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[NR/L2/RMVP/0200](#) Issue 11

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Compliance date:	03 September 2022

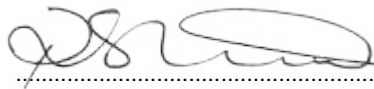
Level 2

NR/L2/RMVP/0200 – Infrastructure Plant Manual

Introduction

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Red requirements – no variations permitted

- Red requirements are to be complied with and achieved at all times.
- Red requirements are presented in a red box.
- Red requirements are monitored for compliance.
- Non-compliances will be investigated and corrective actions enforced.

Amber requirements – variations permitted subject to approved risk analysis and mitigation

- Amber requirements are to be complied with unless an approved variation is in place.
- Amber requirements are presented with an amber sidebar.
- Amber requirements are monitored for compliance.
- Variations can only be approved through the national variations process.
- Non-approved variations will be investigated and corrective actions enforced.

Green guidance – to be used unless alternative solutions are followed

- Guidance should be followed unless an alternative solution produces a better result.
- Guidance is presented with a dotted green sidebar.
- Guidance is not monitored for compliance.
- Alternative solutions should be documented to demonstrate effective control.

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This Network Rail standard/control document is mandatory and shall be complied with by Network Rail Infrastructure Limited and its contractors from 03 September 2022.

Where it is considered not reasonably practicable¹ to comply with the requirements in this standard/control document, permission to comply with a specified alternative should be sought in accordance with the Network Rail standards and controls process, or with the Railway Group Standards Code if applicable.

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NOTE 1: Legislation includes National Technical Specification Notices (NTSNs).

NOTE 2: The relationship of this standard/control document with legislation and/or external standards is described in the purpose of this standard.

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¹ This can include gross proportionate project costs with the agreement of the Network Rail Assurance Panel (NRAP).

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Issue record

Issue	Date	Comments
Issue	Date	Comments
1	June 2011	First issue
2	September 2011	Module P024 re-issued.
3	March 2012	Module P003 Issue 2 replaces Issue 1 (formerly NR/L2/RMVP/0203). Changes include; updated references; table amended in Scope; definitions of competent person, crane controller and lift planner amended; minor text changes. Module P006 Issue 2 replaces Issue 1 (formerly NR/L2/RMVP/0206). Changes include; updated references; table removed from Scope; definitions of competent person, crane controller and lift planner amended; minor text changes. Module P014 new document replacing P014 Issue 1 (formerly NR/L3/RMVP/048/TMM002) and M&EE CoP0014. Module P017 new document replacing P017 Issue 1 and M&EE CoP0017. Module P018 new document replacing P018 Issue 1 and M&EE CoP0018.
4	June 2012	Module P025 new document replacing P025 Issue 1 and M&EE CoP0025. <i>Note. NR/L2/RMVP/0200_P006 Issue 2 was published in Issue 3 of NR/L2/RMVP/0200 under the small scale change process to accommodate the specific changes referenced in the issue record above. It did not incorporate any Letters of Instruction current at that time and therefore NR/BS/LI/228 (Issue 2) remains valid. It is intended that this LOI will be written into future editions of Module P006.</i>
5	March 2013	Manual rewritten and reformatted to new framework and style.
6	May 2014	Module P520 Alert notification system for Network Rail owned Unimog U400 MEWP, new document replacing expired LOI/179.
7	December 2015	New module incorporated into manual, P521 - On-track plant operations scheme.
8	June 2016	New module incorporated into manual, P102 Hand-arm vibration management. Module P501 Issue 2 replaces issue 1. Changes include new section 2.3 portable and transportable plant added; requirements of Letter of Instruction NR/BS/LI/285 incorporated into Section 4 and requirements of Letter of Instruction NR/BS/LI/327 incorporated into Section 6. Module P503 issue 2 replaces issue 1. Changes include reference added to exclusion zones and restricted areas in Section 3; requirement to include lifting accessories as part of load clarified and reference to 'Tandem lift' replaced by 'Multiple lift' to align terminology with BS7121. Module P514 Issue 2 replaces issue 1. Changes include additional requirement added to Sections 2 Safe System of work; 4 Placing a trolley on and off track and 9 Requirements for manually propelled rail handlers. Module P517 Issue 2 replaces issue 1. Changes include note added to Section 9.2a) regarding example lift plan; table 1 amended to clarify pick and carry duties for rail lengths between 20m and 90m for single and tandem lift and lifting multiple lengths of scrap rail with log grabs added.
9	June 2017	All modules have been reviewed and revised with the exception of P520. All details of changes are available within the briefing note P703 has been withdrawn and the content transferred to P301.

