

NATIONAL CODE OF PRACTICE

A close-up photograph of several interlocking metal gears, likely from a heavy-duty vehicle transmission. The gears are made of polished metal and are shown in a perspective view, highlighting their teeth and circular shapes. The background is a dark, solid color.

VSB 6

HEAVY VEHICLE MODIFICATIONS

Section T
Tow Trucks

HEAVY VEHICLE MODIFICATIONS**1. SCOPE**

This Section relates to the construction of tow trucks based on suitable truck chassis.

It outlines the minimum design, installation and performance requirements for the manufacture or modification of tow trucks, including lift trucks and tilt tray trucks.

2. GENERAL INFORMATION

- The design of a tow truck must be certified by an engineering signatory approved by the relevant State or Territory Transport Authority. The engineering signatory is to check the mounting of each of the components and certify that all the components meet the requirements for that particular class of tow truck.
- The tow truck manufacturer may use components that have already been certified by the component manufacturer. For example, the tow truck manufacturer may use a vehicle lift crane that has been certified by the crane manufacturer to meet the Crane Code. However, the engineering signatory is still required to inspect and certify the mounting of the components and that the capacities of the components are applicable to that particular class of tow truck.
- The design of the tow truck may permit use of more than one make/model of a major component (i.e. crane) to be used, providing the engineering signatory has approved it for all possible combinations or options.
- The installation of towing equipment on a vehicle requires consideration of the following points:
 - The lifting equipment must be rated by the manufacturer for the application and comply with AS1418.
 - The truck towing equipment must be compatible in terms of lifting and carrying capacities and be stable for normal road travel.
 - The installation method must conform to the vehicle manufacturer's recommendations and/or be shown to have sufficient chassis reinforcement to maintain the lift induced load moment, within the chassis frame design limits.
- All regulations concerning mass, dimensions, general safety requirements (specifically ADR 42/..) and crane fitting must be complied with and must not contravene any Australian Design Rule to which the base vehicle is required to comply.
- If the crane installation involves modification covered by other sections of this code, then such modifications must conform to the relevant sections of this National Code of Practice.
- The above requirements are addressed in AS 1418 Part 1-5 and 20. More specifically, mobile cranes including tow trucks are addressed in Part 5 and 20 of the standard.

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3. ADR'S AFFECTED

The Australian Design Rules that are applicable to Tow Trucks are:

ADR 42/..; *General Safety Requirements*;

ADR 43/..; *Vehicle Configuration & Dimensions*;

ADR 44/..; *Specific Purpose Vehicle Requirements*;

ADR 62/..; *Mechanical Connections between Vehicles*.

4. TYPE VARIANTS

This Section is specific to the initial construction of and any subsequent modifications to tow trucks.

There are three types of tow trucks in common use:

- **The Over-Lift type.** It comprises a crane that lifts the towed vehicle which is then secured in position by a towing hitch. Refer Figure 1.

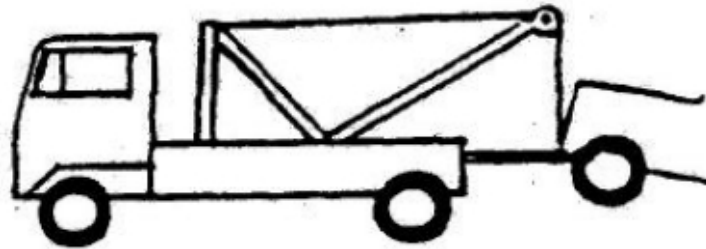


Figure 1

- **The Under-Lift type** which has an arm that extends underneath the towed vehicle and which (the towed vehicle) is lifted by the wheels, chassis or other suitable part. Refer Figure 2.

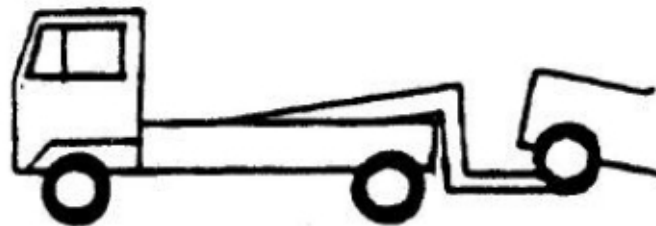


Figure 2

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- **The Tilt and Slide Tray type** which has a tray body that can be moved back and tilted so that the rear end of the tray rests on the ground. The towed vehicle is winched up onto the tray and secured. The tray is then raised up onto the truck chassis again for travel. Refer Figure 3.



Figure 3

All of the above groups can be combined in various ways to meet operator requirements.

