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Section J — Overview

1. Description

This section of Vehicle Standards Bulletin 6 (VSB6) relates to the installation of bodies to vehicle chassis. It specifies the minimum design and performance requirements for the installation of a body onto a vehicle. Modifications that could affect the body mounting system include:

- change of body type
- change of body size
- extended or shortened wheelbase
- fitting of an additional axle
- fitting of chassis reinforcements or adaptations
- chassis extension, such as increased rear overhang.

It consists of the following modification codes:

J1	Body mounting <ul style="list-style-type: none">• mounting of bodies of all types to a motor vehicle or trailer• modification or replacement of body mountings• fitting of body equipment (e.g. roll-over tarps) not covered by other sections of VSB6.
J2	Truck-bus body fitting <ul style="list-style-type: none">• fitting of a bus body (i.e. a passenger carrying pod) onto a truck cab-chassis, with accompanying change of gross vehicle mass (GVM) (Modification Code S1), seating capacity (Modification Code K1) and of ride height (Modification Code F1)• mounting of a complying bus body on a complying rolling chassis.
J3	Fitting of roll-over or falling object protection system <ul style="list-style-type: none">• installation of an external roll-over protection system (ROPS) or a falling object protection system (FOPS) on a motor vehicle in accordance with the ROPS/FOPS manufacturer's instructions where these instructions meet the requirements of Modification Code J3.

Most vehicle manufacturers issue instructions or recommendations for body building and mounting, (typically called body builders guide). The vehicle manufacturer's recommendations are to be the primary source for modifications. This section of VSB6 is intended for use only when the vehicle manufacturer's recommendations are no longer available or applicable.

For bodies of specialised vehicles, such as aluminium tanks, the body manufacturer will provide mounting guidelines that are the primary source for installation instructions and are to be adhered to, along with the chassis manufacturer's guidelines.

A bus body must be installed on a motor vehicle chassis in accordance with both Modification Code J1 **and** certified for bus related requirements in accordance with Modification Code J2.

2. Related Australian Design Rules

The Australian Design Rules (ADRs) relevant to this section include:

ADR no.	Title
13/..	Installation of Lighting and Light-signalling Devices on other than L-Group Vehicles
42/..	General Safety Requirements
43/..	Vehicle Configuration & Dimensions

3. ADR dimension limits

Ensure all dimensions of a vehicle, including internal (where applicable) and external, are in accordance with the limits specified by the applicable in-service heavy vehicle regulator. When considering compliance with dimension limits, loading of the vehicle must be taken into account. For example, loading of a vehicle fitted with a tipper body may result in bulging of the sides that result in the vehicle exceeding width limits. To prevent this, less flexible materials or structures that support the body may need to be used.

Some jurisdictions may allow these dimensions to be exceeded under certain circumstances or conditions through notices or permits. Consult your heavy vehicle regulator for advice.

✎ The installation of a body or body equipment that exceeds the dimension limits is not to be certified under this Section of VSB6.

Where the relevant heavy vehicle regulator has issued a dimension exemption, modification may be certified in accordance with VSB6 Section J.

4. Record keeping

The person responsible for certifying the modification should:

- collate complete records, including drawings, calculations, test results and copies of the appropriate issue of Australian Standards and ADRs
- retain the records for a minimum of seven years after commissioning of the modified vehicle
- make the records available upon request for inspection by officers of the relevant federal, state or territory authority or relevant heavy vehicle regulator.

Reports and checklists

The person responsible for certifying the modification must complete and record the following reports and checklists as applicable:

J1 Checklist	Body mounting
J2 Checklist	Fitting of truck-bus body
J3 Checklist	Fitting of roll-over or falling object protection system

5. Design requirements


Advanced braking systems

Advanced braking systems are an important safety feature fitted to many new vehicles.

Advanced braking systems are programmed by the vehicle manufacturer and are specific to the vehicle to which they are fitted. Changes made to the vehicle, such as engine, tyre size, steering control, suspension characteristics, vehicle mass and its distribution, may impact the performance of the advanced braking system.

Exercise extra caution when modifying vehicles fitted with advanced braking systems. Electric braking systems may be known as:

- electronic stability control (ESC)
- electronic stability program (ESP)
- vehicle stability control (VSC)
- dynamic stability control (DSC)
- vehicle stability assist (VSA)
- roll stability control (RSC)
- roll control system (RCS)
- electronic braking system (EBS)
- trailer electronic braking system (TEBS).

 Advanced braking systems and their components may be easily damaged by common modification, maintenance and servicing techniques, such as the use of rattle guns within one metre of the sensors. When undertaking any work on a vehicle fitted with an advanced braking system, ensure all modifiers are familiar with these systems and the precautions that must be taken.

Ensure that before undertaking any modification on a vehicle that is fitted with an advanced braking system the modifier and approved vehicle examiner (AVE) consult with the vehicle manufacturer to determine the impact on the system.

Modification Code J1 — Body mounting

1. Scope

Modifications covered under this code:

Covered

- mounting of bodies of all types to a motor vehicle or trailer
- modification or replacement of body mountings
- fitting of body equipment (e.g. roll-over tarps, toolboxes) not covered by other sections of VSB6
- mounting of complying omnibus bodies on complying rolling chassis (in conjunction with Modification Code J2).

Not covered

- mounting of bodies in a manner that is likely to lead to failure of the vehicle chassis
- mounting of bodies in a manner that provides insufficient restraint of the body and any possible loading under any operational conditions
- fitting of omnibus bodies that are not also certified using Modification Code J2
- mounting of bodies for specific vehicle category ADR compliance, e.g. bus roll-over protection
- fitting of any body intended for the carriage of people, except when certified to Modification Code J2
- mounting of fifth wheels/turntables (see VSB6 Section P — Tow couplings)
- mounting of ROPS or FOPS to a motor vehicle (see VSB6 Modification Code J3)
- installation of vehicle mounted lifting systems (see VSB6 Section R — Vehicle mounted lifting systems).

❗ The mounting of a truck-bus body must be performed and certified in accordance with this code and also certified as a bus in accordance with VSB6 Modification Code J2.

2. Related standards

Modified vehicles must comply with all ADRs, Australian Standards, acts and regulations. Below are some but not all of the areas that may be affected by the modifications in this code and require certification testing or evidence to demonstrate compliance.

The certifier must ensure that the modified vehicle continues to comply with all related Australian Design Rules.

This...	Must comply with...
Lights	ADR 13/..
Mudguards	ADR 42/..
Vehicle dimensions	ADR 43/..
Exhaust repositioning	ADR 42/.. VSB6 Modification Code A4

3. Certification procedure

The certification procedure for this modification code is as follows:

1.	Modifier	Determine if the modification is within manufacturer specifications. <ul style="list-style-type: none">• If yes, the modification will need to be done in accordance with manufacturer specifications.• If no, the modification will need to be done in accordance with this modification code.
2.	Modifier	Consult with an accredited J1 AVE for guidance on how to perform the modification.

3.	Modifier	Perform modification in accordance with AVE advice and this code.
4.	Modifier	Organise approval inspection by an accredited J1 AVE.
5.	J 1 AVE	Perform inspection, complete J1 checklist and determine if compliance has been achieved. <ul style="list-style-type: none">• If yes, proceed to step 6.• If no, do not proceed, advise modifier rework is required to ensure compliance. Return to step 2.
6.	J1 AVE	Issue modification certificate, affix modification plate, and submit paperwork as required by the relevant AVE registration scheme.

AVEs must be satisfied that the vehicle modification requirements are being met. It is advised that before modifications are carried out they are discussed with the certifying AVE.

4. Compliance requirements

Required:

- Ensure all modifications are performed and certified in accordance with the relevant sections of VSB6.
- Ensure axle loads do not exceed the lesser of the manufacturer's prescribed axle capacities or jurisdictional legal load limits (unless exempted by the relevant heavy vehicle regulator).

❗ The rear overhang and loading space must comply with ADR and jurisdictional, dimension and loading requirements. See section below, Recommended dimensions — NB and NC vehicles.

Recommended:

- Obtain the correct axle loading for general freight bodies that are configured for loading other than water level loading:
 - mark the body clearly with a securely mounted marker at the longitudinal point for the load centre of gravity at maximum legal GVM
 - use this load centre of gravity marker to indicate the point about which the vehicle's payload is to be evenly distributed.
- Ensure markers used to indicate the permissible load at points are highly visible and designed to last the life of the body.
- Ensure the body is marked with maximum payload capacity.

5. Design requirements

Before fabricating or fitting a truck body, consider how the vehicle will operate following the proposed modification, and how changes to size and weight might affect its safety or performance.