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		Two letters of instruction have been incorporated into this revision of the Plant Manual, NR/BS/LI/309 & NR/BS/LI/392. NR/L3/NDS/047/TMC08 – Crane controller checklist has been withdrawn from the Plant Manual and replaced with NR/PLANT/0200_F027 NR/PLANT/0200_F025 – Manually Propelled Rail Handler Lift plan has been updated SMF PL 0253 – Combined OTP Lift Plan/Workplan has been updated to Version 9
10	December 2018	Aligned modules to reduce total number. Re named P102, P511 and P515, updated modules list. Deleted Modules P302, P502, P504, P507, P510, P512, P516, P517, P518, P519, P520, P701 & P702 Creation of a supporting guidance note referenced in the main document Update of reference documents
11	June 2022	Manual updated to incorporate the following requirements: All Modules general update of terminology and correcting standard titles referenced. Module P500: Alignment with updated competence standard NR/L2/CTM/025. Module P501: referenced NR/L2/RMVP/0200/F0462 Module P505: Update information on exclusion zones and referenced task risk control sheets SMF PL 0253 – Combined OTP Lift Plan/Workplan has been updated to Version 10 with updated links to IPM Modules.

Reference documentation

Legislation

SI 1974 No.37	Health and Safety at Work etc Act (HASAWA 1974)
SI 1992 No.2793	Manual Handling Operations Regulations 1992
SI 1997 No.1713	HSE Confined space Regulation 1997
SI 1998 No. 2306	The Provision and Use of Work Equipment Regulations (PUWER 1998)
SI 1998 No. 2307	The lifting Operations and Lifting Equipment Regulations (LOLER 1998)
SI 2002 No.2676	Control of Lead At Work regulation 2002
SI 2002 No. 2677	Control Of Substances Hazardous to Health (COSHH 2002)
SI 2006 No. 599	The Railways and Other Guided Transport Systems regulations 2006 consolidated with amendments 2013
SI 2007 No.735	The Work at Height Regulations 2005 plus amendment regulation 2007
SI 2008 No.1597	Supply of Machinery (Safety) Regulations 2008 plus amendment regulation 2011
SI 2012 No.425	New Roads and Street Works Act 1991

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SI 2012 No.632

Control of Asbestos regulation 2012

SI 2013 No.1471

Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR 2013)

SI 2015 No.51

The Construction (Design and Management) Regulations 2015

Standards

Reference Code
BS 2573-1:1983

Description

Rules for the design of cranes. Specification for classification, stress calculations and design criteria for structures

BS 2573-2:1980

Rules for the design of cranes. Specification for classification, stress calculations and design of mechanisms

BS 8020:2011

Tools for live working. Specification for insulating hand tools for work on or near conductor rail systems operating at voltages up to 1000 V a.c. or 1500 V d.c. Tools for live working - Insulating hand tools for work on or near conductor rail systems operating at voltages up to 1000 Vac. or 1500Vdc.

BS 8460

Safe Use of MEWPS – code of practise

BS EN 280:

Mobile elevating work platforms. Design calculations. Stability criteria. Construction. Safety. Examinations and tests

2013+Amendments

BS EN 818-1

Short link chain for lifting purposes – safety-

BS EN 818-6

Short link chain for lifting purposes -safety- part 6

BS EN 1492-1

Textile Slings Safety 1

BS EN 1492-2

Textile slings safety 2

BS EN 13001-1:2015

Cranes. General design. General principles and requirements

BS EN 13414-1

Steel wire rope slings-safety-

BS EN 13977: 2011

Railway applications. Track. Safety requirements for portable machines and trolleys for construction and maintenance

BS EN 14033-1

Track Rail bound construction and maintenance machines - Technical requirements for running.

BS EN 14033-3:2017

Railbound construction and maintenance machines, General safety requirements

BS EN 15746-2:2010
+Amendments

Road-rail machines and associated equipment. General safety requirements

BS EN 60900:2012

Live working. Hand tools for use up to 1000 V a.c. and 1500 V d.c.

BS EN ISO 5674

Tractors and machinery for agriculture and forestry.

