AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline: Engineering (Rolling Stock) **Category: Standard**

Track Maintenance Vehicle Specific Interface Requirements

WOS 01.700

Applicability

ARTC Network Wide		Western Jurisdiction	
New South Wales	✓	Victoria	

Primary Source

RIC Standard RSU 700 Series Version 2.0

Document Status

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1.2	02 Mar 12	Standards	Operations Standards Manager	Manager Standards	Executive General Manager Technical Services 07/03/2012

Amendment Record

Version	Date Reviewed	Clause	Description of Amendment
1.0	07 Dec 05	All	Reformatting to ARTC Standard and combining all 700 Series into one document
1.1	16 Jul 07	Various Attachments	Updated to reflect new procedure PP-124.1 Track Maintenance Vehicle Registration and Operation Info Packs WOS 01.A5 and WOS 01.A6 included as Reference Checklists in Attachment 1 and 2
1.2	02 Mar 12	Attachments	Attachments WOS 01.A5 and WOS 01.A6 removed from Standard to be published as standalone checklists/forms in Word that can be filled out directly to avoid illegible handwritten submissions

Contents

WOS 01.700 - Introduction

[1] General

1.1 The 700 series of Rolling Stock Operation Standards (WOS 01.700) contain specific interface requirements for track maintenance vehicles operating on the Australian Rail Track Corporation network.

1.2 Requirements that are common with other types of rolling stock are included in the 200 series of Rolling Stock Operation Standards (*WOS 01.200*).

1.3 Track maintenance vehicles must comply with the objectives of the Environment Protection Licence No. 3142.

1.4 Track maintenance vehicles must comply with Environment Protection Licence No. 3142 with respect to maintenance of plant and equipment.

[2] Vehicle types

2.1 Track maintenance vehicles are used to carry out various work on or about the track. The major types of vehicles are:

- Track repair machines. Refer to *WOS 01.710*
- Road/rail vehicles. Refer to *WOS 01.720*
- Flat top trolleys and trailers. Refer to *WOS 01.730*
- Quadricycles and trikes. Refer to *WOS 01.730*

[3] Vehicle identification

3.1 All track maintenance vehicles shall have a discrete identification number.

3.2 The identification number shall be clearly visible on the vehicle from each side and where practical on each end.

3.3 Road registered road/rail vehicles may use the vehicle road registration number. If the road registration number is changed or the vehicle road registration is cancelled, the Australian Rail Track Corporation shall be immediately notified.

[4] Authorisation of vehicles

4.1 For authorisation of track maintenance vehicles please refer to ARTC procedure *PP-124.1 Track Maintenance Vehicle Registration and Operation*.

4.2 The reference checklist for on-track maintenance vehicles (*WOS 01.A5*) is available on the *ARTC Extranet Plant & Equipment Page*..

4.3 Vehicle testing requirements for on-track maintenance vehicles are summarised in *WOS 01.715*.

4.4 The reference checklist for road/rail vehicles (*WOS 01.A6*) is available on the *ARTC Extranet Plant & Equipment Page*.

4.5 Vehicle testing requirements for road/rail vehicles are summarised in *WOS 01.725*.

WOS 01.710 - Body and Underframe

[1] General

1.1 An on-track vehicle is any type of track maintenance vehicle which operates solely on the track.

1.3 Some on-track vehicles can be removed from the line by use of special take-offs or portable turnouts.

1.4 On-track vehicles must be operated in accordance with Australian Rail Track Corporation Network Rule *ANWT 316* and procedure *PP-124.1 Track Maintenance Vehicle Registration and Operation*.

WOS 01.711 - Bogie/Suspension Components

[1] Introduction

1.1 This section contains bogie related requirements which are specific to multiple unit trains. All requirements in *WOS 01.200* which are common requirements also apply to multiple unit trains.