For the vehicle to be as stable as possible when cornering, the centre of gravity of a vehicle should be as low and as near to the centre of the vehicle as possible. The centre of gravity is the point about the cab chassis at which the mass is centred. Any part of the body or equipment added or removed from the vehicle will affect the centre of gravity.

Required:

- Use the vehicle manufacturer's manual as the main source of information for modifying the vehicle body.
- Apply a design factor of safety of three to body mounting components.
- When designing the modification consider the following:
 - distribution of the loads across the axle and group(s), refer to VSB6 Section H — Overview
 - chassis strength, refer to VSB6 Section H — Overview

- where the body modifications require GVM re-rating, ensure the modifications are certified in accordance with VSB6 Section S — Vehicle rating
- the overall dimensions of the modified vehicle.
- Do not let the body project beyond the end of the chassis by more than 1.5 times final chassis depth unless the body structure is self-supporting at full load.
- Ensure the modification achieves optimal centre of gravity (see Figure 1).



Figure 1: Example of centre of gravity

- Endeavour to mount heavy parts of the body or equipment as low and symmetrically about the chassis as possible. This will assist in minimising the centre of gravity height.
- Ensure the body attachment can withstand and evenly distribute forces imposed by payload and body weight during worst case conditions such as full braking and overturning moments.
- Ensure protruding weld beads do not make contact with the top flange of the chassis when in operation. This includes components such as body sub-frames or the bottom side of caps welded to body longitudinals.

Recommended:

- Ensure that the body sub-frame extends for the entire length of the body without breaks or joins.
- Use standard manufacturer mountings and attachment methods.
- Where point load situations occur, (e.g. vehicles fitted with cells/scales), install the body in accordance with manufacturer guidelines.
- Ensure the front end of the sub-frame offers progressive load bearing transition to the chassis (see Figure 2 for two methods of preventing stress concentration).

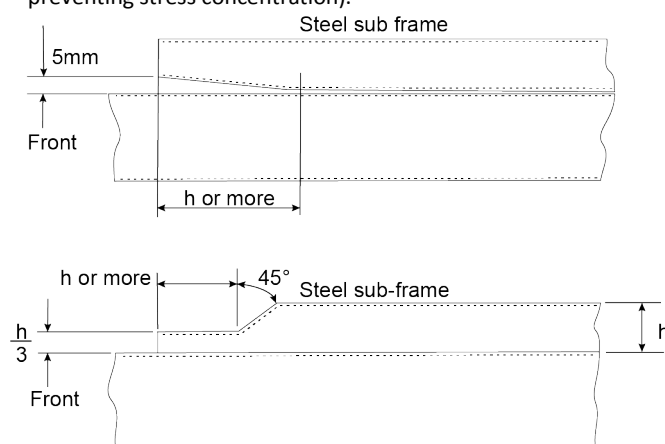


Figure 2: Examples of progressive load bearing transition

- Unless stated otherwise in the vehicle manufacturer manual, ensure that body loads are transmitted directly to the web of the chassis.
- Allocate spacing of 900 mm for body mount including but not limited to outrigger mounts, fish plates and U-bolts, but consider altering this to suit the installation if need be.
- Do not allow the body mounting attachment, including welding or bolts, to be closer than 50 mm to any spring hanger bolt or rivet.
- Use suitably designed vibration isolators between the body and chassis mounting brackets to reduce noise and vibration within the cab and allow for slight misalignment at the body brackets.

- Avoid using U-bolts for body/sub-frame attachments as outlined below in '6. Body mount installation requirements'.
- Do not locate body mounting attachments within the shaded areas of Figures 3 and 4, unless the manufacturer's recommendations state otherwise.
- Ensure the design and installation of the body does not negatively impact on vehicle functions access for maintenance purposes.

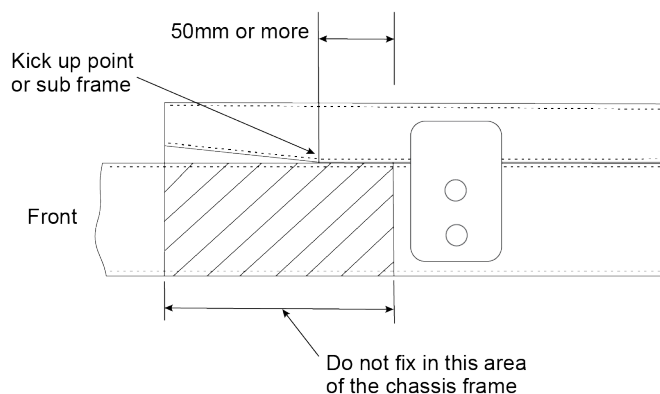
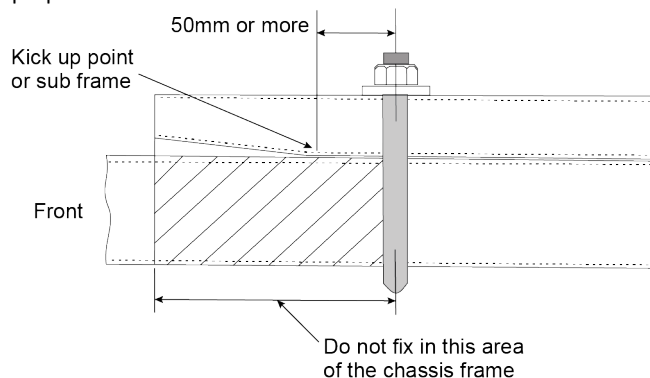


Figure 3: Attachment front end of sub-frame

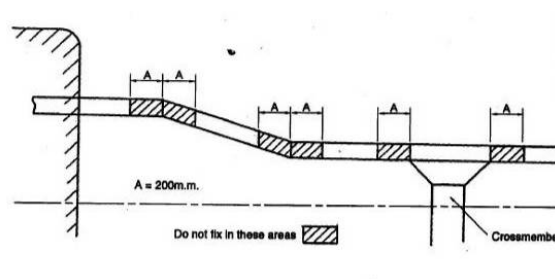


Figure 4: Attachment locations chassis

Wheelbase, rear overhang

Use load distribution calculations and intended use to determine wheelbase, rear overhang and overall body length. Where these calculations cannot be determined use water level load conditions.

Water level loading is calculated assuming a homogenous load evenly distributed over the load space until the vehicle reaches GVM. Axle loads can then be calculated in this condition.

6. Installation requirements

Required:

- When components made of dissimilar metal are bolted together, use an isolating compound or other approved means to prevent corrosion.
- Drill frame side members for body mount attachment in accordance with VSB6 Section H — Chassis.
- Use standard bolts with a minimum ISO Grade 8.8 (or SAE Class 5) and appropriate grade nuts for fastening body mounts to the

chassis (see AS 1110.1). The use of vibration-proof fasteners such as Huck bolts is acceptable, provided the bolt manufacturer's specifications ensure that they are of equivalent strength and toughness.

Recommended:

- Ensure the lower attachment hole on all body mountings is below the neutral axis of the chassis.
- Ensure the bottom edge of the body mount is as near as possible to the web of the chassis to prevent frame cracking.
- Locate the body mountings so that:
 - stress concentrations are kept to a minimum in relation to changes in chassis section, suspension mountings and chassis attachments
 - regular inspection and maintenance can be carried out on mountings and adjacent vehicle parts
 - sufficient clearance of mountings between moving parts such as tail shafts, suspension links, etc.

U-bolt mounting

Where U-bolts are used as the method of fixing the body to the chassis there is no positive location. This means friction and high clamping forces are relied on to prevent movement.

Ensure the manufacturer guidelines are referred to as the use of U-bolts may not be endorsed, particularly for use in conjunction with heat treated chassis rails.

Avoid using a U-bolt to attach a body to the chassis for the following reasons:

- U-bolts work loose over time.
- Runner shrinkage and wear over time can occur, resulting in body movement and damage.
- The load is carried on the top and bottom of the flange of the chassis, rather than the web.
- The body longitudinals stiffen the frame thus reducing the flexibility along part of the frame length.
- U-bolts holding body longitudinals are often over tightened causing:
 - buckling of the frame flange
 - reduced chassis strength
 - frame distortion.
- Positioning metal spacers between top and bottom flanges prevents the flange being buckled, causing localised:
 - loss of flexibility
 - stiffening
 - increased stress.