Guards for power take-off (PTO) drive-shafts. Strength and wear tests and acceptance criteria

BS EN ISO 21898

Packaging. Flexible intermediate bulk containers (FIBCs) for non-dangerous goods

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BS ISO 23853

Cranes: Training of slingers and signallers The Lifting Equipment Engineers Association: Code of Practice for the safe use of lifting equipment

GE/RT8000

Rule Book

GE/RT8000/HB2

Instructions for track workers who use emergency protection equipment

GE/RT8000/HB7

General duties of a controller of site safety (COSS)

GE/RT8000/HB8

IWA, COSS or PC blocking a line

GE/RT8000/HB9

IWA or COSS setting up safe systems of work within possessions

GE/RT8000/HB11

Duties of the person in charge of the possession (PICOP)

GE/RT8000/HB15

Duties of the machine controller (MC) and on-track plant operator

GE/RT8000/HB16

AC electrified lines

GE/RT8000/HB17

DC electrified lines

GE/RT8000/HB20

General duties of a safe work leader (SWL) working outside a possession

GE/RT8000/HB21

Safe work leader (SWL) blocking a line

GE/RT8000/OTM

Working of On-Track Machines (OTM)

GE/RT8000/SS2

Shunting

GE/RT8000/TW4

Preparation and working of freight trains

GI/RT7033

Lineside operational safety signs

GM/RT2004

Requirements for Rail Vehicle Maintenance

GM/RT2400

Engineering Design of On-Track Machines in Running Mode

GM/RT2466

Railway Wheelsets

GO/RT345

Train Drivers – Suitability and Medical Fitness

Requirements

NR/GN/RMVP/0200

Infrastructure Plant Manual Guidance

NR/L1/INI/CP1010

Policy on working safely in the vicinity of buried services

NR/L1/OPS/010

Signals Passed at Danger and Signal Reversions

NR/L1/RMVP/0001

Network Rail's Plant and Traction and Rolling Stock (T&RS) Policy

NR/L2/CTM/025

Competence & Training in On Track Plant Operation

NR/L2/CTM/201

Competence Management

NR/L2/CTM/205

Competence and Training for the Maintenance of Traction and Rolling Stock and On-track Machines

NR/L2/CTM/220

Competence and Training in Portable, Transportable and Mobile Plant Operation

NR/L2/CTM/220 Appendix E

Appendix E - PTMP Units of Competence can be found on Network Rail Safety Central.

NR/L2/ELP/27238

Maintenance specification for fixed plant equipment

NR/L2/ELP/27307

Management of M&EE safety related event reports

NR/L2/ERG/003

Management of fatigue: Control of working hours for staff

undertaking safety critical work

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NR/L2/INF/02237	Electronic Signatures
NR/L2/INI/CP0070	Principal Contractor Licensing Scheme
NR/L2/INV/002	Accident and Incident Reporting and Investigation
NR/L2/OHS/00102/F01	Work activity risk assessment form
NR/L2/OHS/00113	Health surveillance and management of diagnoses for Hand-arm Vibration Syndrome
NR/L2/OHS/00123	Health Screening and Health Surveillance for Noise Induced Hearing Loss
NR/L2/OHS/00124	Competence Specific Medical Fitness Requirements
NR/L2/OHS/003	Fatigue Risk Management
NR/L2/OHS/019	Safety of people at work on or near the line
NR/L2/OHS/022	Working Safely at Height
NR/L2/OHS/032	Training, Competence and Assessment In Accident And Incident Investigation
NR/L2/OHS/157	Health surveillance for silica and asbestos and the management of diagnosed occupational respiratory conditions
NR/L2/OTK/5201	Lineside Vegetation Management Manual
NR/L2/RMVP/0090	Management of Maintenance for Traction and Rolling Stock, On-Track Machines and On-Track Plant
NR/L2/RMVP/0172	Management of the control and calibration of inspection, measuring and test equipment
NR/L2/RMVP/0200/F027	Machine/Crane Controller Checklist
NR/L2/RMVP/0200/P101	Monitoring plant activities
NR/L2/RMVP/0200/P300	Plant Approval and Design
NR/L2/RMVP/0200/P301	Road Rail Access Points (RRAP)
NR/L2/RMVP/0200/P500	Competence and fitness
NR/L2/RMVP/0200/P501	Systems of work
NR/L2/RMVP/0200/P503	Planning for lifting operations
NR/L2/RMVP/0200/P505	Safe working with plant
NR/L2/RMVP/0200/P508	Mobile elevating work platforms
NR/L2/RMVP/0200/P521	On-track plant operations scheme
NR/L2/RMVP/0200/P700	Plant Maintenance
NR/L2/RMVP/1332	Wheelset and Axle Bearing Manual
NR/L2/RSE/100	Network Rail Acceptance Panel processes
NR/L2/RSE/100/05	Product acceptance and change to Network Rail operational infrastructure
NR/L2/RSE/100/06	How to decide what needs product acceptance via NR/L2/RSE/100/05
NR/L2/RVE/0003	Assurance, Performance and Monitoring of Rail Vehicles and On-Track Plant
NR/L2/RVE/01327	Depot Facilities
NR/L2/SCO/203	Loading and Securing of infrastructure traffic
NR/L2/TRK/2102	Design and Construction of Track
NR/L2/TRK/2049	Track Design Handbook
NR/L2/XNG/101	Temporary Vehicular Level Crossings and Temporary Increased Use Of Existing Level Crossings

