-axle group) add 30% to manufacturer's GVM of the tandem-drive vehicle

b) the increases do not amount to 25% or greater increase to the GVM.

Note 7

An HV certifier with the chassis (HVEC) category may set or alter chassis ratings for vehicles of the following classes:

MD3, MD4, ME, NB, NC, TC or TD built or modified in NZ.

The determination of a chassis rating must be supported by the design of a new vehicle or the modifications to an existing vehicle and be recoded on a **Notification of chassis rating for heavy vehicles** form. See **Technical bulletin 3** for additional information on an HV certifier's responsibility when altering a chassis rating.

Note 8

While the bin of a bin lifter truck does not require load anchorages to NZS 5444, the lifting mechanism, if it imposes point loads on the chassis will require chassis certification.

Summary of legislation

Applicable legislation

- **Land Transport Rule: Frontal Impact 2001**
- **Land Transport Rule: Heavy Vehicles 2004**
- **Land Transport Rule: Vehicle Repair 1998**
- **Land Transport Rule: Vehicle Standards Compliance 2002**

Applicable references

- Ladder frame chassis design and modification IRL/LTSA
- AS/NZS 2980:2018: Qualification of welders for fusion welding of steels – Additional requirements for Australia and New Zealand
- AS/NZS ISO9606.1: 2017 Qualification testing of welders – Fusion Welding
- **Technical bulletin 10: Welding in the transport industry**

Frontal Impact Rule

General Safety Requirements (GSRs) (section 2.2)

1. The performance of a motor vehicle in relation to protecting occupants in a frontal impact collision must not be reduced below a safe tolerance of its state when manufactured or modified by any factors including corrosion, structural damage, material degradation, inadequate repair, the fitting of additional equipment or the removal of equipment.

2. In assessing whether the GSR's have been complied with an HVS certifier may take into account:

a) the function of the additional equipment fitted to the motor vehicle after manufacture and the measures taken to minimise the risk of injury from the equipment

b) evidence that the motor vehicle is within the manufacturer's operating limits

c) evidence that the motor vehicle has been damaged by fire or immersion in water.

Modification and repair (section 3.1)

3. A modification to a motor vehicle that affects its frontal impact performance:

a) must not prevent the vehicle from complying with this rule, and

b) must be certified as specified in **Land Transport Rule: Vehicle Standards Compliance 2002**

4. A repair to a component or a group of components that affects a motor vehicle's frontal impact performance must comply with the **Land Transport Rule: Vehicle Repair 1998** and must not prevent the vehicle from complying with this rule.

Vehicle Repair 1998 Rule (section 2.1)

5. A repair to a vehicle, its structure, systems, components or equipment, must restore the damaged or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle, structure, system, component or equipment when manufactured.

6. If the vehicle has been certified as a modified vehicle, the repair must restore the vehicle, structure, system, component or equipment so that it is within safe tolerance of its state when certified as a modified vehicle.

Repair methods (section 2.2)

7. In repairing a vehicle to comply with requirements 6 and 7 a repairer must use a suitable repair method that takes into account the following:

a) the date of manufacture of the vehicle

b) the class, make and other relevant characteristics of the vehicle

c) the approved vehicle standards with which the vehicle is required to comply

d) the existence of relevant manufacturer's recommendations and alternative methods

e) the material specifications used for construction of the vehicle, structure, systems and components or equipment

f) the compatibility of the intended repair process with materials specifications.

New and used replacement systems, components and equipment

8. A repairer must use systems, components and equipment that will enable a vehicle to comply with section 2.1. The systems, components and equipment used to enable the vehicle to comply with section 2.1 may be new or used. Replacement systems, components and equipment used in a repair must comply with an approved vehicle standard applicable, as specified by the relevant rule or regulation, to the year of manufacture of the vehicle system, component or equipment

Heavy Vehicle Rule

General safety requirements (section 3.1)

9. The chassis and body of a vehicle must be of adequate strength for all conditions of loading and operation for which the vehicle was constructed or modified.

10. The body of a vehicle of a monocoque construction must be of adequate strength for all conditions of loading and operation for which the vehicle was constructed or modified.

11. A load bearing structure other than a chassis, a body fitted to a chassis or a monocoque body must be ofadequate strength for all conditions of loading and operation for which the vehicle was constructed or modified.

Vehicle body attachment (section 3.2)

12. The means by which a body is attached to the chassis of a vehicle manufactured on or after 1 October 2005, must be designed and constructed so that the stresses on the attachment, when calculated in accordance with requirement 14 below do not exceed 60% of the yield stress of the material from which the attachment is made.

13. The stresses in requirement 13 above must be calculated under each of the following loading conditions, when the forces are applied at the approximate centre of gravity of the load,

a) a longitudinally-acting force, equivalent to twice the combined weight of the payload capacity and the body mass,

b) a downward-acting force, equivalent to twice the combined weight of the payload capacity and the body mass,

c) a transversely-acting force, equivalent to the combined weight of the payload capacity and the body mass,

d) an upward-acting force, equivalent to the combined weight of the payload capacity and the body mass.

Equipment locking devices (section 3.9)

14. A sliding axle set or sliding chassis, or an outrigger fitted to a vehicle, must have an effective locking device so that other road users are not endangered by the inadvertent extension or separation of that equipment.

15. Locking of the equipment must be readily verifiable by visual inspection.

16. If the outriggers of a vehicle of class NB or class NC fitted with a swivelling crane can be operated from a position from which the locking device is not readily visible, the vehicle must be equipped with an audible or a visual alarm that can be heard or seen from the driver’s seating position, by the date of issue of the first certificate of fitness issued on or after 1 March 2006.

17. The alarm signal must operate when the outrigger is not fully retracted and locked.

18. If the locking device incorporates a system that provides energy for its operation, the device must remain fully engaged in the locked position, or the locking action must be initiated immediately, if the energising system fails.

19. A sliding axle set or a sliding chassis must have endstops at the end of the slideway to prevent the separation of the sliding parts if the primary locking device fails.

Modification (section 6.1)

20. Section 6 applies to all modifications carried out after 1 April 2005.

21. A modification to a vehicle that may affect the safety of the vehicle's components or the overall safety of the vehicle must not prevent the vehicle from complying with this rule.

22. If practicable, a modification to a vehicle must be carried out in accordance with instructions from the vehicle manufacturer and the manufacturer of any equipment being fitted to the vehicle.

23. A modification to a vehicle must be carried out:

a) as specified by the manufacturer of the vehicle, if the manufacturer produces more than 1000 vehicles in a year for a market where compliance with Australian, Japanese, UN/ECE standards or the requirements of the United States, is compulsory, or

b) in accordance with the specifications of an HVS certifier.

24. A modification to a vehicle must be carried out using components that are suitable for automotive application.

Modification affecting chassis (section 6.4)

25. If a vehicle is modified by the addition, removal or relocation of an axle and suspension system, by the replacement of an axle or suspension system with a different type of axle or suspension system, or by the modification of its chassis:

a) a new chassis rating must be issued and a new certificate of loading obtained, or

b) the current chassis rating must be confirmed as being valid.

26. If a vehicle is modified by fitting a hoist, crane, logging bolster, tipping body or other special equipment, which may result in increased stress to a localised area of the chassis or significant redistribution of the load over the chassis:

a) a new chassis rating must be issued and a new certificate of loading obtained, or

b) the current chassis rating must be confirmed as being valid.

27. A modification to the chassis of a vehicle must be designed to stress levels:

a) as specified by the vehicle manufacturer, or

b) in accordance with AS 3990: 1993, Mechanical Equipment – Steelwork, or

c) in accordance with BS 7608: 1993, Code of Practice for Fatigue Design and Assessment of Steel Structures, or

d) in accordance with BS 5400, or

e) that are not higher, when the vehicle is loaded to its proposed new gross vehicle mass, than those of the chassis of the unmodified vehicle loaded to its current gross vehicle mass.

28. If the vehicle manufacturer does not prohibit the welding of the chassis members, a welding that is part of the modification of a chassis must be carried out:

a) as specified by the vehicle manufacturer, or

b) in accordance with AS/NZS: 1554, Parts 1–6, Structural Steel Welding.

Repair (section 7)

29. A repair to the chassis of a vehicle or to a structural element of a monocoque body of a vehicle must be carried out:

    a) as specified by the manufacturer of the vehicle, if the manufacturer produces more than 1000 heavy vehicles in a year for a market in which compliance with Australian, Japanese, UN/ECE standards or the requirements of the United States, is compulsory, or

    b) in accordance with the specifications of a HV certifier, or

    c) in accordance with the pre-engineered solutionsde, approved by the NZTA and published by the New Zealand Truck-Trailer Manufacturers' Federation.

Modification (section 6)

30. The HVS certifier is to be satisfied regarding:

    a) acceptability of the design

    b) the standard of workmanship.

31. The modification shall not result in a reduction in, or impair the performance of, any of the original equipment.

32. Modifications must, where practicable, be carried out in accordance with instructions from the vehicle manufacturer and the manufacturer of any system, component or equipment being fitted to the vehicle

33. Modifications must be carried out:

    a) As specified by the manufacturer of the vehicle, if the manufacturer produces more than 1000 heavy motor vehicles in a year for a market where compliance with Australian, Japanese or UN/ECE standards, or standards of the United States of America is compulsory, or

    b) In accordance with the specifications of a HV certifier with the HVEC category

34. A modification to the engine or drive train (Note 5) must not

    a) Result in the engine or drive train becoming unsuitable for the conditions of loading and operation for which the vehicle is modified

    b) Adversely affect the engine or transmission performance

    c) Exceed the performance limits of the driveshaft as specified by the manufacturer.