Tow Truck classes applying to the above types are defined in ADR44/02 and further categorised in Regulation by the Jurisdictional Registering Authority.

5. GENERAL REQUIREMENTS

5.1 Design Requirements

- The design of any new tow truck must be certified by a Certifying Officer.
- Any alterations to an existing vehicle that would affect the original design certification must be recertified by a Certifying Officer.

5.2 Manufacturing Standards

- There are no recognised international standards for towing equipment; therefore imported equipment cannot be taken to have met the relevant requirements by alternate methods. In most cases, this will result in a drastic reduction in rated capacities. There are only a few Australian manufacturers of towing equipment with the appropriate engineering knowledge, and, for this reason, it is imperative that all the requirements in this Section be complied with.
- All cranes and other lifting equipment that form part of the tow truck, must conform to the relevant sections of AS 1418.5 “Cranes, hoists and winches – Mobile cranes”, and all design specifications must be verified by a Certifying Officer or by a certificate from the manufacturer.
- Any new and previously untested lifting equipment must be fully tested and evaluated. All calculations, test reports and other evidence of such testing must be retained by the manufacturer or his agent.

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5.3 Relevant Australian Standards

- The design and construction shall be in accordance with the following, as appropriate:
 - AS 1418.1-2002 *Cranes - General Requirements*;
 - AS 1418.2-1997 *Cranes (including hoists and winches) - Serial hoists and winches*;
 - AS 1418.5-2002 *Cranes, hoists and winches – Mobile cranes*.
 - AS 1418.11-2007 *Cranes, hoists and winches – Vehicle-loading cranes*
 - AS 1418.20-2015 *Tow Trucks*

6. SPECIFIC REQUIREMENTS

Each Tow Truck design is required to pass the stability tests described in Appendix 1.

7. RECORDING

Engineering analysis necessary in the course of designing a safe tow truck may be much more than what is specified in this section. The Certifying Officer is required to assess the design and the level of analysis required. The following are only minimal requirements:

- Appendix 1 - Stability Tests
- Appendices T1 & T2 which:
 - Summarise the scope of modification work which may be certified under each of these Modification Codes; and
 - Include a list of Sections of the National Code of Practice covering other areas of the vehicle that may have been affected by the modification and which should be analysed to determine whether they, too, require re-certification.
 - Include the checklist appropriate to the particular Modification Code that must be completed.

Records of analysis work, calculations, sketches, vehicle specification data, together with copies of any completed Check Lists, be retained by the Certifying Officer for at least the period specified in Part A of this National Code of Practice.

Appendix 1

STABILITY TESTS

1.0 STABILITY TESTS

1.1 General

Stability tests are to be conducted on Class 1 - 5 lift and tow trucks (As defined in ADR 44/..) only to establish that the vehicle is capable of being safely controlled while towing.

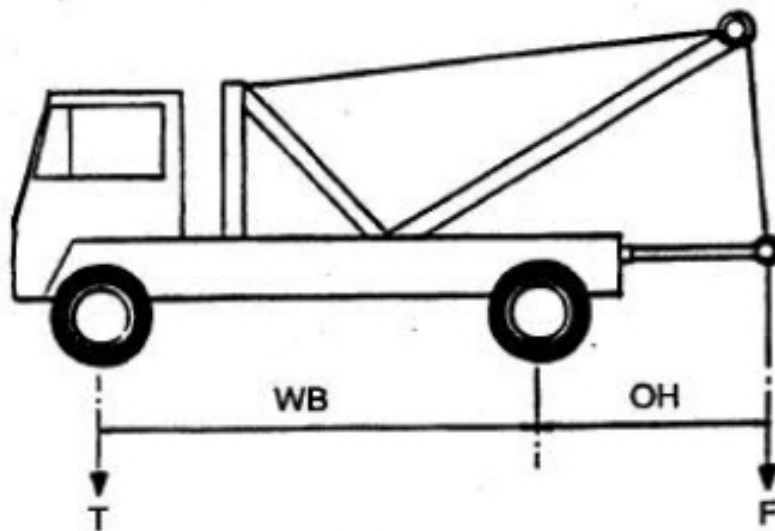
As the weight lift is situated behind the rear axle(s), the tow truck's centre of gravity will move back considerably when a load is lifted. As modern tow trucks have a lifting capacity in excess of what the truck can safely tow, the following should be used to determine SWL for towing.

1.2 Overlifts

Calculate SWL using the formula: $0.6 \times T \times WB = OH \times F$

Where:

0.6	=	a constant meaning 60% of T can be used as a counterweight.
T	=	tare weight of front axle.
WB	=	wheelbase of tow truck.
OH	=	rear overhang measured from pivot point.
F	=	SWL.