If U-bolt mountings are unavoidable, ensure the following:

Required:

- Use a minimum of three U-bolts per side of the chassis with a maximum pitch spacing of 1.2 m and a minimum U-bolt diameter of:
 - bodies up to 2 t load-carrying capacity = 12 mm
 - bodies over 2 t load-carrying capacity = 16 mm.
- Use ISO Grade 4.6 steel U-bolts in preference to others.
- Do not distort the frame, particularly the flanges.
- If the vehicle does not have a box type frame, insert metal spacers between the top and bottom flanges of the chassis to prevent distortion when U-bolts are tightened.
- Do not use wooden spacers as these can shrink and drop out.
- Secure spacers in place using the U-bolts as shown in Figure 5.
- If wooden runners are used, protect them from direct pressure of the U-bolts either by steel capping under the bolt or by a shaped spacer, as shown in Figure 5.

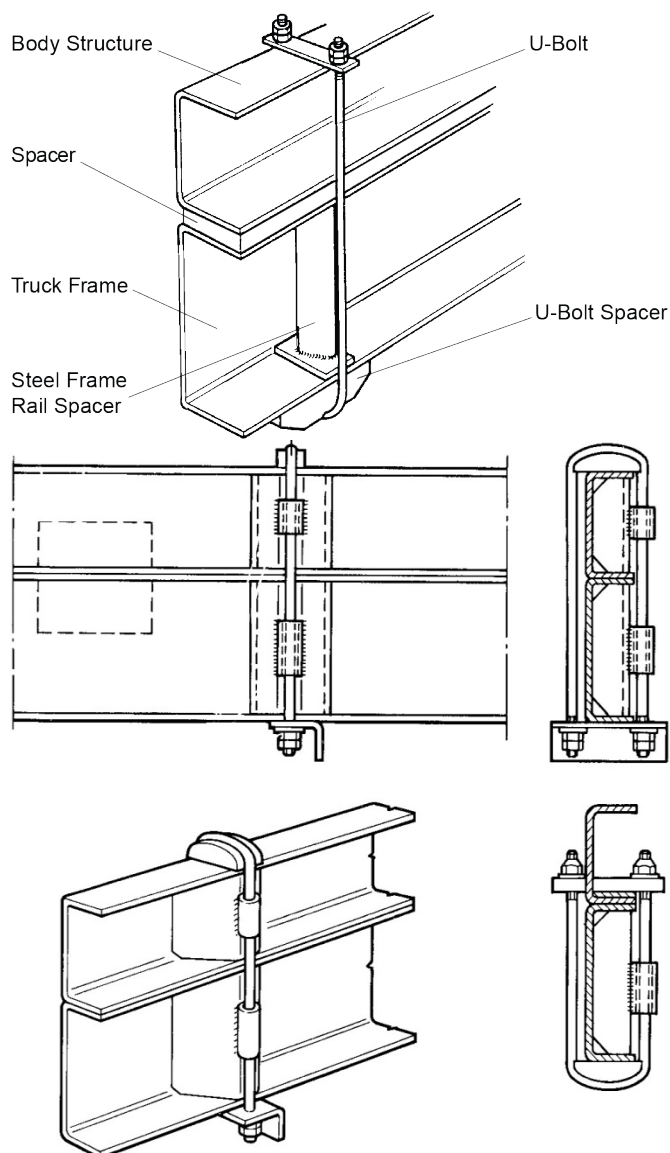


Figure 5: Typical U-bolt body mountings

- Locate the body on the chassis to prevent it from moving during violent braking by using at least four (4) outrigger mounts or fish plates.
- Locate a bracket or fish plate at the front and rear of the body on both sides of the vehicle.

Recommended:

- Allocate spacing of 900 mm between U-bolts, but consider altering this to suit the installation if need be.

Body mount type requirements

It is important to use the correct body mount type in relation to chassis construction and body type. When selecting mounts for platform, tipper and tanker type bodies seek or apply the manufacturer's recommendations and if these are unavailable, adhere to the following guidelines.

If the method of body mounting differs from that recommended by the vehicle or body manufacturer or VSB6, obtain suitable engineering designs from a professional engineer registered with a professional registration body and retain these designs with the modification certification.

Flexible bodies — platform bodies

When a body that is relatively flexible under beaming and torsional loads is fitted to a conventional ladder-type chassis for operation on normal road surfaces, mountings that firmly attach the body to the chassis can be used.

The two preferred mounting systems are outrigger mount and fish plate systems, with the best option for flexible bodies being outrigger mounting brackets (see examples in Figure 6).

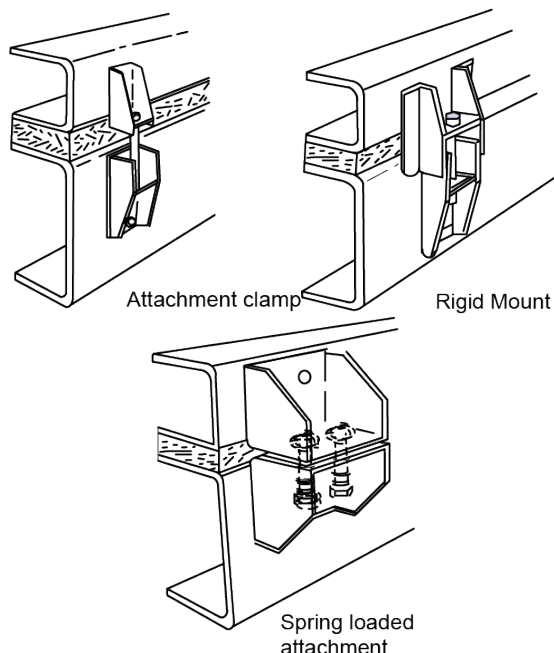


Figure 6: Typical body mounting outrigger brackets, specific to outrigger type mounts

Outrigger mounts

Required:

- Attach outrigger mounts securely to the web of the chassis.
- Provide a clearance space between the frame and the body longitudinals and cross-members.
- Prevent flexing of the web by extending the bracket at least half-way down the web of the frame.
- Ensure bolts joining the frame brackets to the body bracket do not carry shear loads by using brackets designed to limit movement under acceleration and braking (see Figure 6).
- Use bolts with a minimum ISO Grade 8.8 (or SAE Class 5) and appropriate grade nuts (see AS 1110.1). The use of vibration-proof fasteners of equivalent strength such as Huck bolts are an acceptable alternative.
- If using alternative fasteners, check the bolt manufacturer's specifications to ensure that they are of equivalent strength and toughness.

Recommended:

- To facilitate body fitting, enable one pair of mounts to have plain holes to provide fore and aft body location. The remaining mounts may have slotted holes.
- Bolt mounts to the chassis at intervals of 900 mm (this may be altered to suit the installation).

Fish plate mounts

If space available along the side of the chassis precludes the use of outrigger brackets, the body may be attached using fish plates (see Figure 7).

Required:

- Attach fish plate mounts securely to the web of the chassis.
- Prevent flexing of the web by extending the bracket at least half-way down the web of the frame.

- Where attached using bolts, use bolts with a minimum ISO Grade 8.8 (or SAE Class 5) and appropriate grade nuts (see AS 1110.1). The use of vibration-proof fasteners of equivalent strength such as Huck bolts are an acceptable alternative.
- If using alternative fasteners, check the bolt manufacturer's specifications to ensure that they are of equivalent strength and toughness.

Recommended:

- To facilitate body fitting, enable one pair of mounts to have plain holes to provide fore and aft body location. The remaining mounts may have slotted holes.
- Bolt mounts to the chassis at intervals of 900 mm (this may be altered to suit the installation).
- Provide a clearance space between the frame and the body longitudinals and cross-members.
- If necessary, place a spacer between the chassis and body.

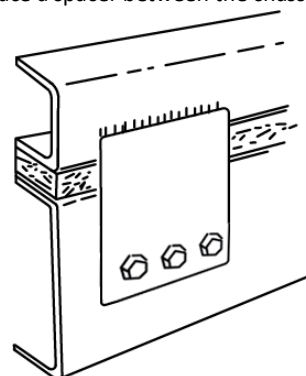


Figure 7: Typical fish plate attachment

Short rigid bodies — tipper bodies

Short-rigid bodies mounted on short wheelbase vehicles, such as tippers, should have a sub-frame mounted securely on the chassis. The sub-frame should be mounted by outrigger or fish plate mounts, this is to provide a strong integral structure for mounting attachments such as hoist, tipper body pivots and guide brackets.

All loads should be distributed over the maximum possible length of the chassis. For a front mounted hoist, the base of the cylinder should be pin-jointed to a cross-member that is attached to the side rails with bolts through drilled and reamed holes in the vertical webs of the chassis.