35. A modification affecting axles, suspension and steering must not:

    a) result in an axle that has a load rating or performance characteristics that are not suitable for all conditions of loading and operation for which the vehicle has been modified.

    b) result in a vehicle being fitted with tyres that alter the wheel track or number of tyres outside the manufacturer's limits unless:

        i. a new axle load rating is established, or

        ii. the current load rating is established as valid

    c) result in a second steer axle being fitted that is incompatible with the existing steering components, or;

    d) result in a steering system fitted to a twin steer set being unsuitable for twin steer operation.

36. A modification affecting axles, suspension or steering must not result in:

a) an axle, a suspension system, or an axle and suspension system that is modified, or that is fitted to a vehicle to replace the one fitted by the vehicle manufacturer, having a load rating and performance characteristics that are not suitable for all conditions of loading and operation for which the vehicle is modified.

b) an axle being fitted to a vehicle with tyres in a way that results in the wheel track being altered beyond the vehicle manufacturer's specified limits, or the number of tyres fitted to an axle exceeds the number specified by the vehicle manufacturer without, either:

i. a new axle load rating being established, or

ii. the current axle load rating being confirmed as being valid.

c) the second steering axle fitted to a vehicle not having a means of steering that is compatible with the existing steering components.

d) the steering system of a vehicle to which a second steering axle is fitted to form a twin-steer axle set not being suitable for operating a twin-steer axle set.

37. A modification affecting a chassis requires:

a) For a vehicle that is modified by the addition, removal or relocation of an axle and suspension system, by the replacement of an axle or suspension system with a different type of axle or suspension system, or by the modification of its chassis: (Note 6)

i. a new chassis rating must be issued and a new certificate of loading obtained, or

ii. the current chassis rating must be confirmed as being valid.

b) For a vehicle that is modified by fitting a hoist, crane, logging bolster, tipping body or other special equipment, which may result in increased stress to a localised area of the chassis or significant redistribution of the load over the chassis (Note 6):

i. a new chassis rating must be issued and a new certificate of loading obtained, or

ii. the current chassis rating must be confirmed as being valid.

c) A modification to the chassis of a vehicle being designed to stress levels:

i. as specified by the vehicle manufacturer, or

ii. in accordance with Australian Standard — 3990-1993: Mechanical equipment — Steelwork, or

iii. in accordance with British Standard 7608:1993, Code of practice for fatigue design and assessment of steelstructures, or

iv. that are not higher, when the vehicle is loaded to its proposed new gross vehicle mass, than those of the chassis of the unmodified vehicle loaded to its current gross vehicle mass.

d) That, if the vehicle manufacturer does not prohibit the welding of the chassis members, then welding that is part of the modification of a chassis must be carried out:

i. as specified by the vehicle manufacturer, or

ii. in accordance with Australian/New Zealand Standard: 1554, Structural steel welding Parts 1 to 6 (see Technical Bulletin ‘Welding in the Transport Industry’)

38. A conversion to right hand drive requires:

a) if practicable, original equipment be used, and

b) that non-original equipment must not be used unless approved by the vehicle manufacturer or a vehicle inspector or inspecting organisation appointed to carry out specialist inspection and certification activities, and

c) that the steering -column must be transferred without altering the integrity of the column or its collapse mechanism, and

d) that, except when fixing mountings to the chassis or body of the vehicle, steering components must not be welded, unless:

i. the welding is designed by the vehicle manufacturer or an HV certifier appointed to carry out specialist inspection and certification activities, and

ii. appropriate non-destructive testing is carried out by a qualified person, and

e) that steering performance and characteristics must be maintained, and

f) the parking brake, auxiliary brake, accelerator and clutch controls must be transferred to the right-hand side of the vehicle, and

g) that new mounting points for the parking brake, accelerator and clutch controls must be of equivalent strength and efficacy to the original mounting points

h) the service brake control assembly to be transferred to the right-hand side of the vehicle, or

i) the service brake pedal assembly to be transferred to the right-hand side of the vehicle and the motion of the brake pedal transmitted to the master cylinder or treadle valve by a **torque shaft**, or **levers and rods** where the master cylinder or treadle valve and the mechanism that transfers the braking effort from the right-hand side to the left-hand side are protected to ensure that the service brake can only be activated by the driver.

Changes that affect brakes

39. The compressor must supply only the brake reservoirs with compressed air until the pressure in those reservoirs reaches the pressure specified by the vehicle manufacturer or the brake manufacturer, or, if such information is not available, two thirds of the maximum operational pressure specified by the vehicle manufacturer or brake manufacturer.

40. An air brake must have priority of the supply of compressed air from the brake reservoir.

41. An air-operated device may be connected to the air brake of a vehicle, only if:

a) the brake is protected so that the operation or failure of the device cannot lower the pressure in [any service brake or parking brake reservoir(s)] below the pressure specified by the vehicle manufacturer or brake manufacturer, or, if such information is not available, two-thirds of its maximum operational pressure specified by the vehicle manufacturer or brake manufacturer; and

b) the supply to the device is drawn from a reservoir separate from the service brake or parking brake reservoir(s) supplying the brake, except as specified in Requirement 42below.

42. Despite 41(b), an air-operated device may be supplied with compressed air from the service brake or parking brake reservoir(s), if:

a) the operation of the device requires only a small amount of compressed air and it is supplied with compressed air by a hose or pipe with an external diameter not exceeding 8mm, or

b) the device is operated only when the vehicle is stationary, or

c) the vehicle manufacturer allows it.

43. A vehicle that is modified by fitting an additional axle, removing an axle, replacing an axle with one that is not of the same make and model, or replacing the brake of an axle with one that is not of the same make and model, must either:

a) be modified so as to continue to meet the technical and performance requirements of the approved standard in the Rule) with which the vehicle originally complied, or

b) comply with all other applicable requirements in this Rule.

44. A powered vehicle with an hydraulic service brake may be fitted with an additional rear axle that has an air operated disc brake as a service brake.

Replacement of chassis rails

45. Where a repair or modification to an original chassis rail or both chassis rails does not consist of an OEM replacement, the repair must be approved by an HVS certifier.

Design considerations

46. In assessing a vehicle to determine its GVM, the HVS certifier must include the aspects set out below:

a) chassis loading diagram, showing principal point and distributed loads. Reasonable assumptions should be made as to the possible ways of distributing the payload

b) shear force and bending moment diagrams derived from (a)

c) chassis member section properties and stresses at critical points changes in section, maximum shear force and bending moment

d) manufacturer's ratings or recommendations for affected components such as steering boxes

e) where applicable, manual and power assisted steering inputs and calculated critical stresses in steering components

f) drawings and specifications in sufficient detail to allow verification of assumed loadings and calculated stresses.

Page amended **1 October 2020** (see **amendment details**)

4-2 Body and cab

Certifier categories: **HVEC** | **HMCD**

Reasons for rejection

1. A motor vehicle is affected by corrosion or weakening of its structure that is apparent by visual inspection so that the vehicle is unsafe to operate.

2. The performance of a motor vehicle in relation to protecting occupants in a frontal impact collision has been reduced below a safe tolerance of its state when manufactured or modified by any factors including corrosion structural damage, material degradation, inadequate repair, the fitting of additional equipment or the removal of equipment (Note 1).

3. A repair or modification to a motor vehicle that affects its frontal impact performance prevents the vehicle from complying with **Land Transport Rule: Frontal Impact 2001**

4. A repair or modification to a vehicle, its cab, structure, systems, components or equipment, has not restored the damaged or worn vehicle, cab, structure, system, component or equipment to be within safe tolerance of the state of the vehicle, cab, structure, system, component or equipment when manufactured (Note 1).

5. In repairing a vehicle, a repairer has not used a suitable repair method that takes into account the following:

a) the date of manufacture of the vehicle

b) the class, make and other relevant characteristics of the vehicle

c) the approved vehicle standards with which the vehicle is required to comply

d) the existence of relevant manufacturers recommendations and alternative methods

e) the material specifications used for construction of the vehicle, structure, systems and components or equipment

f) the compatibility of the intended repair process with materials specifications.

6. A repairer has not used systems, components and equipment that enable a vehicle to comply with requirement 5 above.

7. The body of a monocoque construction or a load bearing structure other than a chassis, or a body fitted to a chassis is not of adequate strength for all conditions of loading and operation for which the vehicle was constructed.

8. For right-hand drive conversions, the right-hand firewall/bulkhead:

a) does not replicate the original left-hand side profile

b) has not been fabricated by using at least the same gauge material, or

c) does not incorporate similar reinforcement to that used by the original manufacturer, or

d) is not fully welded to the original firewall with an overlap of at least 10 mm, or

e) the welding method is not suitable for the materials used.

9. All redundant openings in the firewall/bulkhead have not been permanently sealed to prevent entry of engine fumes into the passenger cabin.

10. A modification to the floorpan and inner guard area fouls steering or tyre clearances.

11. Materials used in a repair, modification or conversion are not of at least the same specification as the original materials.

12. A sill has been sectioned:

a) where this is not permitted in the manufacturer's instructions (Note 1), or

b) against either the manufacturer's instructions or a recognised repair research organisation's procedures (Note 2), or

c) in a manner that is not supported by design and certification from an HVS certifier.

13. A pillar has been sectioned

a) when the manufacturer prohibits repairs to the pillar, or

b) against either the manufacturer's methods or a recognised repair research organisation's procedures (Note 2), or

c) in a manner that is not supported by design and certification from an HV certifier.