[2] Wheels

2.1 Refer to *WOS 01.210* for common wheel requirements.

- *WOS 01.211* Wheels, Design & Manufacture
- *WOS 01.212* Wheels, Minimum Operational Requirements

[3] Axles

3.1 Refer to *WOS 01.220* for common axle requirements

- *WOS 01.221* Axles, Design and Manufacture
- *WOS 01.222* Axles, Minimum Operational Requirements

[4] Wheel and Axles Assembly

4.1 Refer to *WOS 01.230* for common wheel and axle assembly requirements.

[5] Axle Bearing Assemblies

5.1 Refer to *WOS 01.240* for common axle bearing assembly requirements.

[6] Bogie Frames and Associated Componentry

6.1 Refer to *WOS 01.250* for common requirements for bogie frames and associated componentry.

[7] Vehicle Suspension

7.1 Refer to *WOS 01.260* for common vehicle suspension requirements.

- *WOS 01.261* Suspension springs
- *WOS 01.262* Suspension damping
- *WOS 01.263* Resilient suspension components

WOS 01.712 - Brakes and Pneumatic Equipment

[1] Introduction

1.1 On-track maintenance vehicles usually are self propelled vehicles with braking controlled by the operator.

1.2 Vehicles must be equipped with a fail safe braking system.

1.3 The brakes on vehicles shall stop the vehicle safely without skidding the wheels.

1.4 Some vehicles are capable of operating coupled together with the straight air brakes controlled from the leading vehicle. Braked trailers must have the trailer brakes operated from the towing vehicle.

1.5 Vehicles towing unbraked trailers must be tested in accordance with section 5 below, and the permissible loaded mass of unbraked trailer shall be specified and stencilled on the side of towing vehicle.

1.6 Some vehicles have automatic air brake and are capable of being attached to a train and the brakes operated from the train brake pipe.

The automatic braking systems fitted to these vehicles must be compatible with the brake systems of locomotives to ensure that the brakes apply and release as required. Otherwise skidded or scaled wheels could occur. Refer to *WOS 01.270*.

[2] Brake systems

2.1 On-track vehicle brake systems shall have at least two separate brake systems:

- straight air brake
- parking brake (handbrake)

2.2 Some vehicles are equipped to control the brakes on trailers fitted with a straight air brake.

2.3 Some vehicles also have an automatic brake.

2.4 Where a vehicle does not have an automatic air brake, the parking brake must meet the braking performance requirements in Section [5] Brake performance.

[3] Parking brake

3.1 Each vehicle shall have an operable spring parking brake or handbrake.

3.2 The parking brake shall be able to hold the vehicle (in full service condition) stationary on a grade of 1 in 30 for an indefinite period.

3.3 The parking brake shall operate on more than one axle per vehicle.

3.4 A spring parking brake shall be maintained in the released position by main reservoir pressure. There shall be a means of manually releasing the brake.

[4] Automatic brake

4.1 In addition to the requirements of *WOS 01.270* and *WOS 01.271*, the following shall apply to track maintenance vehicles fitted with automatic air brake.

4.2 The auxiliary reservoir shall have sufficient capacity so that at a full service reduction of 175 kPa from 500 kPa brake pipe pressure, the brake cylinder pressure shall be:-

- 370 kPa maximum at zero stroke
- 300 kPa minimum at full stroke.

[5] Brake performance

5.1 The vehicle shall brake on dry level track within the following limits. Tests shall be conducted with the operator applying the brake and not releasing until the vehicle is stationary. The vehicle shall be tested at normal operating speed (typically 30km/h in tare condition), and up to the maximum allowable speed. The wheels must not skid during the test.

5.2 Measured average deceleration rates shall be:

- Air brake 1.1 to 1.4 m/s^2 in tare condition
  0.8 m/s^2 minimum loaded condition
- Vehicles with trailers 1.1 to 1.4 m/s^2 in tare condition
  0.4 m/s^2 minimum in loaded condition

5.3 Load compensating valves shall be required where the tare to gross mass ratio exceeds 1:3. The vehicle shall comply with the requirements of section 5.2 above.

5.4 Where a vehicle is not fitted with an automatic air brake, in addition to the straight air brake, the parking brake must operate to provide a minimum deceleration on level track of 0.8 m/s^2 minimum in loaded condition.

[6] Brake Equipment

6.1 For vehicles fitted with an automatic air brake system refer to *WOS 01.271*.

6.2 Additional requirements are as detailed below.

[7] Coupling Cocks

7.1 Brake pipe and main reservoir coupling cocks (where fitted) refer to *WOS 01.271*.

7.2 Straight air brake coupling cocks shall have a breakaway 12 mm type 'B' coupling mounted 300 mm each side of the towing pin. Straight air brake couplings and cock shall be painted red.

