NZ TRANSPORT AGENCY
WAKA KOTAHI

OVERWEIGHT PERMIT MANUAL

First Edition 1995

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Manual Sponsor:	National Operations Manager
Manual Owner:	Senior Operations Engineer
Regional Office Contact:	Permit Issuing Officers

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Overweight Permit Manual, First Edition 1995

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FOREWORD

This manual replaces the Overweight Permit Policy Manual last revised in 2004 and is the result of a review of existing policy.

It defines the compliance standards applicable to the issue of overweight permits. These standards apply both to the movement of overweight vehicles on state highways and those roads controlled by local authorities that have also adopted NZ Transport Agency's requirements.

Local government comprises sixty-seven territorial and unitary authorities, and most of these currently require vehicles to comply with the manual's provisions.

To function as an effective management tool, a manual must be both clearly written and presented in a readily accessible format. For this reason, the revised manual has been extensively re-written and reformatted. It is also issued in a ring-binder that makes updating simple. The revised manual now more fully meets our shared operational requirements, and we trust that the changes and improvements it incorporates will prove of practical advantage.

G Dangerfield
Chief Executive
July 2010

ACKNOWLEDGEMENTS

This manual was produced under the direction of NZ Transport Agency's Axle Weights and Loadings Advisory Group. This group includes representatives from the following organisations:

NZ Transport Agency

New Zealand Police

New Zealand Local Government Association Inc

New Zealand Road Transport Association Inc

New Zealand Heavy Haulage Association Inc

Crane Association of New Zealand Inc

Record of Amendments

Amendment	Date of Issue	Effective Date	Master Updated By	Date Updated
1	Oct 1995	1/11/95	Transit NZ	Sept 1997
2	Oct 1996	21/10/96	Transit NZ	Sept 1997
3	April 1997	14/4/97	Transit NZ	Sept 1997
4	Sept 1997	22/9/97	Transit NZ	Sept 1997
5	Jan 1998	14/1/98	Transit NZ	Jan 1998
6	March 1999	1/3/99	Transit NZ	March 1999
7	Sept 1999	1/10/99	Transit NZ	Oct 1999
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NZ TRANSPORT AGENCY
WAKA KOTAHI

Manual Management Plan
Overweight Permit Manual SM070

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1. Purpose

This is the Manual Management Plan for the Overweight Permit Manual.

2. Document Information

Manual Name	Overweight Permit Manual
Manual No.	SM070
Availability	This guideline is available in hard copy and electronic format (pdf) from NZ Transport Agency's website: http://www.nzta.govt.nz/resources/overweight-permit-manual/
Manual Owner	Operations Engineer, National Office
Manual Sponsor	National Operations Manager, Highways & Network Operations
Review Team	NZTA's Axle Weights and Loadings Advisory Group (AWLAG) representing NZTA, NZ Police, NZ Local Government Association, Road Transport Forum NZ, NZ Heavy Haulage Association, and the Crane Association of NZ.

3. Amendment and Review Strategy

All Corrective Action/Improvement Requests (CAIRs) suggesting changes will be acknowledged by the manual owner.

Process	Comments	Frequency
Amendments	Will be provided as determined by AWLAG.	As and when requested
Notification	Holders of the hard copy manual will not notified when a new Amendment to the Manual is released, as there is currently no register of holders. There will be general notification via NZTA website and to the NZ Heavy Haulage Association, Crane Association and Road Transport Forum.	Immediately

4. Other Information (at Manual Owner's discretion)

In general the manual will be updated approximately annually to reflect policy changes, and more frequently where the matter is urgent.

5. Distribution

Copies of this Manual Management Plan are to be included in the manual itself and sent to:

Assurance and Compliance Manager
National Operations Manager
Manual Sponsor
Manual Owner
Review Team Members
Head Office file RO1-0001

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TABLES, DIAGRAMS AND GRAPHS

INTRODUCTION

This manual describes NZ Transport Agency's overweight permit policy.

1.1 Intention of Policy

This policy covers the issue of permits for vehicles carrying indivisible loads that exceed the legal mass limits defined in the *Vehicle Dimensions and Mass Rule 2002*. These mass limits are detailed in Section 2.1 of this manual and the Rule allows the issue of such permits.

High Productivity Motor Vehicle permits are available for the transporting of divisible loads (refer Section 5.2 of the *Vehicle Dimensions and Mass Rule 2002*). Overweight permits are not available for the transport of divisible loads that can be practically reduced in size, such as gravel or logs.

The legal mass limits represent the maximum weights that can be sustained under normal conditions without undue deterioration of the road network facilities.

Although there is no established right to exceed the legal mass limits, it is recognised that there are some loads that practically cannot be reduced. A limited number of such loads can be allowed if all facilities on the route are carefully checked when exemption is sought. Restrictions on conditions for travel may be imposed.

This policy contains detailed procedures for determining conditions under which a permit may be issued. It has been developed to satisfy the following objectives:

- To protect road network facilities from loadings which may lead to premature structural deterioration.
- To process permit applications consistently and with a minimum of administration and technical effort.
- To provide guidance to the transport industry on road network limitations to enable development of better vehicles for cartage of heavy loads.
- To provide guidance to the designers and manufacturers of heavy items requiring transport by road.
- To maintain overweight operations with due regard to the safety of vehicle operations.

The overweight limitations have been set without particular regard to the legal mass limits.

Because pavements constitute the major part of the road network, the basic limiting conditions of the policy have been aligned to pavement wear.

Bridges impose a finite limit on the maximum weights that can be carried on any particular route. By carefully classifying the strength of road bridges the policy allows maximum use of these facilities without actively promoting their destruction.

Detailed vehicle parameter calculations are carried out. The vehicle parameters are then compared with pavement and bridge strength information held in road network inventories.

For state highways and some bypasses these checks are carried out by computer using OPermit, the permit checking program. (Refer section 12).

Recent changes mean that local authorities can now choose to have their roading networks included in OPermit.

For some bridge crossings, bridge engineering supervision is a permit condition. This enhances the vehicle carrying ability of a bridge by restricting such factors as speed, position on bridge and other traffic. (Refer section 11).

Under the policy some of the bridge limitations imposed may seem severe, but these merely reflect an engineering appraisal of the load-carrying capacity of the structure in its present condition.

The policy is founded on mutual co-operation between participating road controlling authorities throughout the country, and in presenting it as an operative document NZ Transport Agency gratefully acknowledges the assistance which has been so freely given by representatives both from roading authorities and the transport industry towards its development.

1.2 Parties to Policy

NZ Transport Agency, as road controlling authority, has established this policy for all state highways. There is provision for local authorities to become parties to the policy for the purpose of issuing permits under one common policy throughout New Zealand.

By becoming party to the policy a local authority may issue permits for travel on its roads within the terms of the policy. The local authority can also consent to allow NZ Transport Agency to issue permits for travel on the local authority's roads by giving written approval, refer Section 5.3 of the *Vehicle Dimensions and Mass Rule 2002.*

Any remaining local authorities wishing to become party to this policy should apply to the Chief Executive, NZ Transport Agency, stating the name, address and qualifications of its approving engineer. The NZ Transport Agency would then consider a resolution to confirm the application.

Parties to this policy are listed in Appendix B.

1.3 Enforcement

The Police enforce overweight permits. This involves stopping vehicles travelling under permit, and may involve enforcement weighing. (Refer section 10.3).

Infringement offences and fees are listed in the Second Schedule, Transport Act 1962.

1.4 Overdimension Permits

1.4.1 NZ Transport Agency

The NZ Transport Agency (NZTA) operates a policy for the movement on public roads of overdimension vehicles and loads that exceed the dimension limits of Section 4 of the *Vehicle Dimensions and Mass Rule 2002*. Section 6 of that Rule prescribes the limits and conditions for the movement of such vehicles without permits.

For the transport of vehicles and loads that exceed the limits specified in Section 6 of that Rule, a permit must be obtained from the NZ Transport Agency at:

- NZTA Palmerston North, 0800 OVERSIZE (0800 683 774).

1.4.2 KiwiRail

Permission is required for certain overweight and overdimension vehicles and loads that wish to travel over railway level crossings and/or under rail over road bridges. Permits may be obtained by contacting KiwiRail at:

crossingpermits@kiwirail.co.nz

1.5 Railway Level Crossings

1.5.1 Overdimension Vehicles

(a) Heavy and long vehicles can be slow in clearing railway level crossings which may increase the collision potential. KiwiRail may therefore examine the ability of certain heavy vehicles to clear railway level crossings.

(b) *Other Railway Operators*
Overdimension vehicles may require approval from railway operators (other than KiwiRail to cross their railway level crossings. (Refer section 1.4.3.)

1.5.2 Overweight Vehicles

When processing overweight permits NZ Transport Agency does **not** perform checks on the ability of an overweight vehicle to cross railway level crossings.

1.6 Distribution of Manuals

Any road controlling authority that becomes party to this policy will be able to download a copy of this manual and future amendment from the NZTA website http://www.nzta.govt.nz/

1.7 Revision of Policy

All revisions of this policy shall be subject to review (or initiation) by the NZ Transport Agency Axle Weights and Loadings Advisory (AWLAG) Group. Any permanent changes to this policy will be by consequent resolution of the NZTA.

1.8 Terminology and Abbreviations

Specific terminology and abbreviations are used throughout this manual. Definitions of terms used and standard abbreviations are listed in Appendix A.

2. ROAD NETWORK LEGAL MASS LIMITS

2.1 What is an Overweight Vehicle?

In regard to NZ Transport Agency's overweight permit policy, an overweight vehicle is a vehicle which exceeds any of the mass limits stated in Schedule 2, Part A (General Mass Limits) of the *Vehicle Dimensions and Mass Rule 2002*.

More specifically, without limiting the interpretation of the regulations -

A vehicle is overweight if any of the following apply:

(a)	The mass on any individual axle exceeds the legal mass limits, refer to table 2.1.
(b)	The mass on any tandem axle set exceeds the legal mass limits, refer to table 2.2.
(c)	The mass on any tri-axle set exceeds the legal mass limits, refer to table 2.3.
(d)	The mass on any quad-axle set exceeds the legal mass limits, refer to table 2.4.
(e)	The mass on any two or more axles, that are not an axle set, (including the gross mass of the vehicle) exceeds the legal mass limits, refer to table 2.5.
(f)	The mass on any axle exceeds a temporary limit specified by the road controlling authority (regulation 10(4) of the *Heavy Motor Vehicle Regulations 1974*). Such temporary mass limits are posted to protect weak road pavements.
(g)	The vehicle exceeds the mass limits that a road controlling authority has specified for a particular bridge (regulation 11 of the *Heavy Motor Vehicle Regulations 1974*). Such mass limits are posted to protect weak bridges.

Table 2.1 Legal Mass Limits for Individual Axles

(Refer the *Vehicle Dimensions and Mass Rule 2002 Schedule 2, Part A, Table 1*)

(Diagrams A1 and A2 of Appendix A show axle types and axle sets)

Type of Axle		Maximum Mass (Kilograms)
1.	Single standard tyres: (a) In a twin-steer axle set, or in a tandem axle set with a twin- or single large-tyred axle (b) In any other set	 5,400 6,000
2.	Single large-tyred: (a) In a twin-steer axle set (b) In a quad-axle set (c) In a tandem axle set with 2 single large-tyred axles or in a tandem axle set with a single standard-tyred axle or in a tri-axle set (d) In any other axle set	 5,400 5,500 6,600 7,200
3.	Twin-tyred: (a) In a quad-axle set (b) In a tri-axle set (c) In any other axle set	 5,500 6,600 8,200
4.	Oscillating axle, in any axle set	9,500

Table 2.2 Legal Mass Limits for Tandem Axle Sets

(Refer the *Vehicle Dimensions and Mass Rule 2002 Schedule 2, Part A Table 2*)
(Diagrams A1 and A2 of Appendix A show axle types and axle sets)

Type of Axle		Maximum Mass (Kilograms)
1.	Two single standard-tyred axles: (a) In a twin-steer set (b) Not in a twin-steer set	 10,800 11,000
2.	Two single large-tyred axles: (a) In a twin-steer set (b) Not in a twin-steer set	 10,800 13,000
3.	Two twin-tyred axles: (a) Spaced less than 1.3 m from the first axle to the last axle (b) Spaced 1.3 m or more but less than 1.8 m from the first axle to the last axle (c) Spaced 1.8 m or more from the first axle to the last axle	 14,500 15,000 15,500
4.	Twin-tyred axle: (a) with a single large-tyred axle and 60/40 load share (b) with a single large-tyred axle and 55/45 load share	 13,600 14,500
5.	Single standard-tyred axle with an oscillating axle	13,000
6.	Single standard-tyred axle with a single large-tyred axle or a twin-tyred axle	12,000
7.	Two oscillating axles	15,000

Table 2.3 Legal Mass Limits for Tri-Axle Sets

(Refer the *Vehicle Dimensions and Mass Rule 2002 Schedule 2, Part A, Table 3*)
(Diagrams A1 and A2 of Appendix A show axle types and sets)

Type of Axle	Maximum Mass (Kilograms)
Three oscillating axles, three twin-tyred axles, or three large-tyred axles:	
(a) Spaced 2.5 m or more from the first axle to the last axle	18,000
(b) Spaced 2.4 m or more and less than 2.5 m from the first axle to the last axle	17,500
(c) Spaced 2 m or more and less than 2.4 m from the first axle to the last axle	15,500

Table 2.4 Legal Mass Limits for Quad-axle sets

(Refer the *Vehicle Dimensions and Mass Rule 2002 Schedule 2, Part A, Table 4*)

Type of Axle	Maximum Mass (Kilograms)
Four twin-tyred axles, or four single large-tyred axles	20,000

Table 2.5 Legal Gross Mass Limits

(Refer the *Vehicle Dimensions and Mass Rule 2002 Schedule 2, Part A, Table 5*)

Maximum sum of mass on any two or more axles that together do not constitute a single tandem axle set or single tri-axle set or a single quad-axle set, where the distance from the centre of the first axle to the centre of the last axle is 1 m or more but less than 1.8 m (including maximum gross mass).		
Type of Axle		Maximum Mass (Kilograms)
1.	Two single standard-tyred axles	10,800
2.	Two single large-tyred axles	12,000
3.	A single standard-tyred axle with a single large-tyred axle or a twin-tyred axle	12,000
4.	Any other 2 or more axles	14,500

Table 2.5 continued on next page

Table 2.5 Legal Gross Mass Limits (continued)

(Refer the *Vehicle Dimensions and Mass Rule 2002 Schedule 2, Part A, Table 6*)

Maximum sum of mass on any two or more axles that together do not constitute a single tandem axle set or single tri-axle set or single quad-axle set, where distance from the centre of first axle to centre of last axle is 1.8 m or more (including maximum gross mass).	
Type of Axle	Maximum Mass (Kilograms)
Where the distance from the centre of the first axle to the centre of the last axle is:	
1.8 m but less than 2.5 m	15,500
2.5 m but less than 3.0 m	17,500
3.0 m but less than 3.3 m	19,000
3.3 m but less than 3.6 m	20,000
3.6 m but less than 4.0 m	21,000
4.0 m but less than 4.4 m	22,000
4.4 m but less than 4.7 m	23,000
4.7 m but less than 5.1 m	24,000
5.1 m but less than 5.4 m	25,000
5.4 m but less than 5.8 m	26,000
5.8 m but less than 6.4 m	27,000
6.4 m but less than 7.0 m	28,000
7.0 m but less than 7.6 m	29,000
7.6 m but less than 8.2 m	30,000
8.2 m but less than 8.8 m	31,000
8.8 m but less than 9.4 m	32,000
9.4 m but less than 10.0m	33,000
10.0 m but less than 10.8m	34,000
10.8 m but less than 11.6m	35,000
11.6 m but less than 12.0 m	36,000
12.0 m but less than 12.5 m	37,000
12.5 m but less than 13.2 m	38,000
13.2 m but less than 14.0 m	39,000
14.0 m but less than 14.8 m	40,000
14.8 m but less than 15.2 m	41,000
15.2 m but less than 15.6 m	42,000
15.6 m but less than 16.0 m	43,000
16.0 m or more	44,000

2.2 When can an Overweight Permit be issued?

Overweight Permits are issued under Section 5 of the *Vehicle Dimensions and Mass Rule 2002*, and Regulation 11(16) of the *Heavy Motor Vehicle Regulations 1974*), all of which relate to the safety of roads users, safety of vehicles and the protection of infrastructure.

Overweight permits may be issued for all the overweight vehicle cases in Section 2.1 (a) to (g) above, providing that these comply with the requirements of all governing Acts, Regulations or Rules.

2.3 Vehicle Restrictions

Some clauses in the *Vehicle Dimensions and Mass Rule 2002* restrict the maximum vehicle mass of specific vehicle types, generally for safety considerations.

Overweight permits do **not** override the above vehicle restrictions or any other requirements of the *Vehicle Dimensions and Mass Rule 2002*, the *Heavy Motor Vehicle Regulations 1974*, the *Traffic Regulations 1976*, the *Land Transport Act 1998*, or the vehicle's certificate of loading. Overweight permits have a disclaimer to this effect printed on the back of the standard form NZTA805. (Refer Appendix C.)

2.3.1 Gross Vehicle Mass and Gross Combination Mass

(a) Compliance with regulation 16A of the *Heavy Motor Vehicle Regulations 1974* and Section 4 of the *Vehicle Dimensions and Mass Rule 2002* should ensure vehicles do not exceed safe stability levels and manufacturer's vehicle and componentry ratings.

(b) NZ Transport Agency specifies, on the Certificate of Loading, the Gross Vehicle Mass (for a vehicle) and the Static Roll Threshold (SRT) load height and mass restrictions for vehicles that have a vehicle axle index up to 1.1. These parameters are considered sufficient to meet the requirements in (a) above.

Gross Vehicle Mass and Gross Combination Mass have their meaning defined in Part 2 – Definitions of the *Vehicle Dimensions and Mass Rule 2002* (Page 30) and the *Heavy Vehicle Rule 2004.*

3. PERMIT ADMINISTRATION

3.1 Authority to Issue Permits

3.1.1 State Highways

NZ Transport Agency State Highway Managers (SHM's) (or equivalent) have authority to issue permits for movements on state highways within their region.

Where a movement involves more than one NZ Transport Agency region, then the SHM of one of the regions may issue a permit for the complete journey provided approval for travel within the other region(s) is obtained.

Where a movement involves both state highways and local authority roads, NZ Transport Agency SHM's have authority to issue a permit for the complete journey, provided the local authority(ies) is party to the policy and approves travel for their roads.

SHM's may delegate their authority to issue permits to individual NZ Transport Agency staff members, or their appointed consultants.

SHM's may delegate by special arrangement, the right for a local authority to issue overweight permits in their name for specified lengths of state highways within the boundaries of that local authority.

3.1.2 Local Authority Roads

Approving engineers of local authorities that are party to the policy (refer section B2) have the authority to issue permits for movements on roads within their local authority (excluding state highways).

For movement involving both state highways and local authority roads refer to section 3.1.1.

Local authorities that are not party to this policy (refer section B3) are responsible for considering requests for the movement of overweight vehicles on roads within their boundaries (excluding state highways).

3.2 Where to Apply for an Overweight Permit

Permit applications should be made to the NZ Transport Agency or local authority office relevant to the proposed movement. Refer to section 3.1 and Appendix B.

3.3 Types of Permit

Single and multiple trips, continuous, area and linked permits, and bridge engineering supervision are defined in Appendix A.

An individual Overweight permit may be issued that contains more than one vehicle (or more than one vehicle combination), provided that the vehicles included are identical, as defined in Appendix A (Identical vehicle). These are referred to colloquially as 'Multiple Rego permits'.

3.3.1 Single Trip Permits

When the payload and/or route are unique for a particular vehicle or when required dates of travel are spaced well apart, overweight permits shall be for a single trip at a time.

The permit shall be restricted to the date(s) required to complete the proposed movement. The total period allowed for the movement should generally not exceed seven days.

Single Trip permits are subject to the following conditions:

- for mobile cranes, Single Trip permits shall specifically prohibit movement on pavements for which the PLR exceeds 150%, or to a maximum VAI of 1.50, whichever is the lesser;

- for other vehicles (excluding ISO containers and slurry sealing trucks which have special limits covered in Section 8), permits shall specifically prohibit movement on pavements for which the PLR exceeds 130%, or to a maximum VAI of 1.30, whichever is the lesser;

3.3.2 Multiple Trip Permits

One permit may be issued for multiple trips where there is no significant increase in administrative effort in processing the application.

The permit may be issued either for a number of specified dates or for a continuous period, but in both cases the expiry date should be no later than one month from the date of issue.

When bridge engineering supervision is required for bridges on the route, the exact number of trips shall be specified.

Multiple Trip permits are subject to the following conditions:

- for mobile cranes, Multiple Trip permits shall specifically prohibit movement on pavements for which the PLR exceeds 150%, or to a VAI of 1.50, whichever is the lesser;

- for other vehicles (excluding ISO containers and slurry sealing trucks which have special limits covered in Section 8), permits shall specifically prohibit movement on pavements for which the PLR exceeds 130%, or to a maximum VAI of 1.30, whichever is the lesser;

Multiple trip permits may be issued for periods exceeding one month for specific projects provided that there are no infrastructure issues. Applications need to include evidence of a specific need, and the VAI will be limited to 1.30. **Approval by NZTA National Operations Manager is required.**

3.3.3 Continuous Permits

Any vehicle that qualifies for an overweight permit in terms of sections 6, 7 and 8.4 of this Manual may be issued with a continuous overweight permit for a period not exceeding two years.

A vehicle may be issued with more than one continuous permit.

Continuous permits are issued for travel, either:

- on a network of linked roads not exceeding 100 km in total length, or
- on roads within a 50 km radius centred on the normal operating base of the vehicle, or
- in the case of vehicles carrying ISO containers, on specifically named routes that are to and from sea ports.