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NR/L3/ELP/29987 AND
 NR/L3/ELP/3091
 NR/L3/INF/02226
 NR/L3/INV/3001
 NR/L3/MTC/RCS0216
 NR/L3/MTC/RCS0216/GA08
 NR/L3/MTC/RCS0216/MP01
 NR/L3/MTC/RCS0216/SP21

NR/L3/NDS/308
 NR/L3/OPS/255

NR/L3/RMVP/0201
 NR/L3/SCO/308
 NR/PLANT/0200_F015

NR/PLANT/0200_F016
 NR/PLANT/0200_F017
 NR/PLANT/0200_F018
 NR/PLANT/0200_F022
 NR/PLANT/0200_F023
 NR/PLANT/0200_F026
 NR/SP/OHS/00114

ORR Railway Safety
 Publication 1
 RIS-1530-PLT

RIS-1701-PLT

RIS-1702-PLT

RIS-1710-PLT

RIS 2453-RST

RIS-2700-RST

RIS-2766-RST
 RIS-3119-TOM
 RIS-3350-TOM
 RIS-8250-RST

Guidance

COP 0019
 COP0027
 COP 0029

Working on or about 25 kV AC electrified lines

Corporate Records Retention Schedule
 Reporting and Investigation Manual
 Risk Control Manual
 Ground penetration and excavations
 Task Risk Control sheet - Use and control of OTP
 Use of Brush Cutter / Strimmer / Hedge Trimmer /
 Mechanised Pole Saw
 The loading manual for infrastructure traffic
 Mitigation of Point Run Throughs Within Engineering
 Worksites – Points Stop Equipment (PSE) Process
 Calibration work instruction manual
 Loading Manual for Infrastructure Traffic
 Maintenance parking brake test record – trailer or
 attachment
 On-track plant reference brake test report
 On-track plant routine maintenance brake test report
 On-track plant routine maintenance brake test report
 Safety related plant defect reporting form
 Checks following fitment of module or attachment
 Manually Propelled Rail Handler Lift Plan
 Specialist Risk Assessment - Hand Arm Vibration
 (HAV)
 Developing and Maintaining Staff Competence

Rail Industry Standard for Engineering Acceptance of
 On-Track Plant and Associated Equipment
 Rail industry standard for portable and transportable
 plant used for infrastructure work
 Rail Industry Standard for the Design of On-track
 Machines in Working and Travelling Modes
 Engineering Certification of Railborne Plant and the
 Assessment of Non-Railborne Plant
 Registration, Identification and Data to be Displayed on
 Rail Vehicles
 Rail Industry Standard for Verification of Conformity of
 Engineering Change to Rail Vehicles
 Railway Industry standard for wheelsets
 Accident & Investigation
 Communication of Urgent Operating Advice
 Reporting High Risk Defects

Accident and incident involving OTP
 M&EE Code of Practice for OTP Recovery
 Code of Practice for the Independence and
 Competence of LOLER Thorough Examiners

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COP 0032	Code of Practice for Any Line Open (ALO) Working
CPA 1001	Safe use of quick hitches on excavators
CPA 1002	Construction plant-hire association – Best practice guidance for MEWPs avoiding trapping/crushing injuries to people in the platform
HSE Executive Guidance Note GS6	Avoiding danger from overhead power lines
HSE CIS58	The selection and management of mobile elevating work platforms
HSE construction information sheet No 58 and No.6	The selection and management of mobile elevating work platforms
HSE HSG47	Avoiding danger from underground services
HSE OC234/16	Guidance on the safe use of magnetic lifting devices

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1 Purpose

This manual details requirements and guidance when using plant for the installation, renewal and maintenance of Network Rail's managed infrastructure.