14. Filler has been applied to the windscreen bonding face of the pillar where this is not permitted in the manufacturer's instructions.

15. An incorrect etch primer has been applied to the windscreen bonding face of the pillar.

16. A structure which is used as a point of attachment does not provide a secure mounting.

17. A body, fitted on or after 1 October 2005, has not been designed and constructed so that the stresses on the attachment do not exceed 60% of the yield strength of the material from which the attachment is made calculated to the legislated requirements (Summary of Legislation 14)

18. A motorhome manufactured or converted prior to 1 October 2003 does not have seatbelts and seatbelt anchorages as required in tables 2.1 to 2.3 of **Land Transport Rule: Seatbelts and Seatbelt Anchorages 2002**. Refer to **Technical bulletin 5**

19. A motorhome manufactured or converted on or after 1 October 2003 does not have seatbelts or seatbelt anchorages as required for class MB vehicles in table 2.4 of **Land Transport Rule: Seatbelts and Seatbelt Anchorages 2002** in the front seat positions. Refer to **Technical bulletin 5**

20. A motorhome manufactured or converted on or after 1 October 2003 does not have seatbelts or seatbelt anchorages as required for class MB vehicles in table 2.4 of **Land Transport Rule: Seatbelts and Seatbelt Anchorages 2002** in as may seating position in the rear so that there are at least as many seating positions with seatbelts as there are sleeping berths. Refer to **Technical bulletin 5**

21. A motorhome manufactured or converted on or after 1 October 2003 does not have a notice fitted recommending that, on safety grounds, when travelling in the rear compartment, passengers use seats fitted with seatbelts.

22. A motorhome manufactured or converted on or after 1 October 2003 does not have a notice advising passengers that it is compulsory to wear fitted seatbelts.

23. A seatbelt has been modified and the modification is not approved by the seatbelt manufacturer or, alternatively, the manufacturer of the vehicle it is fitted to.

24. A seatbelt retrofitted to a heavy vehicle on or after 1 April 2002 has not been assessed against the technical requirements of seatbelt anchorage, regarding geometry and load-carrying capacity, in any of the approved vehicle standards for seatbelt anchorages that apply to light motor vehicles.

25. A seatbelt retrofitted to a heavy vehicle on or after 1 April 2002 does not comply with section 2.3 of **Land Transport Rule: Seatbelts and Seatbelt Anchorages 2002**

26. A vehicle that has been damaged by immersion in water to the level of the cab or body has not had its fitted safety systems, both mechanical and electrical/electronic, as well as the structural components, inspected and, where required, repaired to within safe tolerance of original manufacture or most recent certification, and certified appropriately (see **Technical bulletin 1: Heavy vehicle repair thresholds**).

27. A vehicle that has been damaged by fire has not had the structural components of its cab or body inspected to ensure that heat has not reduced its structural strength or damaged fitted safety systems or they have not been reinstated to within safe tolerance of original manufacture or most recent certification and certified appropriately (see **Technical bulletin 1: Heavy vehicle repair thresholds**).

28 A vehicle that has been damaged in a crash has not had the structural components of its chassis or body inspected to ensure that damage has not occurred to structural or fitted safety systems, and they have not been reinstated to within safe tolerance of original manufacture or most recent certification and certified appropriately (see **Technical bulletin 1: Heavy vehicle repair thresholds**).

Note 1

Certifiers must take into account applicable international legislation (eg, FMVSS 216a, UNECE Reg. 29, etc.) to which a vehicle originally complied when determining safe tolerance to the state of manufacture, especially with regards to modifications that may impact occupant safety.

Note 2

Damaged parts should be replaced at factory seams whenever practicable and when required by the vehicle manufacturer.

Summary of legislation

Applicable legislation

- **Land Transport Rule: Frontal Impact 2001**
- **Land Transport Rule: Heavy Vehicles 2004**
- **Land Transport Rule: Seatbelts and Seatbelt Anchorages 2002**
- **Land Transport Rule: Vehicle Repair 1998**
- **Land Transport Rule: Vehicle Standards Compliance 2002**

Applicable references

- AS/NZS 2980:2018: Qualification of welders for fusion welding of steels – Additional requirements for Australia and New Zealand
- AS/NZS ISO9606.1: 2017 Qualification testing of welders – Fusion Welding
- **Technical bulletin 10: Welding in the transport industry**

Frontal Impact Rule

Section 2.2

1. The performance of a motor vehicle in relation to protecting occupants in a frontal impact collision must not be reduced below a safe tolerance of its state when manufactured or modified by any factors including corrosion, structural damage, material degradation, inadequate repair, the fitting of additional equipment or the removal of equipment.

2. In assessing whether requirement 2 has been complied with a certifier may take into account:

> a) the function of the additional equipment fitted to the motor vehicle after manufacture and the measures taken to minimise the risk of injury from the equipment
>
> b) evidence that the motor vehicle is within the manufacturer's operating limits.

Modification and repair (section 3)

3. A modification to a motor vehicle that affects its frontal impact performance:

> a) must not prevent the vehicle from complying with the **Land Transport Rule: Frontal Impact 2001**, and
>
> b) must be certified by an HV certifier.

Repair (section 3.2)

4. A repair to a component or a group of components that affects a motor vehicle's frontal impact performance must comply with **Land Transport Rule: Vehicle Repair 1998** and must not prevent the vehicle from complying with the **Land Transport Rule: Frontal Impact 2001**

Vehicle Repair 1998 (section 2)

5. A repair to a vehicle, its structure, systems, components or equipment, must restore the damaged or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle, structure, system, component or equipment when manufactured or modified.

6. If the vehicle has been certified as a modified vehicle, the repair must restore the vehicle, structure, system, component or equipment so that they are within safe tolerance of its state when certified as a modified vehicle.

7. In repairing a vehicle, a repairer must use a suitable repair method that takes into account the following:

a) the date of manufacture of the vehicle

b) the class, make and other relevant characteristics of the vehicle

c) the approved vehicle standards with which the vehicle is required to comply

d) the existence of relevant manufacturers recommendations and alternative methods

e) the material specifications used for construction of the vehicle, structure, systems and components or equipment

f) the compatibility of the intended repair process with materials specifications.

8. A repairer must use systems, components and equipment that will enable a vehicle to comply with requirement 6 above. The systems, components and equipment used may be new or used. Replacement systems, components and equipment used in a repair must comply with an approved vehicle standard applicable as specified by the relevant rule or regulation to the year of manufacture of the vehicle, system, component or equipment.

Heavy Vehicle Rule

Section 3

9. The chassis and body of a vehicle must be of adequate strength for all conditions of loading and operation for which the vehicle was constructed.

10. The body of a monocoque construction must be of adequate strength for all conditions of loading and operation for which the vehicle was constructed.

11. A load bearing structure other than a chassis, a body fitted to a chassis or a monocoque body must be of adequate strength for all conditions of loading and operation for which the vehicle was constructed.

Vehicle body attachment

12. The means by which a body is attached to the chassis of a vehicle manufactured on or after 1 October 2005 must be designed and constructed so that the stresses on the attachment when calculated in accordance with requirement 14, do not exceed 60% of the yield stress of the material from which the attachment is made.

13. The stresses referred to in requirement 13 must be calculated under each of the following loading conditions, when the forces are applied at the approximate centre of gravity of the load:

a) a longitudinally-acting force, equivalent to twice the combined weight of the payload capacity and the body mass

b) a downward-acting force, equivalent to twice the combined weight of the payload capacity and the body mass

c) a transversely-acting force, equivalent to the combined weight of the payload capacity and the body mass

d) an upward-acting force, equivalent to the combined weight of the payload capacity and the body mass.

Modification (section 6)

14. A modification to a vehicle that may affect the safety of the vehicle's components or the overall safety of the vehicle must not prevent the vehicle from complying with this rule.

15. If practicable, a modification to a vehicle must be carried out in accordance with instructions from the vehicle manufacturer and the manufacturer of any equipment being fitted to the vehicle.

16. A modification to a vehicle must be carried out:

a) as specified by the manufacturer of the vehicle, if the manufacturer produces more than 1000 vehicles in a year for a market where compliance with Australian, Japanese, UN/ECE standards or the requirements of the United States is compulsory, or

b) in accordance with the specifications of an HV certifier.

17. A modification to a vehicle must be carried out using components that are suitable for automotive application.

Repair (section 7)

18. A repair to a vehicle must comply with the Land Transport Rule: Heavy Vehicles 2004 and with Land Transport Rule: Vehicle Repair 1998.

19. A repair to the chassis of a vehicle or to a structural element of a monocoque body of a vehicle must be carried out:

a) as specified by the manufacturer of the vehicle, if the manufacturer produces more than 1000 heavy vehicles in a year for a market in which compliance with Australian, Japanese, UN/ECEstandards or the requirements of the United States is compulsory or

b) in accordance with the specifications of an HVS certifier or

c) by taking into account:

i. any information that is relevant to the vehicle, and

ii. the cause and type of failure, and

iii. any established methods of repair, including the Minor Repair Code, approved by the NZTA and published by the New Zealand Truck-Trailer Manufacturers' Federation.