Typical support bracket

Figure 8 shows a typical installation where the ram force (F) acts at a distance (L) from the centre of the bolting configuration and causes a torsional moment ($F \times L$) that must be resisted by the attaching bolts.

Increasing the number of bolts or the spacing of these mounting bolts (b and d), increases the resistance offered by the joint. Using fewer bolts and a larger spacing, spreads the load over a greater area of the frame. A reduction in dimension (L) will also reduce the torsional moment about the mounting.

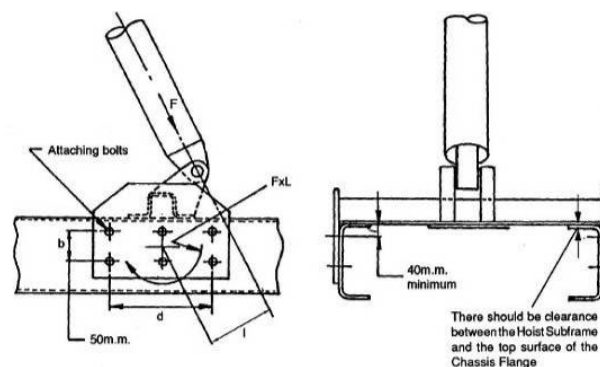


Figure 8: Typical support bracket

Required:

Tipper bodies that have a form of hoist and as such must meet the following requirements, including:

- Ensure tipper bodies fitted to motor vehicles and trailers comply with all the relevant requirements of AS1418.8 including the 'tip truck hoisting systems' section.

🔍 The NHVR has introduced a moratorium on the above requirement for more information refer to Vehicle Standards Guide 17 (VSG17)

- Ensure all hydraulic hoist systems contain burst protection that will, in the event of hose rupture or pipe fracture, prevent the movement of loadbearing hydraulic cylinders.
- Mount the brackets for the tipping pivot so that the load is evenly distributed across the chassis.
- Mount these pivots as near as practicable to the rear suspension to reduce loads applied to the chassis during tipping operation.
- Restrain the forward section of the tipping body across the vehicle using suitable guides.

Recommended:

- Tipper bodies fitted to motor vehicles and trailers comply with relevant requirements of AS1418.8 including the 'tip truck hoisting systems' section.
- Use longitudinal packers on the chassis to distribute tipper body loads wherever practicable.
- For tipper bodies without longitudinal packers, keep supports on the chassis for each body cross-member at least 450 mm in length.
- Provide vertical adjustment or resilient bearer blocks to ensure even distribution of load between all supports. Correctly designed support brackets (see Figure 9) allow the centre line of the body-runners to pass through the centre of the bracket.

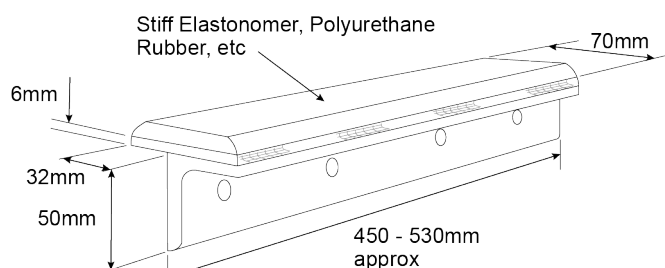


Figure 9: Typical support bracket

Body props**Required:**

- Ensure hoist systems also include an independent mechanism to retain the hoist in the raised position in accordance with and meeting the requirements of AS 1418.8 (i.e. body props).

Recommended:

- Where a body prop is installed, ensure its design and installation is validated by a competent and suitably experienced engineer.
- Ensure that the design of impact locations are considered, including ensuring that it is not possible to mistakenly place the prop in a location at which it is not effective.
- Ensure that the body prop is permanently connected to the vehicle and readily accessible.
- Ensure that body props can be operated independently and without special skill, strength, protective equipment or protective clothing, or tools.

Long and rigid bodies — road tank vehicles

Long and rigid bodies, such as road tank vehicles, may need greater relative movement between body and frame while retaining chassis flexibility. A mounting system with three or five point resilience is preferred (see Figure 10).

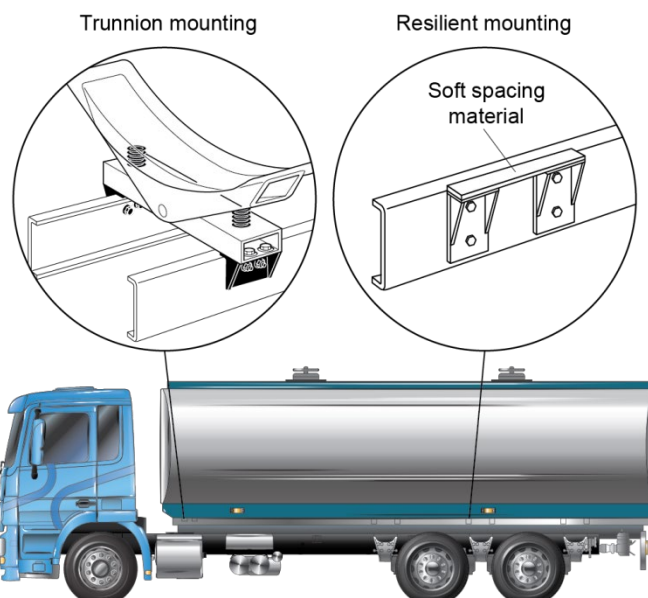


Figure 10: Typical example of tanker mounting

Recommended:

- Ensure brackets are strong enough to support the load safely.
- Ensure the front mounting is a special cross-member with a centrally located trunnion to support the tank and that the mounting is located as far forward as possible.
- Place the second pair of mounting brackets as close as possible to the foremost rear suspension bracket. A smaller pair of mounting brackets should also be positioned adjacent to the rearmost rear suspension hanger bracket (see Figure 11).

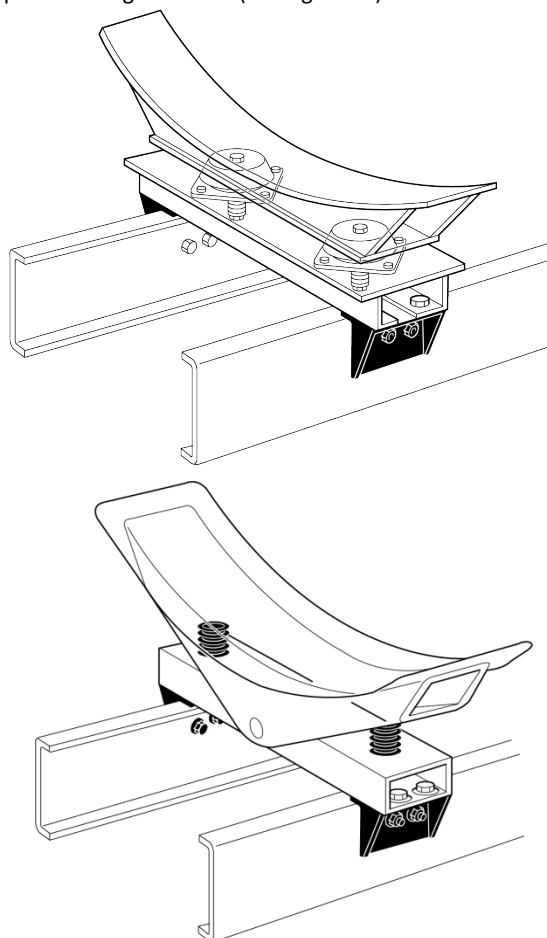


Figure 11: Details of a typical front mounting bracket

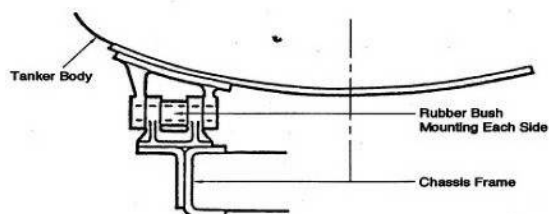


Figure 12: Details of a typical rear mounting bracket

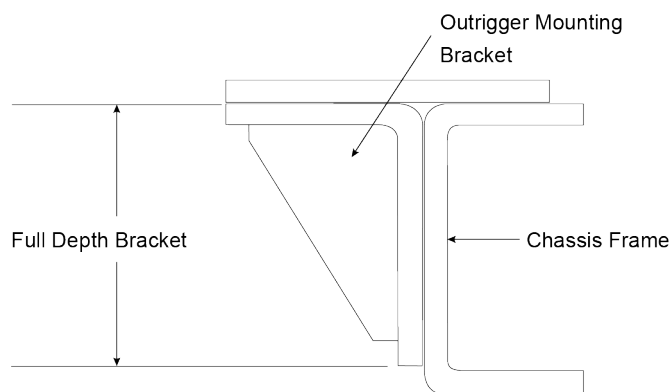


Figure 13: Details of a typical chassis mounting bracket

Alternative mounting for road tank vehicles

Rigid type mounting systems may be used, provided that the attachments are sufficiently flexible and suitably located to allow the chassis to flex. If these mountings are arranged in a three-point layout (see Figure 14, Typical three-point mounting) or a four-point diamond plan (see Figure 15, Typical four-point mounting), the chassis is free to deflect torsionally with no undue stress concentrations in either the chassis or the body.