Application of this manual will support a safe working environment, compliance with statutory legislation and Network Rail's Health and Safety Management System.

2 Scope

This manual applies to all Network Rail functions and its contractors when using plant described as:

- a) on-track machines;
- b) on-track plant;
- c) portable and transportable plant;
- d) mobile plant and road vehicles.

For infrastructure related activities, including but not limited to the installation, renewal, maintenance, inspection and measurement of the infrastructure and its components.

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3 Definitions

Access Point

Area from Network Rail's boundary, including the route from the public highway, up to and including the on/off tracking point.

Accessory for Lifting

Work equipment for attaching loads to machinery for lifting, e.g. Lifting beams, chains etc. Previously known as loose lifting tackle.

Accident

An unwanted or unintended sudden event or a specific chain of such events which has harmful consequences.

Adaptor Plate

The arrangement fitted to an attachment that enables it to be used with a quick hitch.

Adjacent Line

Any railway line that could be fouled by a machine or load during planned operations.

ALARP

As low as reasonably Practicable

Anchor Point

Element (device or facility) secured to or part of a work platform to which a work restraint or fall arrest system can be attached.

Any Line Open (ALO)

A railway line that is open to train movements.

Attachment

Any equipment mechanically fixed to and / or powered or controlled from the host vehicle; this could be an accessory for lifting or digging.

NOTE: Mechanically fixed should be taken to indicate that the attaching point is semi-permanent (very often a quick hitch type device). Equipment which requires skilled fitting staff to assemble or remove should not normally be thought of as an attachment – such equipment is a part of the original vehicle, and its addition is a modification to the vehicle.

Auxiliary Load Lifting Point

A specific term used in relation to road-rail lifting equipment and means a load lifting point that by design will limit the load lifted such that the stability and structural integrity of the machine to which it is fitted is not compromised. This type of lifting point is not a calibrated load lifting point.

Base Vehicle

The vehicle identified on the Certificate of Engineering Acceptance capable of

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utilising a specified module or attachment.

Calibrated Load Lifting Point

In this manual, this is a specific term used in relation to road-rail lifting equipment and means the load lifting point(s) that are used when calibrating the rated capacity indicator.

Competent person (CP)

Person who has been assessed as being qualified and having required practical and theoretical knowledge, experience and skills to carry out a particular role with regard to relevant rules, regulations, instructions or procedures.

Consist

One or more trailers/rail adapted vehicles coupled to on-track plant.

Crane

A machine for raising, shifting and lowering loads by means of a projecting swivelling arm. This includes rail cranes, road rail cranes, road rail excavator cranes, knuckle boom cranes and other similar lifting equipment.

Crane Controller (CC)

The competent person who controls the lifting operation.

Crane Operator

The competent person who physically moves the crane controls.

Cross Tracking

The planned process of transferring on-track plant from one track to another by on and off tracking using proprietary access systems.

Demountable Machine

A vehicle that can travel on the track under its own power system. Such vehicles are not allowed to operate, work or travel outside possessions.

Dunnage

Wood packing used to support loads and materials to prevent damage to cargo or vehicle.

Electrified Lines

Those lines of route that have an electrical contact system for supplying electricity to electric trains.

a.c. Electrified lines are those lines where the traction system voltage is nominally 25kV a.c. supplied by overhead line equipment.

d.c. Electrified lines are those lines where the traction system voltage is nominally 650/750 V d.c. supplied by conductor rail equipment.

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Emergency Services Access Point

Access points used by the emergency services to gain access to Network Rails track in the event of an emergency (e.g. Severn Tunnel).

Engineering Acceptance Certificate (EAC)

Document granted to show that the item of plant complies with Rail Industry Standard RIS-1530-PLT or Railway Group Standard GMRT2400 as appropriate.

NOTE: This was then updated in December 2017 so that plant is required to have an Engineering conformance certificate instead of an EAC.

Engineering conformance certificate (ECC)

Document granted to show that the item of plant complies with Rail Industry Standard RIS-1530-PLT or Railway Group Standard GMRT2400 as appropriate.

Exclusion Zone

An area around a machine including any attachments to the machine, where people must not be present.

Fall Arrest

Personal fall protection system by which a fall is arrested to prevent the collision of the user with the ground or structure.

Foul

Any incursion of a machine or its load, into the maximum combined kinematic envelope of all vehicles that may operate on a line open to traffic.