Seatbelt and Seatbelt Anchorages Rule

Motorhomes

20. A motorhome manufactured before 1 October 2003, or a motor vehicle converted into a motorhome before 1 October 2003, must be equipped with the seatbelts and seatbelt anchorages in Tables 2.1 to 2.3 that are appropriate for the class of vehicle in which the vehicle was registered, when registered as a motorhome and a motorhome manufactured on or after 1 October 2003 and a motor vehicle converted into a motorhome on or after 1 October 2003 must be equipped with:

a) seatbelts and seatbelt anchorages that comply with the requirements for class MB vehicles in Table 2.4, in all front seating positions, and

b) lap (or lap and diagonal) seatbelts that comply with the requirements for class MB vehicles in Table 2.4, in at least as many rear seating positions as the number of sleeping berths exceeds the number of front seating

positions, and

c) a notice, attached in a prominent position, that:

i. recommends, on safety grounds, that when the vehicle is travelling, passengers use seats that are fitted with seatbelts, and

ii. advises passengers that it is compulsory to wear fitted seatbelts.

Motor vehicles that transport detained persons

22. Where a heavy motor vehicle designed exclusively for transporting a person detained by the NZ Police or the corrections services, or by a person acting on their behalf, must be fitted with seatbelts and seatbelt anchorages in front seating positions, but does not have to comply with the requirements for other seating positions.

Modifications to seatbelts

23. A seatbelt must not be modified unless approved by the seatbelt manufacturer or vehicle manufacturer and is carried out in accordance with instructions issued by that manufacturer.

Seatbelt anchorages

24. A seatbelt anchorage that is retrofitted on or after 1 April 2002 in a heavy motor vehicle must comply with 2.3. by considering section 4.1(11) when assessing whether 2.3 is complied with, for the purposes of 4.1(10), the vehicle inspector or inspecting organisation must take into account the technical requirements, regarding geometry and load-carrying capacity, in any of the approved vehicle standards for seatbelt anchorages that apply to light motor vehicles.

Page amended **1 November 2018** (see **amendment details**)

4-3 Steering, suspension and axles

Certifier categories: **HVEC** | **HMCD**

Reasons for rejection

1. An articulated bus cannot complete a 360° turn in either direction without any part of the vehicle except for collapsible mirrors encroaching within a concentric internal radius of 5.3m.

2. In carrying out a 360° turn at the 25m diameter, any part of a vehicle in a combination, other than its articulation mechanism, makes contact with the other vehicle in the combination.

3. A heavy rigid motor vehicle is not supported by:

a) one axle set towards the front of the vehicle, which is either a single-axle set or a twin-steer axle set, and

b) one axle set towards the rear of the vehicle which is a single set, a tandem set or a tri-axle set.

4. Except as provided in Note 3 a heavy motor vehicle has a rear-steering axle (Note 3).

5. Steering axles do not turn through an angle of at least 15° in either direction (Note 3).

6. A mobile crane does not have a mechanism to lock at least one rear axle.

7. A rigid motor vehicle or semi-trailer, fitted with rear-steering axles, does not comply in all configurations with the rear overhang requirements and forward distance requirements.

8. An axle set, apart from a twin-steer axle set, of a heavy motor vehicle is not load sharing.

9. A vehicle with a tandem-axle set (except for a tandem axle set in a heavy passenger service vehicle) that has a single large-tyred axle with a load-share ratio of 60%:40% or 55%:45%, has not been affixed with an indelible plate, so that it is clearly visible to the person who is weighing the vehicle, that specifies the:

a) load-share ratio of the axle set, and

b) tyre size on each axle, and

c) maximum individual axle ratings.

10. An A-train does not have two motor-driven axles in a tandem-axle set or a tri-axle set, or three motor-driven axles in a tri-axle set.

11. A semi-trailer is not supported by one axle set only which is set towards the rear of the vehicle and is:

a) a single-axle set, or

b) a tandem-axle set, or

c) a tri-axle set, or

d) a quad-axle set provided that the semi-trailer is not intended for use in an A-train or B-train combination.

12. The axle set towards the front of a full trailer does not connect all wheels for that part of the trailer to the drawbar steering system.

13. The axle set towards the front of a full trailer is not either a single-axle set or a tandem-axle set.

14. The axle set towards the rear of a full trailer is not one of the following:

a) a single-axle set

b) a tandem-axle set

c) a tri-axle set provided that the front axle set is a tandem-axle set.

15. A simple trailer is not supported by one of the following:

a) a single-axle set

b) a tandem-axle set

c) a tri-axle set.

16. On a pole trailer with two axle sets, the axle set towards the front of the trailer does not connect all wheels for that part of the trailer to the drawbar steering system.

17. The axle set towards the front of a pole trailer with two axle sets is not either a single-axle set or a tandem-axle set.

18. The axle set towards the rear of a pole trailer with two axle sets is not one of the following:

a) a single-axle set

b) a tandem-axle set

c) a tri-axle set provided that the front axle set is a tandem-axle set.

19. A heavy motor vehicle, other than an A-train or a B-train, has a retractable axle (Note 4) where:

a) the retractable axle is not in a rear-axle set, or

b) the retractable axle does not have an automated control that ensures the remaining axle or axles and axle set or axle sets in contact with the ground remain within all manufacturer’s component ratings for all retractable axle

configurations, or

c) the forward distance requirements and rear overhang requirements are not complied with when the axle is in contact with the road and is in a retracted position.

20. A specialist overdimension motor vehicle or a motor vehicle designed principally to transport an overdimension load or an overweight load or both does not have load sharing suspension.

21. A steering system on a motor vehicle, and associated systems and components that could directly or indirectly affect the directional control of the vehicle is not:

a) sound and in good condition and provides the vehicle with safe, efficient, convenient and sensitive control

b) strong, durable and fit for its purpose, taking into account whether adverse effects have resulted from a loss of integrity of any protective system used by a relevant component.

22. A motor vehicle capable of a speed more than 50km/h and equipped with a steering system with no direct mechanical connection between the driver's means of control and the wheels or other means of changing the vehicle's direction does not have at least one additional means of steering that:

a) is sound and in good condition and provides the vehicle with safe, efficient, convenient and sensitive control, and

b) is strong, durable and fit for its purpose, taking into account whether adverse effects have resulted from a loss of integrity of any protective system used by a relevant component, or

c) is approved by the NZTA.

23. A modification to a steering system or to a system or component that could affect the directional control of a motor vehicle prevents the vehicle from having a steering system that is:

a) sound and in good condition and that provides the vehicle with safe, efficient, convenient and sensitive control

b) strong, durable and fit for its purpose, taking into account whether adverse effects have resulted from a loss of integrity of any protective system used by a relevant component

c) compatible with the manufacturer's design or specification for the vehicle.

24. An axle fitted to a vehicle is not of adequate strength or does not have appropriate performance characteristics for all loading and operation for which the vehicle was constructed.

25. (Note 4) A device for altering the distribution of mass between axles has been fitted to a vehicle when:

a) the device does not lift an unpowered axle clear of the ground, or

b) the device does not reduce the mass carried by an unpowered axle without lifting it clear of the ground, or

c) it does not have a control that is spring loaded so that, when the control is released, the mass on the unpowered axle reverts to what it was before the operation of the controls, or

d) it does not have a control with an automatic timing device with an activation time of not more than two minutes after which the mass on the unpowered axle reverts automatically to what it was before the operation of the control and with a non-activation time of at least 30 seconds during which the control cannot be activated again.

26. The suspension system of a vehicle is not of adequate strength or does not have appropriate performance characteristics for all conditions of loading and operation for which the vehicle was constructed.

27. An axle stop device fitted to a vehicle has not been maintained within safe tolerance of its original condition.

28. A modification to a vehicle has not been carried out:

a) in accordance with instructions from the vehicle manufacturer and the manufacturer of any equipment being fitted to the vehicle, or

b) in accordance with the design and certification of an HV certifier.

29. A modification to a vehicle has not been carried out using components that are suitable for automotive application.

30. An axle, a suspension system or an axle and suspension system, fitted to a vehicle to replace the one fitted by the vehicle manufacturer does not have a load rating and performance characteristics that are suitable for all normal conditions of loading and operation for which the vehicle was constructed.

31. If an axle of a vehicle is fitted with tyres in a way that results in the wheel track being altered beyond the vehicle manufacturer's specified limits, or the number of tyres fitted to an axle exceeds the number specified by the vehicle manufacturer, either:

a) a new axle load rating has not been established, or

b) the current axle load rating has not been confirmed as being valid by an HV certifier.

32. A second steering axle fitted to a vehicle does not have a means of steering that is compatible with the existing steering components.

33. A steering box has been used that is not the manufacturer's standard or option, and the origin and specifications have not been identified and recorded.

34. The replacement steering box component is not of at least equal specification to the original with regard to:

a) steering ratio

b) input/output torque.

35. If a new steering box or rack assembly is not used, then any second-hand components has not been crack tested or x-rayed at a non-destructive testing (NDT) authority approved by the Certification Board for Inspection Personnel, or the steering box or steering rack has not been overhauled and all details recorded.

36. The steering column has not been transferred without alteration to the integrity of the column or any collapse mechanism contained therein.

37. Where new column mountings have been fabricated they are not at least of the strength of the original mounts.

38. The use of chain and sprocket, hydraulics or bevel drive boxes have been used where not specifically permitted (Note 7).

39. The original steering geometry has not been preserved and the vehicle does not meet the 25m turning circle requirement.

40. The steering box and steering idler assembly is not positioned so as to mirror the original.

41. When mounting the steering box, care has not been taken to ensure that it is positioned so that when at maximum travel (lock to lock), the chassis frame does not become excessively loaded.

42. The steering linkages contact the stops while there is still substantial travel remaining in the steering box.

43. Steering components other than mounting brackets have been welded on to the chassis or body and this is not supported by a welding procedure and certification by an HV certifier.

