Correct as at 6th June 2026. It may be superseded at any time.

Extract taken from: Heavy vehicle specialist certification > Structure > Chassis frame

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**)