Continuous permits are subject to the following conditions:

- for mobile cranes, permits shall specifically prohibit movement on pavements for which the PLR exceeds 150%;
- for other vehicles (excluding ISO containers and slurry sealing trucks which have special limits covered in Section 8), permits shall specifically prohibit movement on pavements for which the PLR exceeds 120%;
- movement over bridges where bridge engineering supervision is required as a condition of the permit will generally be granted to those firms and operators that are approved under Section 11.4 to carry out self supervision;
- continuous permits shall be subject to the approval of the regional manager (or the approving engineer of the road controlling authority if state highways are not involved) and may be amended at any time by notice in writing;
- continuous permits shall be subject to cancellation by notice in writing, requiring the permit document to be returned to the permit issuing office, if the road controlling authority is satisfied that the operator has not complied with all the conditions of the permit;

- continuous permits shall only be granted providing that:

  — loads to be carried have been substantiated by weighing, or calculations involving known plant masses, to the satisfaction of the approving engineer, and

  — vehicle tare masses are substantiated by weighing at least once in any three year period.

  — unspecified payloads are supported by documented evidence covering both mass and indivisibility.

3.3.4 Area Permits

Any vehicle that qualifies for a continuous permit in terms of sections 6 and 7 of this Manual may alternatively be issued with an area overweight permit. Vehicles carrying ISO containers are **not** eligible for area permits.

Area permits are issued for travel on a specified documented network of roads for a period of up to two years.

Area permits are subject to the same conditions as stated in the preceding section 3.3.3 for continuous permits. Travel will be limited to the network of roads stated on the permit.

3.3.5 Linked Permits

Where overweight vehicles of one operator are travelling in convoy and bridge engineering supervision is involved, permits may be linked for bridge engineering supervision fees.

3.3.6 Permits for Vehicle Fitness Testing

Single or multiple trip overweight permits may be issued for vehicle fitness testing purposes subject to the following limitations:

- at no time shall the PLR exceed 150% — even if this means driving up to a test site and loading up there;

- sites for brake testing shall be limited to sections of road as directed by the road controlling authority; and

- bridges requiring bridge engineering supervision shall not be used.

3.4 Processing Times

Processing offices will make every effort to expedite the processing of overweight permit applications.

As a general guide the times shown in the following table may be taken as an indication of likely processing times (refer section 7.1 for mobile cranes). The processing of permits should be completed within these times from receipt in the processing office of the complete and accurate information which is required for processing the application.

Movements Involving	Processing Time (working days)
One NZ Transport Agency region or local authority	2
More than one NZ Transport Agency region or local authority	3
Extremely heavy loads (Possibly involving complications requiring special arrangements to be negotiated with the applicant)	Considerably longer periods (than above)
Continuous permits	May require more than 3
Area permits	Will be advised when application is received

3.5 Delays to Travel

While permit processing will normally be completed in the above times, it may be necessary to delay travel if the permit requires bridge engineering supervision which requires at least 24 hours notice. Applicants should take such possible delays into account when applying for a permit.

3.6 Administration Charges

3.6.1 Permit Processing Fee

A permit processing fee shall be charged for each permit application in accordance with the following scale. This fee goes towards recovering the administration costs incurred.

Fees are prescribed in Schedule 4A of the Regulation 7(1) of the *Heavy Motor Vehicle Regulations 1974*).

3.6.1 Permit Processing Fee (continued)

Application for Permit Processing	Fee (GST exclusive)
For each single, multiple trip or linked permit	$18.18
For each new continuous or area permit	$54.55 *
For each reissue of a continuous or area permit	$ 9.09
An additional charge for each permit where less than 3 working days are available for processing	$ 9.09

Note: 1. A linked permit is a permit that applies to any vehicle only when used in conjunction with another vehicle for which a permit is also required.

2. A continuous permit is a permit relating to a vehicle that is used frequently and does not have a divisible load.

3. An area permit is a permit relating to a vehicle travelling frequently on a specified network of roads and carrying an indivisible load.

* For area permits the standard permit processing fee shall be charged together with an additional charge which covers the extra costs incurred in the investigation of the routes specified on the permit application. The extra costs should be advised to the permit applicant at the time of application. Refer also to section 3.6.3 (b).

Fees shall accompany the permit application, unless special arrangements are made to collect the fees in another manner.

Fees shall be payable irrespective of whether a permit is finally issued.

Where an application is subsequently modified to satisfy the requirements of the processing office, or an issued permit is amended, then only one permit processing fee is payable.

Fees shall be paid into the operating account of the road controlling authority processing the permit application.

3.6.2 Bridge Engineering Supervision Fee

A bridge engineering supervision fee shall be charged for engineering supervision of state highway bridges in accordance with the following scale:

Bridge Engineering Supervision State Highway Bridges	Fee (GST exclusive)
Each bridge crossed under supervision, but with a maximum of:	$ 40
• on trips up to 160 km • on trips between 160 km and 320 km • on trips over 320 km	$ 80 $160 $240
Failure to rendezvous	$ 40
Note: Local authorities may have other scales for local roads	

(a) Return Trips

For return trips, bridge engineering supervision fees are charged for each direction of travel.

(b) Linked Permits

Where overweight vehicles of one operator are travelling in convoy under linked permits, such that the total supervision effort is not significantly increased over that for one vehicle, only one bridge engineering supervision fee is payable.

Individual vehicle spacing should not exceed 15 minutes for this to apply.

(c) Multiple Trip Permits

A separate bridge engineering supervision fee shall be charged for each of the trips of a multiple trip permit.

(d) Failure to Rendezvous

If an operator fails to rendezvous within one hour of the time arranged and the supervised bridge crossing(s) is/are postponed or cancelled then the operator shall be charged the equivalent of one supervised crossing.

(e) Bridge Engineering Self-Supervision (BESS)

In the case of operators approved for BESS by the NZTA National Operations Manager (or equivalent), no bridge engineering supervision fee would normally be charged.

However those approved operators will be charged a bridge engineering supervision fee in those instances where the regional manager requires certain routes, bridges and/or heavy vehicles to be given bridge engineering supervision by his/her own staff or nominated consultant.

(f) Recovery of Fees

Bridge engineering supervision fees for the complete permit movement and any adjustments shall be recovered by the office issuing the permit and be paid into the operating account of the road controlling authority processing the permit.

Adjustments may arise because of bridges that were not crossed, additional crossings or by failure to rendezvous.

3.6.3 Other Charges

(a) Charges for Technical Investigations

When the Pavement Loading Ratio (PLR) exceeds 150% or the Bridge Loading Ration (BLR) exceeds 200% at any point on the route, the road controlling authority may require the applicant to enter into an agreement to sponsor technical investigations and structural modification of critical facilities before a permit is issued for the proposed movement. (Refer Section 5.)

(b) OPermit Charges

No charge will be made for the use of OPermit where it is used as part of normal processing of overweight permits. Charges will be made for additional investigations, advice and feasibility studies where additional costs arise from the use of the road controlling authority's technical consultants or advisors.

Area permits will usually require additional investigations for which a charge will be made. The cost will be advised to the permit applicant by the processing office at the time of application. Where a large area is involved, such as the entire North Island state highway system, this cost could amount to several thousand dollars.

(c) Charges to Remove Obstructions

Any work done to facilitate movement of the overweight vehicle, e.g. removal of overhead signs, etc shall be a charge to the user to whom the permit is issued.

3.7 Application for Permit (Form NZTA 804)

Operators should complete form NZTA 804 (previously TNZ804), refer Appendix C, supplying all the information requested. Faxed applications are acceptable.

Some processing offices accept telephone applications where the vehicle details are held in the Heavy Vehicle Inventory, refer section 12.1.

It is essential that accurate masses be used. Refer to section 10 for methods of mass determination.

Specific points of origin and destination of movements should be given as well as the proposed route.

For continuous permits involving loads which are not divisible the information to be provided should include either:

- a list of the items to be carried (e.g. details of construction plant); or
- a general description of the payload (e.g. "individual unladen items of construction equipment not exceeding 40 tonnes tare mass" or "One ISO container sealed for export"), provided this can be supported by documentary evidence of mass if requested by the permit issuing officer or the police.

For area permits applicants will be required to provide additional information in the permit application about the routes proposed for coverage. A set of road maps suitably marked up is recommended.

3.8 Issuing of Permit (Form TNZ 805)

The permit is issued by the permit issuing officer completing form TNZ 805, refer Appendix C. The permit issued may include conditions, some of which will involve additional TNZ forms, for example bridge engineering supervision form TNZ 806.

3.9 Permit Issuing Officers and Approving Engineers

Permit issuing officers administer NZ Transport Agency's overweight permit policy. The detailed procedure that they should follow comprises section 4.

When proposed overweight vehicle movements load the route facilities above prescribed limits, the permit issuing officer is required to refer the proposed movement to the appropriate approving engineer(s) for consideration.

The detailed procedure that approving engineers should follow comprises section 5.

Permit issuing officer and approving engineer are defined in Appendix A.

Permit issuing officers and approving engineers throughout New Zealand are listed in Appendix B.

4. PERMIT ISSUING OFFICER PROCEDURE

This section removed

5. APPROVING ENGINEER PROCEDURE

This section details the steps that approving engineers should follow when proposed movements of overweight vehicles have been referred to them.

If the proposed movements involve any of the following:

- pavements where the PLR exceeds 130%;
- bridge decks where the DLR exceeds 130%; or
- bridges where the BLR exceeds 175%.

then the permit issuing officer should refer these movements (facilities) to the approving engineer for consideration. (Refer section 4.3.)

In the case of movements on state highways, the Approving Engineer is generally understood to be the NZTA's Regional Operations Manager, or a party delegated by NZTA as the Approving Engineer.

5.1 All Movements Referred for Approval

Investigate the following aspects:

- Can the payload be carried for all or part of the proposed journey by rail or sea transport?
- Is it a non-productive movement? (e.g. sales promotion, routine servicing, etc).
- Does the size of the item being transported exceed the requirements of use at the destination? (e.g. cranes with surplus lifting capacity, large tractors or motor scrapers for small tasks etc).

If any of these apply, the application may be rejected at the discretion of the approving engineer.

5.2 Pavements Referred for Approval

If	Then
PLR Exceeds 130%	If another route with a lower PLR is available, then this part of the route (with PLR exceeding 130%) shall only be used at the discretion of the approving engineer responsible for the pavement.
PLR Exceeds 150%	• Obtain the approval and any special conditions from the approving engineer responsible for each part of the proposed route. For state highways, the approval of the National Operations Manager shall also be obtained. • Specify any special conditions or arrangements required as a condition of the permit.

5.3 Bridge Decks and Bridges Referred for Approval

If after considering this section a bridge on the proposed route has insufficient capacity and cannot be bypassed:

- try other routes;
- request further engineering analysis if the applicant is willing to meet the cost (refer section 3.6.3); or
- investigate the use of a more suitable transporter to move the load.

5.3.1 Bridges Included In OPermit

- use detailed analysis to more accurately define the conditions under which the load may move;

- if stripping of items would significantly reduce the amount of bridge engineering supervision, specify this as a condition of the permit, adjust axle masses and reprocess accordingly;

- where some restriction is indicated as being necessary, specify this as a condition of the permit. For example, the use of a local bypass may be required. (Refer section 9.2).

5.3.2 Bridges not Included in OPermit

If	Then
DLR does not exceed 150% **and** BLR does not exceed 200%.	• If stripping of items would significantly reduce the amount of bridge engineering supervision, specify this as a condition of the permit, adjust axle masses and reprocess accordingly. • Specify that "central" position and "crawl" speed is required for all bridges with either DLR greater than 130% or BLR greater than 175%, unless a structural analysis shows that some lesser restriction is sufficient to keep the effects of the vehicle within the capacity of the members. • The use of a bypass may be requested instead, refer section 9.2.
DLR exceeds 150% **or** BLR exceeds 200%.	• Obtain the written approval and bridge engineering supervision requirements from the approving engineer responsible for each bridge in this category. This will usually require structural analysis to check that the effects of the vehicle are within the capacity of the members. • Specify the bridge engineering supervision requirements as a condition of the permit.

6. VEHICLE REQUIREMENTS

Note vehicle legal restrictions in section 2.3.

6.1 Vehicle Combinations Carrying a Separate Payload.

6.1.1 Minimum Number of Axles

No overweight permit shall be issued for the transport of a separate payload if the proposed vehicle combination has **less than five axles or less than two driving axles** (but see below).

6.1.2 Full Trailers

When a **full trailer** is included as part of a vehicle combination, and the payload carried by that trailer cannot be distributed in part to other axles of the vehicle combination, then **no overweight permit** shall be issued if the trailer has **less than five axles** (but see below).

6.1.3 Dispensations

The National Operations Manager (for movements involving state highways) or the local authority approving engineer may, in exceptional circumstances, grant a dispensation from the requirements of 6.1.1 and 6.1.2 above to allow the use of a short wheelbase vehicle with less than five axles where the road alignment dictates and no alternative route is available.

6.2 Mobile Plant (Other than Mobile Cranes)

6.2.1 Maximum VAI

Mobile plant (other than mobile cranes which are in section 7) may be issued with an overweight permit for travel in the unladen state in accordance with this policy providing the VAI (refer Appendix D1) does not exceed the value given below for the type of plant:

Mobile Plant (other than cranes)	Maximum VAI
Motor scrapers and dump trucks	1.50
Other plant	1.20

6.2.2 Detachable Axles

The use of detachable (or tag) axles on items of mobile earthmoving plant for transport purposes is not permitted unless specific approval is obtained, see below.

6.2.3 Dispensations

The National Operations Manager (for movements involving state highways) or the local authority approving engineer may, in exceptional circumstances, grant a dispensation from the requirements of 6.2.1 or 6.2.2 above providing that the Pavement Loading Ratio (PLR) (refer Appendix D3) does not exceed 150% for the pavements involved.

6.2.4 Towing of Trailers

Trailers and equipment that are associated with the off-highway operation of mobile plant may be towed behind that vehicle provided that this practice does not increase the bridge engineering supervision requirements.

6.3 Traction Limits

A vehicle combination may be issued with an overweight permit in accordance with this policy providing that its maximum allowable gradient for combination (MGC), refer section D7, is greater than the gradient at all uphill gradients on the proposed route.

The MGC indicates whether a vehicle combination will be able to develop sufficient traction to prevent damage to the pavement surface by wheel slip.

The MGC can be increased by the addition of:

- another prime mover in series
- ballast over the driving axles

The maximum uphill gradient on a route can be determined from highway information sheets or site measurements. It is expressed in percent.

6.4 Vehicle Speed and Travel Time Restrictions

Maximum vehicle speeds for vehicles operating under a permit shall be:

- 30 km/h if the vehicle has one or more unsprung axles;
- 30 km/h if the vehicle is fitted with large earthmover tyres. (Refer section D1.4);
- 70 km/h if the vehicle is truck-mounted with fully sprung axles and is fitted with large truck tyres; and
- up to the legal highway speed for the type of vehicle in all other cases. This will generally be 90 km/h for all heavy motor vehicles excluding school buses.

NOTE: From 3 May 2004, a uniform speed limit of 90 km/h applied to all heavy motor vehicles with a gross vehicle mass exceeding 3500 kg with the exception of school buses, which remain at 80km/h. Previously truck trailers and A trains were limited to a speed of 80 km/h.

Where the 30 km/h speed restriction imposed on vehicles under this policy is likely to create a high risk to other road users an additional condition may be imposed limiting travel to off-peak hours. Prior consultation with the NZTA, NZ Police, and the heavy transport industry is recommended.

6.5 Tyre Pressures

Tyres are to be operated at pressures recommended by either the manufacturer or the Tyre and Rim Associations.

Section 2.4 of the *Land Transport Rule 32013: Tyres and Wheels 2001* specifies **maximum** tyre pressures of:

- 700 kPa for bias ply tyres; and
- 825 kPa for radial tyres.

6.6 Traction Engines

The *Heavy Motor Vehicle Regulations 1974* specifically excludes traction engines from the definition of a heavy motor vehicle (refer Appendix A).

Regulation 10 (1) prohibits the use of certain heavy traffic on roads, including traction engines without pneumatic tyres, unless the written consent of the road controlling authority has been obtained. Conditions may be imposed on this consent (permit).

The two issues for road controlling authorities to consider before authorising travel by traction engines are:

- the effects of high axle loadings on pavements, bridge decks and underground services; and
- the potential disruption and associated risk to other traffic from their slow travel speed.

6.6.1 State Highways

(a) Regional state highway managers may issue letters of authorisation pursuant to subclauses (1) and (2) of regulation 10 of the *Heavy Motor Vehicle Regulations 1974* for the movement of traction engines on state highways, provided that:

- all wheels are fitted with solid rubber tyres with a minimum thickness of 25 mm; and
- movements involving bridge crossings are checked with the OPermit computer checking system assuming an 18.00-22.5 single large tyre size and reference axle mass of 8.0 tonnes;

(b) All movements shall be subject to any condition that the Regional Operations Manager may see fit to impose. The impact of these large slow moving vehicles on other road users should be considered, and restrictions on time of travel may be warranted where traffic flows are significant.

6.6.2 Local Roads

Local authorities may issue permits subject to the conditions they consider appropriate to impose.

6.7 Tracked Vehicles

Regulation 10 (1) of the *Heavy Motor Vehicle Regulations 1974* prohibits the use of tracked vehicles on roads unless the written consent of the road controlling authority has been obtained. Conditions may be imposed on this consent (permit). Such permits should only be considered for military vehicles such as the following:

- Bren Gun Carriers;
- M113 Tracked Personnel Carriers; and
- Scorpion Armoured Fighting Vehicles.

Such consents (permits) should have conditions imposed on them, some examples of which are:

- maximum speed;
- legal mass limits not to be exceeded;
- not permitted on motorways;
- pivot turns being prohibited on pavements;
- heavy braking to be minimised on pavements;
- minimum clearances for rubber pads on track shoes; and
- compliance with NZ Transport Agency requirements.

6.8 Fire Fighting Vehicles

Overweight permits are available for fire fighting vehicles that comply with the requirements of the *Vehicle Dimensions and Mass Rule 2002*. Details are covered in section 8.11.

6.9 Steel Wheeled Vehicles ("Steam Rollers")

Regulation 10 (1) of the *Heavy Motor Vehicle Regulations 1974* also prohibits the movement of steel wheeled or tyred vehicles on roads without the written consent of the road controlling authority. Consents (permits) for the movement of steam rollers and similar steel wheeled vehicles should **not** be issued under any circumstances by parties to this policy.

7. MOBILE CRANE REQUIREMENTS

This section of the manual contains items which relate specifically to mobile cranes. Other items in the manual are applicable to cranes unless specifically stated otherwise.

Note vehicle restrictions in section 2.3.

7.1 Permit Issue

7.1.1 Processing Time — Single Trip

Refer also to section 3 for details.

Permits should be issued within a reasonable processing time of between 4 to 8 normal working hours providing that:

- a permit application on a correctly completed NZTA 804 form is received by the permit issuing office (incomplete details or errors in the application will delay processing);
- the crane is in the heavy vehicle inventory (refer section 12.1);
- the route is for a single trip operation within the approving engineer's district;
- there is no bridge supervision required by the road controlling authorities; and
- self bridge engineering supervision is approved.

Permit applications outside these conditions will take longer to process.

7.1.2 Processing Time — Other Permits

Section 3.4 should be used as a guide to processing times for these permits.

7.1.3 Processing Procedure

Processing procedure should be as described in sections 3, 4 and 5.

7.1.4 Speed and Travel Time Restrictions

The maximum speed of operation on the road shall not exceed any of the following:

- The legal speed.
- The speed restriction specified as a permit condition e.g. bridge engineering supervision.
- the crane manufacturer's design speed, or the manufacturer's rating of the rims and tyres.
- The speed set out in the following table:

SPEED RESTRICTIONS

Mobile Crane Type	Vehicle Axle Index (VAI)	Tyre Size	Maximum Speed (km/hr)	
			Pavements	Specified Restricted Bridges
All terrain and truck mounted	Up to 1.40	Specified	90	50
	1.40 to 1.50		70	50
	Up to 1.50	Large	70	50
Other with suspension	Up to 1.50	Specified standard or large	50	50
Other without suspension	Up to 1.50	Specified standard or large	30	30

Notes:

1. Specified Tyres
   Shall be standard, specified standard and tyres of a size less than or equal to 13.00-24 or 14.00-20.

2. Crane Type
   The manufacturer's classification should be accepted for "all terrain" and "truck mounted" cranes. In general these cranes have load sharing suspension systems and are designed to travel at highway speeds.

   "Other with suspension" includes rough terrain cranes, which are usually fitted with sprung axles. "Others without suspension" means cranes with axles rigidly fixed to the chassis.

Where the 30 km/h speed restriction imposed on mobile cranes under this policy is likely to create a high risk to other road users an additional condition may be imposed limiting travel to off-peak hours. Prior consultation with the NZTA, NZ Police, and the heavy transport industry is recommended.

7.1.5 Tyre Pressures

For tyre pressures refer to section 6.5.

7.1.6 Vehicle Parameter Calculations

Vehicle parameter calculations should be carried out according to Appendix D.

7.1.7. Change of Ownership

On change of ownership, the new owner (or registered person) shall apply for a permit to the approving engineer in the new area of operation stating the Heavy Vehicle Inventory reference number.

Any dispensations applicable to the crane in question may be transferred to the new owner (or registered person) provided that the PLR (refer section D3) the DLR (refer section D4) and the BLR (refer section D5) are acceptable to the approving engineer and the National Operations Manager.

NB: Permits are not transferable and hence a separate application must be made by the new owner (or registered person).

7.1.8 Heavy Vehicle Inventory

Refer to section 12.1.

7.1.9 Mobile Crane Weight Certificates

Refer to section 10.3.4.

7.2 Vehicle Requirements

7.2.1 Rated Capacity

A mobile crane may be issued with an overweight permit in accordance with the policy providing that its VAI (refer section D1) does not exceed 1.50.

7.2.2 Boom Trailers

Mobile cranes configured with boom trailers may be issued with overweight permits in accordance with the policy provided that:

- The boom is free to pivot at all times the crane is operating on the road.
- The application contains a statement from the applicant that:
  - the boom is free to pivot; and
  - no device to alter the load distribution to the axles is in operation.
- The maximum VAI on the crane and the boom trailer does not exceed 1.50.
- Full details of each trailer configuration are submitted by the applicant for technical evaluation at the time of first application for a permit.
- Details shall be recorded on the Heavy Vehicle Inventory Form (TNZ 803).

Mobile cranes are permitted to travel short distances to work sites after parking the trailer. The speed of travel is not to exceed 10km/hr and travel over bridges is to be excluded.

