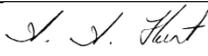


OM94002

Trolley Code

Issue Number	Prepared (P) Reviewed (R) Amended (A)	Approved by	Effective Date
Issue 1	A Hunt (P) W Hudson (R) P Morton (R)		23 October 2008
Issue 2	Network Mechanical TC (R)		14 July 2016

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1. Introduction

1.1 Purpose

This Code:

- Updates, and renames, 'OM94002, Material Trolley Requirements', Issue 1.
- Defines the policies, processes and design standards for approving and maintaining trolleys intended for use on the Network.
- Provides guidance for people or organisations planning to purchase, import, manufacture or modify such vehicles.

1.2 Status

This Code is a Mechanical Code Supporting Document. It is to be used in conjunction with the following documents:

- M2000 Mechanical Code

1.3 Change requests

Please send any requested changes to this document to the document controller:
document.controller@kiwirail.co.nz.

1.4 Change history

1.4.1 Updates to issue 2

The document has been renamed from "Material Trolley Requirements" to reflect its wider scope.

Key new material is the requirement for braking systems on all new trolleys, restrictions on unbraked trolleys, the need for documentation for new trolleys and more explicit certification requirements.

1.5 Scope

This Code applies to all trolleys used on the Controlled Network or under KiwiRail's Safety Case from the effective date of the document. For powered trolleys and any other trolley type or trolley features not specifically addressed in this code seek advice from KiwiRail.

Trolleys accepted for use on the network before the effective date of this document must continue to comply with the Codes under which they were approved for use unless they are modified or repaired to an extent which, in KiwiRail's opinion, warrants upgrade to this standard.

Specific trolley types are also covered by

- M9458 "Wooden Material Trolleys"
- M9459 "Fold Up Material Trolleys".

Manual OM94001 (Hi-Rail Vehicle Code) is the reference document for technical specifications such as: axle load calculations, insulation, braking etc. and should be referred to in the first instance when further information is required.

1.6 How to use this document

Wherever possible, KiwiRail will recommend best practice approval process guidance.

Tips and hints

Helpful recommendations and other useful information, including key points to note, is included throughout the Code in boxes like this.

1.7 Responsibilities

The rail corridor is different from an ordinary construction site, and activities on rail are also covered by the Railways Act 2005 (the Act). The Act requires all rail operators to hold a licence. A rail operator is a person who provides or operates a rail vehicle. A rail vehicle is any vehicle that runs on a railway line. A trolley is classed as a rail vehicle. To obtain a licence, a rail operator must have a 'safety case' approved by the NZ Transport Agency (NZTA). The safety case describes the rail operator's activities and how the operator will keep things safe. This code is a part of KiwiRail's safety case.

Most contractors working for KiwiRail operate under KiwiRail's licence, so must comply with KiwiRail's safety case. KiwiRail is also the Access Provider under the Act. That is why KiwiRail has a particular interest to manage trolleys to ensure safety and ensure it complies with its licence.

However, a trolley owner or operator remains entirely responsible for providing, maintaining and operating the vehicle to the requirements of this code, its certification conditions, maintenance and operating requirements.

Further information on safety cases and licensing requirements may be found on the NZTA website: <http://www.nzta.govt.nz/commercial/rail/licensing.html#holders>

2. Definitions

Term	Definition
Certifying Engineer	Chartered Professional Engineer NZ (CPEng) acceptable to KiwiRail who is independent of vehicle owner and the vehicle supplier/builder/manufacturer, or, other engineer acceptable to KiwiRail (Ref: ipenz.org.nz).
Fail-safe	If a component fails the system or vehicle fails in a safe condition eg, brakes applied rather than brakes released.
HRV	A vehicle fitted with retractable rail wheels so that it can be driven along the track and can be driven onto or off the track at level crossings or other suitable places, and operated on or off track.
Loco 155B	Rail Certificate of Fitness (sticker displayed in vehicle cab) issued by KiwiRail; referred to as Loco 155B RCoF sticker.
Loco 160A	Inspection Checksheet. Applies to all equipment initially, then at 6 monthly intervals as periodic inspection.
Network	For the purpose of this Code, Network represents both NRSS/1 definitions: 1) Controlled Network: all track where occupancy and movement by rail vehicles is under the control of KiwiRail.2) National Rail System: the rail network comprising the Controlled Network and Operator Controlled Territory. It includes all track owned or managed by KiwiRail (including private sidings) and all retained track, unless specifically defined as unavailable for rail activity.
NRSS	National Rail System Standard. These are available from KiwiRail or can be downloaded from the KiwiRail website www.KiwiRail.co.nz (http://www.kiwirail.co.nz).
NZTA	New Zealand Transport Agency.
OEM	Original equipment manufacturer of a vehicle or component recognised by KiwiRail.
Operator	For the purposes of this Code, Operator is the management and/or crew responsible for using the trolley. This is intended as the higher level responsibility. For reference, NRSS/1 defines the Operator as any person (directly) granted Access Rights by the Access Provider etc.
Push trolley	A trolley moved by person-power while on rail.
Trolley	A small maintenance vehicle for use only on rail and either towed by a HRV, moved by hand, or self-powered.
Type Approval Acceptance	KiwiRail correspondence accepting the Certifying Engineer's Type Approval Certificate and granting Network Access rights.
Type Approval Certificate	Design compliance certificate issued by the Certifying Engineer. This may cover other vehicles of the same design as specified by the Certifying Engineer.