Fouling Point

The closest edge of any vehicle's (or load being handled) kinematic envelope to the nearest line open to traffic, noting that different vehicles may impact on the gauge.

Hazard

An object or action with the potential to cause harm.

High Risk Defect

A safety-related defect that caused or had the potential to cause:

- a) the death or injury of any person.
- b) an accident to the plant itself or other associated plant.
- c) damage likely to endanger the safety of.
 - i) any person or animal.
 - ii) trains.
 - iii) the infrastructure.
 - iv) the environment.

This includes discovery of a deficiency in authorised documentation or systems that could, if implemented, cause a high-risk defect as defined above.

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Incident

An unplanned, uncontrolled event that under different circumstances may have resulted in an accident (includes, and may also be referred to as, a 'Near miss' or 'Close call').

Infrastructure

The structures, materials, equipment and components that constitute the railway, including but not limited to track, cables, troughing, lineside and under-track equipment, supporting structures, drainage and pipework.

Lift Planner

A Network Rail competency identifier for the person fulfilling the role of Appointed Person (Lifting Operations) on Network Rail managed infrastructure.

Lifting Equipment

Work equipment; including associated anchoring, fixing or supporting equipment; used for lifting and lowering loads,

Lifting Operation

Any activity concerned with lifting or lowering a load.

Load Limiting Device (LLD)

A device to limit the load being moved by a lifting machine.

Load Lifting Point

Point(s) on lifting equipment at which accessories for lifting are attached in order to lift and lower loads. This includes any integral lifting points on a quick hitch and jaws, where they meet the requirements of this manual.

Local Control

For Capital Delivery works, this means Infrastructure Group Control (IGC)
For Infrastructure Maintenance (IM) works, this means Infrastructure Fault Control or Integrated Control Centre.

Machine (or plant)

See definition of On-Track Machine (OTM) or On-Track Plant (OTP).

Machine controller (MC)

The competent person who controls the safe operation of on-track plant.

Machine operator (MO)

The competent person controlling the movement of on-track plant (OTP).

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M&EE Networking Group

A non-profit making group dedicated to the sharing of professional railway engineering and operations information relating to operational and technical safety for plant and to provide a focus to the rail industry for plant engineering and operations.

Mobile Elevated Work Platform (MEWP)

On-track plant (see definition), mobile machine or demountable machine (no definitions) which consists of, as a minimum, a work platform (or basket) with controls, an extending structure and a chassis; that is intended for work at height.

Multiple Lifting

Two or more items of lifting equipment working together to lift a single load.

National Incident Reports (NIR)

A report of an urgent high-risk defect relating to plant made using NIR-Online.

National Incident Reports - online (NIR-Online)

A web-based application used to initiate, disseminate and manage NIR's relating to plant.

On/Off Tracking

The process of placing on-track plant either on or off the track.

On/Off Tracking Point

See definition for road rail access point (RRAP)

On-Track Machine (OTM)

Any rail mounted vehicle capable of running on railway track meeting the requirements of GM/RT2400 Engineering design and construction of on-track machines.

On-Track Plant (OTP)

Any rail mounted vehicle capable of running on railway track meeting the requirements of RIS-1530-PLT Rail industry standard for engineering acceptance of on-track plant and associated equipment.

On-Track Plant Operations Scheme

The on-track plant operations scheme (POS) is for the provision and operation of OnTrack Plant (OTP) on Network Rail managed infrastructure (NRMI) and Network Rail projects.

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Overhead Line Equipment (OLE)

The overhead wires and supporting infrastructure that carry electricity to power electric trains.

Permanent Road Rail Access Point

A road rail access point (RRAP) designed to remain installed on the track at one location for its entire service life.

Person in charge (PIC)

Person who is on site where the work is being undertaken and has the overall accountability of supervising and overseeing works. This person may or may not be involved in the planning.

Pick and carry

The process of lifting and moving rail along the track with suitably rated lifting equipment and accessories designed to prevent the rail slipping through or turning.

Pick and lift

The process of lifting and moving rail with suitably rated lifting equipment and accessories which remain static during the entire operation, designed to prevent the rail slipping through or turning unless a sufficient length of the rail remains in contact with the ground to act as a restraint.

Planner

The person responsible for the production of planning documentation including the most suitable on, off & cross tracking arrangements.

Plant (or Machine)

Portable mechanical devices driven/used on the railway for infrastructure related activities as described in the scope of this document.

Portable and Transportable Plant

Any plant or equipment used for the installation, renewal or maintenance of the infrastructure meeting the requirements of RIS-1701-PLT.