7.2.3 Counterweights

Counterweights may be repositioned from the manufacturer's designed operating position on the crane's body provided that:

- The maximum VAI is reduced by the repositioning action.
- The counterweight is securely fixed in the new position while on the road.
- The maximum VAI on the crane does not exceed 1.50.
- Full details are submitted by the applicant for technical evaluation at the time of first application for a permit.
- Details shall be recorded on the Heavy Vehicle Inventory Form, (NZTA 803).

Counterweights required for a mobile crane's normal lifting operation may also be carried on a trailer towed behind the crane provided that this practice does not increase the bridge engineering supervision requirements.

8. PAYLOAD REQUIREMENTS

8.1 Divisible Loads

8.1.1 Approved Exceptions

Under Section 5.1(1)(b) of the *Vehicle Dimensions and Mass Rule 2002*, Overweight Permits cannot be issued for divisible loads.

Before the Vehicle Dimensions and Mass Amendment 2010, Approved Exceptions were granted for the following:

- specified ISO containers on specified routes, refer section 8.4;
- transformer oil, refer section 8.5;
- building removals, refer section 8.6;
- slurry sealing, refer section 8.7;
- platform trailers, refer section 8.8;
- towing of trailers, refer section 6.2.4;
- towing of disabled vehicles, refer section 8.9;
- grandfather rights for tourist buses and coaches, refer section 8.10;
- fire fighting vehicles carrying water, refer section 8.11; and

Approved Exceptions will be reviewed by the Axle Weights and Loadings Advisory Group (AWLAG) for both currency, and compliance with the legal definition of Indivisibility, as defined in the VDAM Rule - Part 2 (Definitions).

8.2 Stripping of Loads

The removal of strippable items should be considered by the operator so as to minimise the load and hence the restrictions applying to the movement.

In addition to requirements under other sections of this policy, where the BLR (refer section D5) exceeds 175% or the DLR (refer section D4) exceeds 130%, the approving engineer may require the removal of strippable items if this would significantly reduce the amount of bridge engineering supervision for the journey.

8.3 Ballasted Tractors

The National Operations Manager (for movements on state highways) or the local authority approving engineer, may approve the use of traction ballast on a prime mover (tractor) with two rear driving axles, if other means of transport are not readily available (refer section 6.3).

Proposals submitted for approval are to include gradients en route, MGC(s) (refer section D6), ballast details and masses, makes and number of tractors involved, registration numbers of tractors and trailers.

Notwithstanding the above overweight permits may be issued for tractor(s) each with two rear driving axles, using ballast for traction when towing drawbar trailers, provided that:

- Legal mass limits on the tractor(s) are not exceeded.
- Gradients on the proposed route have been established.
- The MGC, having been calculated according to section D7, is greater than the gradient at all uphill gradients on the proposed route.

8.4 ISO Containers

8.4.1 Eligibility

Generally containers are considered to be divisible loads. However, ISO containers, up to 40 feet in length, and carried on articulated vehicles incorporating a tractor unit and tri-axle set or quad axle set semi-trailer as defined in the *Vehicle Dimensions and Mass Rule 2002*, may be considered as indivisible loads when they have been loaded or packed for the sole purpose of export or import. Tractor units may be either 6 x 4 or 8 x 4 with two rear driving axles, but excluding tri-drive units.

Single, multiple or continuous permits may be issued for vehicles carrying ISO containers, subject to the following conditions:

- road routes are specifically named; and
- routes are to and from sea ports.

Vehicles carrying ISO containers are **not** eligible for area permits.

8.4.2 Broken Journeys

The practice of broken journeys between ports and internal origins/destinations, and the use of in transit storage of ISO containers for logistical reasons, is acceptable within the current policy for the road movement of ISO containers. In this case the route specified shall specify that a break in journey is acceptable subject to the following conditions:

1. Vehicles performing broken journeys or utilising transit storage facilities shall at all times carry appropriate overweight permits, and conform to the specified routes;
2. Accompanying documentation must identify the container by number, vessel, wharf, and date of arrival in, or departure from New Zealand, and the consignee/consignor; and
3. The container shall be sealed for export or import for the entire time that it is in transit storage, except where a regulatory authority has opened the container for compliance or inspection purposes and provided evidence of this either by way of documentation or by using a replacement seal. In either event there shall be no change in the container's contents or increase in mass.

8.4.3 Tyre Size

Minimum tyre size shall be a 235 millimetre manufacturer's designated section width having an aspect ratio of 75 and fitted to a 17.5 inch rim.

8.4.4 Evidence Bona Fide

It will be necessary for an operator wishing to rely on this policy to carry documentation supporting the fact that, in the case of export containers, the entire contents of the container had been loaded or packed for the sole purpose of export or, in the case of imported containers, the entire contents of the container were loaded or packed overseas.

Any of the following documents will be acceptable:

- Shipping company delivery order;
- Shipping company carter's note;
- Carrier's waybill;
- Wharf gate pass;
- Any other traceable document.

It will be sufficient compliance with this policy if the driver produces a photocopy or facsimile of the document.

Where a vehicle being used under the authority of this policy is stopped by an enforcement officer the driver must immediately upon demand give to that officer documentary evidence that the container has been loaded or packed for the sole purpose of export or import.

Approval to operate under the authority of this policy may be revoked if it is shown that an operator deliberately misrepresented the fact that a container had been loaded or packed for the sole purpose of export or import.

8.4.5 Maximum Vehicle Axle Index and Mass Limits

Overweight permits may be issued for vehicles that qualify under clause 8.4.1 above, with the following mass limits being applied:

- VAI (refer Appendix D1) not exceeding 1.10 on all axles. Vehicles that qualify under clause 8.4.6 of this manual may exceed this limit.
- Quad axle set on semi-trailers with a quad-axle set, having either twin-tyred or single large-tyred axles, will be limited to 22 tonnes.
- Front axles on the tractor unit will be limited to either the legal mass limit i.e. 6.00 tonnes (standard tyres), 7.20 tonnes (large tyres), and 5.40 tonnes (axles in a twin steer axle set) or the manufacturer's rating, whichever is the lesser.
- Gross mass of the vehicle combination will be limited to either 44 tonnes or the sum of the axle group masses, whichever is the lesser.

8.4.6 Motorway Use

Vehicles carrying ISO containers under an overweight permit, in accordance with section 8.4, are permitted to use motorways. (Refer section 9.3).

8.4.7 Grandfather Rights for Single Large Tyred Vehicles

Vehicles that were first registered in New Zealand before 1 October 1997 and at that time fitted with single large tyres may be issued with permits to operate at the same axle masses that now apply to vehicles fitted with twin tyred axles. These rights will remain for the life of the trailer, or terminate at the change of ownership.

8.4.8 Vehicle Safety Requirements

Vehicles carrying ISO containers under overweight permits at a gross vehicle mass between 39 and 44 tonnes are required by the NZ Transport Agency to either be brake coded or meet the Interim Brake Specification.

Under the *Vehicle Dimensions and Mass Rule 2002,* semi-trailers (vehicles of Class TD) with a VAI not exceeding 1.10 must also hold a certificate of loading incorporating the vehicle's static roll threshold compliance results for load height and gross mass. This requirement also applies to vehicles that are eligible for overweight permits under clause 8.4.6 above. In addition the semi-trailer mass must not exceed the Maximum Towed Mass on the vehicle's certificate of loading.

8.5 Transformer Oil

The removal of oil from transformers can cause technical difficulties with the transformers. Transformer oil is not regarded as a divisible component.

8.6 Building Removals

- Continuous and area permits may be available for movements where the Pavement Loading Ratio (PLR) does not exceed 120%;
- Single trip permits may be available where the PLR exceeds 120%;
- Where the PLR exceeds 130% single trip permits may be available as for other loads that are not readily divisible. The Approving Engineer may request the cutting up of heavier houses if this would significantly reduce the amount of bridge engineering supervision for the proposed journey;
- For movements on state highways where the PLR exceeds 150% the approval of the National Operations Manager shall be obtained; and
- Buildings shall be transported in accordance with the current requirements specified on the overdimension permit.

8.7 Slurry Sealing

Permits may be issued to allow partially loaded slurry sealing trucks to operate, including travel between stockpiles and sealing sites, according to the following table:

Maximum Vehicle Axle Index (VAI)	Radius of movement from stockpile site (km)
1.30	5
1.20	20

8.8 Platform Trailers

Permits may be issued to allow empty platform trailers towed behind ballasted tractors to carry a second empty trailer. Such permits are subject to the vehicle combination meeting any vehicle safety requirements of the NZ Transport Agency. The ballast used for traction shall conform to section 8.3 of this policy.

8.9 Towing and Transporting Disabled Vehicles

This policy relates to the issue of overweight permits for the towing of vehicles that have been involved in an accident or suffered mechanical failure. Where the disabled vehicle is a risk to road safety because of its dangerous location it will be permissible for the vehicle combination to exceed the legal axle and gross mass limits without enforcement action whilst towing from the point of the accident or breakdown.

The towing distance shall be the minimum required to move the disabled vehicle from the point of accident or breakdown to the nearest place of safety out of the traffic stream where the disabled vehicle can be reduced in size, or for a distance of 10 km, whichever is the lesser. It shall exclude travel over any bridges.

For the onward movement from the place of safety of disabled vehicles that exceed the legal mass limits, continuous overweight permits may be issued to dedicated breakdown trucks and multi-axle low bed transporters provided all the following conditions are met:

- the disabled item is limited to individual vehicles not combinations;
- the gross mass of the vehicle to be towed has been reduced by the removal of all or part of the load, or it is not practical to do so;
- the vehicle axle index does not exceed 1.20;
- as far as is practicable the vehicle combination complies with the *Vehicle Dimensions and Mass Rule 2002*; and
- the vehicle combination complies at all times with all relevant regulations (such as Dangerous Goods, Certificate of Loading, Road User Charges, and Load Security).

The usual distance limit of 50 km radius centred on the normal operating base of the vehicle for continuous permits will be waived under this policy.

8.10 Grandfather Rights for Tourist Buses and Coaches

Buses and coaches that are currently used for tour and charter operations may be granted overweight permits to operate with passengers and luggage above the legal mass limits under the following conditions:

- First built and operated in New Zealand under design approvals prior to 1992,
- Fitted throughout with air suspension or a combination of spring and air suspension,
- Axle limit to be 6.60 tonnes on the steer axle. Legal mass limits to apply to all other axles and gross vehicle mass,
- Tour and charter operations only.

The vehicle must operate within the axle ratings laid down on the Certificate of Loading. These rights will expire when the vehicle ceases use as a commercial tour vehicle. The rights do not apply to any bus or coach that is rebuilt after the date of this amendment to comply with the design approvals identified above.

8.11 Fire Fighting Vehicles

Fire appliances operated by the NZ Fire Service, the NZ Defence Force, and civilian airports that may exceed the General Mass limits when carrying water for the purposes of maintaining a fire fighting capability, are eligible for overweight permits covering movement on public roads providing they comply with the *Vehicle Dimensions and Mass Rule 2002*.

9. ROUTE REQUIREMENTS

9.1 Alternative Routes

In general, permits should be processed using the route desired by the applicant. However, if the proposed route involves either of the following:

- pavements where the PLR exceeds 130%, or
- bridges which cannot be bypassed and which have:
  - decks where the DLR exceeds 130%, or
  - spans where the BLR exceeds 175%

then the approving engineer for the office issuing the permit may require that an alternative route be used. (Refer section 5).

9.2 Use of Local Bypasses for Weak Bridges

Where an acceptable ford, railway level crossing or other crossing is available as an alternative to a bridge that would require bridge engineering supervision, the approving engineer may require that such an alternative crossing be used instead of the bridge.

9.3 Use of Motorways

As a general policy motorway travel by overweight vehicles and loads is permitted wherever practically possible with the exception of the following vehicles:

- those that do not have the capability to operate safely at 70 km/h or greater;
- those restricted as a condition of the overweight permit in sections 6.4 or 7.1.4 to a maximum speed of 50 km/h or less.

In some cases evidence of the vehicle's capability may be required from the vehicle manufacturer.

NZ Transport Agency's Regional State Highway Managers (RSHMs) may determine local conditions for motorway travel following consultation with the NZ Transport Agency (NZTA), NZ Police, and the heavy transport industry.

In general overweight vehicles should be allowed to use the motorway network in preference to urban roads and streets. The principal restriction on the use of motorways should be those vehicles that impose a hazard because they are incapable of operating safely at a reasonable speed. Motorway travel at speeds below 70 km/h may be permitted at the discretion of RSHMs provided additional local conditions covering vehicle movement (e.g. time of travel) are also imposed following the consultation outlined above.

10. WEIGHT DETERMINATION AND ENFORCEMENT

10.1 Weighing Procedures

10.1.1 General

All weighing shall be done in accordance with The Transport (Measurement of Weight) Notice 1997.

All weighings shall be supervised by NZ Police or a consultant approved by NZ Transport Agency to ensure that correct procedures are used when weighbridge certificates are supplied by the applicant.

The weighing record must include a concise description of the vehicle and its loading condition, including the extent of operating gear carried and the description and position of the payload.

In general, the police will accept these weighing records.

10.1.2 Weighing for Permit

The permit issuing officer or any of the road controlling authorities involved in a movement, may require the vehicle to be weighed at a specific locality as a condition of the permit. This will require either:

- that confirmation of axle masses from a certified weighing facility be sent to the permit issuing officer clearly indicating the permit serial number, or

- that the weighing be done under the control of a person nominated by the permit issuing officer.

In addition the road controlling authority may, by exception, require evidence of satisfactory load sharing of vehicles that have non compliant suspension systems.

10.2 Determination of Axle Weights by Calculation

10.2.1 Principles

Individual axle masses can be determined for multi-axled vehicles by calculation. Calculations require the following information:

- vehicle dimensions and axle tare masses
- payload position and mass

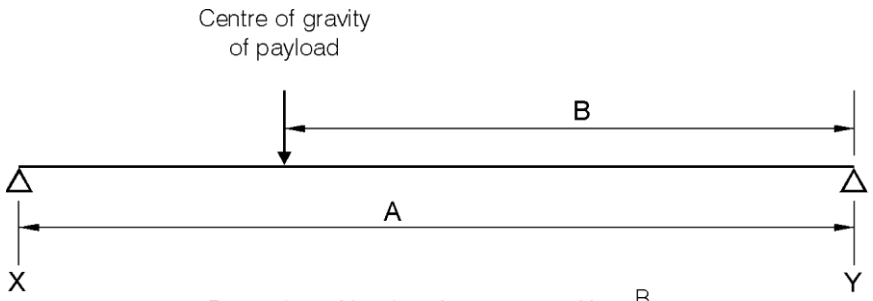
Dimensional and tare mass data for commonly used transporters is available from the Heavy Vehicle Inventory (refer section 12.1).

Payload masses can be obtained from plant handbooks, manufacturers' assessments or previous weighings. Previous weighings are preferable.

The payload is distributed to the axles and added to the tare axle masses. The method of distribution involves considering each rigid section of the vehicle in turn and proportioning the load on that section to the supporting sections.

Some allowance should be made for the possibility that the payload centre of gravity may vary from the assumed position.

10.2.2 Distribution of Payload

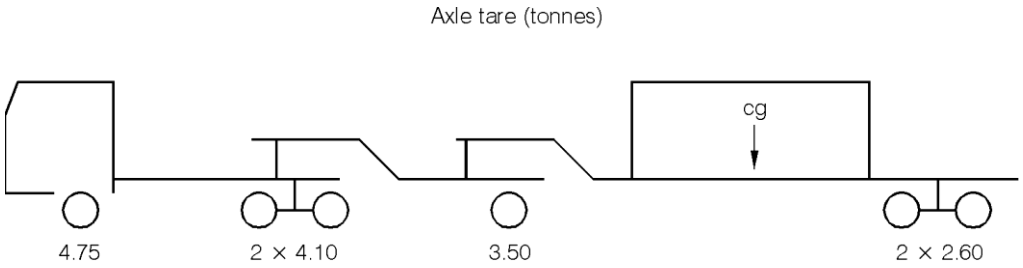


Proportion of load on front support X = $\frac{B}{A}$

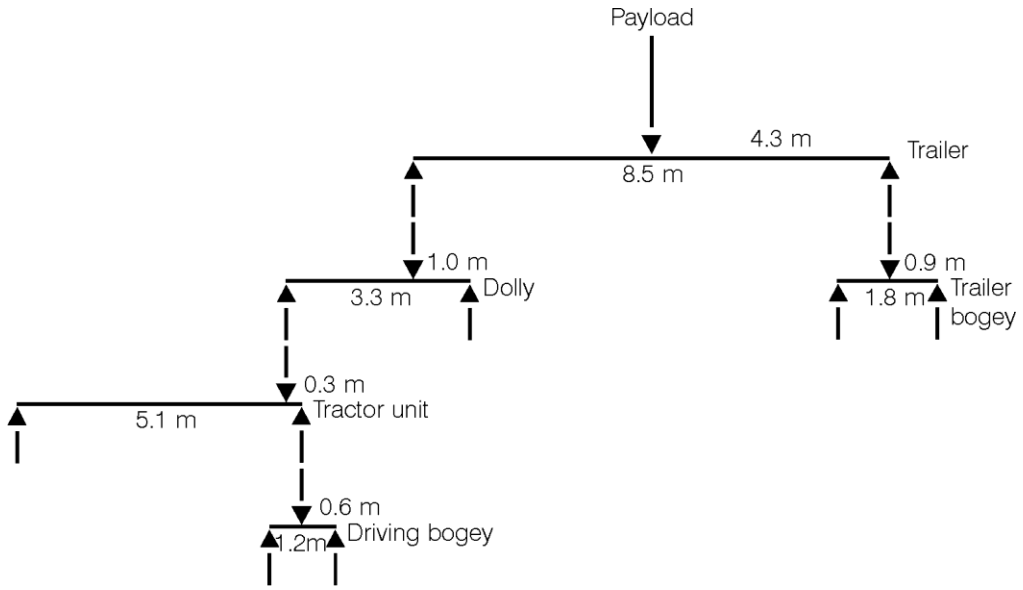
Proportion of load on rear support Y = $1 - \frac{B}{A}$

10.2.3 Example

The transporter in the diagram below consists of three units; tractor, dolly and trailer. The tractor and trailer have rear tandem axles with walking beam suspensions. Calculate the axle masses for a 40 tonne payload.



Distribution of the payload to the axles can be represented diagrammatically:



The payload is carried by the trailer and is distributed to the dolly and the rear bogey.

The load on the dolly is distributed to the dolly axle and to the tractor, etc.

For each section the distribution is done by reference to section 10.2.2, hence:

Part of Vehicle	Proportion of Payload
Trailer	1.00
Trailer bogey	0.49
Trailer axles	0.50 × 0.49 = 0.245 each
Dolly	0.51
Dolly axle	0.70 × 0.51 = 0.36
Tractor	0.30 × 0.51 = 0.15
Steering axle	0.06 × 0.15 = 0.01
Driving bogey	0.94 × 0.15 = 0.14
Driving axles	0.50 × 0.14 = 0.07 each

For a 40 tonne payload, axle masses would therefore be:

Payload	0.40	2.80	2.80	14.40	9.80	9.80
Tare	4.75	4.10	4.10	3.50	2.60	2.60
Gross	5.15	6.90	6.90	17.90	12.40	12.40

10.3 Enforcement

10.3.1 Breaches of Overweight Permits

Police officers may, at any time, stop and weigh a vehicle travelling under permit.

Police are authorised to divert vehicles operating on overweight permits up to five kilometres from the approved route for the purpose of weighing, provided understrength bridges are not included on the route.

Non compliance with the Road User Charges Act will not be regarded as a breach of overweight permits.

NZ Transport Agency and New Zealand Police have agreed to define breaches of overweight permits as *major* or *minor* as follows:

If the vehicle is found to be in major or minor breach of any of the conditions set by the permit, then:

- the permit is no longer valid and is cancelled unless it is revalidated by a Police officer following successful adjustment of the load;
- the vehicle must remain at the point of weighing until a new overweight permit has been obtained, or the load adjusted to comply with the permit mass and the original permit has been revalidated;
- the police will issue an infringement notice for breach of overweight permit in every instance (they may also issue notices for any other offences detected); and
- the police will issue overloading infringement notices calculated from the legal mass limits.

Unless the permit is revalidated by the Police following adjustment of the load, application must be made to the original permit issuing office for a new permit to be issued for the entire journey. Time will have to be allowed to enable the new details to be processed.

The Police will not waive overloading infringements until they have inspected the revoked and replacement permits and are satisfied that the breach was minor.

Where a vehicle has been found to exceed the stated permit mass limits and the operator is able to adjust the load to comply with those mass limits, NZ Police have agreed to revalidate overweight permits at the roadside in order that the journey may resume. The full process for roadside enforcement of overweight vehicles and subsequent action by the NZ Police is shown in section 10.3.2.

NZ Transport Agency will support requests from the Police for access to overweight permits for information.

Infringement offences and fees are listed in the Second Schedule, Transport Act 1989.

Major breach of overweight permit:

- No permit held;
- Incorrect route used;
- Different vehicle used;
- Different load carried (unless payload is unspecified);
- Breach of bridge supervision requirements;
- Permit mass exceeded, requiring additional bridge and road restrictions or supervision on new permit;
- Permitted speed exceeded;
- Weight limit stated on Certificate of Loading exceeded (refer section 4.1).