3. Policy

3.1 Documentation

From the date of Issue 2 of this Code, manuals covering operating instructions, servicing, maintenance, training and competency must be provided for trolleys new to the network.

The operator's manual must highlight key safety information and include maintenance and operating instructions. Any certificates must be included as an appendix.

Manuals need not be carried in the field must be available by hard copy or softcopy on portable devices.

4. Requirements

4.1 Wheel Profiles

Tread profiles must be to drawing 7604. This drawing is included in Appendix A of National Rail System Standard/6. Recommended tread profiles are: E1 on drawing 7604/15 for pressed steel wheels and B2 on drawing 7604/12 for cast wheels. Gauge 50107551 will be used to check the E1 profile (see OM94001, Appendix C).

4.2 Rated Load

In operation the gross weight of the trolley and its load shall not exceed the maximum towing capacity of the towing vehicle.

4.3 Maximum Axle Load

The maximum axle load in kg, must be less than $20D$, where D is the wheel diameter in mm.

4.4 Insulation

All trolleys must be insulated for track circuits. That is there must not be a short-circuit between the rails through any part of the vehicle.

If the trolley is to be connected to another rail vehicle care must be taken to ensure that vehicles isolated on opposite sides do not provide an earth path when coupled. Approved spark gap devices may be fitted to both sides of a fully insulated trolley to guard against this (see "Earth Path").

4.5 Earth Path

Any trolley taller than 2.5 m above rail level or fitted with any equipment capable of extending above 2.5 m or to be loaded higher than 2.5 m must be provided with an "earth path" to one rail for working in electrified areas. Alternatively approved spark gap devices fitted to both sides of the trolley will be acceptable.

4.6 Brakes

WARNING

Runaway is one of the greatest hazards arising from the use of trolleys and other rail maintenance equipment. It can result in serious injury or death and the risk must be carefully managed.

4.6.1 Phasing in of brake requirements

A requirement for all trolleys to be fitted with a fail-safe brake system is being phased in. Interim restrictions will be imposed on the use of unbraked trolleys on grades.

The following dates apply:

From 1 July 2016 the following trolleys must be fitted with a fail-safe brake system:

- Trolleys new to the network from that date.
- All trolleys rated for a gross load of 1500kg or more [no change].

From 1 September 2016 existing trolleys without a fail-safe brake system must be either:

- (Preferably) fitted with a fail-safe brake system, or
- Restricted to operation on gradients of less than 1 in 90, or
- On gradients steeper than 1 in 90 be operated only with a site safety plan that specifically sets out how the trolley(s) will be operated safely.

From 1 July 2017 all trolleys must be fitted with a fail-safe brake system or operated only with job-by-job site safety plans that specifically set out how the trolley(s) will be operated safely.

From 1 July 2018 all trolleys must be fitted with a fail-safe brake system.

4.6.2 General requirements

Brakes must operate in such a way as to prevent runaway of the trolley during all stages of on-tracking and off-tracking.

The brake must hold the fully loaded trolley indefinitely on a grade of at least 1:33 when in the most unfavourable loading condition and vehicle orientation, on greasy rail (rail wheel to rail coefficient of friction 0.12). This can be tested on level track by ensuring that the handbrake will restrain a force equal to: Vehicle weight divided by 30 in either direction. Note: this test includes a 10% allowance for load transfer on a grade.

Brakes must operate on the tread of at least two wheels or on discs on at least one axle. If the trolley has more than two axles then at least 50% of wheels (and axles) must be braked.

The brake must remain effective with wear in the interval between maintenance inspections without need for frequent adjustment.

4.6.3 Towed trolleys

Trolleys that are towed by a vehicle must have a brake that will automatically apply and remain applied when the trolley is not connected. The system must be fail-safe so that the brake will apply automatically and remain applied if the towing connection parts.

Towed trolleys must be capable of braking when travelling using a signal from the towing vehicle e.g. like a truck/trailer airbrake system¹.

All trolleys must stop within the following distances, in any load condition on level, dry track, both alone (as if uncoupled from the towing vehicle) and in combination with the towing vehicle according to the maximum speed displayed on the trolley.

¹ For information, a hi-rail vehicle does not have the braking effort to be able to reliably control an unbraked load of any significant weight. KiwiRail's Kershaw bundling carts were retrofitted with a fail safe air brake system after stopping incidents, including a collision. The brakes are of the road "fail safe" air release type fed from a bolt-on air compressor on the excavator.

- 22 metres from 25 km/h,
- 50 metres from 50 km/h.