7.3 All cocks shall be side venting when in the closed position.

7.4 All cocks shall be closed when the handle is vertically 'up' and across the line of the pipe. Cocks shall be open when the handle is horizontal and in line with the pipe.

[8] Coupling hoses

8.1 Coupling hoses shall comply with Australian Standard AS 2435 Elastomeric Hose for Railway Air Brake.

8.2 The nipple sizes for standard coupling hoses shall be:

- 1-1/4 inch BSP for brake pipe hose
- 3/4 inch BSP for main reservoir hose

WOS 01.713- Body and Underframe

[1] Rolling stock outline

1.1 Vehicles shall comply with the Rolling Stock Outline specified in *WOS 01.110*.

1.2 Where a vehicle operates with equipment outside the Rolling Stock Outline, such as lifting jibs, elevated platforms etc, there shall be a means of ensuring that it is not driven, in travel mode, with this equipment exceeding the Rolling Stock Outline.

These vehicles require an electrical safety inspection before being permitted to operate. Refer to SWU 932 for the rules applying to the use of cranes and elevating plant near electrical equipment.

[2] Couplers and draftgear

2.1 Automatic couplers and draftgear where fitted shall comply with the requirements of the ROA Manual of Engineering Standards and Practices.

[3] Towing fixtures, jacking and lifting points

3.1 All vehicles shall have towing fixtures.

3.2 Appropriate jacking points shall be supplied at the junction of the underframe side sill and bogie centreplate transom.

3.3 Vehicles shall have appropriate lifting points or brackets to insert lifting jigs.

[4] Steps and handrails

4.1 Steps and handrails shall generally comply with the requirements of ROA Manual of Engineering Standards and Practices, however their use and application shall meet current Occupational Health and Safety requirements.

[5] Marking and lettering

5.1 Each vehicle shall have the vehicle type, or code, and number clearly visible in 125mm high characters on each side, and where practical at the end, of the vehicle.

5.2 Each vehicle fitted with automatic couplers shall have the allowable trailing load (in tonnes), maximum speed and length over couplers marked on each side of the vehicle.

5.3 All brake valves and cocks shall be clearly labelled to indicate their function and any special instructions which are applicable for their use.

5.4 All on track maintenance vehicles shall be fitted with AEI tags as specified in Appendix H (*WOS 01.H*) of this manual.

5.5 To enhance visibility of trains from the side at level crossings, all track maintenance vehicles that can be coupled to and hauled in a train consist shall be fitted with reflective delineators (reflectors). Refer to Appendix I (*WOS 01.I*).

WOS 01.714 - Safety Equipment

[1] Driver's safety system

1.1 Each driven vehicle should be fitted with driver safety systems as specified in Appendix D (*WOS 01.D*).

1.2 Track maintenance vehicles operating as a train, refer to *WOS 01.716*, are required to have an approved driver safety system.

[2] Speed Indication

2.1 Each vehicle shall have an operative speed indication device.

2.2 The maximum speed for vehicles shall be displayed in the vehicle for compliance by the operator of the vehicle.

[3] Data Logger/Recorder

3.1 Track maintenance vehicles operating as a train, refer to *WOS 01.716*, shall be fitted with a data recording system to record at least the following:-

- time
- speed
- brake pipe or brake cylinder pressure

3.2 It is desirable that the following critical driving functions be also recorded:-

- vigilance acknowledgment
- throttle position
- horn operation
- headlight operation
- distance

3.3 The system shall have provision for identification of the vehicle operator. If this is not possible, vehicle operator rosters shall be kept to enable operators to be identified.

[4] Pressure Indication

4.1 Each vehicle shall have a means of indicating pressure of main reservoir, brake pipe, spring brake and brake cylinder where applicable.

4.2 Gauges shall be clearly labelled and calibrated in kPa.

[5] Driver's emergency cock

5.1 Vehicles with automatic brake shall be fitted with an emergency cock near each driving position. The cock when opened shall directly vent the brake pipe.