44. The primary steering position and controls do not remain on the right-hand side when a left-hand drive dual steering is added.

45. A replacement rear/drive axle does not have:

a) a mass rating that is adequate for the mass rating of the vehicle.

b) a suitable final drive ratio.

46. All welding performed on an axle housing is not in accordance with the axle manufacturer's specifications or is not supported by a welding procedure and certification by an HV certifier.

47. The axles are not fitted within the axle manufacturer's installation specifications.

48. If the axle final drive ratio has been changed, it is no longer suitable for the road speed or gradability or the speedometer accuracy is not maintained.

49. A replacement front axle does not have a mass rating that is adequate for the mass rating of the vehicle.

50. All welding performed on an axle housing is not in accordance with the axle manufacturer's specifications.

51. The axle has not been installed within the vehicle/axle manufacturer's specified caster angle limits.

52. If the front axle is driven, then the axle final drive ratio is not suitable for the road speed and gradability.

53. The mass rating of the modified suspension is not sufficient for the mass rating of the vehicle.

54. The modified suspension does not maintain the vehicle's suspension balance under braking.

55. A modified suspension component fouls during its full travel.

56. The suspension system is not fitted according to the suspension manufacturer's specifications.

57. Variable ride height and constant ride height mechanisms have not been fitted and adjusted in accordance with the suspension manufacturer's specifications.

58. The wheel alignment has not been checked and adjusted to within the appropriate specifications.

59. Bump stops have been attached to the chassis flange.

60. Shock absorbers fully compress or fully extend through the full suspension travel.

61. A pitman arm has been heated, welded, bent or drilled and it has not been stress relieved.

62. A pitman arm has been welded and the affected area has not been x-rayed and demonstrated to be sound.

63. Steering stops have not been mounted in accordance with the specifications of the steering box manufacturer.

64. Not all hoses, steel tubing and reservoirs connected with a power steering pump are in accordance with the hydraulic standard, size, flow and pressure ratings recommended by the steering box or hydraulic cylinder manufacturer.

65. The steel tubing connected with a power steering pump is not of sufficient length to allow adequate cooling.

66. A hydraulic pump does not have a flow and pressure rating that is compatible with the steering box or hydraulic cylinder used.

67. Hoses and steel tubing have not been routed clear of exhaust areas and areas likely to cause abrasion or other damage.

68. The mounting point for the cylinder in a Ram type steering system has not been designed to take into account the cylinder's peak loading and deflections or for fatigue.

69. The mounting of the cylinder does not allow the cylinder full and free movement through the entire arc of the steering components and suspension travel.

70. Drag links have not been made of one continuous length of material between end fittings or are not supported by certification of an HV certifier.

71. A power steering system has not been fitted with a pressure relief valve.

72. A forged or heat-treated steering component has been cut, welded or heated and is not supported by certification of an HV certifier.

73. Any replacement component does not have a rating suitable for the loading imposed on it.

74. Any standard part, such as splines, tapers and keyways does not conform to a recognised standard.

75. Any standard part that is a mating component does not comply with compatible standards.

76. End fittings, ball joints, plain bearing end fittings and idler arm pivots have been used and they do not have manufacturer's ratings in excess of the loads or angular travel to be imposed on them.

77. A moving component may be fouled through its full travel movement and suspension movement.

78. For suspension, axle and steering system attachments, threaded fasteners are not of an appropriate grade for the application.

79. A vehicle has not been road-tested after a steering or suspension modification.

80. The steering system does not provide safe and positive handling of the vehicle.

81. The steering system is not free of any undue restrictions to operation through its range of operation.

82. The steering control is not in the normally accepted direction in relation to the effect on the vehicle.

83. The minimum steering effort with power assist is less than five newtons force measured at the steering wheel rim under all conditions.

84. The maximum steering effort measured at the steering wheel rim exceeds 250 newtons force when tested under the following conditions:

a) the vehicle is loaded to its GVM and is correctly distributed on the vehicle axles, and

b) the tyres are inflated at the recommended tyre pressure, and

c) the vehicle is travelling at a speed of 10 km/h or less, and

d) the steering wheel is turned at a constant rate so that in four seconds the steering angle acquired is sufficient to turn the vehicle within a 25-metre diameter circle, and

e) the turn is made to both the left and right.

85. With the power steering system disabled, the steering effort required exceeds 600 newtons when doing the above test, with the exception that the turn rate can be decreased to six seconds.

86. A repaired or replaced spring slipper has not been fitted or replaced in a tradesman like manner using materials that are fit for purpose and are within safe tolerance of original manufacture.

87. A spring slipper has been fitted to reduce spring lash and has not been certified by a HV certifier.

88. A spring slipper has been repaired more than once and is not supported by certification or a report from a HV certifier relating to the most recent repair.

89. A modification to an axle, the steering or the suspension that may affect the brakes has not been referred to a HV certifier with the brakes category (HVEK).

90. The brake system of an air-braked heavy vehicle does not have priority of the supply of air from the air compressor.

91. An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes without protecting the brake circuit.

92.An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the external diameter of the supply hose or pipe is larger than 8mm.

93.An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the device operates when the vehicle is moving.

94.An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the vehicle manufacturer does not allow it.

95. A vehicle that is modified by fitting an additional axle, removing an axle, replacing an axle with one that is not of the same make and model, or replacing the brake of an axle with one that is not of the same make and model has not been referred to a HV certifier with the Brakes category (HVEK).

96. A powered vehicle with an hydraulic service brake has been fitted with an additional rear axle that does not have the same type of braking system as the original axle or an air operated disc brake as a service brake.

97. A vehicle that has been damaged in a crash has not had its steering and suspension components inspected to ensure that damage has not occurred to these critical safety systems and they have not been reinstated to within safe tolerance of original manufacture or most recent certification and certified appropriately (see **Technical bulletin 1: Heavy vehicle repair threesholds**).

98. A vehicle that has been damaged by fire has not had its steering and suspension components inspected to ensure that damage has not occurred to these critical safety systems and they have not been reinstated to within safe tolerance of original manufacture or most recent certification and certified appropriately (see **Technical bulletin 1: Heavy vehicle repair threesholds**).

99. A vehicle that has been damaged by immersion in water has not had its steering and suspension components inspected to ensure that damage has not occurred to these critical safety systems and they have not been reinstated to within safe tolerance of original manufacture or most recent certification and certified appropriately (see **Technical bulletin 1: Heavy vehicle repair threesholds**).

Note 1

Notwithstanding requirement 1 of this section any person may operate any motor vehicle having the steering column to the left of the longitudinal centreline of the body of the vehicle if the vehicle:

a) was purchased from the Crown by the owner or any former owner, or

b) is for the time being exempt from subclause 1 of this regulation by virtue of an exemption granted under regulation 90 of these regulations.

Note 2

New and used replacement systems, components and equipment:

A repairer must use systems, components and equipment that will enable a vehicle to comply with requirement 8.

The systems, components and equipment used to enable the vehicle to comply with requirement 8 may be new or used.

Replacement systems, components and equipment used in a repair must comply with an approved vehicle standard applicable as specified by the relevant rule or regulation to the year of manufacture of the vehicle, system, component or equipment.

Note 3

A forklift, the rear unit of an articulated bus or a mobile crane may have one or more rear steering axles.

A rigid vehicle without a heavy tow coupling or a semi-trailer (other than a semi-trailer in an A-train combination or a B-train combination) may have steering axles in the rear-axle set, if no more than half of the axles within the axle set steer at any time.

A semi-trailer with a quad-axle set must have at least one but not more than two steering axles within the quad-axle set provided that they are:

a) the two rearmost axles which must be capable of turning in the same direction through an angle of at least 15 degrees, or

b) the foremost and rearmost axle which must be capable of turning in opposite directions through an angle of at least 15 degrees, or

c) where fitted with a single steering axle in a quad-axle set, the steering axle must be the rearmost axle.

A steering axle in the last case must be capable of turning through an angle of at least 15 degrees in either direction and have that confirmed by certification by a HVS certifier with the chassis category.

Note 5

A modification to a steering system or to a system or component that could affect the directional control of a motor vehicle must be certified.

Note 6

Major reworking of the design of the vehicle relates to subsequent major modification of the standard vehicle as produced and tested by the vehicle manufacturer and includes:

a) fitting of different types of engine and relocation of engine and/or transmission

b) addition or removal of axles

c) alteration of wheelbase by:

i. moving axles on chassis rails

ii. extending or shortening the chassis

d) replacement of the original chassis rails by a structure of different form

e) addition of heavy duty equipment for special purpose operations, for example hydraulic hoists which may place extra

stress on localised areas of the chassis and/or other equipment

f) conversion to left-hand drive dual steering (in special purpose vehicles only).

Note 7

Dual steering conversions may only be carried out on special purpose vehicles such as street sweepers, weed sprayers, road markers, refuse collection and the like.

All of the relevant requirements also apply to dual steering conversions except where the left-hand steer position is being added, that is. the vehicle is originally right-hand steer. The steering motion may be transferred by way of chain and sprocket or bevel boxes.

Note 8

Where a spring slipper has been repaired or replaced a LT400 is not required if a CoF inspector is satisfied that the spring slipper plate has been repaired or replaced in a tradesman like manner, using components and materials that are fit for purpose and within safe tolerance of its state when manufactured.

However, if there is evidence of successive repairs or the spring slipper has been fitted in such a way that it may reduce spring lash then certification is required and a LT400 presented.