Proprietary

Third party manufactured equipment which has been approved by Network Rail.

Quick Hitch

A latching device that enables attachments including buckets to be connected to a machine and interchanged quickly.

Rail Mounted plant

Any plant that has rail wheels or runners that can run on the track either self-propelled

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or manually propelled. This includes on track machines, On-track plant, trolleys, skates, scooters, etc.

Rail Vehicle

A rail guided vehicle registered on the Rolling Stock Library (RSL). This includes locomotives, coaches, wagons, multiple units, on track machines etc., but excludes on track plant and portable and transportable plant as defined by this document.

Rated Capacity Indicator (RCI)

A safety device which provides visible and/or audible indication that a lifting machine is approaching and/or exceeding its rated capacity.

NOTE: *RCIs were also known as an Automatic Safe Load Indicator (ASLI).*

Risk

Is the combination of the severity of harm that could be caused by a hazard, with the likelihood of it happening.

RISQS

Rail Industry Supplier Qualification Scheme (RISQS)

The scheme that provides a registration, qualification and audit process for suppliers that is shared by the UK rail industry.

Road Mode

Using the working functions of a road-rail vehicle when it is off track and on its road wheels or tracks.

Road Rail Access Point (RRAP)

A designated pre-planned location suitable for on/off and cross tracking On-Track Plant.

Road Rail Excavator Crane

An excavator that has been converted for rail use or an OEM factory built road rail machine that can be used for lifting operations in either road or rail mode.

Road Rail Vehicle (RRV)

A vehicle that can travel on the ground, or on rail by virtue of a rail wheel guidance system, under its own power. Such vehicles are not allowed to operate, work or travel on rail outside possessions.

Safe Stop

Health and Safety Executive (HSE) recommended procedure when stopping a machine i.e. bring the vehicle to a halt with reasonable pressure applied on the break, handbrake on, controls in neutral, engine off and key removed.

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Safe Working Leader

The role of an employee of Network Rail, a principal contractor or a contractor who has gained a railway contractors certificate, who manages safe delivery of work.

Safe Working Load

The maximum load which an item of lifting equipment may raise, lower or suspend under a particular service condition.

Safety-related Defect

In the context of this manual, this means a failure of, or damage to plant or any component or system the plant, which prevents or impairs its intended function and could cause an accident or incident.

Semi-Permanent Road Rail Access Point

A road rail access point that has been constructed and is intended to be removed in its entirety or in part for maintenance purposes.

Serviceable Rail

Rail that has previously been installed in track but has been recovered and remanufactured, i.e. taken to a depot, examined, defects removed, and flash butt welded back together.

NOTE: Recovered rail may be given serviceable rail status, but only after assessment at a material Depot.

Shunting Movement

Any movement of a train or vehicle other than a train passing normally along a running line.

Slinger

The competent person who attaches or removes accessories for lifting and relays the crane controller's commands where instructed to do so.

Stabling

Leaving a vehicle in a safe condition unattended after following the safe stop procedure.

NOTE: A trailer left unattended in a worksite is not stabled but is regarded as a shunting movement and therefore should comply with the appropriate parts of the Rule Book.

Swept Envelope

A cross-sectional profile, taken at right angles to the track, enclosing all dynamic movements, static deflections and overthrows of all points along the surface of the vehicle that can reasonably be expected to occur under the appropriate range of operating conditions as it sweeps past a theoretical track location.

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Tandem Lifting

Replaced by the term 'multiple lift', lifting of a single load with two or more lifting machines working together.

NOTE: Where two excavator cranes are used which are physically connected, controlled by an individual operator and the RCI on either crane will stop the movement of both cranes, then this is not tandem lifting.

Technical File

A collection of documents that demonstrates that machinery or sub systems complies with the provisions of The Supply of Machinery (Safety) Regulations 2008, or The Railways (Interoperability) Regulations 2006 as appropriate.

Temporary Road Rail Access Point

Possession related road rail access points which are removed at the end of the possession.

Thimbling

A process of laterally moving long welded rail using lifting equipment fitted with an appropriate accessory for lifting capability.

Thorough Examination

A thorough examination by a competent person including any testing appropriate to the purpose deemed necessary by the competent person.

Track Jack Type 1 (obstruction less)

Lifting equipment used to raise the rail that will not protrude above rail height or come within 50mm of the running edge when lifting the rail, and can be lowered from full height under load within 10 seconds.