[6] Emergency equipment

6.1 Each vehicle shall be supplied with the emergency equipment as specified in the Route Access Standard (RAS).

[7] Communications

7.1 On-track maintenance vehicles shall be fitted with train radio system or portable train radios.

[8] Lights

8.1 Vehicles shall be fitted with headlights.

8.2 Vehicles shall be fitted with one red and one white marker light at each corner of the vehicle, as close to the top corners of the structure as possible, and between 900 mm and 2500 mm above rail height. These lights shall be switchable such that:

- In travel mode white lights show on the forward end and red lights on the rear end.
- In work mode, white lights show at both ends.

8.3 All track repair vehicles and overhead wiring vehicles shall be fitted with an orange flashing light. The orange flashing light must be switched on at all times when the vehicle is on track, excepting when a track maintenance vehicle is marshalled in a train consist. Refer *ANWT 316*. The lights are to work such that:-

- In travel mode, lights activate when the brakes are applied.
- In work mode, lights activate when the ignition is switched on.

[9] Horns

9.1 Vehicles shall be fitted with a horn.

9.2 Vehicles with a maximum speed of 30 km/h or more shall be fitted with a horn that meets the requirements for the low horn as specified in the ROA Manual of Engineering Standards and Practices Table 13.2. That is:

	Low Horn
Speed	Stationary
External location	100m
External noise limit	85dB(A) min 90dB(A) max
Driver's cab internal noise limit	85dB(A) max

9.3 Vehicles with a maximum speed of less than 30 km/h shall be fitted with a horn equivalent to an automotive horn.

WOS 01.715 - Vehicle Performance

[1] Introduction

1.1 The performance specified in this Unit relates to the operation of the on-track maintenance vehicle on the Australian Rail Track Corporation network.

[2] Test requirements summary

2.1 The following table summarises the test requirements for on-track maintenance vehicles:

Compatibility Test	Reference
Static rolling stock outline test	*WOS 01.281*
Static vehicle weigh test	*WOS 01.282* (see 2.5 below)
Static vehicle twist test	*WOS 01.283*
Vehicle/bogie swing test	*WOS 01.284* (see 2.6 below)
Vehicle/vehicle swing test	*WOS 01.285* (see 2.7 below)
Brake performance test	*WOS 01.287* and *WOS 01.712*
Ride performance test	*WOS 01.288* (see 2.8 below)
Kinematic rolling stock outline test	*WOS 01.289* (see 2.9 below)
Signal visibility test	*WOS 01.293*
Electrical safety inspection	*WOS 01.294*
Signal compatibility test	*WOS 01.295*
Signal interference test	*WOS 01.296*

2.2 **Jacking point vertical load test.**

It is recommended that the owner/operator conduct jacking point vertical load tests to ensure that the vehicle is capable of withstanding loads imposed during vehicle recovery.

2.3 **Static end compression test.**

It is recommended that the owner/operator conduct a static end compression test to ensure that the vehicle is capable of withstanding the loads imposed during operation. Loads shall be commensurate with the proposed maximum duty of the vehicle.

2.4 **P2 force determination**

The P2 force shall not exceed the limits specified in *WOS 01.120*.

2.5 **Static vehicle weigh test**

Vehicles shall be type tested to determine the fully provisioned mass, however, where any axle load can possibly exceed agreed limits each vehicle of that type shall be weighed to determine the load distribution across all axles.

2.6 **Vehicle / bogie swing test**

A vehicle / bogie swing test is only required for vehicles equipped with bogies.

2.7 **Vehicle / vehicle swing test**

A vehicle / vehicle swing test is only required for coupled vehicles.

2.8 **Ride performance test**

A ride performance test is only required where it is proposed to operate the vehicle at speeds in excess of 15 km/h for vehicles up to and including 5 tonnes gross mass, or 31 km/h for vehicles over 5 tonnes gross mass.

2.9 **Kinematic rolling stock outline test**

A dynamic kinematic rolling stock outline test is only required where it is proposed to operate the vehicle at speeds in excess of 15 km/h for vehicles up to and including 5 tonnes gross mass, or 31 km/h for vehicles over 5 tonnes gross mass.

[3] Maximum speed

3.1 The Australian Rail Track Corporation reserves the right to set the maximum operating speed based on dynamic performance and infrastructure limitations.

3.2 The Australian Rail Track Corporation approved maximum operating speed shall be displayed on each side of the vehicle and within the driver's compartment.

WOS 01.716 - Track Vehicles Operating Under the Control of Track Signals

[1] General

1.1 Track vehicles which operate the track circuits correctly may be authorised to operate under the control of track signalling.