Required:

Due to the large concentrated loads that result from these mounting methods, use substantial load bearing cross-members.

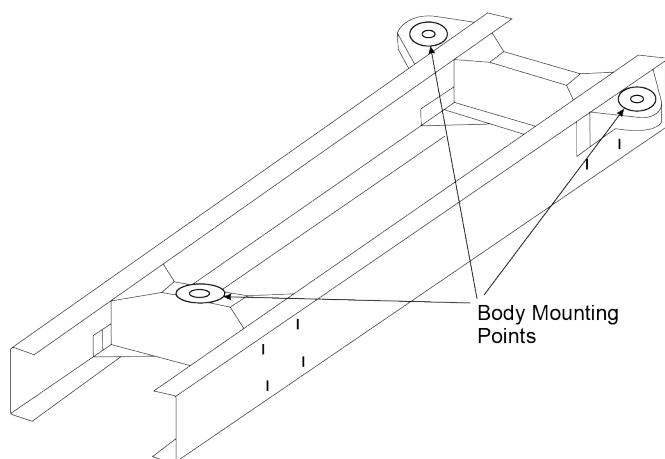


Figure 14: Typical three-point mounting

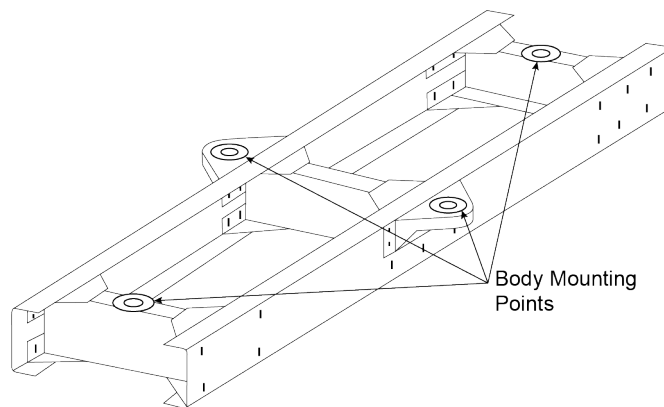


Figure 15: Typical four-point mounting

Road tank vehicles (dangerous goods)

Required:

- If a road tank vehicle is to carry liquid dangerous goods, ensure it satisfies the special requirements outlined in the Australian Code for the Transport of Dangerous Goods by Road and Rail.

Recommended:

- Consult officers of the relevant state or territory authority controlling transport of the particular dangerous goods.

Semi-rigid bodies

Required:

- Ensure vertical compliance allowances are provided in the body mountings of vehicles where rigidity limits the ability of the frame to resist beaming and twisting. This can be achieved by fitting resilient mountings or mountings with slotted holes and friction inserts. Resilient mountings may comprise a steel spring or a rubber bush and are usually used in conjunction with outrigger brackets (see Figure 16).

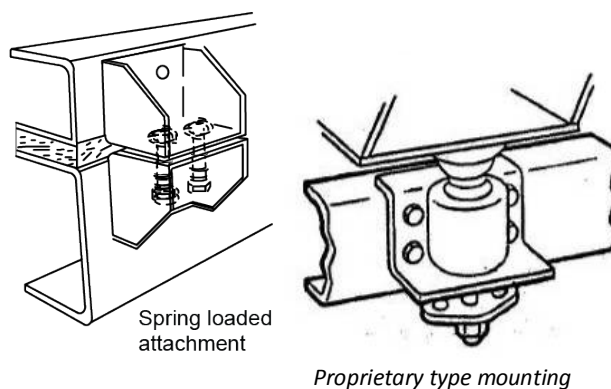


Figure 16: Typical resilient mountings

- If necessary, provide brackets or lugs engaging frame side rails or cross-members for body location and to resist horizontal forces

(see Figure 17).

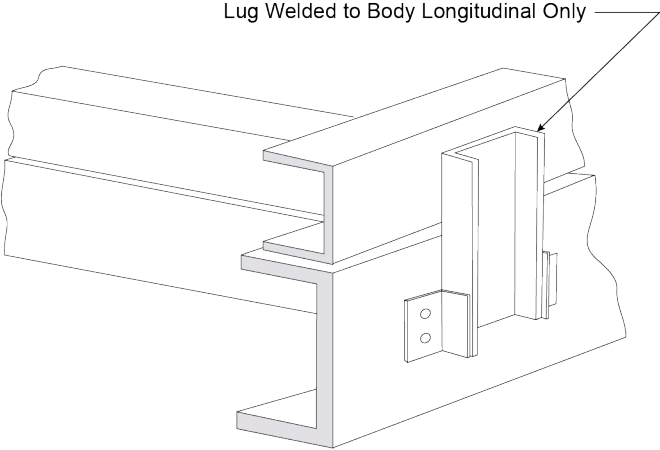


Figure 17: Additional horizontal restraint used with some body mountings

- Use mountings suited to occasional large beaming or torsional frame deflections to carry the body load on the top of the frame or bracket and allow the retaining bolts to move vertically upwards in a slotted hole against the resistance of a friction pad clamped between the frame and the bracket (see Figure 18).

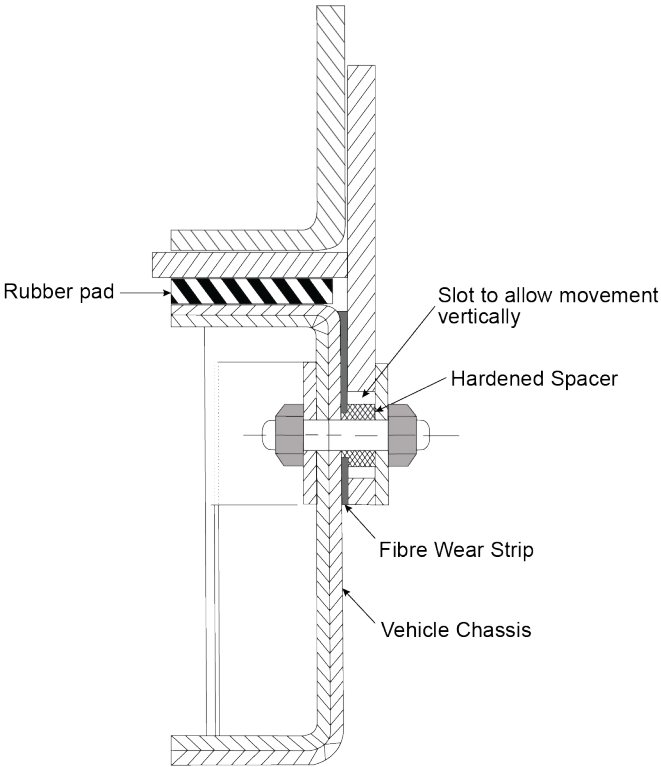
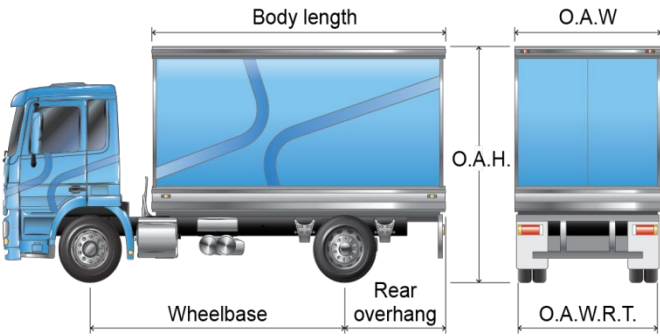


Figure 18: Body mounting with vertical compliance and friction clamping

Recommended dimensions — NB2 and NC vehicles

Outlined below are recommended dimensions to maintain the safety and integrity of the vehicle after the body is fitted and if the original vehicle manufacturer’s advice is not available.



- O.A.W.: Overall width
- O.A.H.: Overall height
- O.A.W.R.T.: Overall width across rear tyres

Figure 19: Maximum recommended dimensional limits

Dimension limits

Recommended:
Ensure all dimensions of a vehicle, including internal (where applicable) and external, are in accordance with the limits specified by the applicable in-service heavy vehicle regulator.