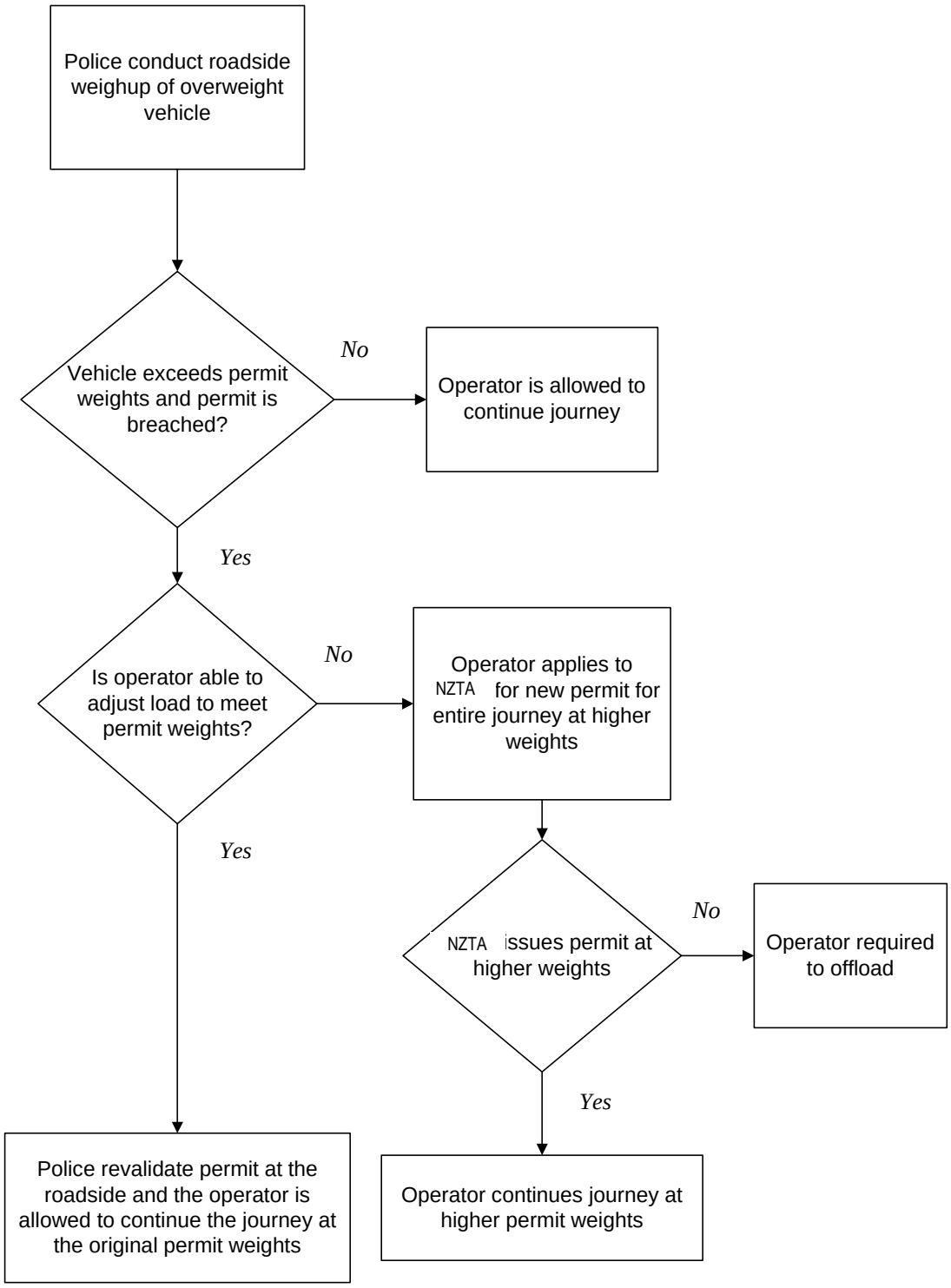
Minor breach of overweight permit:

- Permit masses exceeded, but no additional bridge supervision requirements ensue on new permit

Section 11.4.7 explains the consequences of breach of permit in terms of companies and drivers that have been registered to perform Bridge Engineering Self Supervision (BESS).

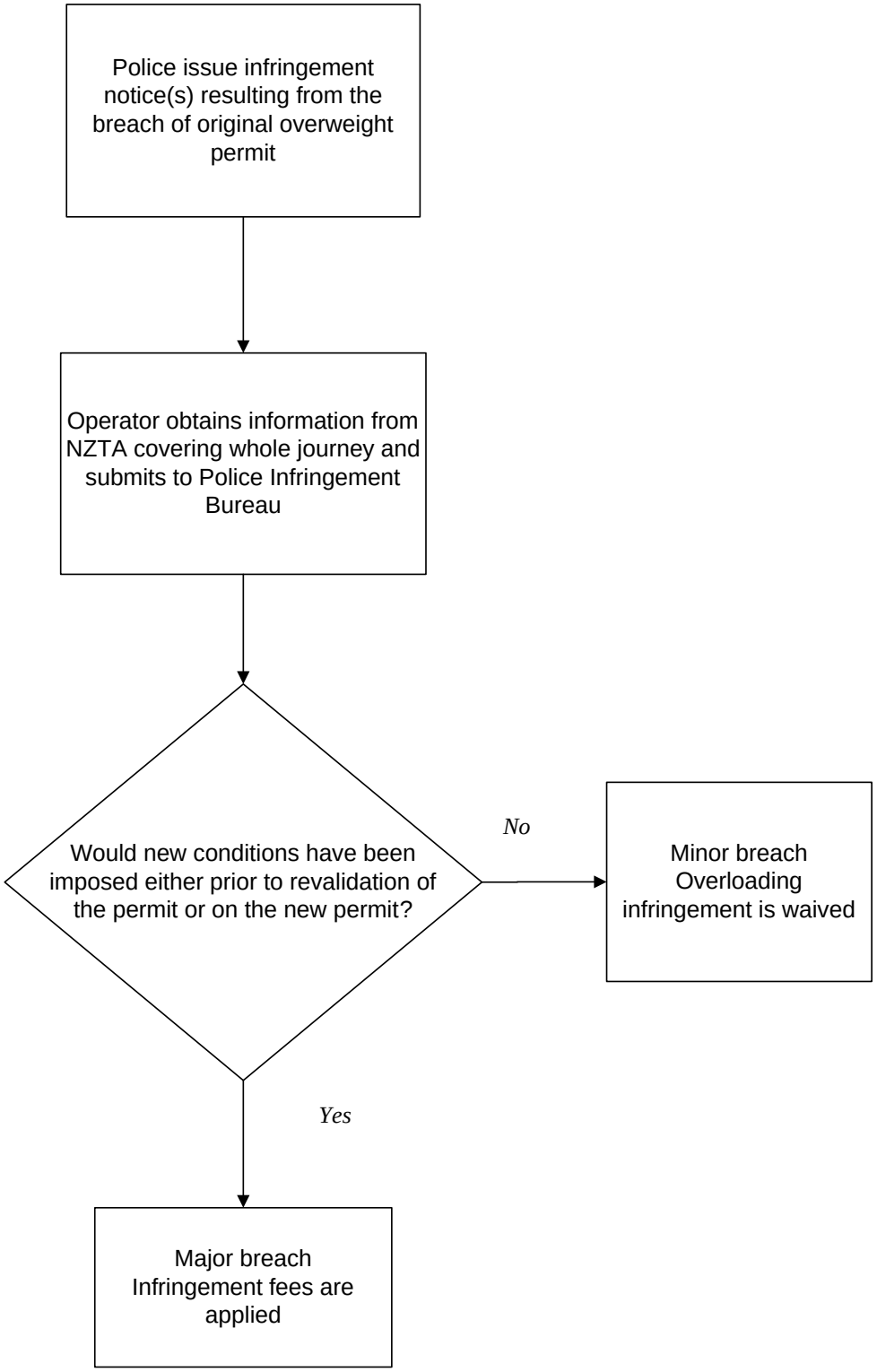
10.3.2 Process for Breaches of Overweight Permits

1. At the roadside



10.3.3 Process for Breaches of Overweight Permits (continued)

2. Subsequent Police action



10.3.4 Mobile Plant

Fixed mass mobile plant (motor scrapers, forklifts, mobile cranes etc) having constant axle masses and dimensions, may have their overweight permit endorsed with their certified masses obtained from a supervised weighing site.

Police officers will recognise such certified masses as an alternative to enforcement weighing provided that:

- weighings and dimension checks are conducted under police supervision;
- approved and certified weighing equipment only is used;
- the endorsement applies only to the trips listed on the permit and ceases to have effect when the permit date has expired;
- no modifications have been made to the vehicle or load which affects the certified weights;
- the vehicle has either a current certificate of fitness or warrant of fitness, whichever is applicable;
- the vehicle complies with the mass limitations imposed by the certificate of loading; and
- the vehicle complies with all of the provisions of the Road User Charges Act 1977.

10.3.5 Mobile Crane Weight Certificates

To prevent repeated enforcement weighing of a fixed weight mobile crane, a "Mobile Crane Weight Certificate" may be issued by the Crane Association of New Zealand.

The certificate incorporates a detailed description of major accessories likely to significantly effect the mass and includes photographs.

Cranes issued with this certificate will not be weighed routinely by police officers, provided that all the conditions listed in section 10.3.2 are complied with.

If there are valid reasons to believe that changes have been made, that would cause a significant increase in the masses stated on the certificate, then a crane remains subject to enforcement weighing.

The above does not prevent police from weighing a mobile crane if they consider there is good reason to.

11. BRIDGE ENGINEERING SUPERVISION AND TRAFFIC SAFETY

This section covers the policy for bridge engineering supervision and traffic safety on bridge crossings.

Permit issuing officers should refer to section 11.6 for the procedure to follow when completing the permit conditions.

11.1 General

Bridge engineering supervision is specified as a condition of an overweight permit when it is necessary to apply special positional and/or speed controls to keep the effects of the vehicle within the capacity of the bridge. (Refer section 12.3.1).

As a result of complying with these conditions the overweight vehicle may also produce an impact on traffic safety which requires the presence of a qualified pilot to warn other traffic.

The road controlling authority has the power to impose these controls on the overweight vehicle and to have its authorised officers ensure that the conditions are carried out under Clause 5.1(3)(i) of the *Vehicle Dimensions and Mass Rule 2002*.

11.2 The Role of the Bridge Supervisor

Bridge engineering supervision is normally carried out by personnel directly responsible for maintaining the structural integrity of the bridge. It involves checking that the overweight vehicle complies with the permit conditions on bridge crossings. In many cases a speed restriction with the vehicle remaining in its own lane will be sufficient. For travel on state highways the bridge supervision service is provided by NZ Transport Agency's engineering consultants.

The responsibility for traffic safety during bridge crossings rests principally with the holder of the overweight permit. The bridge supervisor should ensure that their routine activities during bridge crossings are limited to the protection of the structure, rather than the direction and control of traffic.

Following the bridge crossing the supervisor should initial the form TNZ 806 alongside each bridge for which they have provided supervision.

Road controlling authorities may require that bridges be inspected for damage by their supervisor after the overweight vehicle has crossed. Any damage observed should be immediately reported and followed up.

11.3 Arrangements for Rendezvous for Bridge Supervision

Where bridge engineering supervision is included as a condition of an overweight permit, the permit holder shall contact the bridge engineering supervisor at least 24 hours before the bridge crossing and arrange to meet the supervisor at some convenient place before the bridge.

If the overweight vehicle is delayed through unforeseen circumstances, the operator shall make every effort to contact the supervisor and change the arranged rendezvous time.

If the overweight vehicle fails to rendezvous within one hour of the time arranged, the crossing arrangements will be deemed to have been cancelled. This will be conveyed to the permit issuing officer, since failure to rendezvous incurs a fee. (Refer section 3.6.2.).

11.4 Bridge Engineering Self Supervision by Operators

11.4.1 Policy

The policy of bridge engineering self supervision was first introduced in 1987, and reviewed by NZ Transport Agency in 1996. Under this policy companies that have a good record in relation to observing the *Vehicle Dimensions and Mass Rule 2002* and NZ Transport Agency's overweight permit policy may be approved to carry out bridge engineering supervision.

The impact of this policy has been to largely eliminate the use of NZ Transport Agency's consultants for routine bridge crossings on state highways. In future road controlling authorities are expected to extend self supervision by transport operators to all bridge crossings where they are satisfied that the integrity of the bridge structure is not threatened.

11.4.2 Conditions of the Policy

This policy is subject to the following conditions:

- The National Operations Manager is authorised to approve companies. A list is kept of approved companies, together with a schedule of approved drivers.
- The company is to nominate, on the basis of proven good record, the driver(s) it wishes to be permitted to provide such supervision, and the vehicles or plant items involved. NZTA will consider applications taking into account the record of the company together with advice received from consultants, NZ Police, and other road controlling authorities. In the case of drivers the NZTA will consult with the NZ Police. Any of the driving licence classes 2, 3, 4, and 5 are acceptable for the purpose of registration by the NZTA.

- When bridge self supervision is authorised the permit is endorsed by the permit issuing officer to specify which bridges and drivers are covered. The only person that can perform bridge engineering self supervision is a BESS-registered driver, and that individual must be the person **driving** the permitted overweight vehicle. Pilots who are BESS Registered cannot act as a BESS driver as well as acting as pilot for a bridge crossing, as their primary role is to control traffic to ensure public safety.

- While the responsibility for bridge engineering supervision remains with the road controlling authority or NZ Transport Agency's engineering consultant, the permit holder must advise them of any discrepancy or damage associated with a bridge crossing. Such advice should be given as soon as possible, but in any case within 24 hours of the bridge crossing.

- If permit conditions are breached, the National Operations Manager has the discretion to disqualify the company and/or the driver and remove their names from the list.

- Companies that provide evidence of measures taken to avoid a recurrence of a breach of overweight permit should be reinstated to the approved list for bridge engineering self supervision following three months of disqualification.

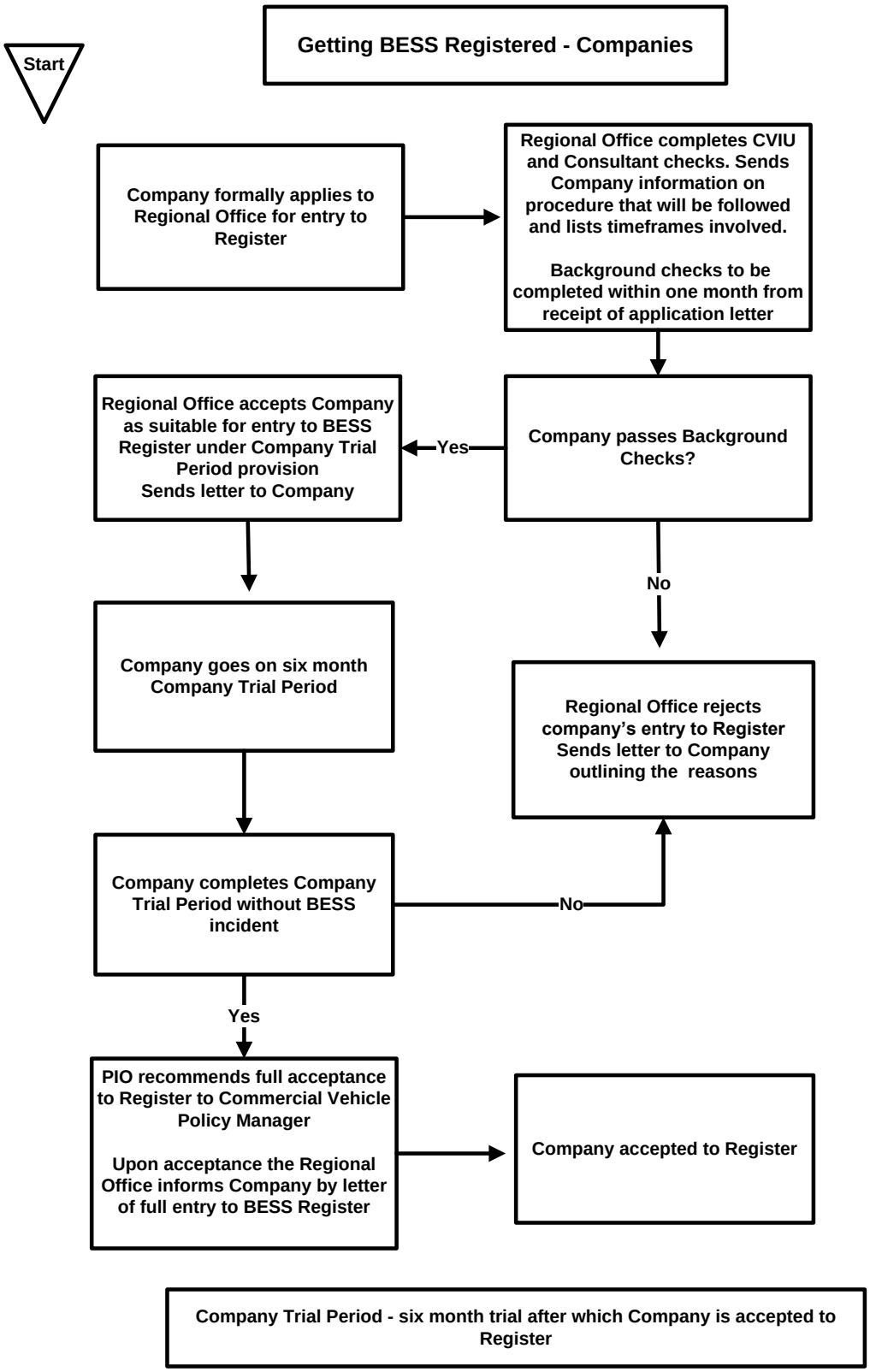
-

11.4.3 Administration of BESS

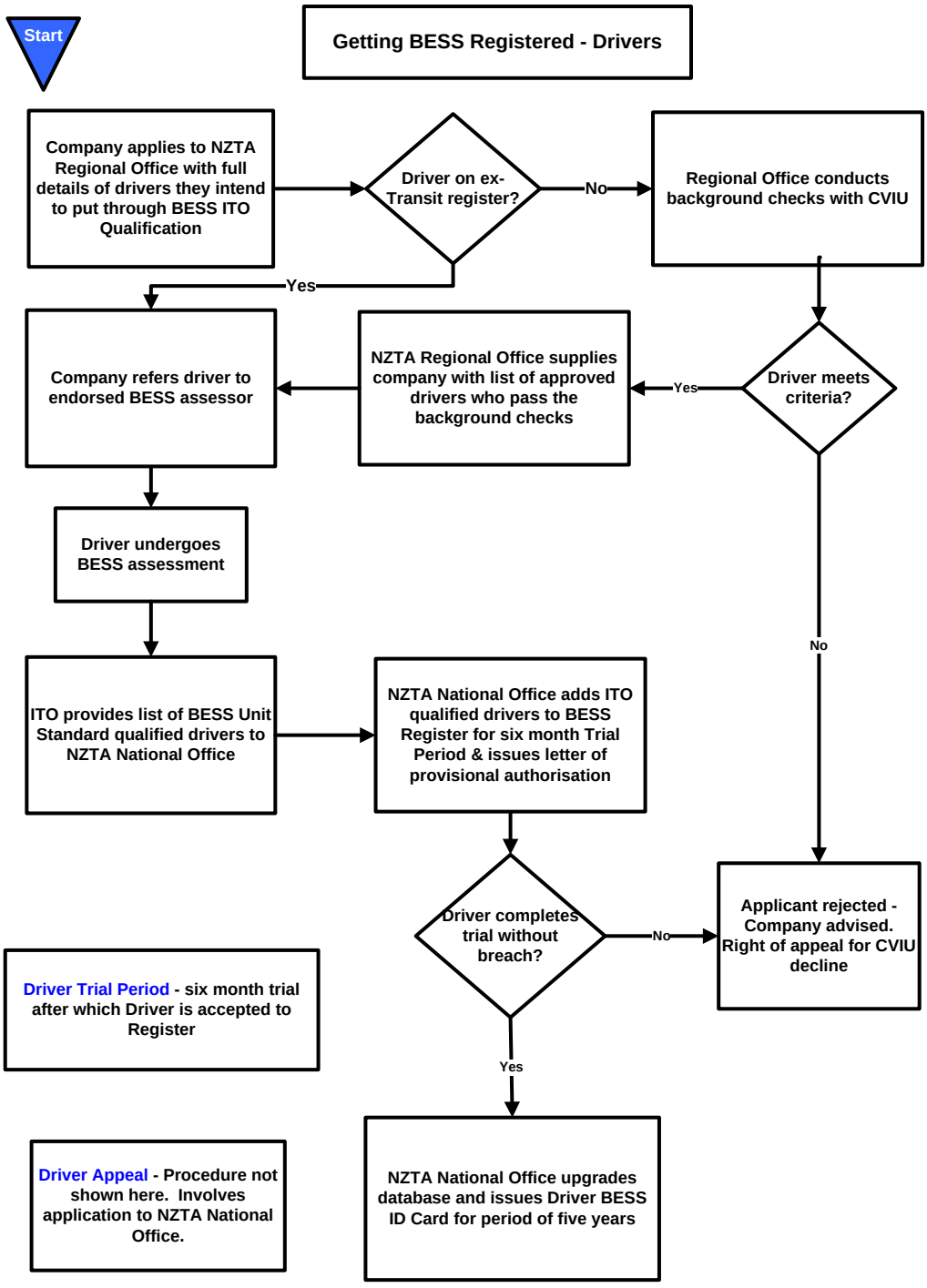
Since 2009, NZTA has adopted a new system for the administration of BESS involving the assessment and registration of drivers against NZQA Unit Standard 23436 (US23436).

The process for gaining registration and administering the database is shown in the following flow charts.