1.2 These vehicles shall be fitted with an approved function recording device and vigilance control system and operated in accordance with Australian Rail Track Corporation Network Rule *ANWT 316*.

[2] Authorisation

2.1 Before a vehicle is authorised to operate under the control of track signalling, the vehicle must undergo the Signal compatibility test in *WOS 01.296* for all track circuits that cover the proposed area of operation for the vehicle.

[3] Retesting

3.1 The Australian Rail Track Corporation reserves the right to request measurements of the wheel profiles in order to determine compatibility with the rail profile.

WOS 01.720 - Road/Rail Vehicles

[1] General

1.1 A road/rail vehicle is any type of track vehicle which can travel on either road or rail and which can transfer from one mode of operation to the other. Road/rail vehicles are sometimes called “Hi-rail” vehicles.

1.2 Some road/rail vehicles may be road registered and therefore approved by RTA, however, this, in no way, gives acceptance for operation on track.

1.3 Some road/rail vehicles are restricted to operation only within a protected worksite. Other road/rail vehicles are permitted to travel anywhere within the Australian Rail Track Corporation network.

1.4 Road/rail vehicles must be operated in accordance with Australian Rail Track Corporation Network Rule *ANWT 316*.

WOS 01.721 - Suspension

[1] Introduction

1.1 This section contains bogie related requirements which are specific to road/rail vehicles. All requirements in *WOS 01.200* which are common requirements also apply to road/rail vehicles unless excluded below.

WOS 01.722 - Brakes

[1] Introduction

1.1 The brakes on these vehicles shall stop the vehicle safely without skidding the wheels on dry track.

1.2 Vehicles towing unbraked trailers must be tested in accordance with section 3 below, and the permissible loaded mass of unbraked trailer shall be specified and stencilled on the side of towing vehicle.

[2] Brake systems

2.1 Road/rail vehicle brake systems usually operate in one of the two following ways:-

- Rubber road wheels braking directly on rail
- Steel rail wheels braking on the rail

[3] Brake performance

3.1 The vehicle shall brake on dry level track within the following limits. Tests shall be conducted with the operator applying the brake and not releasing until the vehicle is stationary. The vehicle shall be tested at normal operating speed (typically 30 km/h) in tare condition, and at maximum allowable speed if safe to do so at the test site. The wheels must not skid during the test.

3.2 Vehicle decelerations

- Service brake — 1.1 m/s^2 (0.11g) minimum in tare condition
  1.0 m/s^2 (0.10g) minimum loaded condition
- Vehicles with trailers — 1.1 m/s^2 (0.11g) minimum in tare condition
  0.8 m/s^2 (0.08g) minimum in loaded condition

3.3 The parking brake shall be able to hold the vehicle (in full service condition) stationary on a grade of 1 in 30 for an indefinite period.

WOS 01.723 - Body

[1] Rolling stock outline

1.1 Vehicles shall comply with the Rolling Stock Outline specified in *WOS 01.110*.

1.2 Where a vehicle operates with equipment outside the Rolling Stock Outline, such as lifting jibs, elevated platforms etc, there shall be a means of ensuring that it is not driven, in travel mode, with this equipment exceeding the Rolling Stock Outline.

- These vehicles require an electrical safety inspection, as specified in *WOS 01.294*, before being permitted to operate. Refer to ANWT 322 and "ARTC Electrical Standard PMP 04 Requirements for Work using Cranes and Plant" for the use of cranes and elevating plant near electrical equipment

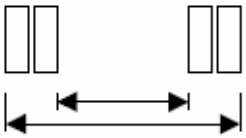
1.3 Rubber tyres fitted to these vehicles must be either running on the rail head or be raised and fixed securely such that they conform with the Rolling Stock Outline specified in *WOS 01.110*.