Summary of legislation

Applicable Legislation

- *New Zealand Gazette* 21 August 1980, page 2457 (Note 2)
- **Land Transport Rule: Frontal Impact 2001**
- **Land Transport Rule: Heavy Vehicles 2004**
- **Land Transport Rule: Steering Systems 2001**
- **Land Transport Rule: Vehicle Dimensions and Mass 2002**
- **Land Transport Rule: Vehicle Repair 1998**.

Frontal Impact Rule (section 2.2)

1. The performance of a motor vehicle in relation to protecting occupants in a frontal impact collision must not be reduced below a safe tolerance of its state when manufactured or modified by any factors including corrosion, structural damage, material degradation, inadequate repair, the fitting of additional equipment or the removal of equipment.

2. In assessing whether Requirement 1 above has been complied with a certifier may take into account:

a) the function of the additional equipment fitted to the motor vehicle after manufacture and the measures taken to minimise the risk of injury from the equipment,

b) evidence that the motor vehicle is within the manufacturer's operating limits.

3. A modification to a motor vehicle that affects its frontal impact performance (section 3.1):

a) must not prevent the vehicle from complying with this rule, and

b) must be certified.

4. A repair to a component or a group of components that affects a motor vehicle's frontal impact performance must comply with **Land Transport Rule: Vehicle Repair 1998** and must not prevent the vehicle from complying with this rule.

Vehicle Repair 1998, rule 34001 (section 2.1)

5. A repair to a vehicle, its structure, systems, components or equipment, must restore the damaged or worn vehicle, structure, system, component or equipment so that they are within safe tolerance of the state of the vehicle, structure, system, component or equipment when manufactured or modified.

6. In repairing a vehicle (section 2.2) to comply with Requirement 5 above, a repairer must use a suitable repair method that takes into account the following:

a) the date of manufacture of the vehicle

b) the class, make and other relevant characteristics of the vehicle

c) the approved vehicle standards with which the vehicle is required to comply

d) the existence of relevant manufacturer's recommendations and alternative methods

e) the material specifications used for construction of the vehicle, structure, systems and components or equipment

f) the compatibility of the intended repair process with materials specifications (Note 3).

Vehicle Dimensions and Mass 2016 (section 4)

7. An articulated bus must be able to complete a 360-degree turn in either direction without any part of the vehicle except for collapsible mirrors encroaching within a concentric internal radius of 5.3m.

8. In carrying out a 360-degree turn at the 25m diameter as specified in chapter 3-1 Dimensions, no part of a vehicle in a combination, other than its articulation mechanism, may come into contact with the other vehicle in the combination.

9. A heavy rigid motor vehicle must be supported by:

a) one axle set towards the front of the vehicle, which must be either a single-axle set or a twin-steer-axle set, and

b) one axle set towards the rear of the vehicle which must be a single set, a tandem set or a tri-axle set.

10. Except as provided in (Note 3) a heavy motor vehicle must not have any rear-steering axle.

11. A mobile crane must have at least one rear axle locked so that it is non-steering, when the crane is being operated on the road.

12. A rigid motor vehicle or semi-trailer, fitted with rear-steering axles must comply in all configurations with the rear overhang requirements and forward distance requirements in chapter **3-1 Dimensions**.

13. The axle sets, except a twin-steer axle set, of a heavy motor vehicle must be load sharing.

14. If a tandem-axle set has a single large-tyred axle with a load-share ratio of 60%:40% or 55%:45%, the manufacturer of the vehicle must securely affix to the vehicle an indelible plate, so that it is clearly visible to the person who is weighing the vehicle, that specifies the:

a) load-share ratio of the axle set, and

b) tyre size on each axle, and

c) maximum individual axle ratings.

15. An A-train must have two motor-driven axles in a tandem-axle set or a tri-axle set, or three motor-driven axles in a tri-axle set.

16. A semi-trailer must be supported by one axle set only which must be set towards the rear of the vehicle and must be:

a) a single-axle set, or

b) a tandem-axle set, or

c) a tri-axle set, or

d) a quad-axle set (except if the semi-trailer is in an A-train combination or a B-train combination).

17. The axle set towards the front of a full trailer must connect all wheels for that part of the trailer to the drawbar steering system and must be either a single-axle set or a tandem-axle set.

18. The axle set towards the rear of a full trailer must be one of the following:

a) a single-axle set,

b) a tandem-axle set,

c) a tri-axle set provided that the front axle set is a tandem-axle set.

19. A simple trailer must be supported by one of the following:

a) a single-axle set,

b) a tandem-axle set,

c) a tri-axle set.

20. A pole trailer with one axle set may only carry poles or long loads that are not part of the trailer and must be supported by a single-axle set, a tandem-axle set or a tri-axle set.

21. For a pole trailer with two axle sets the axle set towards the front of the trailer must connect all wheels for that part of the trailer to the drawbar steering system and must be either a single-axle set or a tandem-axle set.

22. The axle set towards the rear of a pole trailer with two axle sets must be one of the following:

a) a single-axle set,

b) a tandem-axle set,

c) a tri-axle set provided that the front axle set is a tandem-axle set.

23. A heavy motor vehicle, other than an A-train or a B-train, may have a retractable axle (Note 5) provided that:

a) the retractable axle is in a rear-axle set,

b) the retractable axle has an automated control that ensures the remaining axle or axles and axle set or axle sets in contact with the ground remain within the mass limits and within all manufacturer's component ratings for all retractable axle configurations,

c) the forward distance requirements and rear overhang requirements are complied with whether the axle is in contact with the road or is in a retracted position.

24. A specialist overdimension motor vehicle designed principally to transport an overdimension load or an overweight load or both must be load sharing.

Steering systems 2001 (sections 2 and 3)

25. A steering system on a motor vehicle, and associated systems and components that could directly or indirectly affect the directional control of the vehicle must be:

a) sound and in good condition and must provide the vehicle with safe, efficient, convenient and sensitive control

b) strong, durable and fit for their purpose, taking into account whether adverse effects have resulted from a loss of integrity of any protective system used by a relevant component.

26. A motor vehicle capable of a speed more than 30 km/h and equipped with a steering system with no direct mechanical connection between the driver's means of control and the wheels or other means of changing the vehicle's direction must have at least one additional means of steering that complies with requirement 27.

27. A modification to a steering system or to a system or component that could affect the directional control of a motor vehicle must not prevent the vehicle from complying with requirement 27 (Note 6).

28. If a steering system or a system component that could affect the directional control is modified:

a) the steering system must be compatible with the performance and component specifications of the manufacturer of the vehicle or steering system for the original steering system, and

b) the loads and stresses on the steering system and its components must be demonstrably within the design and performance criteria established by their manufacturer for the specific application in which they were originally used.

29. A repair to a steering system, or a repair to a motor vehicle that affects its steering system must comply with all other requirements in this section.

Heavy Vehicle Rule

Section 3

30. An axle fitted to a vehicle must be of adequate strength and have appropriate performance characteristics for all loading and operation for which the vehicle was constructed.

31. A device for altering the distribution of mass between axles must not be fitted to a vehicle unless:

a) the device lifts an unpowered axle clear of the ground, or

b) the device reduces the mass carried by an unpowered axle without lifting it clear of the ground, and

i. it has a control that is spring loaded so that, when the control is released, the mass on the unpowered axle reverts to what it was before the operation of the controls, or

ii. it has a control with an automatic timing device with an activation time of not more than two minutes after which the mass on the unpowered axle reverts automatically to what it was before the operation of the control and with a non-activation time of at least 30 seconds during which the control cannot be activated again.

32. The suspension system of a vehicle must be of adequate strength and have appropriate performance characteristics for all conditions of loading and operation for which the vehicle was constructed.

33. An axle stop device fitted to a vehicle must be maintained within safe tolerance of its original condition.

Modification (section 6)

Section 6 applies to all modifications carried out after 1 April 2005.

34. A modification to a vehicle that may affect the safety of the vehicle's components or the overall safety of the vehicle must not prevent the vehicle from complying with this Rule.

35. If practicable, a modification to a vehicle must be carried out in accordance with instructions from the vehicle manufacturer and the manufacturer of any equipment being fitted to the vehicle.

36. A modification to a vehicle must be carried out:

a) as specified by the manufacturer of the vehicle, if the manufacturer produces more than 1000 vehicles in a year for a market where compliance with Australian, Japanese, UN/ECE standards or the requirements of the United States, is compulsory, or

b) in accordance with the specifications of an HVS certifier.

37. A modification to a vehicle must be carried out using components that are suitable for automotive application.

38. An axle, a suspension system or an axle and suspension system, fitted to a vehicle to replace the one fitted by the vehicle manufacturer, must have a load rating and performance characteristics that are suitable for all conditions of loading and operation for which the vehicle was constructed.

39. If an axle of a vehicle is fitted with tyres in a way that results in the wheel track being altered beyond the vehicle manufacturer's specified limits, or the number of tyres fitted to an axle exceeds the number specified by the vehicle manufacturer, either:

a) a new axle load rating must be established or

b) the current axle load rating must be confirmed as being valid.

40. A second steering axle fitted to a vehicle must have a means of steering that is compatible with the existing steering components.

41. The steering system of a vehicle fitted with a second steering axle, as part of a twin-steer axle set, must be suitable for operating a twin-steer axle set.

42. A repair to the chassis of a vehicle or to a structural element of a monocoque body of a vehicle must be carried out:

a) as specified by the manufacturer of the vehicle, if the manufacturer produces more than 1000 heavy vehicles in a year for a market in which compliance with Australian, Japanese, UN/ECE standards or the requirements of the United States is compulsory, or

b) in accordance with the specifications of an HVS certifier, or

c) in accordance with the Minor Repair Code, approved by the NZTA and published by the New Zealand Truck-Trailer Manufacturers' Federation.

