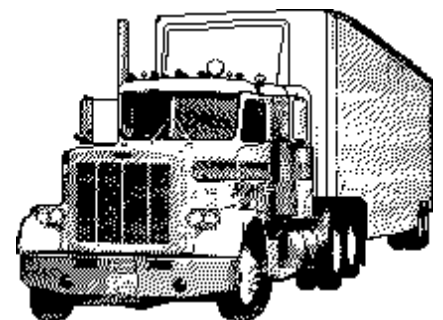
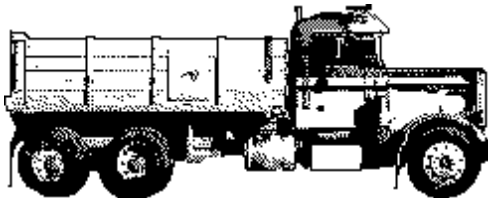


Section T

**TOW TRUCKS**



**HEAVY VEHICLE MODIFICATIONS****1. SCOPE**

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

It outlines the minimum design and 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 any tow truck must be certified by a Certifying Officer who is approved by the relevant State or Territory Regulations Authority. The Certifying Officer must 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 Certifying Officer is still required to 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 configuration may include parameters that allow more than one model of a major component (i.e. crane) to be fitted to that configuration if it has been certified by a Certifying Officer for all possible combinations or options.
- The installation of towing equipment on a vehicle requires consideration of the following points:
  - Any lifting equipment must be of an approved type and be manufactured by an approved manufacturer.
  - The truck towing equipment combination must be compatible in terms of lift and load capacities and be stable for normal operation.
  - 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/..., Section 12) and crane fitting must be complied with and must not contravene any Australian Design Rule to which the vehicle would normally comply.
- If a crane installation involves modification to components covered by other sections, then such modifications must conform to the relevant sections of this National Code of Practice.
- The above requirements are covered by AS 1418 Part 1-5. Part 5, which specifically deals with mobile cranes, has been amended to include tow trucks.

## HEAVY VEHICLE MODIFICATIONS

## 3. ADR's AFFECTED

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

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

ADR 43/..; *Vehicle Configurations and Dimensions;*

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

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

## 4. AFFECTING MODIFICATIONS

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

There are three types of tow truck in common use:

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

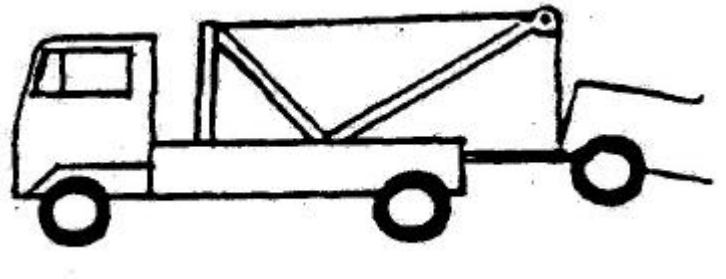


Figure 1

- **The Under-Lift type**, that 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.

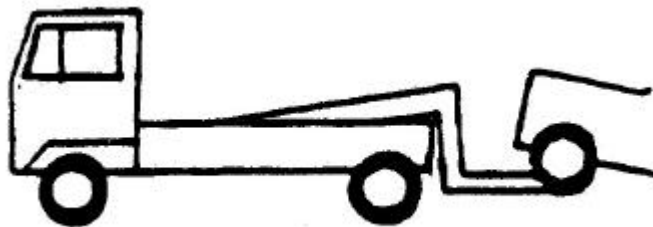


Figure 2

**HEAVY VEHICLE MODIFICATIONS**

- **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.

**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 overseas standards for towing equipment, therefore imported equipment should not be exempted from the relevant requirements. 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, and all design specifications must be verified by a Certifying Officer or by a certificate from the manufacturer.
- Any new and previously untried 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.

**5.3 Relevant Australian Standards**

- The design and construction shall be in accordance with the following, where appropriate:
  - AS 1418 Part 1 *Cranes - General Requirements*;
  - AS 1418 Part 2 *Cranes - Serial Hoists and Winches*;
  - AS 1418 Part 5 *Cranes - Mobile and Vehicle Loading Cranes*.

**HEAVY VEHICLE MODIFICATIONS**

6. SPECIFIC REQUIREMENTS

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

7. RECORDING

It is not feasible in this Section to cover every aspect of analysis that might be necessary in the construction of a tow truck. The Certifying Officer is required to appraise the design and determine the level of analysis required. However, in the Appendices of this document are:

- 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 should be completed.

It is suggested that analysis work records, sketches and other vehicle data, together with copies of any calculation sheets and completed Check Lists, be retained by the Certifying Officer for at least the period specified in Part A of this National Code of Practice.

## HEAVY VEHICLE MODIFICATIONS

## Appendix 1

## STABILITY TESTS

## 4.1 General

Stability tests are to be conducted on Class 1 - 5 lift and tow trucks only to establish that the vehicle is capable of being safely controlled while towing.

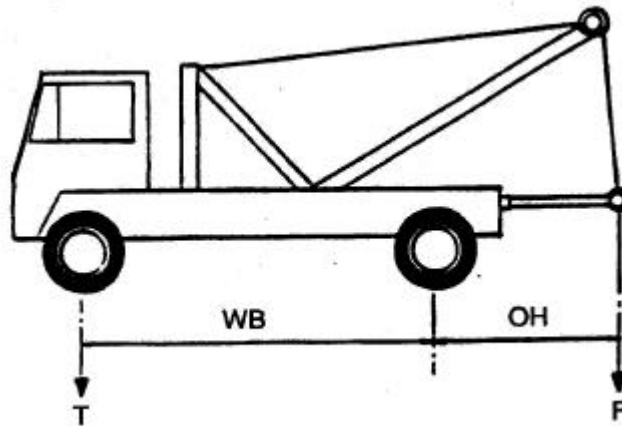
As the weight lift is situated behind the rear axle(s), the tow truck's centre of gravity will move back considerably when a load is lifted. As modern tow trucks have a lifting capacity in excess of what the truck can safely tow, the following should be used to determine SWL for towing.