1.4 Rubber tyres shall be centred laterally with respect to the rail wheels.

1.5 As the wheel track of rubber tyres vary from vehicle to vehicle, various categories of permissible internal and external tyre widths are permitted. Some categories result in operating restrictions for the vehicle. These categories are:

Category	Minimum width (mm)	Maximum width (mm)	Restrictions
1	1365	2160	Unrestricted. Vehicle may operate in all areas.
2	1100	2260	May operate in all areas but speed is restricted to 20km/h in the forward and 5km/h in the reverse direction when traversing track fitted with check rails or guards rails, such as at points, crossings, bridges and level crossings.
3	1100	2440	Restricted to non-train stop areas and speed is restricted to 20km/h in the forward and 5km/h in the reverse direction when traversing track fitted with check rails or guards rails, such as at points, crossings, bridges and level crossings. Care must be taken in areas where there is high ballast shoulders, sleepers layed-out, rail lubricators, etc.
4	N/A	N/A	Vehicles operating within a protected worksite do not have a restriction on the minimum and maximum tyre width, however, the worksite supervisor must give permission for all movements.

Where dual tyres are fitted, the inside width is measured across the inside faces of the inner tyres. The outside width is measured over the outside faces of the outer tyres.



WOS 01.724 - Safety Equipment

[1] Speed Indicator

1.1 Vehicles shall have an operative speed indicating device. Vehicles operating above 30km/h shall be fitted with an approved speed recording device.

[2] Head lights and warning lights

2.1 Vehicles shall be fitted with headlights and tail lights.

2.2 Road/rail vehicles shall be fitted with an orange flashing light. The flashing light must be activated at all times when the vehicle is on rail.

[3] Horns

3.1 Vehicles shall be fitted with a horn.

3.2 Vehicles with a maximum speed of 30 km/h or more shall be fitted with a horn that meets the requirements for the Low Horn as specified in the ROA Manual of Engineering Standards and Practices, Table 13.2. That is:

	Low Horn
Speed	Stationary
External location	100m
External noise limit	85dB(A) min 90dB(A) max
Driver's cab internal noise limit	85dB(A) max

3.3 Vehicles with a maximum speed of less than 30 km/h shall be fitted with a horn equivalent to an automotive horn.

[4] Emergency equipment

4.1 Each vehicle shall be supplied with the emergency equipment as specified in Route Access Standard (RAS).

WOS 01.725 - Vehicle Performance

[1] Introduction

1.1 The performance specified in this Unit relates to the operation of the road/rail vehicle on the Australian Rail Track Corporation network.

[2] Test requirements summary

2.1 The following table summarises the test requirements for road/rail vehicles operating on the Australian Rail Track Corporation network:

Compatibility Test	Reference
Static rolling stock outline test	*WOS 01.281*
Static vehicle weigh test	*WOS 01.282*
Static vehicle twist test	*WOS 01.283*
Brake performance test	*WOS 01.287* and *WOS 01.722*
Ride performance test	*WOS 01.726*
Electrical safety inspection	*WOS 01.294*

WOS 01.726 - Ride Performance Test

[1] Introduction

1.1 A ride performance test is required to ensure vehicle stability and compatibility with the track and to establish the optimum vehicle operating conditions.

1.2 This WOS covers base ride performance based on vehicle stability considerations.

[2] When a Ride Performance Test is Required

2.1 A ride performance test shall be conducted on all vehicle types which have not been approved by the Australian Rail Track Corporation to operate on the Australian Rail Track Corporation network.

2.2 This test is the basis for determining the maximum operating speed for vehicles. The maximum operating speed of road/rail vehicles is generally restricted to 30km/h for vehicles of 5 tonne gross mass or more and 50km/h for vehicles not exceeding 5 tonne gross mass. Where a vehicle meets all other requirements of this Standard and these speeds are not to be exceeded, a ride performance test may not be required.

2.3 The Australian Rail Track Corporation reserves the right to request and have a ride performance test carried out on any vehicle for the following reasons:

- Proposed modification to the suspension characteristics.
- Proposed change in wheel profile.
- Proposed change in vehicle operating conditions.
- Any proposed vehicle modification which may affect the vehicle ride performance.
- Significant change in the vehicle tare mass.
- Where, in the Australian Rail Track Corporation's opinion, there is suspected poor ride performance.

[3] Measurement of Ride Performance

3.1 Ride performance shall be measured using vertical and lateral accelerometers positioned on the vehicle body as near as possible to the leading rail wheels at the centre of the vehicle.

3.2 All measured accelerations shall be filtered at 10Hz low pass.

3.3 Average acceleration shall be taken as the mean peak acceleration measured about the zero axis. The mean peak acceleration shall be calculated from the 10Hz low pass filtered acceleration.