Conversion of a vehicle to right-hand drive

45. If a vehicle is converted from left-hand drive to right-hand drive:

a) if practicable, original equipment must be used, and

b) non-original equipment must not be used unless approved by the vehicle manufacturer or a vehicle inspector or inspecting organisation appointed to carry out specialist inspection and certification activities, and

c) the steering -column must be transferred without altering the integrity of the column or its collapse mechanism, and

d) except when fixing mountings to the chassis or body of the vehicle, steering components must not be welded, unless:

i. the welding is designed by the vehicle manufacturer or a vehicle inspector or inspecting organisation appointed to carry out specialist inspection and certification activities, and

ii. appropriate non-destructive testing is carried out by a qualified person, and

e) steering performance and characteristics must be maintained, and

f) the parking brake, auxiliary brake, accelerator and clutch controls must be transferred to the right-hand side of the vehicle, and

g) new mounting points for the parking brake, accelerator and clutch controls must be of equivalent strength to the original mounting points.

46. If a vehicle is converted from left-hand drive to right-hand drive:

a) the service brake control assembly must be transferred to the right-hand side of the vehicle, or

b) the service brake pedal assembly must be transferred to the right-hand side of the vehicle and the motion of the brake pedal must be transmitted to the master cylinder or treadle valve by:

i. a torque shaft, or

ii. levers and rods.

47. For a vehicle to which 46(b) applies, the master cylinder or the treadle valve and the mechanism that transfers the braking effort from the right-hand side to the left-hand side must be protected to ensure that the service brake can be activated only by the driver.

Conversion of a vehicle to dual steering

48. A conversion to dual steering may be carried out only on a special purpose vehicle.

49.If a special purpose vehicle is converted to dual steering:

a) if practicable, original equipment must be used, and

b) non-original equipment must not be used unless approved by the vehicle manufacturer or a vehicle inspector or inspecting organisation appointed to carry out specialist inspection and certification activities, and

c) except when fixing mountings to the chassis or body of the vehicle, steering components must not be welded, unless:

i. the welding is designed by the vehicle manufacturer or a vehicle inspector or inspecting organisation appointed to carry out specialist inspection and certification activities, and

ii. appropriate non-destructive testing is carried out, and

d) steering performance and characteristics must be maintained, and

e) new mounting points for the parking brake, accelerator and clutch controls must be of equivalent strength to the original mounting points.

50. If a special purpose vehicle is converted to dual steering:

a) the service brake control assembly must be replicated on the other side of the vehicle in a way that prevents the hydraulic or pneumatic line pressure from acting on the non-operating master cylinder or treadle valve, or

b) the motion of the brake pedal must be transmitted to the master cylinder or treadle valve by:

i. a torque shaft, or

ii. levers and rods.

51. The steering motion on a special purpose vehicle that has been converted to dual steering may be transmitted by chain and sprocket or bevel gear boxes, if proper means are provided to eliminate backlash.

Priority and protection of air brakes

52. The compressor must supply only the brake reservoirs with compressed air until the pressure in those reservoirs reaches the pressure specified by the vehicle manufacturer or the brake manufacturer, or, if such information is not available, two thirds of the maximum operational pressure specified by the vehicle manufacturer or brake manufacturer.

53. An air brake must have priority of the supply of compressed air from the brake reservoir.

54. An air-operated device may be connected to the air brake of a vehicle, only if:

a) the brake is protected so that the operation or failure of the device cannot lower the pressure in [any service brake or parking brake reservoir(s)] below the pressure specified by the vehicle manufacturer or brake manufacturer, or, if such information is not available, two-thirds of its maximum operational pressure specified by the vehicle manufacturer or brake manufacturer, and

b) the supply to the device is drawn from a reservoir separate from the service brake or parking brake reservoir(s) supplying the brake, except as specified in 55.

55. Despite 54(b), an air-operated device may be supplied with compressed air from the service brake or parking brake reservoir(s), if:

a) the operation of the device requires only a small amount of compressed air and it is supplied with compressed air by a hose or pipe with an external diameter not exceeding 8mm, or

b) the device is operated only when the vehicle is stationary, or

c) the vehicle manufacturer allows it.

56. A vehicle that is modified by fitting an additional axle, removing an axle, replacing an axle with one that is not of the same make and model, or replacing the brake of an axle with one that is not of the same make and model, must either:

a) be modified so as to continue to meet the technical and performance requirements of the approved standard in the Rule with which the vehicle originally complied, or

b) comply with all other applicable requirements in this Rule.

57. A powered vehicle with an hydraulic service brake may be fitted with an additional rear axle that has an air operated disc brake as a service brake.

Page amended **2 December 2019** (see **amendment details**)

4-4 Engine and drive train

Certifier categories: **HVEC** | **HMCD**

Reasons for rejection

1. Devices to protect against drive-shaft failure have not been maintained within safe tolerance of their original condition.

2. Fuels for a passenger service vehicle and the vehicle’s equipment are not carried in permanent fuel tanks.

3. For a vehicle which entered service as a passenger service vehicle in New Zealand before 1 July 2000, the design and location of fuel tanks do not incorporate a device to compensate the internal pressure without fuel overflow and without fuel spillage, even in the case of roll-over of the passenger service vehicle.

4. Fuel tanks and fuel lines are not:

a) corrosion-resistant, or

b) designed and constructed of durable, fuel-resistant material, or

c) securely mounted, or

d) protected from suspension or steering component movement, or

e) reasonably protected from collision damage.

5. Access to the fuel-tank filling inlet is not from outside the body of the passenger service vehicle.

6. A filling inlet does not have a leak-proof cap.

7. The design, construction and maintenance of the exhaust system does not ensure that:

a) emitted heat or fumes cannot harm the occupants of the vehicle, or

b) the outlet pipe is not shielded or located in a position where other road users, or passengers entering or exiting the vehicle, cannot be burned by the exhaust, or

c) the outlet pipe does not discharge on the left-hand side of the vehicle at a low level

d) the exhaust outlet may affect pedestrians.

8. The transmission on a vehicle is not of adequate strength and have appropriate performance characteristics for all conditions of loading and operation for which the vehicle was constructed.

9. The transmission on a vehicle has not been installed in accordance with the transmission manufacturer's instructions and maintained within safe tolerance of its original condition.

10. A device fitted to a vehicle to restrict the field of swing of a drive shaft in the event of a drive shaft failure has not been maintained within a safe tolerance of its original condition.

11. A modification to a vehicle has resulted in the vehicle's engine or transmission becoming unsuitable for the conditions of loading and operation for which the vehicle is modified.

12. A modification to a vehicle has adversely affected the performance of the vehicle's engine or transmission.

13. A modification to a vehicle that affects the performance of the vehicle's drive shaft has resulted in the drive shaft manufacturer's specified limits being exceeded.

14. Any new mountings are not at least the same strength as the original or the movement of the accelerator linkages is impeded in any way.

15. A component has been used that is not within the manufacturer's ratings.

16. Adequate protection from heat has not been provided for all hoses, electrical harnesses, fuel and hydraulic lines, electrical components, rubber/plastic components and any other heat sensitive components.

17. Engine mounts are not of sufficient strength to withstand the torsional and vertical loads.

18. Engine mounts are unable to restrict excessive engine movement.

19. Engine mounts have not been designed so that if they fail the engine will remain captive.

20. The engine mounts do not maintain sufficient clearance between the engine and the chassis/cab/body components.

21. The engine has not been mounted so as to maintain the correct alignment of the driveline.

22. Fuel lines have not been routed so that they are not affected by a heat source, for example the exhaust or the turbo charger.

23. Fuel lines are not adequately secured or protected from mechanical damage.

24. The exhaust system has been located under fuel tanks, or fuel or oil fillers.

25. The exhaust system does not expel the exhaust gases outside the vehicle perimeter.

26. The transmission does not have adequate capacity for the torque/power output of the engine.

27. Any openings required for the gearshift lever have not been adequately sealed to prevent exhaust gases and engine fumes entering the cabin.

28. The accuracy of the vehicle speedometer has been impaired by any modification or repair.

29. If the vehicle has an automatic transmission, the engine starter is not inoperative when the transmission lever is in a drive or reverse position.

30. The reverse lights do not operate when reverse gear is selected unless operated by an independent switch.

31. The transmission mounts are not of sufficient strength to withstand the torsional and vertical loads.

32. The transmission has not been mounted so as to maintain the correct alignment of the driveline.

33. The engine and transmission mounting method are not compatible, that is both flexible or both solid mounted.

34. The drive shaft has not been fabricated from one length of material between end fittings.

35. The drive shaft is not of sufficient strength to withstand the imposed loads.

36. The drive shaft is not correctly aligned within specifications.

37. The drive shaft has not been adequately balanced.

38. The maximum operating speed of the drive shaft is not within 65% of the critical or resonant speed of the drive shaft.

39. The drive shaft does not have sufficient clearance so that it will not come into contact with any part of the vehicle through the full suspension travel.

40. The universal joint has not been installed within the manufacturer's specifications or is not correctly phased.

41. The universal joint is not of sufficient strength to withstand the imposed loads.

42. The universal joint does not have sufficient clearance so that it will not come into contact with any part of the vehicle through the full suspension travel.

43. The length of the slip joint is not sufficiently long so that, through the full suspension travel, the joint does not bottom out or become disengaged.

44. The minimum spline engagement with the joint fully extended is less than the manufacturer's specifications or, in the absence of manufacturer's specifications 1.5 times the spline diameter.