Body overall width	$\leq \text{O.A.W.R.T.} + 300 \text{ mm}$, unless specified otherwise by the manufacturer. Do not allow width to exceed 2.5 m, unless exempted by the relevant regulator. If body width exceeds maximum recommended dimension of $\text{OAWRT} + 300 \text{ mm}$, seek the advice of the vehicle manufacturers on recommended tyre pressures and record this on modification records.
Overall height	$\leq 1.85 \times \text{O.A.W.R.T.}$, unless specified otherwise by the manufacturer. Do not allow height to exceed 4.3 m, unless exempted by the relevant regulator.
Rear overhang	Must be the lesser of 3.7 m or 60% wheelbase, unless exempted by the relevant regulator.
Overall length	Must not exceed 12.5 m, unless exempted by the relevant regulator.

J1 Checklist — Body mounting (example)

J1 Checklist — Body mounting

📌 This checklist is for use by approved vehicle examiners (AVEs) when assessing modifications relating to body mounting.

Vehicle and modifier details

Vehicle make:	Vehicle model:	Month and year of manufacture:
VIN (if applicable):	Vehicle chassis no. (if applicable):	Vehicle modifier (company name):

Advanced braking systems

Braking systems	Check Yes, No, N/A as applicable:	Yes	No	N/A
1 Is the advanced braking system (where fitted) un-affected or re-certified after the vehicle modification?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Modification details

Modification criteria	Check Yes, No as applicable:	Yes	No
1 Has the modification been performed in accordance with the manufacturer's guidelines?		<input type="checkbox"/>	<input type="checkbox"/>

Installation details

General body installation	Check Yes, No, N/A as applicable:	Yes	No	N/A
1 Is the vehicle within the maximum allowable dimensions as prescribed by the Australian Design Rules and jurisdictional mass, dimension and loading?		<input type="checkbox"/>	<input type="checkbox"/>	
2 Is the attachment of the body capable of supporting the maximum loads imposed by the payload and the body weight during worst case conditions, while evenly distributing the load throughout the chassis?		<input type="checkbox"/>	<input type="checkbox"/>	
3 If body mounting brackets are used, are they bolted to the chassis rail web as required by this modification code or otherwise done in accordance with the vehicle manufacturer's guidelines or in accordance with a suitable engineering design?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Does the front end of the body sub-frame give a progressive load bearing transition to the chassis?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Are the body mounting attachments (fish plates, U-bolts etc.) in appropriate locations and spacing along the chassis and body sub-frame?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 If U-bolts are used, and the vehicle does not have a box type frame, are metal spacers inserted between the top and bottom flanges of the chassis rail to prevent distortion of the flanges below the U-bolts?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 If U-bolts are used with wooden runners, are the runners protected from U-bolt damage by steel capping or shaped spacers under bolts?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 If U-bolts are used, are at least four (4) outrigger brackets or fishplates used, one on each side of the vehicle at the front and rear?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tipper	Check Yes, No, N/A as applicable:	Yes	No	N/A
9 Is the design and installation of the ram mounting sufficient to withstand the maximum ram force and the torsional moment from the ram force?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 Does the tipper body meet the requirements of AS 1418.8?				
11 If the tipper body uses a hydraulic hoist system, does the system contain burst protection?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 Are the brackets for the tipping pivot mounted in a manner that evenly distributes the loads into the chassis?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 Is the forward section of the tipping body transversely restrained by guides?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 Are body props meeting the requirements of AS 1418.8 fitted?				
Rigid type body installation (i.e. road tank vehicles)	Check Yes, No, N/A as applicable:	Yes	No	N/A
15 Does the mounting system for the tank accommodate the torsional stiffness of the tank while still retaining the chassis frame flexibility?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16 Are the mounting brackets of sufficient strength to safely support the load?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Road tank vehicles carrying liquid dangerous goods	Check Yes, No, N/A as applicable:	Yes	No	N/A
17 Does the road tank vehicle meet requirements of the Australian Code for the Transport of Dangerous Goods by Roads and Rail?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Vehicle chassis no./VIN:	Date:	Signed:

J1 Checklist — Body mounting

✎ This checklist is for use by approved vehicle examiners (AVEs) when assessing modifications relating to body mounting.

Compliance

Modification	Check Yes, No as applicable:	Yes	No
1 Does this modification meet all the requirements of the manufacturer's guidelines / Modification Code J1?		<input type="checkbox"/>	<input type="checkbox"/>
2 Is the quality of the work to an accepted industry standard?		<input type="checkbox"/>	<input type="checkbox"/>
3 Have all of the modification details and all calculations applicable to the modification been recorded in accordance with the record keeping requirements of VSB6?		<input type="checkbox"/>	<input type="checkbox"/>
4 Does the modified vehicle continue to comply with all affected Australian Design Rules?		<input type="checkbox"/>	<input type="checkbox"/>

Authorisation

Other than modification criteria, if the answer to any relevant question is NO the modification is not acceptable.			
Comments:			
Examined by:	Company (if applicable):		AVE no.:
Signed:	Modification certificate no.:	Modification plate no.:	Date:

Vehicle chassis no./VIN:	Date:	Signed:

Modification Code J2 — Truck-bus body fitting

1. Scope

A truck-bus is a composite vehicle consisting of truck cab-chassis fitted with a specifically constructed bus-body for carrying passengers. The composite vehicle must therefore meet the safety standards (including ADRs) that also apply to an omnibus.

Modifications covered under this code:

Covered

- fitting of a bus body (i.e. a passenger carrying pod) onto a truck cab-chassis, with change of GVM, seating capacity and of ride height
- mounting a compliant bus body on a compliant rolling chassis.

Not covered

- certification of an omnibus body
- certification of a body fitted to a rolling chassis based on a bus chassis sub-assembly registration number (BC-SARN) (carry out using the second stage of manufacture (SSM) approval process).

➤ If a SSM identification plate approval (IPA) holder retrofits a bus body to an in-service truck for which the fitting would be covered by the IPA at the SSM, only perform the modification in accordance with this code if it is also performed in accordance with that SSM IPA.

2. Related standards

Modified vehicles must comply with all ADRs, Australian Standards, acts and regulations. Below are some but not all of the areas that may be affected by the modifications in this code and require certification testing or evidence to demonstrate compliance.

The certifier must ensure that the modified vehicle continues to comply with all related Australian Design Rules.

Truck-chassis

This...	Must comply with...
Installation of lighting and light-signalling devices on other than L-group vehicles	13/..
Commercial vehicle brake systems	35/..
Maximum road speed limiting for heavy goods vehicles and heavy omnibuses	65/..
Emission control for heavy vehicles	80/..
External noise	83/..

Bus body

This...	Must comply with...
Seatbelts	4/..
Anchorage for seatbelts	5/..
Installation of lighting and light-signalling devices on other than L-group vehicles	13/..
Child restraint anchorages and child restraint anchor fittings	34/..
General safety requirements	42/..
Specific purpose vehicle requirements	44/..
Requirements for omnibuses designed for hire and reward	58/..
Standards for omnibus rollover strength	59/..
Seat strength, seat anchorage strength and padding in omnibuses	66/..
Occupant protection in buses	68/..

3. Certification procedure

The certification procedure for this modification code is as follows:

- Modifier** Determine if the modification is within manufacturer specifications.
 - If **yes**, the modification will need to be done in accordance with manufacturer specifications.
 - If **no**, the modification will need to be done in accordance with this modification code.
- Modifier** Consult with an accredited J2 AVE for guidance on how to perform the modification.
- Modifier** Perform modification in accordance with AVE advice and this code.
- Modifier** Organise approval inspection by an accredited J2 AVE.
- J2 AVE** Perform inspection, complete J2 checklist and determine if compliance has been achieved:
 - If **yes**, proceed to step 6.
 - If **no**, do not proceed, advise modifier rework is required to ensure compliance. Return to step 2.
- J2 AVE** Issue modification certificate, affix modification plate, and submit paperwork as required by the relevant AVE registration scheme.

AVEs must be satisfied that the vehicle modification requirements are being met. It is advised that before modifications are carried out they are discussed with the certifying AVE.