[4] Base Ride Performance Criteria

4.1 The base ride performance criteria for all road/rail vehicles operating on the Australian Rail Track Corporation network shall be as follows:

Parameter	Limit	Test Speed
Maximum lateral acceleration	+/- 0.5g	110% design
Average lateral acceleration	+/- 0.35g	110% design
Maximum vertical acceleration	+/- 0.8g	110% design
Average vertical acceleration	+/- 0.5g	110% design
Lateral Ride Index	3.5	100% design
Vertical Ride Index	3.5	100% design

4.2 Sustained hunting is not permitted and is defined as greater than 0.5Hz sinusoidal lateral oscillations of the vehicle, resulting in lateral vehicle body accelerations measured at the leading rail wheel lateral axis centre of greater than 0.35g sustained for 10 seconds or longer.

4.3 Ride index shall be calculated in accordance with the algorithm specified in the ROA Manual of Engineering Standards and Practices.

[5] Vehicle Test Configuration

5.1 The vehicle under test shall be tested in the minimum tare condition. If the vehicle has a substantial imbalance when in the loaded condition, a test may be required in the loaded condition.

5.2 The air pressure in all tyres of the vehicle under test shall be inflated to the manufacturer's specification.

[6] Test Track Configuration

6.1 Ride performance testing shall be tested on track as specified in the ROA Manual of Engineering Standards and Practices or as mutually agreed between the owner/operator and the Australian Rail Track Corporation.

[7] Test Procedure

7.1 The vehicle under test shall be instrumented as specified in section 3.

7.2 The vehicle under test shall be operated up to 110% of the maximum desired operating speed, progressively, starting at the lower speed.

7.3 Once it has been established that it is safe to do so, the vehicle speed shall be maintained constant at 100% and 110% of the maximum desired operating speed for a minimum period of 60 seconds each.

7.4 All test results shall be displayed in real time to the testing staff, for the duration of testing.

WOS 01.727 - Vehicle Operation

[1] Introduction

1.1 Road/rail vehicles must be operated in accordance with Australian Rail Track Corporation Network Rule *ANWT 316* and procedure *PP-124.1 Track Maintenance Vehicle Registration and Operation*.

WOS 01.730 - Trolleys, Trailers, Quadricycles and Trikes

[1] General

1.1 Trolleys, trailers, quadricycles and trikes are any type of track maintenance vehicle which operates solely on the track but can be readily removed from the track.

1.2 Quads and trikes are prohibited from operation on the ARTC network.

1.3 Trolleys and trailers must be operated in accordance with Australian Rail Track Corporation Network Rule *ANWT 316* and procedure *PP-124.1 Track Maintenance Vehicle Registration and Operation*.

WOS 01.731 - Flat Top Trolleys

[1] General

1.1 A trolley is a small non-powered track vehicle used for conveying tools and equipment along the track.

1.2 A trolley can be readily removed from the track.

1.3 A trolley shall not be towed or pushed by other track vehicles.

1.4 A trolley must, at all times, be accompanied by enough employees to control and remove the vehicle from the line as required.

1.5 Trolleys do not require lights to be fitted or displayed during daylight. When operating at night, in heavy fog, or in tunnels, suitable front and rear lights must be displayed.

1.6 Trolleys must travel at walking pace.

1.7 Trolleys must not convey personnel.

WOS 01.732 - Trailers

[1] General

1.1 A trailer is a small non-powered track vehicle used for conveying tools and equipment along the track.

1.2 A trailer may be operated as a trolley or attached to another vehicle using an approved tow bar. The towing vehicle shall be approved to tow a trailer and the allowable mass of the unbraked trailer shall be stencilled on the towing vehicle.

1.3 A trailer can be readily removed from the track.

1.4 A trailer must, at all times, be accompanied by enough employees to control and remove the vehicle from the track as required.

1.5 A trailer does not require lights to be fitted or displayed during daylight. When operating at night, in heavy fog, or in tunnels, suitable front and rear lights must be displayed.

1.6 A trailer not attached to a motorised track vehicle must travel at walking pace.

[2] Braked Trailers

2.1 Braked trailers shall be equipped with a failsafe braking system capable of being operated from the towing vehicle straight air brake.