Information – hydraulic brake systems

Systems that use hydraulic pressure from a towing vehicle to release the brakes must be approached with caution. Incidents have occurred overseas because disconnecting/reconnecting the hydraulic lines introduced air and/or contamination that made the system unreliable and prone to misuse.

4.6.4 Push trolleys

Push-trolleys must have a fail-safe brake that will apply automatically and remain applied if the person moving it lets go or the trolley is left unattended on the track.

Brake system maintenance must be included in the operating instructions for the equipment. Any critical item that needs checking before use or is prone to abuse or damage must be clearly labelled indicating what is to be checked.

All push trolley brakes must be able to either:

- hold the trolley indefinitely, in any load condition in either direction on dry track, on a grade of 1:20, or
- withstand a pull test in any load condition in either direction on level, dry track using a force equal to the vehicle weight divided by 2.

(For information only these tests approximate stopping within 2m on level track from 5km/h, a typical walking speed.)

4.7 Draw Bars and Pins

Drawbars are to be designed for tensile and compressive longitudinal loads of at least 1.5 times the rated capacity of the trolley based on the yield stress of the material used (assuming that the drawbar is pinned at both ends and movement is not constrained in any direction when in use).

The rated load must be displayed on the drawbar².

Drawbar pins to be designed for a load of 6.0 times their rated capacity based on the yield stress of the material used. For information this is based on a pin in shear at 33% of yield and a load impact factor of 2.0³.

Drawbar pins are to be secured by a visible latch that is self latching so that the pin can not work out. For information an example is a simple pendulum that is swung to one side to withdraw the pin.

All drawbars and their connections at both ends, and trolley attachments, are to be certified by a Certifying Engineer. The Certifying Engineer shall issue a design certificate certifying the design, manufacture and repair (if appropriate). The certificate must be provided to the KiwiRail inspector when the trolley is first presented for use on rail and subsequently if requested.

4.8 Lifting Points

Any trolley not able to be readily lifted by two people must be fitted with a lifting eye or other safe lifting point(s) which can be used to lift the trolley clear of the track by mechanical means.

² For information, this is standard practice for truck drawbars.

³ For information, loosely based on NZS5446:1987 for truck drawbars.

4.9 Marking & Fittings

All trolleys must display the following:

- Name of owner.
- Tare weight in kg. #
- Maximum rated load in kg. #
- Maximum speed in km/h. #
- Identification number assigned by owner (if applicable).
- Any trolley with ladders, handholds or any other facility allowing access to a standing position higher than 1.8 metres above rail level must be fitted with clearly legible labels or lettering with the wording “Danger Live Wires Above” and carrying the electricity hazard symbol.
- A red reflector facing along the track at each corner of each end.
- Drawbar certification and rated load as specified above.

All lettering is to be clearly visible.

Items marked # are to be displayed on both sides or both ends.

5. Maintenance Inspections

Trolleys must be inspected before their first use on rail and thereafter will be subject to six-monthly inspection to code 155. Trolleys must clearly display a current Loco 155B sticker when on rail.

The following items are to be checked during the six-monthly inspection⁴:

- Markings and fittings as above.
- Rail wheels are not cracked, unduly worn and are to code. On pressed wheels check for wear (minimum 3 mm) and alignment using CCE drawing 95397.
- Lift wheels and check wheel bearings. Bearings to be greased or oiled appropriate to type.
- Wheel insulation is free from earth or other soiling.
- Axles are not cracked and are straight (including stub axles).
- Wheel back – back dimensions are between 996 mm and 998 mm.
- There are no cracks and the trolley is generally in sound condition.
- Draw bar and couplings are in good order.
- Decks are sound and bolts are tight.
- All labels and markings are in place and legible, including drawbar ratings.
- Reflectors are fitted and in good order.
- Brakes operational and in good order. An on/off functional test is required. A full brake test may be conducted at the inspector's discretion.
- All other operating and safety devices are serviceable.
- Any other requirements on the current 155 inspection sheet.

The vehicle is to be test run as part of the inspection.

6. New Equipment Approval

Unless KiwiRail agrees otherwise in writing a trolley must be certified before its first use on rail. Certification will always be required if the trolley is not of a typical type or has features or equipment that an inspector can not readily assess. Certification will be by a Chartered Professional Engineer (CPEng) acceptable to KiwiRail who is independent of vehicle owner and the vehicle supplier/builder/manufacturer. In some circumstances a professional engineer who is a member of IPENZ may be acceptable to KiwiRail. The engineer shall issue a design certificate certifying the design, manufacture and repair (if appropriate). A copy of the certificate must be provided to the KiwiRail inspector when the trolley is first presented for use on rail and subsequently if requested.

Persons intending to introduce new equipment to the National Rail System are advised to discuss likely requirements with KiwiRail before commencing construction.

END

⁴ Transferred from M9458, "Wooden Material Trolleys Maintenance Handbook" and M9459, "Fold Up Material Trolleys Maintenance Handbook"