4. Certification requirements

If the manufacturer's installation instructions are not available or no longer applicable, apply the following:

Required:

- Ensure the body installation meets the requirements of, and is certified in accordance with VSB6 modification codes J1 and J2.
- Ensure the modified vehicle complies with all relevant ADR requirements, this may require compliance with an additional vehicle category, such as MD or ME (see ADR applicability tables for guidance).
- If a bus body is re-used, do not remove SSM approval plate or manufacturer's plate from the bus body. Certify the attachment of the bus body to the replacement truck-chassis in accordance with this modification code.
- Where the base vehicle used has not been tested and certified at the new category's requirements, ensure that all applicable braking requirements are validated. For example, an NC category vehicle fitted with a truck bus body must meet ME requirements and therefore the higher braking requirement of ME vehicles.
- Ensure the modified vehicle complies with the emergency exit requirements of either ADR58/.. or ADR44/.. (as applicable).
- Ensure a report or other evidence of compliance with ADRs, Australian Standards and public transport requirements is provided to the owner/operator of the vehicle for presentation at registration or vehicle inspection.
- Ensure compliance with ADRs relating to additional vehicle categories such as MD or ME (as applicable).
- Retain evidence of compliance with all related ADRs. Statements of assurance are not acceptable.

- Additional jurisdictional requirements may also apply, in particular if the truck-bus is to be used for public transport.
- While it is acceptable to detach a truck-bus driver's cabin from the passenger compartment (bus body), ensure effective communication can be maintained between the driver and passengers at all times. This can be achieved either directly or by use of audio/visual technologies.

New vehicles requirements

Required:

- If the truck cab-chassis is a new vehicle as defined under the *Motor Vehicle Standards Act 1989*, certify it using the SSM approval process administered by the Commonwealth Department of Infrastructure and Regional Development (DIRD).
- Do not use this code to circumvent the intent of the SSM approval process, for example, by certifying a bus body fitting to a new truck cab-chassis that is registered but has not been supplied to market or used in transport.

Date of manufacture issue

Because a truck-bus body may have different dates of manufacture, the component (truck or bus body) with the most recent date of manufacture is accepted for determining the safety standards that apply to the vehicle, including anti-theft and emissions requirements. For example, if a 1/1990 truck is fitted with a 1/2000 bus body the completed truck-bus must comply with all applicable vehicle safety standards that apply to a bus supplied to market in 1/2000.

Many road agency / state or territory transport authorities accept the date of manufacture shown on the compliance/identification plate of the truck cab-chassis as the date of manufacture of the truck-bus for registration purposes.

If the vehicle is imported, the road agency / state or territory transport authority may instead reference the build date as date of manufacture (or in some cases the date that the vehicle entered Australia). The final decision in this matter rests with the relevant heavy vehicle regulator.

J2 Checklist — Fitting of a truck-bus body (example)

J2 Checklist — Fitting of truck-bus body

🔧 This checklist is for use by approved vehicle examiners (AVEs) when certifying fitting of a truck-bus body.

Vehicle and modifier details

Chassis		
Vehicle make:	Vehicle model:	Month and year of manufacture:
VIN (if applicable):	Vehicle chassis no. (if applicable):	Identification plate approval (IPA) / Second stage of manufacture (SSM) IPA number:
Bus body/pod		
Vehicle make:	Vehicle model:	Month and year of manufacture:
VIN (if applicable):	Vehicle chassis no. (if applicable):	Identification plate approval (IPA) / Second stage of manufacture (SSM) IPA number (if applicable):
Modifier		
Vehicle modifier (company name):	Modifier address:	

Advanced braking systems

Braking systems	Check Yes, No, N/A as applicable:	Yes	No	N/A
1 Is the advanced braking system (where fitted) un-affected or re-certified after the vehicle modification?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Modification details

Modification criteria	Check Yes, No as applicable:	Yes	No
1 Has the modification been performed in accordance with the manufacturer's guidelines?		<input type="checkbox"/>	<input type="checkbox"/>

Installation details

Body	Check Yes, No, N/A as applicable:	Yes	No	N/A
1 Are the requirements detailed in Modification Code J2 fully met in relation to operation and visibility of passenger exits and entrances?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Has the installation of the body to the chassis been performed and certified in accordance with Modification Code J1?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Compliance

Modification	Check Yes, No as applicable:	Yes	No
1 Does this modification meet all the requirements of the manufacturer's guidelines / Modification Code J2?		<input type="checkbox"/>	<input type="checkbox"/>
2 Does the vehicle meet the braking requirements of ADR 35/.. at the applicable category (i.e. ME, MD)?		<input type="checkbox"/>	<input type="checkbox"/>
3 If applicable, does the vehicle meet the requirements of ADR 44/.. and/or ADR 58/.. ?		<input type="checkbox"/>	<input type="checkbox"/>
4 If ADR 59/.. applies, does the bus-body and its attachment to the chassis meet the strength and performance requirements of ADR 59/.. ?		<input type="checkbox"/>	<input type="checkbox"/>
5 Does the modified vehicle continue to comply with all affected Australian Design Rules, including any additional Australian Design Rules for the additional category of vehicle?		<input type="checkbox"/>	<input type="checkbox"/>
6 Have all of the modification details and all calculations applicable to the modification been recorded in accordance with the record keeping requirements of VSB6?		<input type="checkbox"/>	<input type="checkbox"/>
7 Have the engineering report(s) or other evidence and details called for in Modification Code J2 been obtained and kept with the vehicle file?		<input type="checkbox"/>	<input type="checkbox"/>

Authorisation

Other than modification criteria, if the answer to any relevant question is NO the modification is not acceptable.			
Comments:			
Examined by:	Company (if applicable):	AVE no.:	
Signed:	Modification certificate no.:	Modification plate no.:	Date:

Vehicle chassis no./VIN:	Date:	Signed:
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Modification Code J3 — Fitting of roll-over or falling object protection system

1. Scope

This modification code provides the standards that must be met when installing a roll-over protection system (ROPS) or a falling object protection system (FOPS) on an in-service vehicle. It advises the precautions needed to provide a distributed load over the vehicle chassis in order to protect the chassis from point loading and fatigue stresses.

➤ Note that where the vehicle manufacturer has guidelines on the installation of ROPS/FOPS, these guidelines take precedence over and above this section of VSB6. Where the vehicle manufacturer's guidelines do not cover the installation of ROPS/FOPS, the requirements of this section of VSB6 prevail.

- ⚠ Warning: Ensure that only ROPS/FOPS suitable for use in automotive applications are fitted.
- ⚠ Poorly designed ROPS/FOPS are unlikely to provide the desired protection of a ROPS/FOPS and may increase the risk of injury and/or death in the event of an incident.
- ⚠ The installation of poorly designed ROPS/FOPS to a vehicle chassis is likely to increase the stress on the chassis and may induce fatigue cracking. This fatigue cracking is likely to be more prevalent in vehicles which are used off-road or on unsealed roads. The design of the ROPS/FOPS mountings should take into consideration the inputs likely to occur in off-road use when conducting fatigue calculations on the ROPS/FOPS and vehicle chassis.
- ⚠ Unless explicitly permitted by the vehicle manufacturer's guidelines, under no circumstances should ROPS/FOPS be welded directly to the chassis.

Modifications covered under this code:

Covered

- installation of an external ROPS/FOPS on a motor vehicle in accordance with the ROPS/FOPS manufacturer's instructions where these instructions meet the requirements of this modification code.

Not covered

- installation of a ROPS/FOPS internal to the cabin compartment
- certification of a ROPS/FOPS
- installation of ROPS/FOPS where the manufacturer instructions are unavailable or do not meet requirements of this modification code.

2. Related standards

Modified vehicles must comply with all ADRs, Australian Standards, acts and regulations. Below are some but not all of the areas that may be affected by the modifications in this code and require certification testing or evidence to demonstrate compliance.

The certifier must ensure that the modified vehicle continues to comply with all related Australian Design Rules.

Truck-chassis

This...	Must comply with...
Installation of lighting and light-signalling devices on other than L-group vehicles	13/..
Rear vision mirrors	14/..
General safety requirements	42/..
Vehicle configuration and dimensions	43/..

It is recommended that the certifier ensure the ROPS/FOPS device be constructed so it is fit for purpose.

Some work sites such as building or mining sites may require the ROPS/FOPS to be built and certified in accordance with recognised standards such as the following:

- AS 2294
- ISO3471
- ISO3449
- ADR 59/..
- an equivalent international standard.

3. Certification procedure

The certification procedure for this modification code is as follows:

1	Modifier	Obtain the installation instructions and evidence of design calculations/testing from the ROPS/FOPS manufacturer.
2	Modifier	Consult with an accredited J3 AVE for guidance on how any modifications are required to be performed, and if the installation and design calculations/testing supplied by the ROPS/FOPS manufacturer to cover any chassis stresses or fatigue are adequate.
4	Modifier	Perform modifications in accordance with AVE advice and this code.
5	Modifier	Organise approval inspection by an accredited J3 AVE.
6	J3 AVE	Perform inspection, complete J3 checklist and determine if compliance has been achieved: <ul style="list-style-type: none"> • If yes, proceed to step 7. • If no, do not proceed, advise modifier rework is required to ensure compliance. Return to step 2.
7	J3 AVE	J3 AVE issues modification certificate, affixes modification plate, and submits paperwork as required by the relevant AVE registration scheme.