## 4.2 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.



**HEAVY VEHICLE MODIFICATIONS**

**4.3 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).

**HEAVY VEHICLE MODIFICATIONS****Appendix T1****Modification Code T1****CONSTRUCTION OF TOW TRUCKS**

Modifications that are covered under this Modification Code are:

1. Construction of tow trucks.
2. Modification or replacement of tow truck non-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. Mounting a tow truck configuration that has not been certified by a Certifying Officer.
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.
4. Modifications or structural repairs to lifting components.

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

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

<b>DETAIL</b>	<b>REQUIREMENTS</b>
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

## HEAVY VEHICLE MODIFICATIONS

## Checklist T1

## CONSTRUCTION OF TOW TRUCKS

(NOTE: Answer only those sections applicable)

(Y=Yes N=No)  
delete if not applicable**1.0 Crane****1.1 Hydraulics**

Are all the hydraulic hoses secure and clear of all moving components, and do they have satisfactory ground clearance?

Y N

**1.2 Mounting**

Is the mounting method approved by chassis manufacturer or certified by a Certifying Officer?

Y N

Is the mounting method approved by crane manufacturer or certified by a Certifying Officer?

Y N

Is the crane mounted on a suitably designed sub frame?

Y N

Does all welding conform to all relevant Australian Standards?

Y N

Are all mounting bolts correctly torqued?

Y N

**1.3 Specifications**

Make of Crane:.....Serial No:.....

Model No:.....Capacity:.....

Tested 125% stability metres kg?

Y N

Tested 110% overload and swing metres kg?

Y N

**1.4 General**

Is the quality of workmanship to a satisfactory standard?

Y N

Does the crane meet the requirements of ADR 44/.. for this class of tow truck?

Y N

Is the crane manufactured by an approved manufacturer or has the construction been supervised and approved by a Certifying Officer?

Y N

**2.0 Winch****2.1 Hydraulics**

Are all the hydraulic hoses secure and clear of all moving components, and do they have satisfactory ground clearance?

Y N

**HEAVY VEHICLE MODIFICATIONS****2.2 Mounting**

Is the mounting method approved by chassis manufacturer or certified by a Certifying Officer? Y N

Is the mounting method approved by winch manufacturer or certified by a Certifying Officer? Y N

Is the winch mounted on a suitably designed sub frame? Y N

Does all welding conform to all relevant Australian Standards? Y N

Are all mounting bolts correctly torqued? Y N

**2.3 Specifications**

Make of Winch: .....Serial No: .....

Model No: .....Capacity: .....

**2.4 General**

Is the quality of workmanship to a satisfactory standard? Y N

Does the winch meet the requirements of ADR 44/., AS 1418-2 and the relevant sections of this National Code of Practice for this class of tow truck? Y N

**3.0 Vehicle Lift Tray****3.0 Hydraulics**

Are all the hydraulic hoses secure and clear of all moving components, and do they have satisfactory ground clearance? Y N

**3.1 Mounting**

Is the mounting method approved by chassis manufacturer or certified by a Certifying Officer? Y N

Is the tray mounted on a suitably designed sub frame? Y N

Does all welding conform to all relevant Australian Standards? Y N

Are all mounting bolts correctly torqued? Y N

**3.2 General**

Is the quality of workmanship to a satisfactory standard? Y N

HEAVY VEHICLE MODIFICATIONS

4.0 Tilt Tray and Slide – Tray Tow Truck

4.1 Hydraulics

Are all the hydraulic hoses secure and clear of all moving components, and do they have satisfactory ground clearance? Y N

4.2 Mounting

Is the mounting method approved by chassis manufacturer or certified by a Certifying Officer? Y N

Is the tilt tray mounted on a suitably designed sub frame? Y N

Does all welding conform to all relevant Australian Standards? Y N

Are all mounting bolts correctly torqued? Y N

4.3 General

Is the quality of workmanship to a satisfactory standard? Y N

Does the unit meet the special requirements as specified in the relevant sections of this National Code of Practice? Y N

Vehicle Chassis No/VIN: .....

Vehicle Modifier: .....

Examined by: .....

Company (if applicable):.....

Certifying Officer No:..... Modification Certificate No:.....

Modification Plate No:.....

Signed:.....Date:.....

## HEAVY VEHICLE MODIFICATIONS

## Appendix T2

## Modification Code T2

## DESIGN OF TOW TRUCKS

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.

**NOTE: The modified vehicle/modifications must continue to comply with all applicable ADR's, Australian Standards or 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.

<b>DETAIL</b>	<b>REQUIREMENTS</b>
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/..

HEAVY VEHICLE MODIFICATIONS

Checklist T2

DESIGN OF TOW TRUCKS

(Y=Yes N=No)
delete if not applicable

- 1.0 Do all components comply with the appropriate parts of AS 1418 - Crane Code? Y N
2.0 Will any chassis alterations comply with Section H of this National Code of Practice? Y N
3.0 Will any body mounting comply with Section J of this National Code of Practice? Y N
4.0 Are all components rated below the manufacturer's specifications? Y N

Vehicle Chassis No/VIN:.....

Vehicle Modifier:.....

Examined by:.....

Company (if applicable):.....

Certifying Officer No:..... Modification Certificate No:.....

Modification Plate No:.....

Signed:..... Date:.....

...