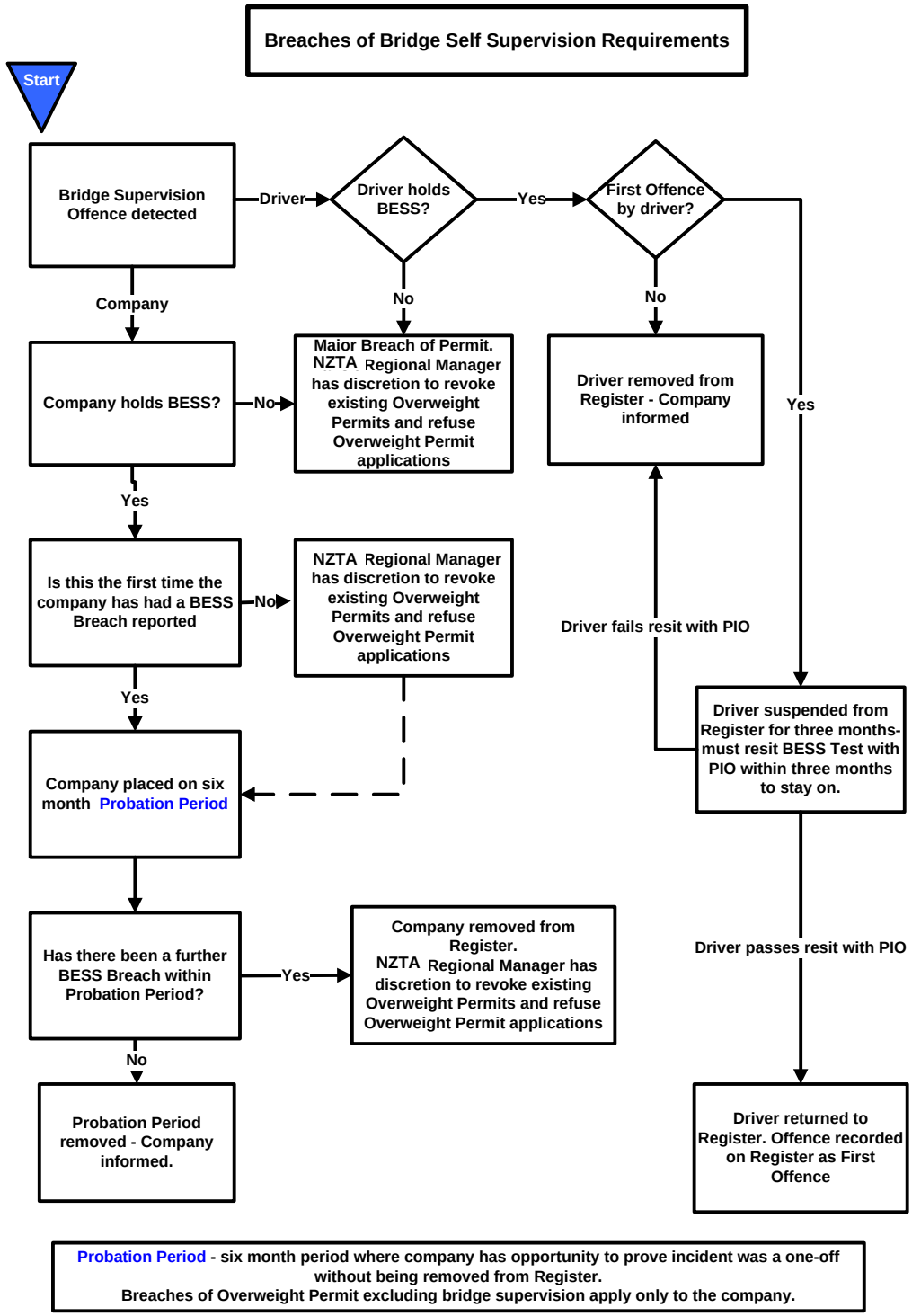
11.4.4 Approval of Companies



11.4.5 Approval of Drivers



11.4.6 Breaches of BESS requirements



11.4.7 Breach of Overweight Permit and BESS Registration

The following table shows the consequences to BESS-registered companies and drivers that may ensue from breaches of overweight permits.

Breach of Permit		NZ Police Action under Cl 10.3.3	NZTA Action under BESS
Company offence	Driver offence		
No permit held		Major breach	None
	Incorrect route used	Major breach	None
Different vehicle used		major breach	None
Different load carried		Major breach	None
Breach of bridge supervision requirements		Major breach	See Cl. 11.4.6
	Breach of bridge supervision requirements	Major breach	See Cl. 11.4.6
Permit mass exceeded, leading to additional restrictions on new permit		Major breach	None
	Permit speed exceeded (non-BESS related)	Major breach	None
Weight limit on COL exceeded		Major breach	None
Permit masses exceeded, but no additional restrictions on new permit		Minor breach	None

11.5 Traffic Control at Bridge Crossings

11.5.1 Approved Industry Procedure

The New Zealand Heavy Haulage Association and the Crane Association of New Zealand have jointly developed the document "Code of Practice for traffic control at bridges being crossed by overweight vehicles". This document meets NZ Transport Agency's requirements for traffic control by overweight vehicles at bridge crossings.

11.5.2 Qualification

Traffic controllers who have been registered with either of the two industry associations mentioned in section 11.5.1 or separately recognised by the road controlling authority may be permitted to accompany overweight vehicles for the purpose of providing traffic control on bridge crossings as required in section 11.6.

11.5.3 Power to Stop Vehicles

Any person accompanying an overweight vehicle for which a permit has been issued by NZ Transport Agency has the power to stop vehicles on any state highway where this is necessary for the purposes of safety.

11.6 Requirements for Traffic Control at Bridge Crossings

Level & Condition for Bridge Crossing [1]	Risk to other vehicles	Traffic control requirements [4]
50 km/hr or 20 km/hr own lane	Not significant	None required
All Crawl own lane [2, 6]	Low	Overweight vehicle to have revolving amber light or flashing amber light visible from the rear, together with rear facing retro-reflective hazard panels if the vehicle is also overdimension.
All Crawl central or crawl offset [5, 6]	High	Provide qualified traffic controllers or Class 1 or Class 2 certified pilots [3] using approved industry procedures

Notes:

1. The first column refers to the bridge engineering supervision requirements which are outputs from the overweight permit computer checking system. It is expected that permits issued by local authorities using alternative methods would follow a similar pattern.

2. A traffic controller may need to be present for own lane travel (20 km/hr or crawl) where other heavy vehicles have to be prevented from travelling on the same span as the overweight vehicle. It is expected that this will only apply on long span bridges where the critical span of the bridge as identified by the overweight permit computer checking system is over 30 metres in length.

3. Class 1 and Class 2 pilots are certified under the NZ Transport Agency (NZTA) scheme for classifying pilots used to escort overdimension vehicles and loads.

4. Vehicles or loads exceeding 3.1 m in width may require a pilot under the NZTA scheme for overdimension vehicles/loads irrespective of the bridge crossing condition being imposed by NZTA.

5. For Crawl central or crawl offset on one lane bridges overweight vehicles shall comply with the low risk traffic control requirements given above.

6. Crawl speed means not exceeding a uniform speed of 10 km/h.

12. Inventory procedures and OPermit

12.1 Heavy Vehicle Inventory

An inventory of heavy vehicles that operate under overweight permits has been compiled by NZ Transport Agency. The inventory includes transporters, mobile plant and articulated vehicles.

For each vehicle the inventory lists information necessary for overweight permit applications. This makes the processing of permits more efficient.

Each vehicle is allocated a permanent serial number. A separate record is held for each vehicle configuration that may require a permit.

Changes in vehicle information should be maintained by NZTA regional offices.

Whenever permit applications are made for vehicles not in the inventory, form NZTA 803 should be completed and sent to NZ Transport Agency regional offices.

12.2 Pavement Inventories

Before this policy can be implemented in an area, the pavements of all roads likely to be subjected to overweight movements must be graded into grades A, B, C or D.

Pavement grades should be stored in and available from inventories.

Pavement gradings for state highways and agreed overweight bypasses are stored in OPermit (refer section 12.4). These pavement grades are available from NZ Transport Agency regional offices.

12.2.1 Pavement Grades

Under this policy a Grade A pavement allows axle weights approximating the legal axle weight limits (refer section 2) at a PLR (refer section D3) of 100%

Similarly, grades B, C and D allow progressively reducing axle weights, as shown in the following table:

Pavement Grade	*Approximate % Legal Axle Weight Limits Allowed at PLR 100%	Pavement Grade Factor
Grade A	100%	1.000
Grade B	89%	0.889
Grade C	78%	0.778
Grade D	67%	0.667

*Exact for twin-tyred spaced axles.

12.2.2 Grading of Pavements

Regional managers are responsible for grading state highway pavements. They should inform NZ Transport Agency head office of all grading and regrading determinations as soon as they are made.

At a PLR of 150%, which is allowed in some cases under this policy, axle masses will be 50% in excess of masses at the PLR 100% level.

The grading of a particular pavement should be chosen so that the pavement structure and its underlying components (foundation, culverts, services, etc) can sustain axle weights at the 150% PLR level without substantially increasing the pavement wear at the likely overload frequency.

Pavement gradings should be determined in the expectation that they can be maintained for at least five years, although as a matter of routine, gradings should be subject to review at two-yearly intervals.

The following points regarding a pavements condition should be considered:

- Pavements that show signs of shape defects appearing, particularly in the wheel tracks, may be suffering from foundation overstrain or low basecourse shear strength which may justify a lower pavement grading. "Shape" and "ride" components of pavement structural ratings should indicate this condition.

- Pavements that are surfaced with structural dense asphaltic layers and have a "high" Benkelman Beam deflection together with signs of surface cracking may justify a lower pavement grading, as in this situation the cracking represents loss of structural competence as well as surface waterproofing. "Cracking" and "patching" components of pavement structural ratings should indicate this condition.

- Where the strength of a pavement significantly varies on a seasonal basis, then the grading of that pavement can be varied accordingly.

- If unexpected deterioration of any pavement occurs, then the pavement grading should be modified immediately.

12.3 Bridge Inventories

Before this policy can be implemented in an area, all bridges likely to be subjected to overweight movements must be rated, which involves:

- classifying the main structural members into bridge classes, for example Class 100; and

- grading the bridge decks into deck grades, for example Grade A.

Detailed methods of bridge classification and bridge deck grading are given in section 6 of the NZ Transport Agency "Bridge Manual for Design and Evaluation", 1992.

Bridge classes and deck grades should be stored in and available from inventories.

12.3.1 Bridge Classes

Under this policy, bridge class is the percentage of the standard Rating Load that the main structural members of a bridge are allowed to carry (with a maximum of 120) when a vehicle is travelling:

- under an overweight permit; and

- under normal vehicle operating conditions.

The Rating Load produces approximately the same effect on the main structural members of a bridge as a vehicle with a VGI (refer section D2) of 1.75 under normal vehicle operating conditions.

Hence a Class 100 bridge is allowed to carry vehicles with VGI values of up to 1.75 when travelling:

- under an overweight permit; and

- under normal vehicle operating conditions.

Similarly, a Class 50 bridge is allowed vehicles with VGI values of up to 1.75 x 50%.

In each of these cases the BLR (refer section D5) is 175%.

Normal vehicle operating conditions include crossing the bridge:

- at up to the legal speed limit;

- in any lane; and

- with traffic in the other lanes.

Bridge engineering supervision (refer section 11) restricts the normal vehicle operating conditions to enhance the vehicle carrying ability of the bridge.

Under this policy bridge engineering supervision is required when the BLR exceeds 175%.

12.3.2 Deck Grades

Under this policy, the Deck Capacity Factor (DCF) is the proportion of the standard Rating Load that the bridge deck is allowed to carry when a vehicle is travelling:

- under an overweight permit; and
- under normal vehicle operating conditions.

Deck grades are shown in the following table:

Deck Capacity Factor (DCF)		Deck Grade	Deck Grade Factor
equal to or more than	less than		
1.00		Grade A	1.000
0.89	1.00	Grade B	0.889
0.78	0.89	Grade C	0.778
0.67	0.78	Grade D	0.667
	0.67	Grade E	

Deck grades are a coarser measure than DCF. They are used in manual calculations and for the issue of overweight permits. DCF is used for calculations in OPermit.

The Rating Load produces the same effect on the deck of a bridge as a vehicle with a VAI (refer section D1) of 1.30 under normal vehicle operating conditions.

Hence a Grade A bridge deck is allowed to carry vehicles with a VAI of up to 1.30 when travelling:

- under an overweight permit
- under normal vehicle operating conditions (refer section 12.3.1).

Similarly, a Grade C bridge deck is allowed to carry vehicles with a VAI of up to 1.30 x 0.78.

In each of these cases the DLR (refer section D4) is 130%.

Under this policy **bridge engineering supervision** (refer sections 11 and 12.3.1) is required when the DLR (= VAI/Deck Grade Factor) exceeds 1.30.

The following table shows the maximum VAI of vehicles that each grade of bridge deck is allowed to carry when vehicles are travelling:

- under an overweight permit; and
- under normal vehicle operating conditions(i.e.: without bridge engineering supervision).

Deck Grade	Maximum VAI allowed without bridge engineering supervision (1.30 Deck Grade Factor)
Grade A	1.30
Grade B	1.16
Grade C	1.01
Grade D	0.87

12.4 NZTA Overweight Permit Checking System (OPermit)

This computer system is a program used in conjunction with NZ Transport Agency's overweight permit policy. The NZ Transport Agency owns and maintains the information stored in the system, together with the software. The system covers state highways and agreed bypasses for overweight loads. Refer to the NZ Transport Agency's "Overweight Permit Route Maps" available from the NZTA website under 'Manuals'.

Recent changes mean that local authorities can now choose to have their roading networks included in OPermit.

The OPermit software programme is written in Java. The programme together with bridge, highway and vehicle data are stored on a server in Wellington.

The programme checks pavements and bridges on a specified route for their ability to carry a specified overweight vehicle, and prints any restrictions or supervision requirements for the route in the form of a test report. It also populates the overweight permit template stored in the system with vehicle details and bridge crossing conditions.

APPENDIX A DEFINITIONS

In this manual, unless the context indicates to the contrary, the terms used shall have the following meaning:

* As defined in the *Vehicle Dimensions and Mass Rule 2002*.

Approving Engineer	For permits issued by NZ Transport Agency, the Approving Engineer is the NZTA's Regional Operations Manager. For any local authority, the Approving Engineer is the registered engineer currently serving that authority in the position of city or district engineer or their assistants.
Area Permit	Is an overweight permit that covers all travel on a specified network of roads by a vehicle that is eligible for continuous permits, and carrying an indivisible load.
Articulated Vehicle *	Any motor vehicle with a trailer attached, so that part of the trailer is superimposed upon the motor vehicle and a substantial part of the mass of the trailer and of its load is borne by the motor vehicle. Such a trailer shall be called a semi-trailer. (Refer Diagram A3).
A Train *	An articulated vehicle towing a full trailer. (Refer Diagram A3).
Axle *	One or more shafts, spindles or bearings in the same vertical transverse plane by means of which, in conjunction with wheels mounted on those shafts, spindles, or bearings, a portion of the mass of the vehicle is transmitted to the roadway. * "Axle set" is a single axle set, a tandem axle set, a twin-steer axle set, a tri-axle set, or a quad-axle set. * "Oscillating axle" is any axle which complies with the following provisions: (a) The axle has 4 wheels and 4 or 8 tyres attached thereto, consisting of 2 pairs of wheels; and

Axle (continued)

(b) Each such pair of wheels is mounted on a separate axle so affixed to the motor vehicle as to share the load equally between the 2 wheels and to permit oscillation of the separate axles in a vertical transverse plane which is at right angles to the longitudinal centre line of the vehicle; and

(c) The centre of each such wheel is at least 500 mm distant from the centre of every other wheel fitted to the motor vehicle.

"4-tyred oscillating axle" (represented by (4)) is an oscillating axle, having one tyre on each of the four wheels.

"8-tyred oscillating axle" (represented by (8)) is an oscillating axle having twin tyres on each of the four wheels.

* "Single-tyred axle" is any axle fitted with 2 or more wheels, but which is neither an oscillating axle nor a twin-tyred axle.

* "Single axle set" is either 1 axle or 2 axles having their centres spaced less than 1 m apart.

* "Single large-tyred axle" (represented by SL) is a single-tyred axle that is not a single standard-tyred axle.

* "Single standard-tyred axle" (represented by S) is a single-tyred axle fitted with tyres smaller than:

(a) A manufacturer's designated tyre section width of 13 inches or 330 mm and a rim diameter of 24 inches at the bead seat; or

(b) A manufacturer's designated tyre section width of 14 inches or 355, and a rim diameter of 19.5 inches at the bead seat.

* "Tandem axle set" is 2 axles having their centres spaced not less than 1 m and not exceeding 2 m apart and are load sharing.

* "Tri-axle set" is 3 axles, where:

(a) The centre of the first and third axles are spaced not less than 2 m and not exceeding 3 m apart; and

Axle (continued)	(b) All axles contain an equal number of tyres of the same size, and none of the axles is a single standard tyred axle; and (c) The axles are a load-sharing axle set. * "Quad-axle set" is 4 axles, where: (a) The centres of the first and fourth axles are spaced not less than 3.75 m, and not more than 4 m apart; and (b) All axles contain an equal number of tyres of the same size; (c) None of the axles is a single standard-tyred axle; and (d) The axles are a load-sharing axle set. * "Twin-tyred axle" (represented by T) is any axle, not being an oscillating axle, which has a wheel track of 1.3 m or more and is equipped with 4 or more tyres. * "Twin-steer axle set" is a tandem axle set with single tyres, where both axles are connected to the same mechanism in order to steer similarly. (A dual-wheel assembly consisting of twin wheels fitted with twin tyres shall be deemed to be one wheel.) Axle types are shown in Diagram A1. Axle sets are shown in Diagram A2.
Axle Group	A series of axles is an axle group if the axle spacings are all less than 2.4 metres — refer section D1.
Axle Index	The ratio of the mass on an axle, to the reference axle mass for that axle — refer section D1.
Axle Spacing	The longitudinal distance between centre lines of any two adjacent axles.
Bridge Class	A measure of the ability of the main structural members of a bridge to carry overweight vehicles — refer section 12.3.1.

Bridge Engineering Supervision	Is supervision provided to ensure that the effects of a vehicle are kept within the capacity of a bridge. Bridge engineering supervision is indicated if the DLR exceeds 130% or if the BLR exceeds 175%. However, these limits may be exceeded without bridge engineering supervision if a detailed structural analysis of the bridge shows that allowable stress levels are not exceeded when the particular vehicle operates unsupervised. OPermit more accurately defines the extent of bridge engineering supervision needed — refer section 11 for supervision procedures.
Bridge Loading Ratio (BLR)	An indicator of the extent to which the gross load on the whole or any part of a particular vehicle will load the main structural members of a particular bridge — refer section D5 for method of calculation.
B Train *	An articulated vehicle comprising a towing vehicle and 2 semi-trailers connected at two points of articulation where the ratio of the forward distance of the longer trailer to that of the shorter trailer does not exceed 1.3 — Refer Diagram A3.
Certificate of Loading	A document issued by a Certificate of Fitness issuing authority, e.g., Vehicle Testing New Zealand, on which is stated the maximum permissible loading.
Continuous Permit	A continuous permit that covers the movement of a vehicle that is used frequently in a specific area or on a specific route. The vehicle's load is constant and not considered to be divisible — Refer section 3.3.3.
Crawl Speed	Not exceeding a uniform speed of 10 km/h on bridge crossings.
Critical Span	The length of the most critical longitudinal span of a particular bridge as assessed during rating of the bridge.
Critical Wheelbase	The wheelbase giving the VGI (ie, maximum GI) — refer section D2 for method of determination.
Deck Capacity Factor (DCF)	Is used for deck calculations in OPermit. It is more accurate than deck grades.
Deck Grade	A measure of the ability of a bridge deck to carry overweight vehicles — refer section 12.3.2.
Deck Grade Factor	Refer section 12.3.2.

Deck Loading Ratio (DLR)	An indicator of the extent to which the axles of a vehicle will load a particular bridge deck — refer section D4 for method of calculation.
Divisible Load	A payload that is either a fluid or has more than one separate component even though these components may be temporarily connected for the purposes of handling, storage or transport. Examples are milk, gravel, logs, animals, bundles of steel or timber.
Full Trailer *	A trailer with 2 axle sets, the foremost of which is steered by a drawbar; and includes a semi-trailer with non-steering axles coupled to a converter dolly — Refer Diagram A3.
Gross Index (GI)	The ratio of the mass on any grouping of axles, to the reference mass for that grouping — refer section D2 for method of calculation.
Gross Vehicle Mass	The maximum permitted mass of the vehicle either specified by the manufacturer or determined by the NZ Transport Agency.
Heavy Motor Vehicle *	A motor vehicle that is either of Class MD3, MD4, ME, NB, NC, TC, or TD as defined in Table A: Vehicle classes in the *Vehicle Dimensions and Mass Rule 2002*, or any vehicle not so defined with a gross vehicle mass that exceeds 3500 kg, but not including traction engines.
Identical vehicle	A vehicle (or vehicle combination) can be considered identical for operating on Multiple Rego permits if it meets all of the following criteria: • same model prime mover • identical axle spacing's • same tyre size • identical inner and outer wheel track • all units (including Prime movers) in the combination have a sufficient GVM for the load in question, • all units (including Prime movers) in the combination have sufficient axle ratings for the load in question, • all units (including Prime movers) in the combination have sufficient MTM, GCM, 5th wheel, tow bar and tow ball ratings etc where applicable, for the load in question (if there is no 5th Wheel fitted there is no reason to have a 5th wheel rating for instance).

Indivisible load	A load that cannot reasonably (without disproportionate effort, expense or risk of damage to the load) have its size reduced or be divided into two or more sections for road transport; and includes customs-sealed import/export ISO containers
Large Tyres	Refer definition of axle — single large-tyred axle, and section D1.4.
Linked Permits	Are separate permits covering the movement of vehicles, of the same owner, travelling in convoy over the same route with similar bridge engineering supervision requirements. (Refer section 3.3.4.)
Load Sharing Axle Set *	An axle set suspension system that has effective damping characteristics on all axles of the set and is built to divide the load between the tyres on the set so that no tyre carries a mass more than 10% greater than the mass it would carry if: (a) the load were divided in the axle set so that each tyre carries an equal load; or (b) the axle set is a tandem axle set comprising a twin-tyred and a large single-tyred axle and is built to divide the load between the tyres on the set so that: (c) (i) 60% of the load is borne by the twin-tyred axle and 40% of the load is borne by the large single-tyred axle; or (ii) 55% of the load is borne by the twin-tyred axle and 45% of the load is borne by the large single-tyred axle.
Maximum Allowable Gradient for Combination (MGC)	The maximum uphill gradient which a particular vehicle combination can negotiate without subjecting the pavement surface to the possibility of damage through loss of traction by driving wheels — refer section D6 for method of calculation.
Mobile Plant	A vehicle that is operated mainly off the highway and which does not carry a separate payload while on the highway. This includes mobile cranes, motor scrapers, dump trucks, drilling rigs, front-end loaders, forklifts, crushing plants, batching plants, etc.

Mobile Power Crane	A self propelled pneumatic tyred vehicle consisting of either: ▪ a crane mounted on a purpose made crane carrier; or ▪ a crane mounted on a truck
Multiple Trips	Are the separate movements of one particular vehicle over the same route with similar payloads within a limited time period. (Refer section 3.3.2.)
National Operations Manager	The NZTA Manager responsible for national operations on the state highway network.
OPermit	The computer based permit checking system used by NZ Transport Agency — refer section 12.4.
Overdimension Permit	A term used for the permit issued on behalf of the NZ Transport Agency to allow the movement on a public road of a motor vehicle that exceeds the dimension limits stated in Section 6 of the *Vehicle Dimensions and Mass Rule 2002*.
Overweight Permit	A permit issued by a road controlling authority to allow the movement on a public road of a heavy motor vehicle that exceeds the mass limits stated in Section 4 of the *Vehicle Dimensions and Mass Rule 2002*. It is issued on form TNZ 805 that complies with Form 1 of Schedule 3 of that Rule.
Pavement Grade	A measure of the ability of a road pavement to carry overweight vehicles — refer section 12.2.1 for method of determination.
Pavement Grade Factor	Refer section 12.2.1
Pavement Loading Ratio (PLR)	An indicator of the extent to which the axles of a particular vehicle will load a particular road pavement — refer section D3 for method of calculation.
Payload	Any load carried by a vehicle that is not permanently attached to the vehicle.
Permit Issuing Officer	The person who issues the overweight permit on behalf of the road controlling authority, signing form TNZ 805.

Rating Load	Used to rate bridges. It is equivalent to the maximum load which would be allowed to cross a Class 100 Grade A bridge without bridge engineering supervision under the overweight policy — refer section 12.3.
Reference Axle Weight	The nominal allowable mass given to an axle which takes into account the axle type and spacing. In general terms the reference axle mass is equivalent to the legal axle mass limit. (Refer section D1.2).
Reference Gross Weight	For any grouping of axles this is the nominal allowable mass given to that grouping of axles — refer D2.1.
Regional State Highway Manager	The regional manager of one of the NZ Transport Agency's eight regional offices: Auckland, Hamilton, Tauranga, Napier, Wanganui, Wellington, Christchurch, and Dunedin.
Regional Operations Manager	The regional operations manager of one of NZ Transport Agency's four network operating regions: Auckland/Northland, Hamilton, Wellington, and Christchurch.
Road Controlling Authority	The authority, body or person or persons having control of the road; and includes any person acting under and within terms of any delegation or authorisation given by a controlling authority.
Semi-Trailer	See articulated vehicle.
Single Trip	A continuous movement under permit by one vehicle. This includes a movement in one general direction with stops totalling no more than two days but without change of load. Also included is an outward plus return journey over substantially the same route with stops totalling no more than two days with or without change of load. (Refer section 3.3.1.).
Spaced Axle	An axle that is 2.4 metres or more from the nearest axle— refer section D1.
Small Standard Tyres	Are standard tyres with their tyre designation listed in Table R4. They have smaller footprint areas, and hence lower reference axle masses, than standard tyres. (Refer section D1.4).
Specified Standard Tyres	Are standard tyres with their tyre designations listed in Table R3. They have larger footprint areas, and hence higher reference axle loads, than standard tyres. (Refer section D1.4).

Standard Tyres	Refer definition of axle — single standard-tyred axle and section D1.4.
Strippable Load	A payload that can be significantly reduced in mass (albeit with some difficulty) without causing irreparable damage. Examples are removal of blade, rippers and ripper mechanism from a tractor, removal of jib and counterweights from a crane, cutting of a log which would otherwise later be cut at a mill, the cutting of a welded steel truss. **Note:** Once the load is stripped the parts are then a divisible load.
Traction Friction Coefficient	A value that reflects the friction force developed between the wheel/tyre and the pavement surface during traction
Transporter	A vehicle specifically designed to carry a payload.
Vehicle Axle Index (VAI)	The maximum axle index for the vehicle. It is an indicator of the extent to which axles of a particular vehicle are loaded, taking into account the type of axle involved — refer section D1 for method of calculation.
Vehicle Dimensions and Mass Rule 2002	The *Land Transport Rule 41001: Vehicle Dimensions and Mass 2002* that updates and replaces many parts of the legislation relating to the dimensions and masses of vehicles used on public roads.
Vehicle Gross Index (VGI)	The maximum gross index for a vehicle. It is an indicator of the effect of the gross load of a vehicle on bridges — refer section D2 for method of calculation.
Wheelbase	The distance from the centre of the first axle to the centre of the last axle in a grouping of axles.
Wheel Track	The distance between the centres of the left-side and right-side wheels of a pair of wheels. (Refer Diagram A1 for inner and outer wheel tracks for oscillating axles.)

Diagram A1 : Axle Types

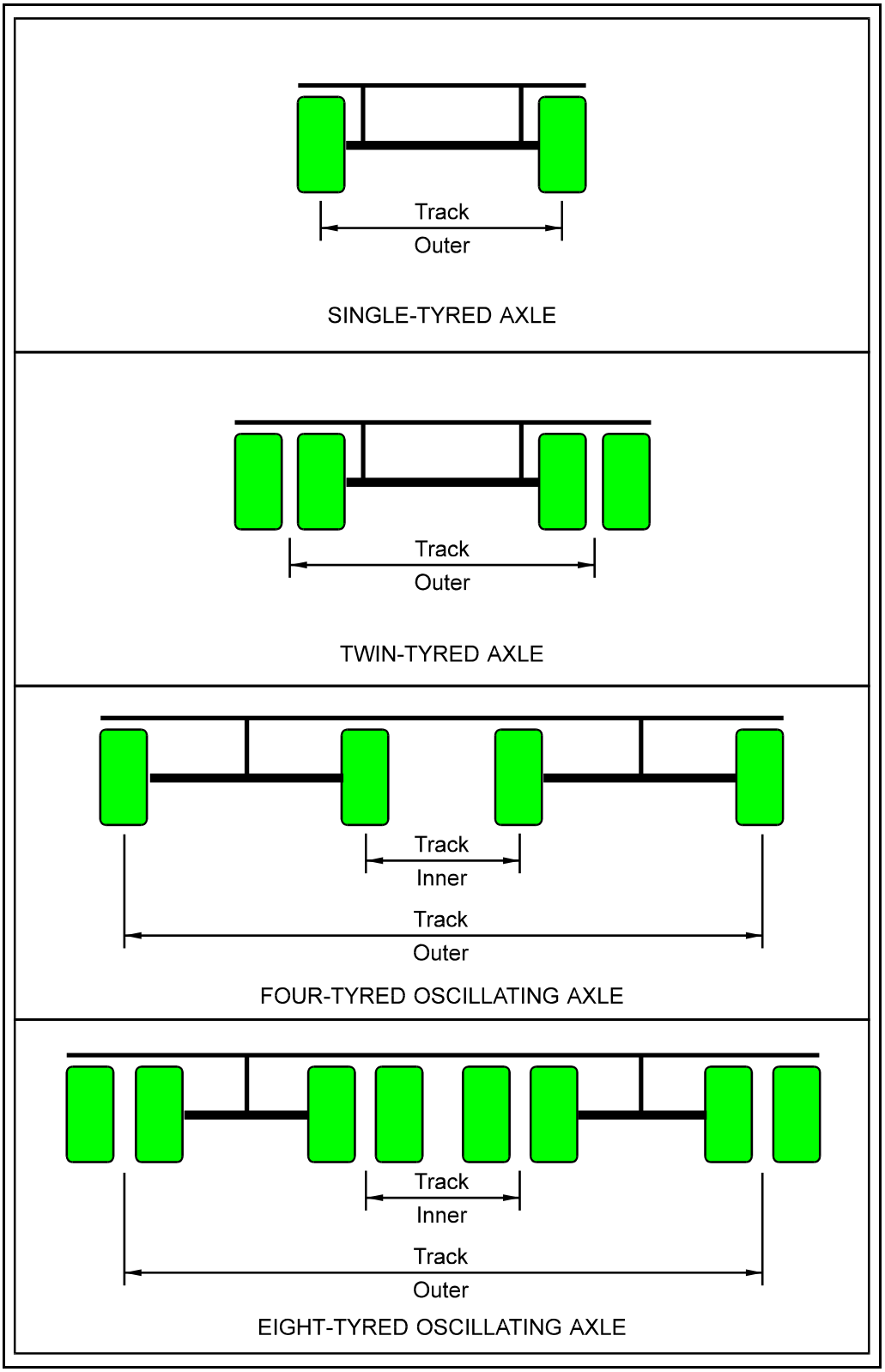


Diagram A2 : Axle Sets

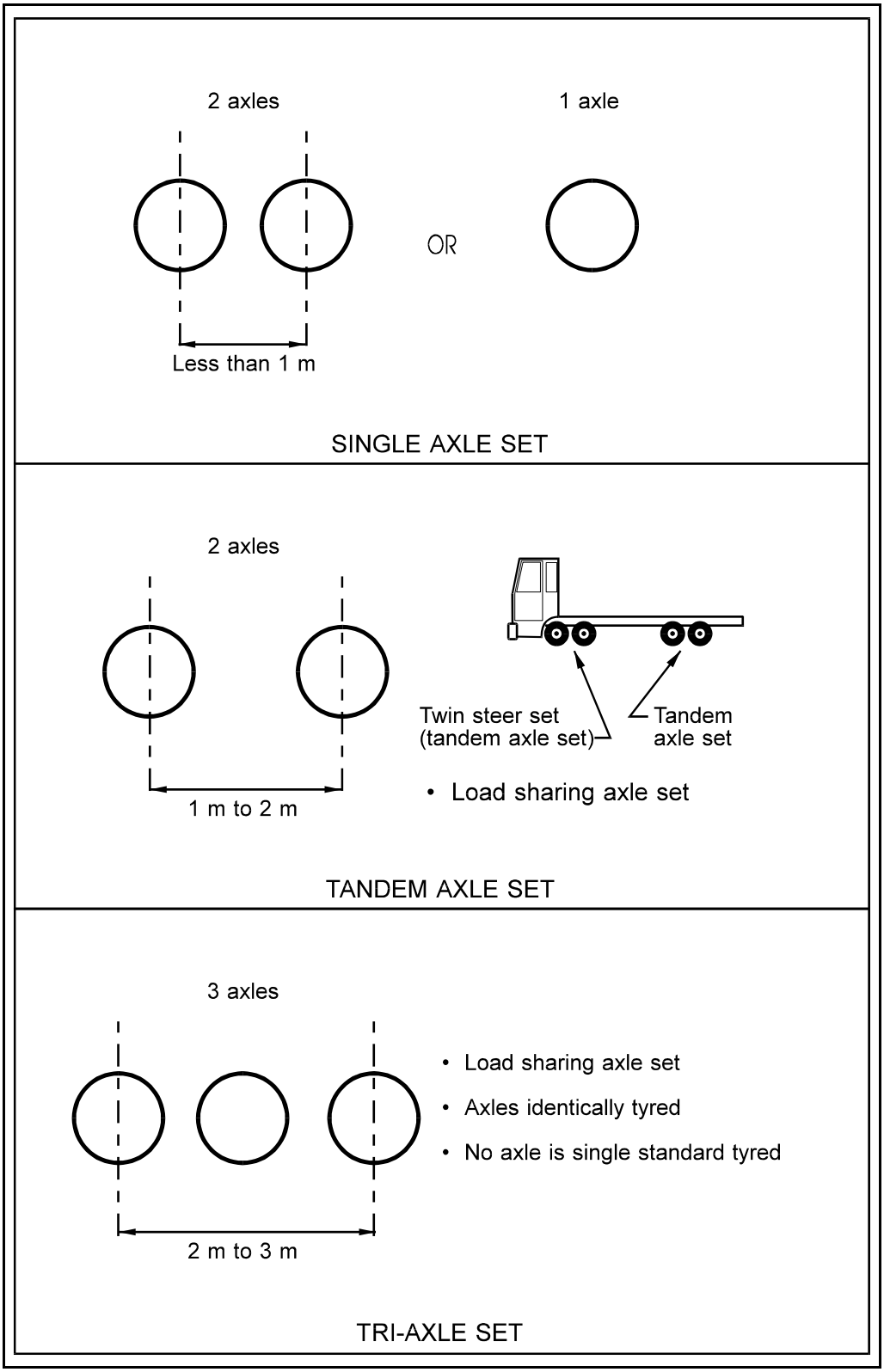
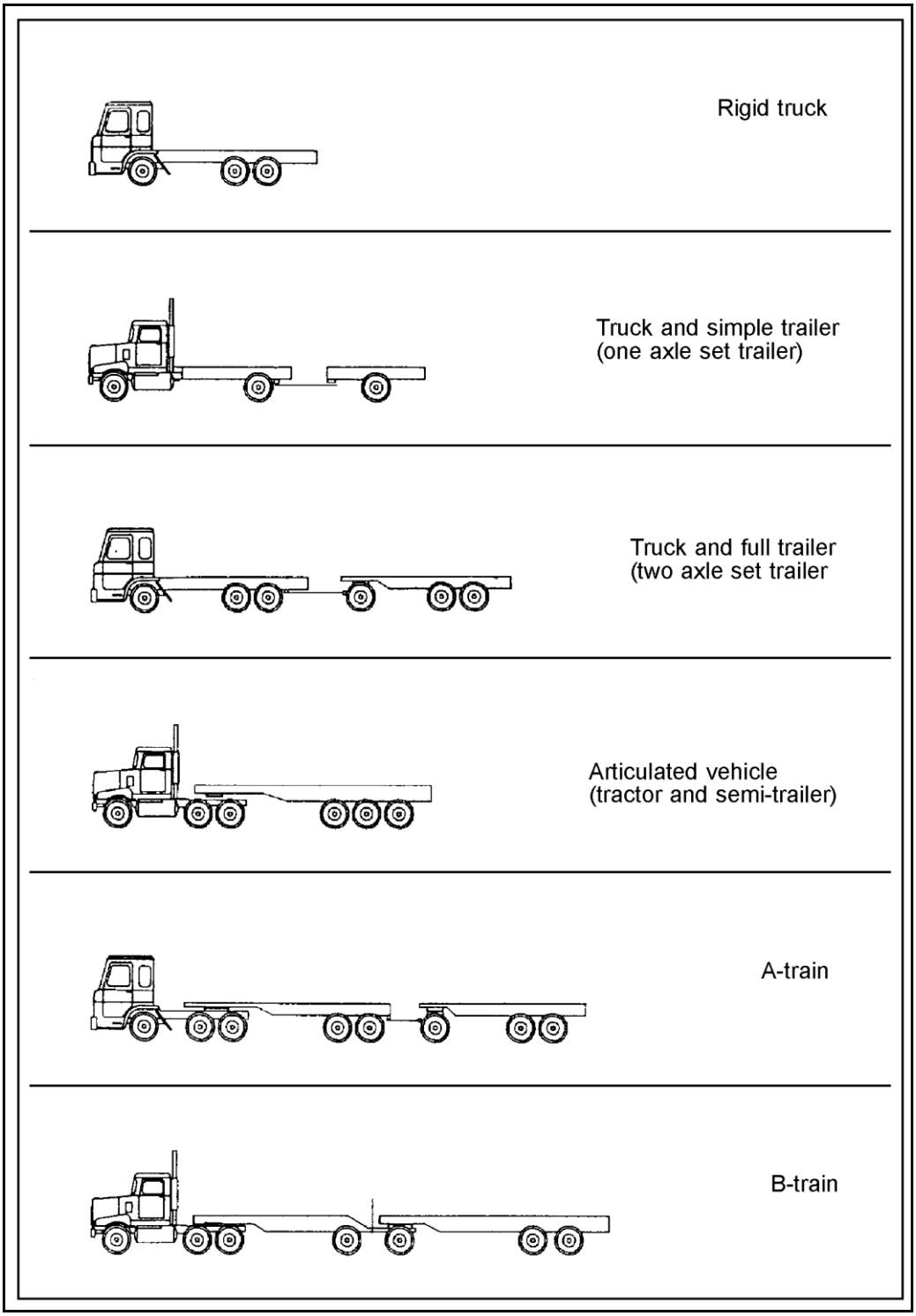


Diagram A3 : Vehicle Types



APPENDIX B APPROVED ISSUING AUTHORITIES

B1 NEW ZEALAND TRANSPORT AGENCY

B1.1 Approving Engineers

In each of NZ Transport Agency's eight regional offices the regional manager, or a person nominated by him/her, is the Approving Engineer.

NZ Transport Agency Regional Office	Approving Engineer (write in)
Auckland	
Hamilton	
Tauranga	
Napier	
Palmerston North	
Wellington	
Marlborough Roads	
Christchurch	
Dunedin	

B1.2 Permit Issuing Officers

In each of the following offices there is a NZ Transport Agency nominated Permit Issuing Officer:

Office	Permit Issuing Officer (write in)
NZTA Regional Office AUCKLAND	
NZTA Regional Office HAMILTON	
NZTA Regional Office TAURANGA	
NZTA Regional Office NAPIER	
NZTA Regional Office PALMERSTON NORTH	
NZTA Network Consultant WELLINGTON	
NZTA Network Consultant NELSON	
NZTA Sub Office MARLBOROUGH ROADS	
NZTA Regional Office CHRISTCHURCH	
NZTA Regional Office DUNEDIN	

B2. LOCAL AUTHORITIES PARTY TO THE POLICY

Each of the following local authorities is party to the NZ Transport Agency Overweight Policy. Each has at least one person nominated as Approving Engineer.

Local Authority	Approving Engineer (write in)
Far North District Kaipara District	
Rodney District North Shore City Waitakere City Auckland City Manukau City Papakura District Franklin District	
Thames Coromandel District Hauraki District Waikato District Matamata-Piako District Hamilton City Waipa District South Waikato District Otorohanga District Waitomo District Taupo District	
Western Bay of Plenty District Tauranga District Whakatane District Rotorua District Kawerau District Opotiki District	
Gisborne District	
Hastings District Napier City Central Hawke's Bay District	
New Plymouth District Stratford District South Taranaki District	

B2. LOCAL AUTHORITIES PARTY TO THE POLICY (Continued)

Local Authority	Approving Engineer (write in)
Ruapehu District Wanganui District Rangitikei District Manawatu District Tararua District Palmerston North City Horowhenua District	
Kapiti Coast District Masterton District Carterton District South Wairarapa District Upper Hutt City Porirua City Lower Hutt City Wellington City	
Nelson City Marlborough District Tasman District	
Kaikoura District Hurunui District Waimakariri District Selwyn District Christchurch City Banks Peninsula District Ashburton District Timaru District Mackenzie District Waimate District	
Buller District Grey District	
Queenstown-Lakes District Central Otago District Waitaki District Dunedin City Clutha District	
Southland District Gore District Invercargill District	

B3. LOCAL AUTHORITIES NOT PARTY TO THE POLICY

The following local authorities are not party to the NZ Transport Agency Overweight Policy:

Whangarei District
Wairoa District
Westland District
Chatham Islands County

APPENDIX C STANDARD FORMS

The following standard forms are used in the administration of the overweight permit policy.

NZTA 804 Overweight Permit Application Form with Vehicle Information

This is used to record all permit applications together with information on vehicles. This is available from the NZTA website.

http://www.nzta.govt.nz/resources/overweight-permit-manual/docs/SM070-forms.doc

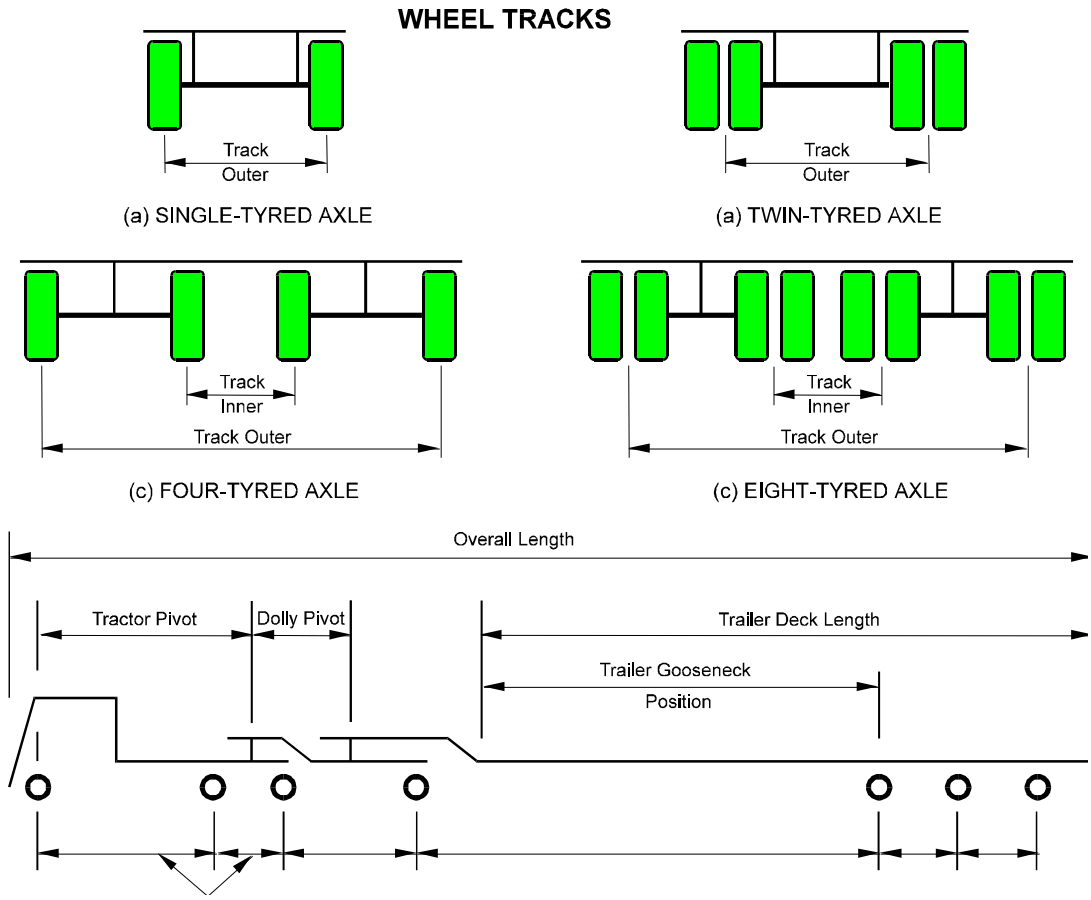
NZTA 805 Overweight Permit Form

All permits are issued on the NZTA 805. This complies with requirements of the *Vehicle Dimension and Mass Rule 2002*, Schedule 3, Form 1.

NZTA 806 Bridge Engineering Supervision Form

This form is used as an attachment to the Overweight Permit Form to record bridge engineering supervision requirements and supervisors.

Explanation of terms used



NOTE: The vehicle type shown here is made up of three units as follows.

AXLE NUMBER	1 2 3	4	5 6 7
UNIT NUMBER	UNIT 1	UNIT 2	UNIT 3
UNIT TYPE	TRACTOR	DOLLY	TRAILER
VEHICLE TYPE	TRANSPORTER		

TNZ 804 Incorporating Vehicle Information Updated Sept 2009

APPENDIX D VEHICLE PARAMETER CALCULATIONS

D1 VEHICLE AXLE INDEX (VAI)

D1.1 Axle Groups

The NZ Transport Agency's vehicle parameter calculations, in particular VAI, are based on axle groups and not axle sets.

Axles are considered to be in a group if all spacings are less than 2.4 metres.

A **spaced axle** is an axle that is 2.4 metres or more from the nearest axle.

D1.2 Reference Axle Weight

The reference axle mass for any axle is a nominal allowable mass given to that axle which takes into account the axle type and spacing.

In general terms the reference axle mass is equivalent to the legal axle mass limit (Refer section 2.1).

Tables R1, R2, R3 and R4 list reference axle masses for various axle types and spacings.

D1.3 Axle Index (AI)

The AI for an axle is:

$$AI = \frac{\text{Axle mass}}{\text{Reference axle mass for that axle}}$$

The vehicle axle index (VAI) for a vehicle is the maximum AI, considering all axles, for that vehicle.

The VAI is an indicator of the extent to which axles of a particular vehicle are loaded, which in turn indicates the effect of those axle weights on pavements and bridge decks.

D1.4 Types of Tyres

This manual covers the following four types of tyres:

Tyre Type	Description
Standard	• Any tyre smaller than: 330 mm (13 inches) tyre section width x 24 inch bead seat diameter; or 355 mm (14 inches) tyre section width x 19.5 inch bead seat diameter • Legal status • **Only** standard tyres are used on twin-tyred axles and on oscillating axles
Large	• Any tyre not a standard tyre • Legal status • Tyre designation listed in Table R2 • Currently only used on mobile plant, including cranes
Specified Standard	• Standard tyres with their tyre designation listed in Table R3 • Specified by NZTA for use in vehicle parameter calculations They can have larger footprint areas, and hence higher reference axle masses, than standard tyres • No legal status (legally defined as Standard tyres)
Small Standard	• Standard tyres with their tyre designation listed in Table R4 • Specified by NZTA for use in vehicle parameter calculations They have smaller footprint areas, and hence lower reference axle masses, than standard tyres • No legal status (legally defined as Standard tyres)

D1.5 Types of Axles

This manual covers the following five types of axles. These axles are defined in Appendix A and shown diagrammatically in Diagram A1:

Axle Type	Represented
Single standard-tyred	S
Single large-tyred	SL
Twin-tyred	T
Four-tyred oscillating	(4)
Eight-tyred oscillating	(8)

D1.6 Calculation of VAI

To calculate the VAI for a particular vehicle:

- Obtain for the vehicle:
  - axle types
  - axle spacings
  - axle masses
- For each axle determine the number of axles in its axle group.
- For each axle determine its reference axle mass from the tables as follows:

Axle Type	Table
Standard-tyred	R1
* Single large-tyred spaced	R2
* Large-tyred **other** than single-tyred spaced	$\frac{R1 \times R2}{y}$
* Single specified standard-tyred spaced	R3
* Specified standard-tyred **other** than single-tyred spaced	$\frac{R1 \times R3}{y}$
Twin small standard-tyred spaced	R4
Twin small standard-tyred in a group	$\frac{R1 \times R4}{8.2}$
Where y = 5.4 for single-tyred axles 6.7 for twin-tyred axles	

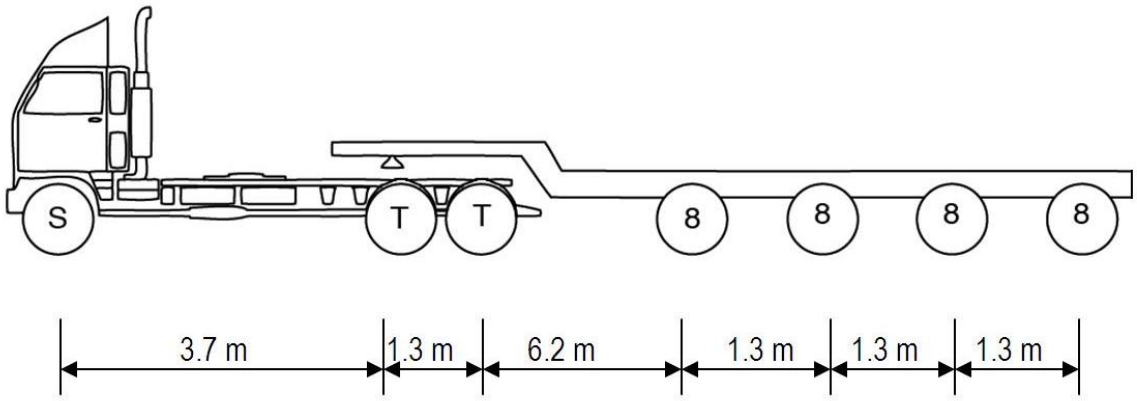
* Currently only mobile plant (including cranes) use specified standard tyres and large tyres.

- Calculate for each axle its AI from

$$AI = \frac{\text{axle mass}}{\text{reference axle mass}}$$

- Determine the VAI for the vehicle, this is the maximum of the AI's for the vehicle.

Example: Calculate the VAI for the transporter with the axle types, axle spacings and axle masses (1000 kg) shown below.



Proposed Axle Weights (PAW) in tonnes

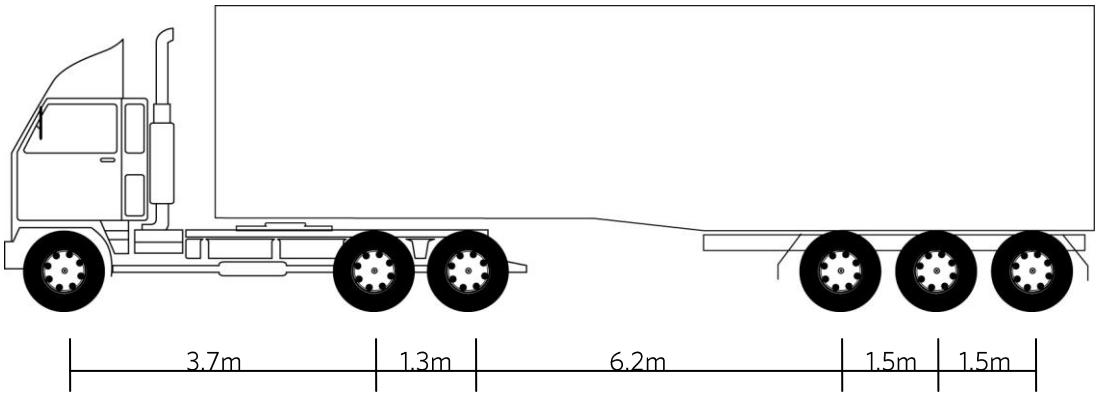
6		8.5	8.5	10	10	10	10

All axles have Standard tyres

Reference Axle Weights for Standard Tyres (RAW) from Table R1	5.4 (1 axle in group)	7.4 (2 axles in group)	7.4 (2 axles in group)	8.7 (4 axles in group)	8.7 (4 axles in group)	8.7 (4 axles in group)	8.7 (4 axles in group)
PAW/RAW	6.4/5.4	9.0/7.3	9.0/7.3	10/8.7	10/8.7	10/8.7	10/8.7
AI Values	=1.11	=1.15	=1.15	= 1.15	=1.15	= 1.15	=1.15

VAI (highest of AI's) = 1.15

Example: Calculate the axle masses permitted for the articulated vehicle carrying an ISO container with the axle types and spacings shown below.



Proposed Axle Weights (PAW) in tonnes

5.95 8.14 8.14 7.26 7.26 7.26

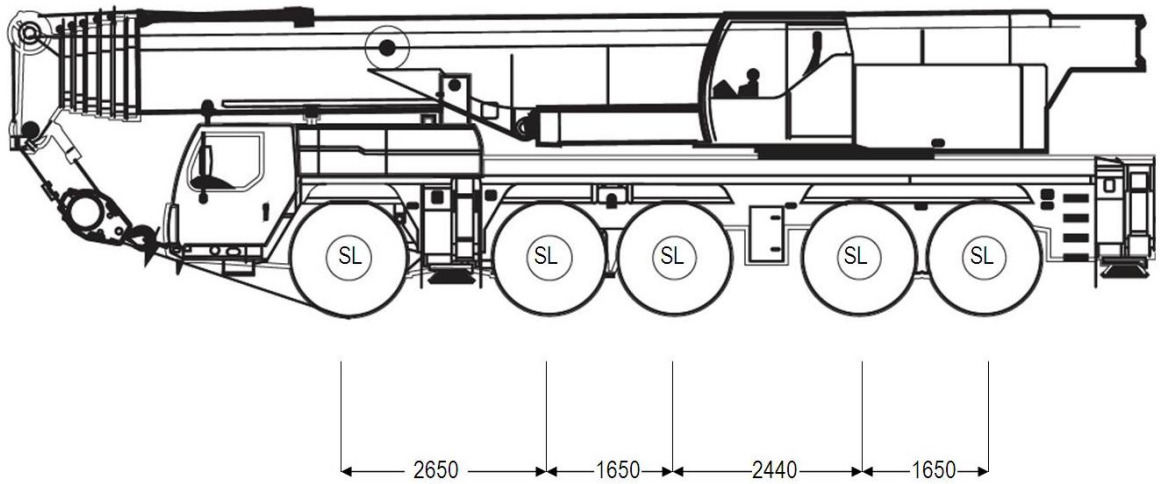
All axles have Standard tyres. Axles 2 to 6 are twin tyred axles.

Reference Weights for Standard Tyres (RAW) from Table R1	5.4 (1 axle in group)	7.4 (2 axles in group)	7.4 (2 axles in group)	6.6 (3 axles in group)	6.6 (3 axles in group)	6.6 (3 axles in group)
PAW/RAW	5.95/5.4	8.14/7.4	8.14/7.4	7.26/6.6	7.26/6.6	7.26/6.6
AI Values	= 1.10	= 1.10	= 1.10	= 1.10	= 1.10	= 1.10

Maximum VAI = 1.10

Gross Mass is 44.0t maximum

Example: Calculate the VAI for the mobile crane with the axle types, axle spacings and axle masses shown below.



Proposed Axle Weights (PAW)

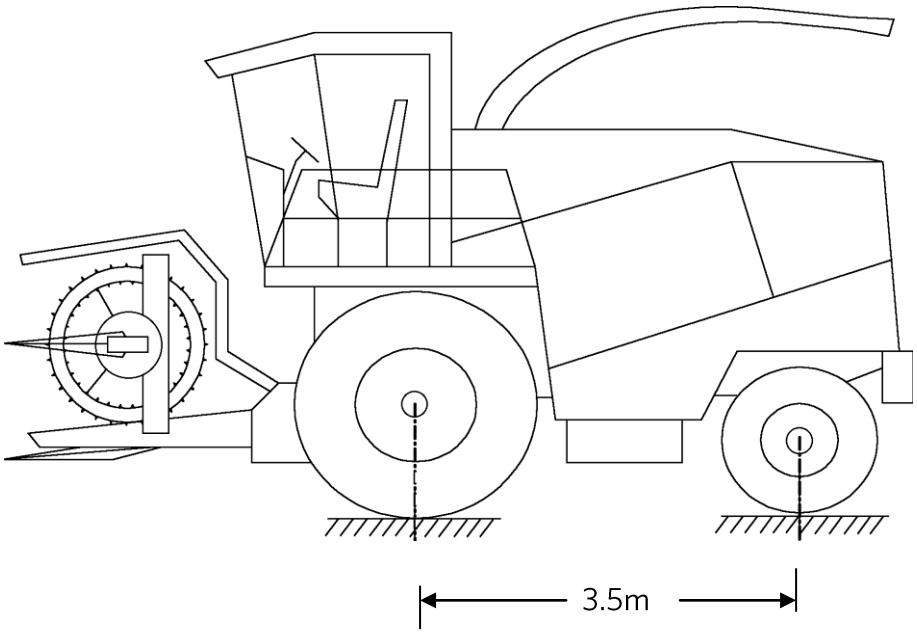
Tonnes	11.20	11.20	11.20	10.80	10.90

All axles have 20.5R25 tyres. These are Single Large (SL) tyres.

Reference Weights for Standard Tyres (RAW) from Table R1	5.4 (1 axle in group)	5.0 (2 axles in group)	5.0 (2 axles in group)	5.0 (2 axles in group)	5.0 (2 axles in group)
Reference Axle Weight for Single Large tyred spaced axles from Table R2	9.5	9.5	9.5	9.5	9.5
(R1 x R2)/y (y=5.4 for SL)	(5.4 x 9.5)/5.4 = 9.5	(5.0 x 9.5)/5.4 = 8.796	(5.0 x 9.5)/5.4 = 8.796	(5.0 x 9.5)/5.4 = 8.796	(5.0 x 9.5)/5.4 = 8.796
PAW/RAW	11.20/9.5	11.20/8.796	11.20/8.796	10.80/8.796	10.90/8.796
AI Values	= 1.18	= 1.27	= 1.27	= 1.23	=1.24

VAI (highest of AI's) = 1.27

Example: Calculate the VAI for the harvester with the axle types, axle spacings and axle masses shown below.



Proposed axle masses (tonnes) 11.4 5.0

Tyres are 800/65R32 front and 540/65R24 rear. Both are Single Large (SL) tyres.

Reference Weights for Standard Tyres (RAW) from Table R1	5.4 (1 axle in group)	5.4 (1 axle in group)
Reference mass for Single Large tyred spaced axles from Table R2	9.5	7.0
(R1 x R2)/y (y=5.4 for SL)	(5.4 x 9.5)/5.4 = 9.5	(5.4 x 7.0)/5.4 = 7.0
AI Values = Axle mass/Ref Axle Weight	11.4/9.5	5.0/7.0
AI	1.20	0.71

VAI (highest of AI's) = 1.20

Table R1 : Reference Axle Weights for Standard-Tyred Axles

No of Axles in Group	Distance to Nearest Axle (m)	Reference Axle Weight (1000kg)			
		Axle Type			
		S	T	(4)	(8)
1	2.4 or more	5.4	8.2	9.5	11.8
2	1.0 or more	4.8	7.3	8.4	10.5
2	1.1 or more	4.8	7.3	8.5	10.5
2	1.2 or more	4.8	7.3	8.5	10.5
2	1.3 or more	4.9	7.4	8.5	10.6
2	1.4 or more	4.9	7.4	8.6	10.7
2	1.5 or more	4.9	7.5	8.7	10.8
2	1.6 or more	5.0	7.5	8.7	10.8
2	1.7 or more	5.0	7.6	8.8	10.9
2	1.8 or more	5.1	7.7	8.9	11.0
2	1.9 or more	5.1	7.8	9.0	11.2
2	2.0 or more	5.2	7.8	9.1	11.3
2	2.1 or more	5.2	7.9	9.2	11.4
2	2.2 or more	5.3	8.0	9.3	11.5
2	2.3 or more	5.3	8.1	9.4	11.7
3	1.0 or more	4.0	6.1	7.1	8.8
3	1.1 or more	4.1	6.2	7.2	8.9
3	1.2 or more	4.1	6.3	7.3	9.0
3	1.3 or more	4.2	6.3	7.4	9.1
3	1.4 or more	4.3	6.5	7.5	9.3
3	1.5 or more	4.3	6.6	7.6	9.5
3	1.6 or more	4.4	6.7	7.8	9.7
3	1.7 or more	4.5	6.9	8.0	9.9
3	1.8 or more	4.6	7.0	8.1	10.1
3	1.9 or more	4.7	7.2	8.3	10.4
3	2.0 or more	4.9	7.4	8.6	10.6
3	2.1 or more	5.0	7.6	8.8	10.9
3	2.2 or more	5.1	7.8	9.0	11.2
3	2.3 or more	5.3	8.0	9.2	11.5
4 or more	1.0 or more	3.8	5.8	6.8	8.4
4 or more	1.1 or more	3.9	5.9	6.8	8.5
4 or more	1.2 or more	3.9	6.0	6.9	8.6
4 or more	1.3 or more	4.0	6.1	7.0	8.7
4 or more	1.4 or more	4.1	6.2	7.2	8.9
4 or more	1.5 or more	4.2	6.3	7.3	9.1
4 or more	1.6 or more	4.3	6.5	7.5	9.4
4 or more	1.7 or more	4.4	6.7	7.7	9.6
4 or more	1.8 or more	4.5	6.9	7.9	9.9
4 or more	1.9 or more	4.6	7.1	8.2	10.2
4 or more	2.0 or more	4.8	7.3	8.4	10.5
4 or more	2.1 or more	4.9	7.5	8.7	10.8
4 or more	2.2 or more	5.1	7.7	8.9	11.1
4 or more	2.3 or more	5.2	8.0	9.2	11.4

Table R2 : Reference Axle Weights, Large Tyres

Single Large-Tyred Axles spaced at 2.4 metres or more, sorted by Rim size

Tyre Size	Reference Axle Weight (t)	Contact Area (Sq. cm)
435/50R19.5	7.8	968
Bridgestone 13.00 R20	8	1090
14.00-20	7.6	903
365/80R20	7.5	610
365/85R20	7.5	610
14.75/80 R20 (13.00 R20 Pilote)	7.5	850
15.50/80 R 20 (G 20 Pilote)	7.6	860
16.00-20	8.2	1160
17.50/65 R20	7.5	840
24 R 21 XZL	9.3	1675
350/75 R22.5	6.9	645
355/50R22.5	6.9	406
14 R22.5	7	650
365/65R22.5	7.1	667
15.00-22.5	7.2	710
385/55R22.5	7.2	710
385/65 R22.5	7.2	710
16.50-22.5	7.8	968
425/65 R22.5	7.8	968
445/65 R22.5	7.9	1030
18.00-22.5	7.9	1030
500/60R22.5	8.8	1420
550/60R22.5	8.8	1420
560/60R22.5	7.2	970
700/50R22.5	10.5	2174
710/45R22.5	10.5	1113
750/45R22.5	10.5	2496
12.00 R24	7	645
13.00-24	7.3	774
385/95R24 (14.00R24)	7.8	968
14.00-24	7.8	968
14.9 R24	6.5	279
16.00-24	8.6	1355
480/70R24	6.5	533
500/85R24	7	578
540/65R24	7	474
13.00-25	7.3	774
14.00-25	7.9	1032
385/95 R25	8.2	1125
16.00-25	8.8	1420
445/80R25	8.5	1290
445/95R25	8.5	1420
17.50-25	8.5	1290
18.00-25	9.2	1725
505/95 R25	9.2	1725
20.5R25 (525/95R25)	9.5	1740
525/80R25	9.5	1740

Table R2: Reference Axle Weights, Large Tyres (continued)

Tyre Size	Reference Axle Weight (t)	Contact Area (Sq. cm)
20.50-25	9.5	1740
22/65 R 25	9.6	1740
23.50-25	10.5	2200
26.50-25	11.3	2580
29.50-25	12.9	3420
750/65 R 25	11.8	2903
480/80R26	6.5	533
540/65R26	7	674
580/70R26	7.3	510
28L26	8.2	1165
750/65R26	8.5	702
Trellborg 500/60 R 26.5	8.8	1420
600/55 R 26.5	9.5	1740
680/55R26.5	8	1070
Trellborg 700/50 R 26.5	9.5	1740
750/45R26.5	10.5	2496
800/45R26.5	10.6	1388
480/65R28	6.8	385
540/65R28	7	449
600/65R28	7.5	541
600/70R28	7.5	822
380/85R30	6	311
540/65R30	7	518
600/65R30	7.5	832
600/70R30	7.5	563
710/55R30	8.2	574
650/75R32	7.9	760
800/65 R32	9.5	866
800/75R32	9.5	1420
900/60R32	10	1021
Claas Terratrac 635mm wide	10.5	2144
18.00-33	10	2000
16.9R34	6.5	341
18.4R34	6.5	533
480/70R34	6.8	439
540/65R34	7	536
540/70R34	7	674
600/65R34	7.5	651
710/75R34	8.5	781
600/65R38	7.5	663
650/65R38	7.9	759
650/70R38	7.9	1017
650/75R38	7.9	791
650/85R38	7.9	864
710/70R38	8.5	788
715/75R38	8.5	1181

Table R2: Reference Axle Weights, Large Tyres (continued)

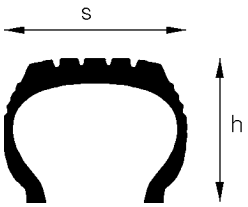
Tyre Size	Reference Axle Weight (t)	Contact Area (Sq. cm)
800/70R38	9.5	972
480/70R42	6.8	533
18.4R42	6.8	533
480/80R42	6.8	453
520/85R42	7	585
20.8R42	6.9	544
620/70R42	7.6	722
650/65R42	7.9	756
710/65R42	8.5	1165
710/70R42	8.5	707
850/55R42	9.5	1669
900/50R42	10	940
420/80R46	6.5	415
18.4R46	6.8	533
480/80R46	6.8	609
520/80R46	7	630
520/85R46	7	653
620/70R46	7.6	791
480/80R50	6.8	629

Table R3 : Reference Axle Weights for Single Specified Standard-Tyred Axles spaced at 2.4 metres or more

This table applies to mobile plant (including cranes) and accompanying towed trailers which use specified standard tyres.

* Tyre Size	Reference Axle Weight (t)	Contact Area (Sq Cm)
13/80 R20	6.5	550
12.00R20	6.9	580
14/80 R20	7.0	610

* Example truck tyre marking 14/80 R20 where:
14 is the tyre section width in inches
80 is the aspect ratio (h/s = 0.80)
R is the tyre construction (R = radial)
20 is the bead seat diameter in inches
s = section width of tyre
h = section depth of tyre



If the aspect ratio is 1 (ie h = s) then the /80 would not be included in the tyre marking, for example, 12.00 R20.

Table R4 : Reference Axle Weights for Twin Small Tyred Axles spaced at 2.4 metres or more

This table applies to articulated vehicles fitted with small tyres and involved with the movement of ISO containers. See example on page D-4.

Tyre Designation	Reference Axle Weight (1000 kg)	Contact Area (Sq Cms)
235/75 R17.5	7.8	300
10 R17.5	7.8	310

D2 VEHICLE GROSS INDEX (VGI)

D2.1 Reference Gross Weight

The reference gross mass for any grouping of axles is the nominal allowable mass given to that grouping of axles.

In general terms the reference gross mass is equivalent to the legal mass limits, although this is less true since the legal gross mass limits were raised in 1988. (Refer section 2.1.4).

Table R5 lists reference gross masses for various wheelbases.

D2.2 Gross Index (GI)

The GI for a grouping of axles is:

$$GI = \frac{\text{Sum of the axle masses for the grouping}}{\text{Reference gross mass for the grouping wheel base}}$$

The vehicle gross index (VGI) is the maximum gross index for a vehicle.

The wheelbase giving the VGI is termed the **critical wheelbase**.

The VGI is an indicator of the effect of the gross mass(es) of a vehicle on bridges, in particular the main structural members. (Refer section D5).

It should be noted that axle types are not relevant (have no effect) on VGI.

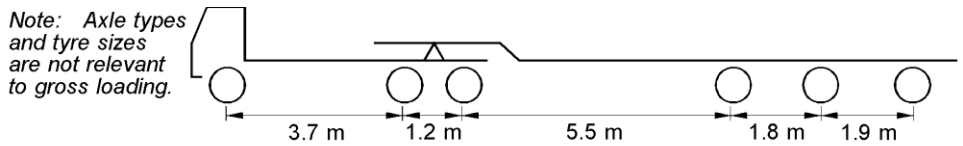
D2.3 Calculation of VGI

To calculate the VGI and critical wheelbase for a particular vehicle:

- Obtain for the vehicle:
  - axle masses
  - axle spacings
- For the heaviest loaded individual axle and for each grouping of axles:
  - sum the axle masses
  - sum the axle spacings to get the wheelbase
  - from Table R5 get the reference gross mass
  - calculate the GI = $\frac{\text{sum of axle masses}}{\text{reference gross mass}}$

- Determine the VGI for the vehicle, this is the maximum GI for the vehicle.
- Determine the critical wheelbase, this is the wheelbase giving the VGI.

Example: Calculate the VGI and the critical wheelbase for the transporter with the axle masses and axle spacings shown below.



Proposed axle loads (tonnes): 6.4 | 9.0 | 9.0 | 9.3 | 9.0 | 8.7

Wheelbase = 1.2 m

Wheelbase = 1.8 m Wheelbase = 1.9 m

$\frac{6.4}{14.5} = 0.44$ $\frac{18.0}{14.5} = 1.24$

$\frac{18.3}{15.5} = 1.18$ $\frac{17.7}{15.5} = 1.14$

Wheelbase = 4.9 m

Wheelbase = 3.7 m

$\frac{24.4}{25.0} = 0.98$

$\frac{27.0}{22.0} = 1.23$

Wheelbase = 10.4 m

$\frac{45.0}{34.0} = 1.30$

Wheelbase	GI
0.0 m	0.85
1.2 m	1.24
10.4 m	1.30
14.1 m	1.35

Wheelbase = 14.1 m

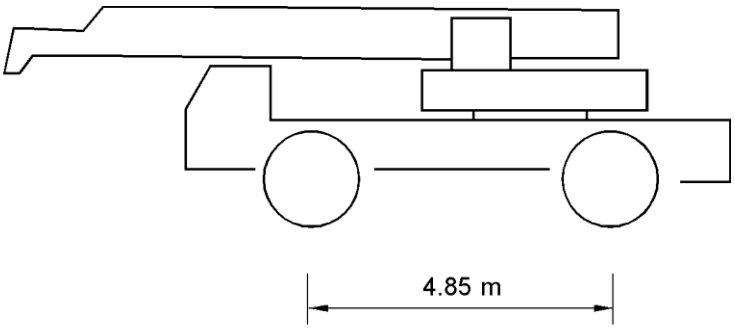
$\frac{51.4}{38.0} = 1.35$

Heaviest loaded individual axle, wheelbase 0.0 m = 9.3/11.0 = 0.85

VGI = 1.35 at a critical wheelbase of 14.1 metres.

Example: Calculate the VGI and the critical wheelbase for the mobile crane with the axle masses and axle spacings shown below.

Note: Axle type and tyre sizes are not relevant to gross loading.



Proposed axle loads (tonnes)

10.3 12.5

Wheelbase = 0.0
(heaviest axle)

$$\frac{12.5}{11.0} = 1.14$$

Wheelbase = 4.85 m

$$\frac{22.8}{25.0} = 0.91$$

VGI = 1.14 at a critical wheelbase of 0.0 metres.

Table R5 : Reference Gross Weights

Wheelbase (metres)	Reference Gross Weight (1000kg)
0.0 (individual axles)	11.0
1.0 or more	14.5
1.7 or more	15.5
2.2 or more	17.0
2.5 or more	18.0
2.8 or more	19.0
3.1 or more	20.0
3.4 or more	21.0
3.7 or more	22.0
4.0 or more	23.0
4.4 or more	24.0
4.8 or more	25.0
5.2 or more	26.0
5.6 or more	27.0
6.0 or more	28.0
6.4 or more	29.0
7.1 or more	30.0
7.8 or more	31.0
8.5 or more	32.0
9.2 or more	33.0
9.9 or more	34.0
10.4 or more	34.5
10.9 or more	35.0

Wheelbase (metres)	Reference Gross Weight (1000kg)
11.4 or more	35.5
11.9 or more	36.0
12.4 or more	36.5
12.9 or more	37.0
13.4 or more	37.5
13.9 or more	38.0
15.0 or more	38.5
16.0 or more	39.0
17.0 or more	39.5
18.0 or more	40.0
19.0 or more	40.5
20.0 or more	41.0
21.0 or more	41.5
22.0 or more	42.0
23.0 or more	42.5
24.0 or more	43.0
25.0 or more	43.5
26.0 or more	44.0
27.0 or more	44.5
28.0 or more	45.0
29.0 or more	45.5
30.0 or more	46.0

D3 PAVEMENT LOADING RATIO (PLR)

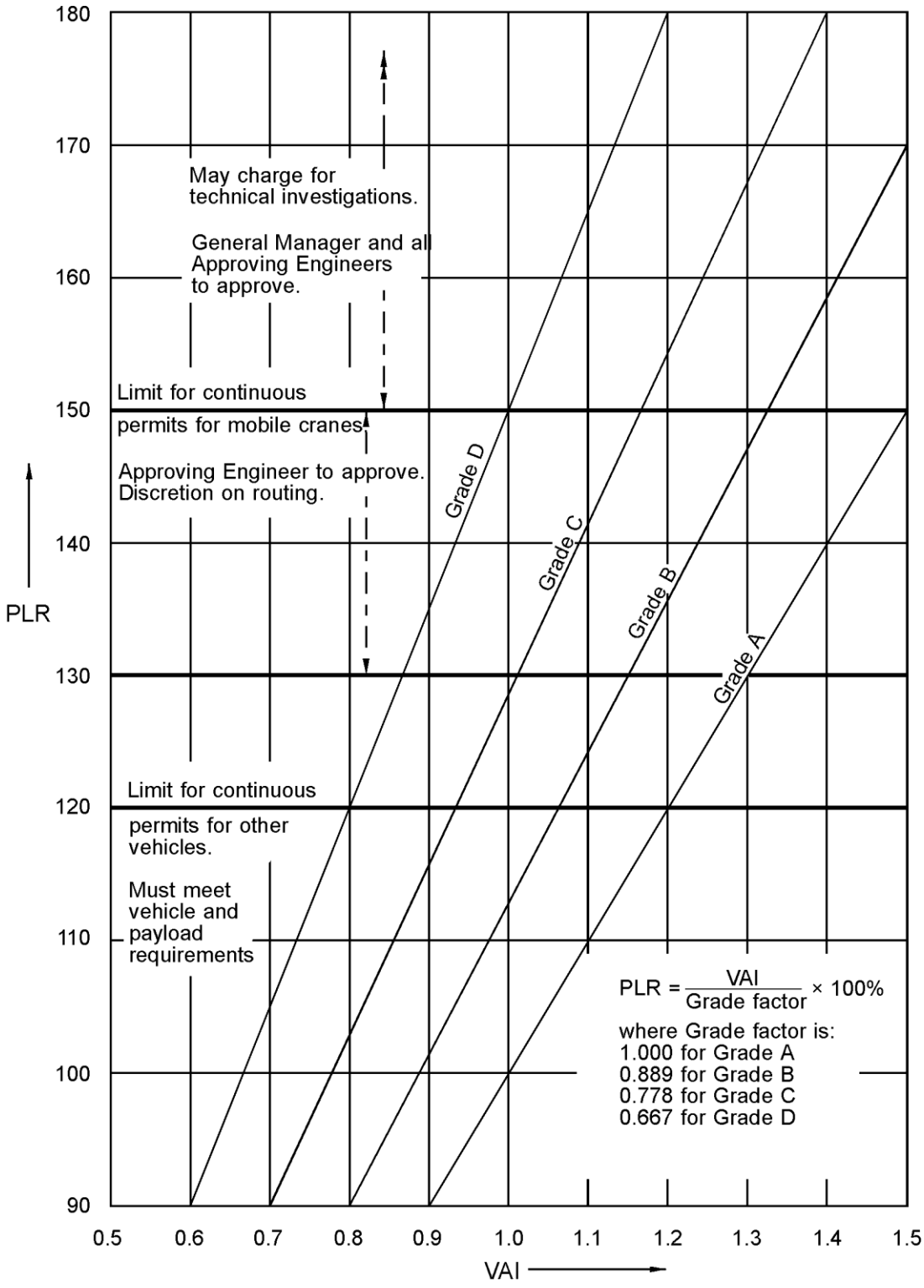
The PLR is used to control the loading on pavements according to the pavement strength. Using the VAI from section D1, the PLR is given by:

PLR = (VAI / Pavement Grade Factor) x 100%

where the Pavement Grade Factor is:

1.000 for **Grade A** pavements;
0.889 for **Grade B** pavements;
0.778 for **Grade C** pavements;
0.667 for **Grade D** pavements.

The graph on the following page represents the above PLR formula graphically.



Graph L1: Pavement Loading

D4 DECK LOADING RATIO (DLR)

The DLR is used as a first check on bridge decks.

Using the VAI from section D1 the DLR is given by:

DLR = (VAI / Deck Grade Factor) x 100%

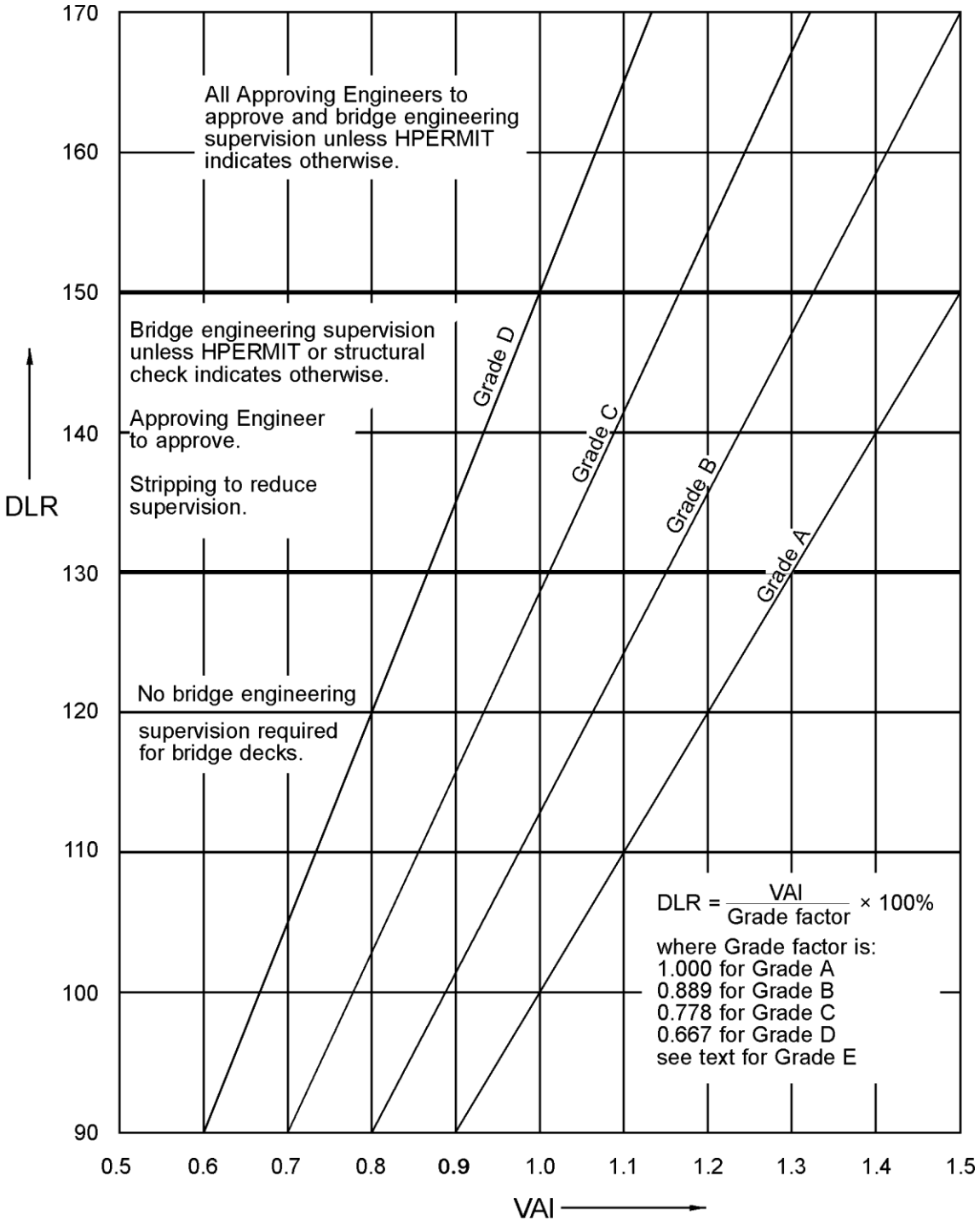
where the Deck Grade Factor is:

1.000 for **Grade A** decks;
0.889 for **Grade B** decks;
0.778 for **Grade C** decks;
0.667 for **Grade D** decks.

If a bridge deck is Grade E then the DLR shall be taken as greater than 130%.

If the Deck Capacity Factor (DCF) is available from the OPermit system, this should be used in place of the above Deck Grade Factor for more accurate determination of the DLR.

The graph on the following page represents the above DLR formula graphically.



Graph L2 : Deck Loading

Note: OPermit has replaced HPERMIT as the computer based permit checking system.

D5 BRIDGE LOADING RATIO (BLR)

The BLR is used as a first check in determining the conditions under which an overweight vehicle can cross a particular bridge as far as the main structural members are concerned.

The BLR is calculated as follows:

(a) If the length of the critical span for the bridge is unknown or is greater than the critical wheelbase determined in section D2, then:

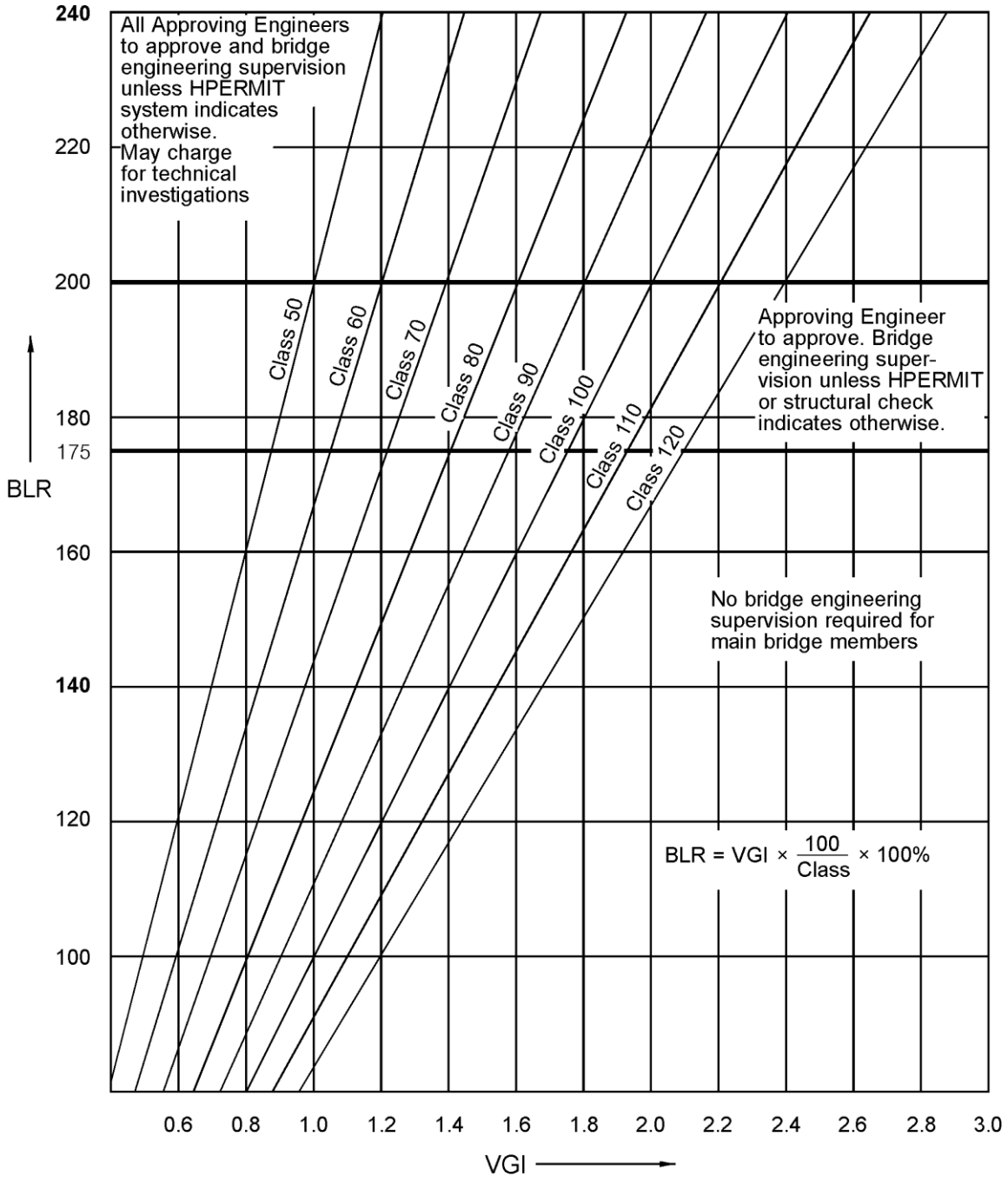
$$BLR = \frac{VGI \times 100}{\text{Bridge Class}} \times 100\%$$

(b) Otherwise:

$$BLR = \frac{GI \times 100}{\text{Bridge Class}} \times 100\%$$

where GI is the maximum GI for a wheelbase shorter than the critical span.

The graph on the following page represents the above BLR formulae graphically.



Graph L3: Bridge Loading

Note: OPermit has replaced HPERMIT as the computer based permit checking system.

D6 TRACTION LIMITS (MGC)

The Maximum Allowable Gradient for Combination (MGC) indicates whether a vehicle combination will be able to develop sufficient traction to prevent damage to the pavement surface by wheel slip.

The MGC for a particular vehicle combination is:

$$MGC = [(TFC \times \text{Drive Axle Mass} \times 100) / \text{Total Mass}] - 2$$

where:

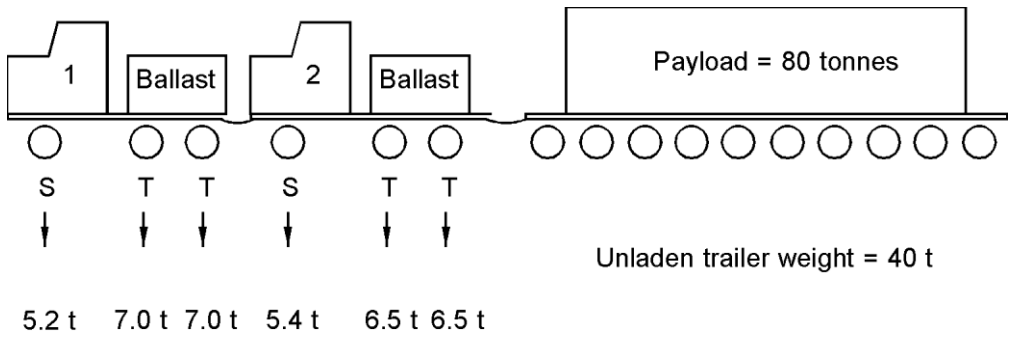
- TFC (traction friction coefficient) is:
  - 0.6 for chipseal surfacing
  - 0.8 for asphaltic concrete surfacing.
- Total Mass is the mass of the whole combination, in tonnes. It includes mass of prime movers, ballast, trailer and payload.
- Drive Axle Mass is the sum of the axle masses of all driving axles, in tonnes.
- The numbers 2 and 100 are constants.
- MGC is expressed in percent.

Example: Calculate the MGC for the vehicle combination with two ballasted prime movers shown below.

Payload = 80 tonnes

Prime mover 1 :	mass on steering axle	= 5.2 tonnes
	mass on driving axles	= 7.0 tonnes
Prime mover 2 :	mass on steering axle	= 5.4 tonnes
	mass on driving axles	= 6.5 tonnes
Ten axle trailer :	mass of unladen trailer	= 40 tonnes

Maximum uphill gradient on proposed route = 8%
Pavement surface on proposed route is chipseal.



Weight	=	[5.2 + (2x7.0)]t	+	[5.4 + (2x6.5)]t	+	[40t]	+	[80t]
		Sum of prime mover 1 axle masses	+	Sum of prime mover 2 axle masses	+	Tare mass of unladen trailer	+	payload mass
	=	19.2t	+	18.4t	+	40t	+	80t
	=	157.6 tonnes						

Drive axle mass = 2 x 7.0 + 2 x 6.5
= 27.0 tonnes

TFC = 0.6 for chipseal pavements

MGC = [(TFC x Drive Axle Mass x 100) / Total Mass] - 2

= [(0.6 x 27.0 x 100)/157.6] -2

= 8.28%

This is greater than the maximum uphill gradient on the route, 8%, so the prime movers will be able to develop sufficient traction to shift the load without damaging the pavement. If this application complies with the other requirements of this Policy a permit may be issued.