45. The minimum spline end clearance with the joint fully contracted is less than the manufacturer's specifications or, in the absence of manufacturer's specifications, one spline diameter.

46. When road tested, the drive line has unacceptable vibrations within the design speed range.

47. When a vehicle has been repowered prior to entering the fleet the powerpack does not:

a) meet the emissions requirements of the **Emissions Rule**, or

b) have all the components such as cooling system, exhaust system and treatment, induction systems and electronic controls systems fitted as required by the manufacturer to meet the emissions requirements of the **Emissions Rule**

- See also Technical bulletin 17: Heavy vehicle power pack upgrades to meet emissions requirements.

48. When a vehicle has been repowered prior to entry onto the fleet the powerpack does not meet the emissions requirement of the **Emissions Rule** (see also Technical bulletin 17: Heavy vehicle power pack upgrades to meet emissions requirements).

49. When a vehicle has been repowered prior to entry onto the fleet the powerpack does not include all the components such as the cooling system, exhaust system including treatment, induction system and electronic control system fitted as required by the manufacturer to meet the emissions requirements of the **Emissions Rule** (see also Technical bulletin 17: Heavy vehicle power pack upgrades to meet emissions requirements).

50. An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the external diameter of the supply hose or pipe is larger than 8mm.

51. An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the device operates when the vehicle is moving.

52. An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the vehicle manufacturer does not allow it.

53. A vehicle that is modified by fitting an additional axle, removing an axle, replacing an axle with one that is not of the same make and model, or replacing the brake of an axle with one that is not of the same make and model has not been referred to a HV certifier with the brakes category (HVEK).

54. A powered vehicle with an hydraulic service brake has been fitted with an additional rear axle that does not have the same type of braking system as the original axle or an air operated disc brake as a service brake.

Summary of legislation

Applicable legislation

- **Land Transport Rule: Heavy Vehicles 2004**
- **Land Transport Rule: Passenger Service Vehicles 1999**
- **Land Transport Rule: Vehicle Exhaust Emissions 2007**

Passenger Service Vehicles Rule

Suspension and drive line (section 6.7)

1. Devices to protect against drive-shaft failure must be maintained within safe tolerance of their original condition.

Fire fighting and protection against fire

2. The design and construction of a passenger service vehicle must minimise the risk of fire.

3. Materials used in the construction and fittings of a passenger service vehicle:

a) must be such that, if they are ignited, the risk of emission of harmful fumes and gases is minimised, and

b) must not be of a type which would contribute to the rapid spread of a fire.

4. The exhaust system, including any turbo-chargers and any other heat sources, must be installed, located, shielded and ventilated so that:

a) no ignitable or heat sensitive materials could fall on the exhaust system or heat source, and

b) material adjacent to any hot surface forming part of, or connected to, the exhaust system or any other heat source must not, under any operating condition, be heated sufficiently to cause degradation.

5. The design of the engine installation and engine compartment must ensure that no fuel, oil or other combustible materials could accumulate in the engine compartment or drip on to any high temperature surface.

6. The engine compartment must be lined with, or made of, fire-resistant materials in a manner that complies with the engine manufacturer's specifications for minimum clearances.

7. The engine compartment of a heavy passenger service vehicle, with an engine positioned rearward of the front axle set, must be maintained to ensure that the clearance space between the lining or compartment walls and the engine or its ancillary components is maintained within safe tolerance of the clearance that existed when the engine was installed.

8. Devices to protect against drive-shaft failure must be maintained within safe tolerance of their original condition.

Fuel tanks and protection against fumes and gases (section 6.2)

9. Fuels for a passenger service vehicle and the vehicle's equipment must be carried in permanent fuel tanks.

10. The design and location of fuel tanks must:

a) incorporate a device to compensate the internal pressure without fuel overflow and without fuel spillage, even in the case of roll-over of the passenger service vehicle, except as specified in b) below,

b) for a vehicle which entered service as a passenger service vehicle in New Zealand before 1 July 2000, ensure that any fuel overflow will not accumulate on any part of the vehicle.

11. Fuel tanks and fuel lines must be:

a) corrosion-resistant, and

b) designed and constructed of durable, fuel-resistant material, and

c) securely mounted, and

d) reasonably protected from collision damage.

12. Access to the fuel-tank filling inlet must be from outside the body of the passenger service vehicle. Each filling inlet must be provided with a leak-proof cap.

13. The design, construction and maintenance of the exhaust system must ensure that:

a) emitted heat or fumes cannot harm the occupants of the passenger service vehicle, and

b) the outlet pipe is shielded or located in a position where other road users, or passengers entering or exiting the vehicle, cannot be burned by the exhaust, and

c) the outlet pipe does not discharge on the left-hand side of the vehicle.

Heavy Vehicle Rule

Transmission (section 3.4)

14. The transmission on a vehicle must be of adequate strength and have appropriate performance characteristics for all conditions of loading and operation for which the vehicle was constructed.

15. The transmission on a vehicle must be installed in accordance with the transmission manufacturer's instructions and maintained within safe tolerance of its original condition.

19. A device fitted to a vehicle to restrict the field of swing of a drive shaft in the event of a drive shaft failure must be maintained within a safe tolerance of its original condition.

Modification affecting engine and transmission (section 6.2)

17. A modification to a vehicle must not result in the vehicle's engine or transmission becoming unsuitable for the conditions of loading and operation for which the vehicle is modified.

18. A modification to a vehicle must not adversely affect the performance of the vehicle's engine or transmission.

19. A modification to a vehicle that affects the performance of the vehicle's drive shaft must not result in the drive shaft manufacturer's specified limits being exceeded.

Priority and protection of air brakes

20. The compressor must supply only the brake reservoirs with compressed air until the pressure in those reservoirs reaches the pressure specified by the vehicle manufacturer or the brake manufacturer, or, if such information is not available, two thirds of the maximum operational pressure specified by the vehicle manufacturer or brake manufacturer.

21. An air brake must have priority of the supply of compressed air from the brake reservoir.

22. An air-operated device may be connected to the air brake of a vehicle, only if:

> a) the brake is protected so that the operation or failure of the device cannot lower the pressure in [any service brake or parking brake reservoir(s)] below the pressure specified by the vehicle manufacturer or brake manufacturer, or, if such information is not available, two-thirds of its maximum operational pressure specified by the vehicle manufacturer or brake manufacturer, and
>
> b) the supply to the device is drawn from a reservoir separate from the service brake or parking brake reservoir(s) supplying the brake, except as specified in *23.*

23. Despite *22(b)*, an air-operated device may be supplied with compressed air from the service brake or parking brake reservoir(s), if:

> a) the operation of the device requires only a small amount of compressed air and it is supplied with compressed air by a hose or pipe with an external diameter not exceeding 8 mm; or
>
> b) the device is operated only when the vehicle is stationary; or
>
> c) the vehicle manufacturer allows it.

24. A vehicle that is modified by fitting an additional axle, removing an axle, replacing an axle with one that is not of the same make and model, or replacing the brake of an axle with one that is not of the same make and model, must either:

> a) be modified so as to continue to meet the technical and performance requirements of the approved standard in the Rule) with which the vehicle originally complied; or
>
> b) comply with all other applicable requirements in this Rule.

25. A powered vehicle with an hydraulic service brake may be fitted with an additional rear axle that has an air operated disc brake as a service brake.

Page amended **9 April 2018** (see **amendment details**)

4-5 PSV roof racks

Certifier categories: **HVEC** | **HMCD**

Reasons for rejection

1 The roof rack fitted to a PSV is not fitted and rated for that particular make and model of PSV, or

2. The roof rack fitted to a PSV is not rated and certified by a person authorised by the Agency to do so.

3. The roof-rack does not have a sign or plate on the left-hand side stating:

a) the purpose of the roof-rack, if other than for general baggage, or

b) the maximum weight it is allowed to carry, or

c) the manufacturer of the roof-rack, or

d) either of the following:

i. identification of the passenger service vehicle to which it is fitted (make, model and registration number, or Vehicle Identification Number, or chassis number), or

ii. if rated and certified either by the vehicle manufacturer or by a person authorised by the NZTA to do so, for a vehicle model, the plate need not identify the individual vehicle, but must identify the approval for that vehicle model

4. A PSV fitted with a roof rack has been certified that it meets the static tilt requirements and the roof rack was not fully laden.

Summary of legislation

Applicable legislation

- **Land Transport Rule: Passenger Service Vehicles 1999**

Passenger Service Vehicles 1999 (section 7)

Roof-racks

1. The roof-rack must:

a) be fitted and rated as appropriate for that particular make and model of passenger service vehicle, or

b) be rated and certified by a person authorised by the NZTA to do so, and fitted in accordance with that authorised person's instructions.

2. The roof-rack must have a sign or plate on the left-hand side stating:

a) the purpose of the roof-rack, if other than for general baggage, and

b) the maximum weight it is allowed to carry, and

c) the manufacturer of the roof-rack, and

d) either of the following:

i. identification of the passenger service vehicle to which it is fitted (make, model and registration number, or Vehicle Identification Number, or chassis number), or

ii. if rated and certified either by the vehicle manufacturer or by a person authorised by the NZTA to do so, for a vehicle model, the plate need not identify the individual vehicle, but must identify the approval for that vehicle model

3. A motor vehicle which entered service as a passenger service vehicle in New Zealand on or after 1 July 2000 and is fitted with a roof rack must meet the stability requirements under the following conditions of static tilt:

- The roof-rack must be loaded with the maximum permitted load (see **section 7-2**).