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1.3 Underlifts

Use the same formula as for overlifts.

Because underlifts can carry their loads at different positions, three calculations should be performed:

- 1) with lifting boom fully retracted;
- 2) with lifting boom fully extended; and
- 3) with lifting boom halfway between fully retracted and fully extended.

The lifting point is where the unit picks up on the towed vehicle. (In the case of wheel-lifts, it is the centre of the wheels lifted.)

The SWL calculated must be less than the maximum allowed by the crane manufacturer in that position, but should not be less than minimum requirements for the relevant class of tow truck.

The tow truck should be capable of being safely controlled at low speed when the lifting gear is subject to a 25% overload. Where a test weight is not available, the tow truck owner shall be responsible for supplying the test load. For slewing cranes, tests are to be conducted as for the stability tests for truck mounted cranes (refer Section Q of this National Code of Practice).

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Appendix T1

Modification Code T1

CONSTRUCTION OF TOW TRUCKS

Modifications that are covered under this Modification Code are:

1. Construction of tow trucks according to a design package issued according to Modification Code T2 "*Design of Tow Trucks*".
2. Modification or replacement of tow truck components other than lifting components.
3. Reinforcement of a chassis for the purpose of fitting tow truck components.
4. Replacement of tow truck lifting components.

Modifications that are **not** covered under this Modification Code are:

1. Cutting or extending the chassis.
2. Construction of tow trucks that is not according to a design package issued according to Modification Code T2 "*Design of Tow Trucks*".
3. Repositioning or the addition of any vehicle components to enable the tow truck components to be mounted or the vehicle configuration to conform to the chassis requirements must maintain ADR compliance and meet the relevant sections of this national code of Practice..
4. Modifications or structural repairs to lifting components.

NOTE: The modified vehicle/modifications must continue to comply with all applicable ADR's, Australian Standards and relevant Regulations/Acts.

Outlined below are areas of the vehicle that may have been affected by the modifications and may require recertification, testing and/or data to show compliance of the modified vehicle.

DETAIL	REQUIREMENTS
Rear Axle/s Installation	Modification Code D1
Chassis Frame Alteration	Modification Code H4
Remounting of Body	Modification Code J1
Tow Couplings	Modification Code P1
Truck Loading Cranes	Modification Code Q1

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Checklist T1

CONSTRUCTION OF TOW TRUCKS

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Appendix T2

Modification Code T2

DESIGN OF TOW TRUCKS

The intention of this Code is to allow suitably qualified persons to show that the tow truck design complies with the requirements of this code, the ADRs and the relevant Australian Standards.

The T2 Certifying Officer can design and certify the design to code T2 and also issue T2 documentation, including a Certificate of Modification and comprehensive instructions along with a checklist for use by a Certifying Officer holding code T1 who in turn can construct, inspect and certify a tow truck by fitting a modification plate to Code T1.

The T2 design documentation (issued by the person holding T2 code) must be held by the person (holding T1 code) who constructs/inspects the tow truck. The tow truck operator must hold the T1 Certificate of Modification issued by the person who constructed and/or inspected the tow truck before fitting a T1 modification plate to it.

In such cases, the T2 certificate should be issued, recommending an appropriate specification for the tow truck. The certificate will identify the source of the data and confirm that the tow truck has not been inspected by the T2 officer. The T2 Certifying Officer will also issue a checklist which may then be used by the T1 certifying officer to approve the individual tow truck after inspection to verify that the componentry is as described in the checklist and that the vehicle's mechanical condition is satisfactory.

Modifications that are covered under this Modification Code are:

1. Certification of a tow truck design.
2. Rating of lifting/towing components.
3. Testing/certifying of lifting/towing components.

Modifications that are **not** covered under this Modification Code are:

1. Rating of any components beyond the manufacturer's specifications.
2. Construction and inspection of a tow truck. For this, refer to Modification Code T1.

NOTE: The modified vehicle/modifications must continue to comply with all applicable ADRs, Australian Standards and relevant Regulations/Acts.

Outlined below are areas of the vehicle which may have been affected by the modifications and which may require recertification, testing and/or data to show compliance for the modified vehicle.

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DETAIL

REQUIREMENTS

Rear Axle/s Installation

Modification Code D1

Chassis Frame Alteration

Modification Code H4

Remounting of Body

Modification Code J1

Tow Couplings

Modification Code P1, ADR 62/..

Truck Loading Cranes

Modification Code Q1, AS
1418

Class of Tow Truck

ADR 44/..

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Checklist T2

DESIGN OF A TOW TRUCK