AVEs must be satisfied that the vehicle modification requirements are being met. It is advised that before modifications are carried out they are discussed with the certifying AVE.

4. Certification requirements

Required:

- Install the ROPS/FOPS in accordance with the manufacturer's instructions.
- Obtain a copy of evidence provided from the ROPS/FOPS manufacturer, in the form of calculation or testing, that the mounting method is not likely to cause un-reasonable stress in the chassis and cause the chassis to fatigue during the recommended service life of the vehicle. A copy of this evidence must be provided with the modification certificate and retained by the vehicle operator.

5. Design requirements

Required:

- Ensure a progressive load bearing transition to the chassis. Typically this is done by extending the sub-frame or mounting plates as far as practical so that it ends in front of the steer axle rear spring hanger and extends at least the same distance rearward of the spring hanger. The ends of the sub-frame or mounting plates should also taper to assist in the load bearing transition (see Figures 20 and 21).

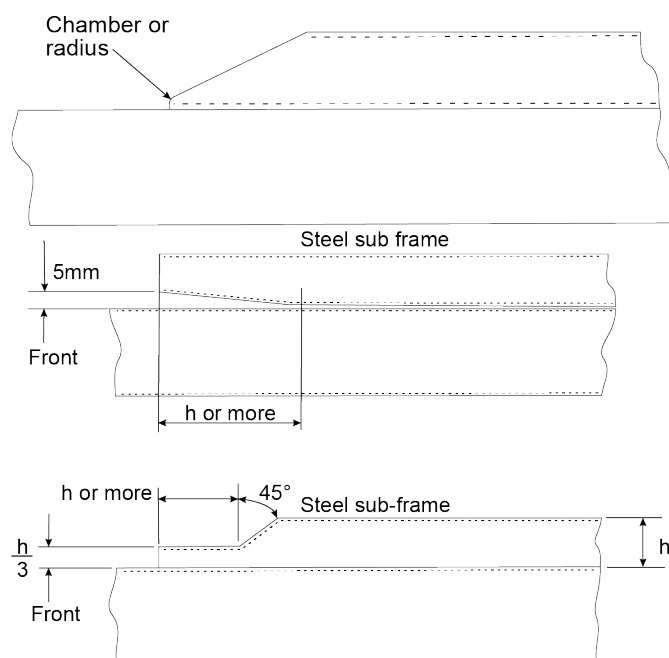


Figure 20: Examples of progressive load bearing transition

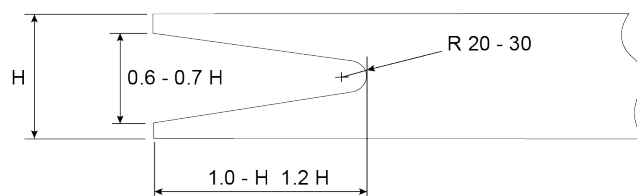


Figure 21: Typical frog-mouth tapering

Recommended:

- Consider using a square hollow section (SHS) or rectangular (RHS) sub-frame design in preference to any other.
- Ensure that the ROPS/FOPS device does not cause the modified vehicle to exceed GVM requirements when in operation.
- Consider the overall load carrying capacity and weight distribution of the vehicle with the ROPS/FOPS attached.

6. Installation requirements

The method of attaching ROPS/FOPS to the sub-frame can vary according to sub-frame design and its position on the chassis.

Required:

- Do not weld the ROPS/FOPS sub-frame to the vehicle chassis.
- Attach the ROPS/FOPS to the sub-frame/chassis using the ROPS/FOPS manufacturer's mounting bolt layout.
- Ensure that where the manufacturer has more than one mounting bolt layout available that a single mounting bolt layout that is specified by the ROPS/FOPS manufacturer is used to install the ROPS/FOPS.
- Ensure the ROPS/FOPS mounting plate extends at least 2H either end of the ROPS/FOPS, where H is the height of the chassis, or otherwise provides a load bearing transition of stress into the chassis.
- Ensure that the installation of the ROPS/FOPS also meets the mounting requirements of VSB6 Modification Code J1.
- Where required, place a spacer between the chassis and body.
- Ensure that any additional holes in the chassis are created in accordance with VSB6 Section H — Chassis.
- Use non-collapsing washers with the fasteners and self-locking nuts, or vibration-proof fasteners, to prevent loosening.

Recommended:

- Ensure bolts are no greater than 19 mm in diameter.
- Ensure ROPS/FOPS to sub-frame/chassis mounting bolts or studs are at least ISO Grade 10.9 (SAE Class 8), unless a lower grade is specified by the ROPS/FOPS manufacturer.
- Use fish plates which are bolted or welded to the ROPS/FOPS sub-frame to attach the vehicle chassis (see Figure 22).

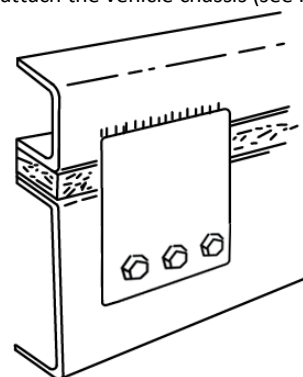



Figure 22: Typical fish plate attachment

- Do not allow the fastener tensile stress, induced by the ROPS/FOPS load moment, to exceed 20% of the material yield stress. The load moment includes the moment created by the forces imparted from the movement/vibration/wind loading of the ROPS/FOPS in operation.

J3 Checklist — Fitting of roll-over or falling object protection system (example)

J3 Checklist — Fitting of roll-over or falling object protection system

 This checklist is for use by approved vehicle examiners (AVEs) when certifying fitting of a roll-over protection system (ROPS) or falling object protection system (FOPS) to a motor vehicle chassis.

Vehicle and modifier details

Vehicle make:	Vehicle model:	Month and year of manufacture:
VIN (if applicable):	Vehicle chassis no. (if applicable):	Vehicle modifier (company name):

Advanced braking systems

Braking systems	Check Yes, No, N/A as applicable:	Yes	No	N/A
1 Is the advanced braking system (where fitted) un-affected or re-certified after the vehicle modification?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Modification details

Modification criteria	Check Yes, No as applicable:	Yes	No
1 Has the modification been performed in accordance with the manufacturer's guidelines?		<input type="checkbox"/>	<input type="checkbox"/>

Installation details

ROPS or FOPS	Check Yes, No, as applicable:	Yes	No
1 Is the ROPS or FOPS attached to the chassis or sub-frame using the ROPS or FOPS manufacturer's mounting bolt layout?		<input type="checkbox"/>	<input type="checkbox"/>
2 Does the ROPS or FOPS mounting plate extend at least 2H either end of the ROPS or FOPS or otherwise provide a load bearing transition of stress into the chassis?		<input type="checkbox"/>	<input type="checkbox"/>
3 Is the mounting bolt layout sourced from one set of specifications only?		<input type="checkbox"/>	<input type="checkbox"/>
4 Are non-collapsing washers used with fasteners and self-locking nuts, or vibration-proof fasteners, to prevent loosening?		<input type="checkbox"/>	<input type="checkbox"/>
5 Are all holes drilled in accordance with Section H — Chassis?		<input type="checkbox"/>	<input type="checkbox"/>
6 Have a copy of calculations or test results for the chassis stress and fatigue which have been supplied by the ROPS or FOPS manufacturer been kept with the certification?		<input type="checkbox"/>	<input type="checkbox"/>

Compliance

Modification	Check Yes, No as applicable:	Yes	No
1 Does this modification meet all the requirements of the manufacturer's guidelines / Modification Code J3?		<input type="checkbox"/>	<input type="checkbox"/>
2 Is the quality of the work to an accepted industry standard?		<input type="checkbox"/>	<input type="checkbox"/>
3 Does the modified vehicle continue to comply with all affected Australian Design Rules?		<input type="checkbox"/>	<input type="checkbox"/>

Authorisation

Other than modification criteria, if the answer to any relevant question is NO the modification is not acceptable.			
Comments:			
Examined by:	Company (if applicable):	AVE no.:	
Signed:	Modification certificate no.:	Modification plate no.:	Date:

Vehicle chassis no./VIN:	Date:	Signed: