

The Institute of Road Transport Engineers of New Zealand
Second International Heavy Vehicle Seminars. 1987.

Session 3: Weights and Dimensions

"New Zealand Weights and Dimensions"

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Ministry of Transport, Wellington

- 1) Q: What is the number one strategic management goal of the Ministry of Transport ?
A: To "Promote Greater Safety, Efficiency and Effectiveness in Transport". (Ref 1)

- 2) Q: What is the "Purpose Statement" of the Road Transport Division ?
A: To "Advance Efficient Safe Road Use". (Ref 2)

- 3) Q: What goals has the Road Transport Division established in order to achieve the "Purpose" of the organisation ?
A: The Division's Strategic Plan identifies 22 goals the first of which is "Reduce Accidents" (Ref 3)

- 4) Q: By how much should accidents be reduced to meet the above goal ?
A: The target is to achieve a fatality rate better than
a) 3.4 deaths per 10,000 vehicles registered in 1987.
b) 3 deaths per 100 million vehicle km driven. (Ref 3)

- 5) Q: How do these objectives rate our performance compared to overseas countries represented at this seminar.

A: Deaths/10,000 Vehicles

1985		1965		
1.	U.K	2.7	3	6.1
2.	U.S.A.	2.7	1	5.1
3.	Canada	3.0	-	-
4.	Australia	3.2	4	8.5
5.	N.Z	3.8	2	5.5

Deaths/100 Million Vehicle Km's

1985		1965		
1.	U.S.A.	1.6	1	3.3
2.	U.K	1.9	3	4.9
3.	Canada	2.3	-	-
4.	Australia	2.4	4	6.6
5.	N.Z	2.7	2	4.0

(Ref 4)

6) Q: How can N.Z increase its road safety to the levels targeted in the Divisions objectives

A: By employing the "Three E's" of road safety:
 Engineering
 Enforcement
 Education

7) Q: Based on New Zealand and Overseas experience which of the "Three E's" offers the greatest potential to reduce road accidents in New Zealand.

A: Engineering.

8) Q: What road safety engineering improvements are under consideration by the Division

A: 1: Road Engineering

- # Motorway Median Barriers
- # Improved Traffic Signs
 - International Symbolic Signs
 - New Advisory Speed Signs
 - New Speed Limit Signs
- # Improved night time delineation
- # More no passing lines
- # More Divided roads and passing lanes

- # Environmental heavy traffic restrictions
- # Accident black spot studies

2: Vehicle Engineering

- # New Vehicle Design Rules
- # New Heavy Vehicle Size Limits
- # New Heavy Vehicle Safety Standards

9) Q: What are the main effects of the new size limits with respect to vehicle dimensions

A: The new limits are described in appendix 1 "The New Vehicle Size Limits , 1987".
The main changes compared to the old limits are

- a. New maximum overall lengths are specified for combination types

Rigid Vehicles and Trailers	-11m
Articulated Vehicles	-17m
Truck/Trailers	-19m
B-Trains(special conditions apply)	-20m
A-Trains(special conditions apply)	-20m
- b. Maximum forward lengths are increased to 8.5m
- c. Rear overhang is reduced to 3.2m or 3.7m
- d. Axle groups :

Maximum of 2 axle groups on a unit	
Maximum axle group spread	2m for tandem
	3m for tri

10) Q: What are the effects of the new weight limits.

A: The new weight limits are shown in appendix 2

Main effects changes are:

- a) 6 tonne single axles
- b) 15 tonne tandem axle group spaced greater than 1.3 m.
- c) 18 tonne tri axle group spaced greater than 2.5 m
- d) 39 tonne on 13.5 wheelbase.
- e) 44 tonne max gross weight on 16.0 m wheelbase

f) Other new wheelbase dependent weight limits for ungrouped axles.

11) Q: What are new heavy vehicle design and safety standards which will be required.

A: New Safety requirements for new weight limits :

- a) New size limits/weight limits (as proposed)
- b) Brake Standards (code of practice under completion by industry).
- c) Drawbars (SANZ DZ5446 , due 1/88)
Tow couplings (SANZ DZ5446 , due 1/88)
Towing eyes (SANZ DZ5446 , due 1/88)
Towing eye attachment (SANZ DZ5446 , due 1/88)
- d) 5th wheel units (SANZ P5450 , due 9/88)
- e) 5th wheel king pins (SANZ P5451 , due 9/88)
- f) Load anchorage points (SANZ P5444 , due 9/88)
- g) Tyre ratings (MOT Policy)
- h) Chassis ratings (MOT Policy)
- i) Truck Trailer weight ratio 1:2 (MOT/MWD Policy)
- j) Load equalising axle groups (MOT Policy)
- k) Tandem drive over 39 tonne (MOT Policy)
- l) Review of weighing tolerance (MOT/MWD Policy)
- m) Existing limits will generally continue to apply for vehicles with castoring or steering axles and A-Trains

12) Q: What other factors should heavy vehicle owners and operators keep well in mind , concerning the new size and weight limits.

A: a) Some of the new maximum size vehicles are much less manoeuvrable than exiting units.(appendix 3)

Therefore , the largest available vehicle may not be best for operators.

Because

- i) they may not fit existing streets, accessways, buildings.
 - ii) local authorities are not obliged to design all streets for maximum units.
 - iii) Maximum units may be excluded from some areas in future, using laws and street design.
 - iv) Maximum size units are not always the most cost effective.
- b) So carefully review your needs before increasing the size of your rigs.
- c) The Road Transport Division is determined to meet its road safety goals and objectives and to regain our position compared to overseas countries. To help achieve this roading and vehicle standards at least as good as those overseas are required.
- d) The new limits and standards are to help achieve this , so be fully familiar with them before assuming your rig will qualify for 44 tonne.

13) Q: How will the new limit improve the future N.Z. heavy vehicle fleet, in comparison to existing vehicles.

A: The case of a semi trailer can be used to demonstrate some of the advantages typically available with the new limits (see appendix 4).

a) Efficiency gains -

- # Simpler construction ; lower costs.
- # Lower maintenance.
- # Lower tare + increased gross = greater payload
- # Standardisation of fleets easier.

b) Safety gains -

- # Reduced rear overhang ; handling better and stability.
- # Longer trailer wheelbase ; better stability.
- # Longer trailer wheelbase ; better ride, stability, handling, braking.
- # Fewer steerable axles ; lower C.O.G , wider stable spring base.

Higher standards of safety equipment.

14) Q: How will buses and coaches be affected.

A: New size limits for buses and coaches are under active discussion with members of that industry. The MOT has proposed the adoption of the existing Australian length limits, retaining the existing height and turning circle.

The new weight limits will be available to buses which meet the new safety standards where applicable. (see Question 1)

15) Q: When can the new size and weight limits be used :

A: a) "New Size Limit Permit" can be now obtained on application to MOT, to allow vehicles to use the new size limits. (see appendix 5)

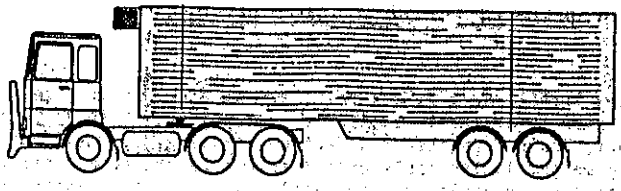
b) "Overweight Permits" may be issued by Road Controlling Authorities for use of vehicles which comply with new size limits, but only up to 39 tonne.

c) Weight limit increases will be approved above 39 tonne when the new safety requirements are available. This could be mid 1988.

Appendices : 1. New Vehicle Size Limits , 1987
2. Revised Load Limits for Class 1
3. Tracking Diagrams
4. Typical Proposed and Existing Semi Trailers
5. New Size limit Applications

References 1. Draft Goals for MOT 1988/89
2. Strategic Planning in the Road Transport Division 1985-87
3. Strategic Plan 1987/88
4. Road Accidents and the Allocation of Resources to Roading In New Zealand : An International Comparison IPENZ Conference , 1988

Permits Required



THE NEW

VEHICLE

SIZE

LIMITS

1987

TRAFFIC ENGINEERING

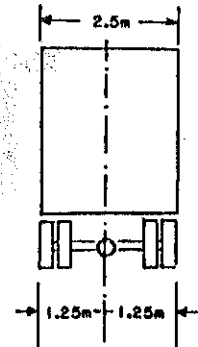


MAXIMUM PERMITTED VEHICLE DIMENSIONS

- Notes 1) Until the Traffic Regulations have been amended, these size limits can only be used if approval is obtained by application to Ministry of Transport, Traffic Engineering Section, Private Bag, Wellington.
 2) Existing weight limits apply unless an overweight permit has been issued.
 3) Buses and light vehicles are not included. Existing limits apply.

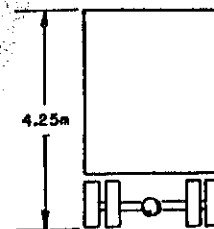
WIDTH

Maximum width = 2.5m
 Width on each side of vehicle centreline = 1.25m (except Agricultural vehicles up to 3.7m in width travelling no faster than 25 km/h in daylight)
 Ropes, lashings, straps, chains, and related connectors and tensioners may extend an additional 25mm on each side while in use to secure loads on vehicles which are loaded in accordance with "The Truck Loading Code". This 25mm does not include any devices fixed rigidly to a vehicle such as gates, bolsters, brackets, sockets, hooks, rails, etc.
 Side marker lights and direction indicators may exceed the width limit.
 Collapsible mirrors which do not extend more than 240mm on each side of the vehicle may exceed the maximum width of 2.5m.



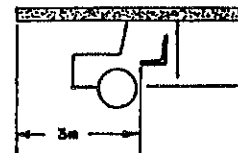
HEIGHT

Maximum height including all load restraints, loads and vehicle fittings and attachments = 4.25m



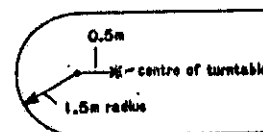
FRONT OVERHANG

Maximum overhang forward of the front edge of the drivers seat for vehicle and load (other than a trailer) = 3m.



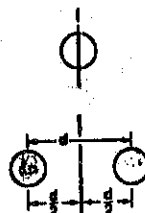
DISTANCE AHEAD OF KINGPIN (Semi trailers and turntable type trailers)

Maximum distance from a point 0.5m ahead of kingpin or centre of turntable = 1.5m radius (does not include trailer drawbars)

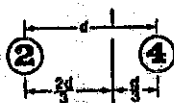


REAR AXIS - DEFINITION

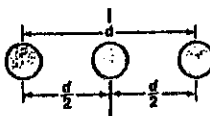
- (a) One non steering axle - that axle
- (b) Tandem axle group or single axle group of more than one axle. (i) both axles fitted with an equal number of tyres - midway between those axles.



- (ii) Where one axle fitted with twice number of tyres of the other - 1/3 of way from the axle fitted with greater number of tyres towards axle with lesser number of tyres.

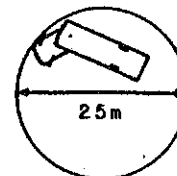


- (iii) triaxle group - midway between extreme axles of group



TURNING CIRCLE (all vehicles and combinations)

Maximum turning circle = 25.0m (wall to wall)



- (c) No non-steering axles and all other vehicles - point determined by Secretary for Transport

REAR OVERHANG

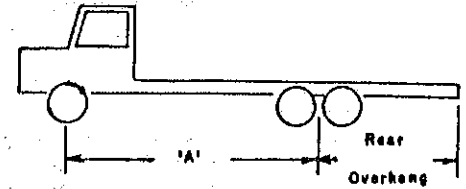
Rigid vehicles and trailers (except semi-trailers)

Rear Overhang must not exceed the lesser of rigid

- (a) 3.2m (or 3.7m, if the vehicle exceeds 9.5m in overall length or is a pole trailer (jinker) with one axle group)

OR

- (b) 60% of 'A' ('A' being the distance from front axis to rear axis or centre of tow coupling to rear axis).



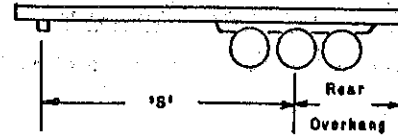
Semi-trailers

Rear Overhang must not exceed the lesser of

- (a) 3.2m

OR

- (b) 50% of 'S' ('S' being the distance from kingpin to rear axis).



Special Cases

- 1) Vehicles fitted with retractable axles:

The retractable axle shall be ignored for the purposes of determining rear overhang and regarded as a fixed axle for the purposes of determining forward distance.

- 2) Semi-trailers fitted with steerable axles:

Permits will be issued for steerable axles up to 37 tonnes and subject to conditions determined by the Secretary for Transport.

GROUND CLEARANCE

Within 1m of any axle minimum ground clearance shall be 100mm

At any point from the midpoint between adjacent axles and either adjacent axle, the ground clearance shall be at least 1/10 of the distance from the axle to the point where the ground clearance is measured.

At any point in front of the first axle and behind the last axle the ground clearance shall be at least 1/10 of the distance of that point from the axle.

AXLE GROUPS - DEFINITIONS

Single axle:- either one axle, or two axles with centres between transverse, parallel, vertical planes spaced less than 1.0m apart.

Tandem axle Group:- A combination of two axles which are not less than 1.0m and not more than 2.0m apart.

Triaxle Group:- A combination of three axles in which the front and rear axles are not less than 2.0m and not more than 3.0m apart.

PERMITTED AXLE GROUPS

Rigid vehicle or truck tractor shall be supported by two axles or axle groups disposed as follows:- (i) towards the front of the vehicle, with all wheels connected to the steering system for that part of the vehicle, either a single axle or a twin-steer group; (ii) towards the rear of the vehicle either a single axle or a tandem axle group or a triaxle group.

A semi-trailer shall be supported towards the rear by either a single axle or a tandem axle group or a triaxle group.

A trailer shall be supported by either (i) a single axle or a tandem axle group, or in the case of a pole trailer either a single axle or a tandem axle group or a triaxle group, or two axle groups disposed toward the front and rear of the trailer. Or (ii) a single axle or a tandem axle group or a triaxle group towards both the front and rear of the trailer provided that all wheels in the front axle or axle group are connected to the steering mechanism for that part of the vehicle.

LOAD SHARING

Note: Future weight limits will require all axles in an axle group (except those in a twin steer group) to be load sharing.

OVERALL LENGTH

Single Vehicles

Rigid truck = 11.0m
 Full trailer (includes drawbar) = 11.0m

Vehicle Combinations

Articulated vehicle = 17.0m
 Truck and trailer = 19.0m
 A - train = 20.0m
 B - train = 20.0m

FORWARD DISTANCE

DEFINITION:-

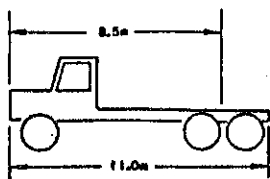
Forward distance is the distance from the rear axis to:
 (a) the front of the vehicle for a rigid vehicle
 (b) the front of the rigid part of the vehicle for a trailer with two axle groups
 (c) the front of the drawbar for a trailer with one axle group
 (d) the kingpin in the case of a semi-trailer.

Maximum forward distance for all vehicles and loads except pole (jinker) trailer = 8.5m
 Maximum forward distance for pole (jinker) trailers = 7.4m

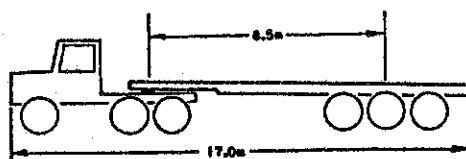
TRAILING LENGTH FOR A-TRAINS AND B-TRAINS

Maximum distance from centre of 5th wheel on the tractor unit to rear of combination = 14.5m

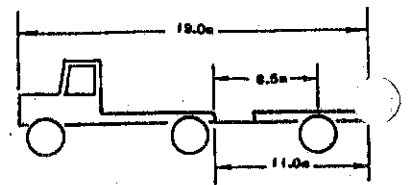
Rigid truck



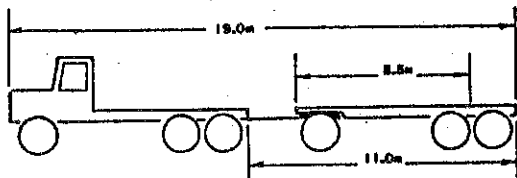
Articulated vehicle



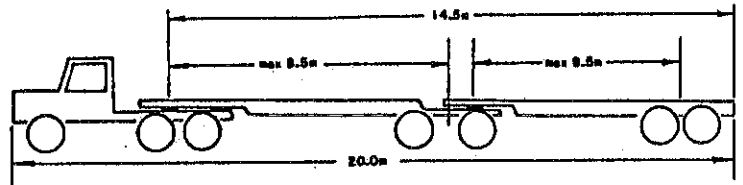
Truck and trailer (one axle group)



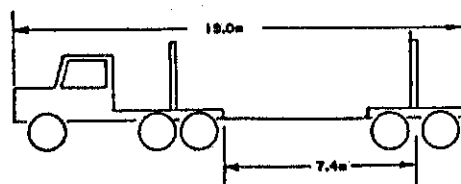
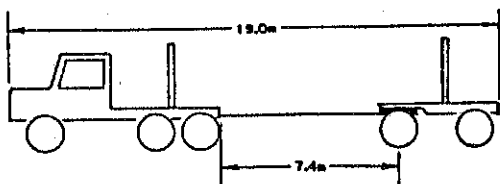
Truck and full trailer (two axle group)



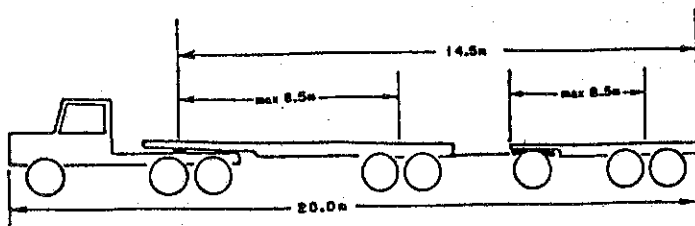
B-Train



Logging jinkers



A-Train *



*** Special Requirements for 20.0m Long A-Train**

- (a) Three axle tandem drive axle tractor units (6x4) are to be used.
- (b) Semi-trailer:- The distance from the rear axis to tow coupling shall not exceed 30 percent of the distance from the point of articulation to the rear axis.
- (c) Will continue to be limited to 39 tonnes under the new weight limits.

DISTANCE BETWEEN VEHICLES

Maximum separation between vehicles in combination shall be 4.0 metres.

NOTES

- (1) Vehicles towing two trailers (with exception of B-trains) will be limited to 39 tonnes.
- (2) New Standards will be required for 5th wheel coupling for those vehicles above 39 tonnes.

Permits Required

Revised load limits for Class 1 to be:

a Maximum Weights on Individual Axles

- Single tyred 6.0 tonnes
- Twin tyred 8.2 tonnes

b Maximum sum of the weights on tandem axles fitted with twin tyres.

<u>Axle Spacing</u>	<u>Weight Limit</u>
1.00 metres but less than 1.30 metres	14.5 tonnes
1.30 metres but less than 1.80 metres	15.0 tonnes

c Maximum sum of the weights on any two adjacent twin tyred axles spaced at 1.80 metres or more - 15.5 tonnes.

d Maximum sum of the weight on tri-axle groups fitted with twin tyres or approved large-sized single tyres.

<u>Distance From First To Third Axle in Tri-Axle Group</u>	<u>Weight Limit</u>
2.4 metres but less than 2.5 metres	17.5 tonnes
2.5 metres but less than 3.0 metres	18.0 tonnes

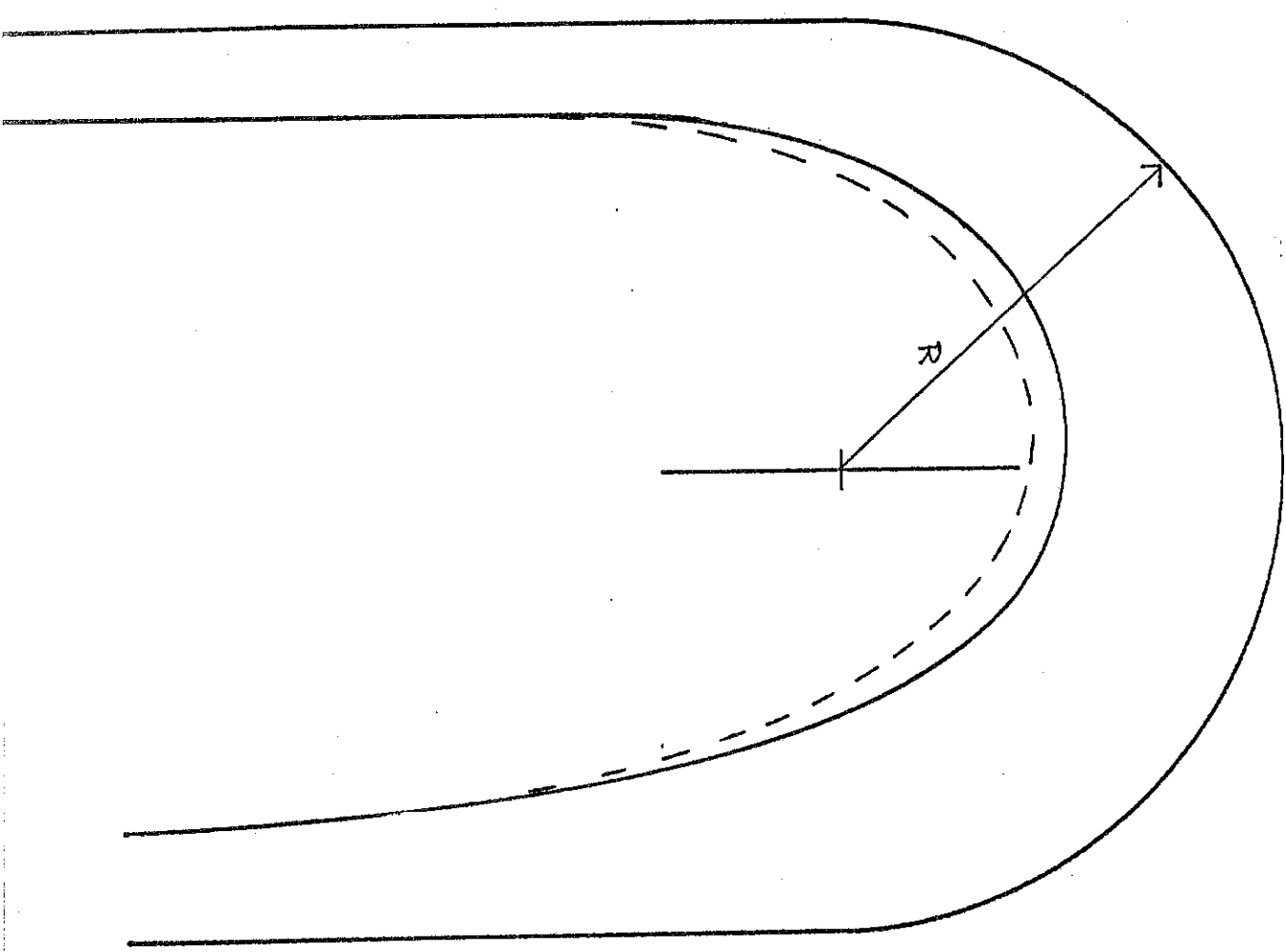
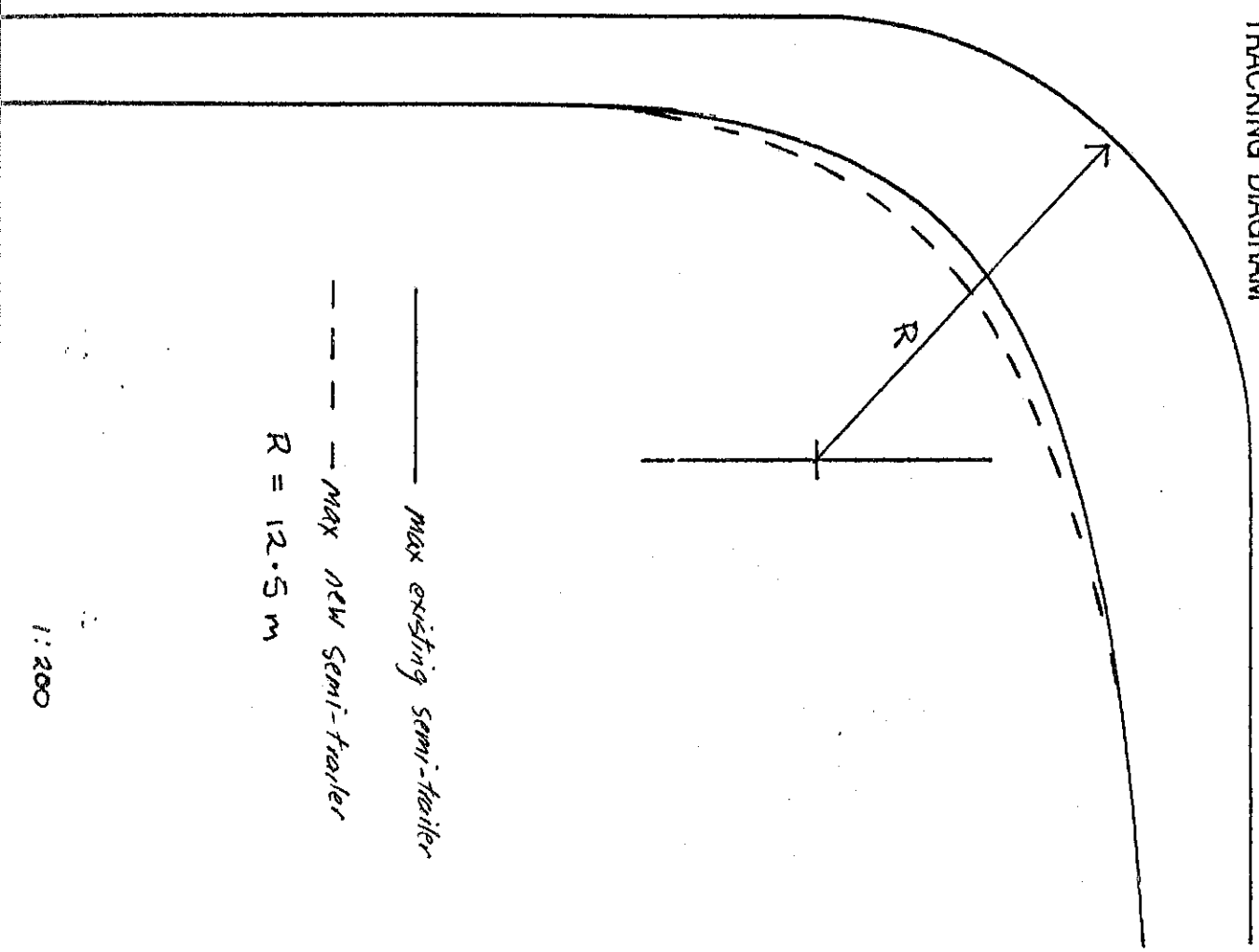
e Wheel base table

<u>Distance from First To Last Axle</u> (Metres)	<u>Weight Limit (Tonnes)</u>
3.0	19.0
3.3	20.0
3.6	21.0
4.0	22.0
4.4	23.0
4.7	24.0
5.1	25.0
5.4	26.0
5.8	27.0
6.4	28.0
7.0	29.0
7.6	30.0
8.2	31.0
8.8	32.0
9.4	33.0
10.0	34.0
10.8	35.0
11.6	36.0
12.4	37.0
13.2	38.0
13.5	39.0
14.4	40.0
14.8	41.0
15.2	42.0
15.6	43.0
16.0 or more	44.0

(Approximate)
TRACKING DIAGRAM

— Max existing semi-trailer
- - - Max new semi-trailer
 $R = 12.5 \text{ m}$

1:200



Appendix 4.

Typical "Proposed" and "Existing" Semi-Trailers