Track Jack Type 2

Lifting equipment used to raise the rail that will cause an obstruction to traffic when placed under the rail but with a quick release mechanism enabling the jack to be lowered from full height and removed from under the track within a maximum of 10 seconds.

Track Jack Type 3

Lifting equipment used to raise the rail that will cause an obstruction to traffic when placed under the rail and cannot be quickly lowered from full height.

Track Jack Type 4

Lifting equipment that has been designed for track slewing.

Trailer

A non-self-propelled, rail mounted vehicle capable of being towed or propelled. This includes attachments with more than two rail wheels.

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Travelling Mode

A vehicle is considered to be in travelling mode when it is on the rail, with its suspension allowing movement along the track and all parts stowed and everything within the applicable gauge.

Trolley

All hand-controlled trolleys and other manually propelled equipment that is mounted on rail wheels or runners to allow it to be moved along the track.

Urgent High-Risk Defect

A high-risk defect that gives rise to the need to undertake an urgent campaign check, component replacement or repair programme, or plant withdrawal. 'Urgent' in this context means an action taken immediately, or, additionally to any planned maintenance or repair.

Walking Pace

3 – 5 mph (4.8km/h – 8.0km/h) on a flat level surface without underfoot issues (water/snow/ice/debris).

Wheel-Scotch

A wedge shape block, normally wood, fitted on the rail between wheel and railhead preformed to suit the diameter of the wheel to which it is fitted. It normally has a handle on one side to facilitate fitment and enables the wheel-scotch to fall from the rail once released.

Working Load Limit (WLL)

The maximum load that an item of lifting equipment is designed to raise, lower or suspend under ideal conditions (by calculation).

Working Mode

A vehicle is in working mode as soon as any part of the vehicle or equipment is unstowed from its travelling mode, or not within the applicable gauge.

Work Platform

A term used specifically in relation to a (MEWP) and means a guarded platform which can be moved under load to a required working position and from which erection, repair, inspection or similar work may be carried out.

NOTE: Also known as a "cage", "bucket", "basket" or "carrier".

Work Restraint

Personal protective system by which a person is prevented from reaching zones where the risk of a fall exists.

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Acronyms and Abbreviations

ALARP	As Low As Reasonably Practicable
ALO	Any Line Open
ASLI	Automatic Safe Load Indicator
CC	Crane Controller
CDM	Construction Design and Management
COSHH	Control Of Substances Hazardous to Health
COSS	Controller of Site Safety
CP	Competent Person
CPA	Construction Plant Association
EAC	Engineering Acceptance Certificate
ECC	Engineering Conformance Certificate
ES	Engineering Supervisor
HASAWA	Health and Safety at Work etc Act 1974
HAVS	Hand Arm Vibration Syndrome
HSE	Health and Safety Executive
IGC	Infrastructure Group Control
IM	Infrastructure Maintenance
IP	Infrastructure Projects
LLD	Load Limiting Device
LOLER	Lifting Operations and Lifting Equipment Regulations 1998
MC	Machine Controller
MEWP	Mobile Elevated Work Platform
MLD	Movement Limiting Device
MO	Machine Operator
NIR	National Incident Reports
NRMI	Network Rail Managed Infrastructure
OEM	Original Equipment Manufacturer
OLE	Overhead Line Equipment
OTM	On-Track Machine
OTP	On-Track Plant
PICOP	Person in Charge of Possessions
PICOS	Person in Charge of siding Possessions
PM	Program Manager
POS	Plant Operations Scheme
RCI	Rated Capacity Indicator
RISQS	Rail Industry Supplier Qualification Scheme
RPSE	Rail Plant Support Engineer
RRAP	Road Rail Access Point
RRV	Road Rail Vehicle
RSL	Rolling Stock Library
SSOW	Safe System Of Work
TME	Track Maintenance Engineer
UDL	Uniform Distributed Load
WLL	Working Load Limit

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4 Index of modules

When a module is added, amended or withdrawn to this standard, the index in Table 1 will be updated and affected documents will be reissued in accordance with described in NR/L2/CSG/STP001.

Module number		Module title
NR/L2/RMVP/0200/	Issue	
P100	4	Reporting and investigation of plant related events
P101	4	Monitoring plant activities
P102	4	Plant occupational health
P300	5	Plant approval and design
P301	4	Road rail access points
P500	4	Competence, Training and Fitness for Plant Operations
P501	5	Systems of work
P503	5	Lifting operations
P505	4	Safe working with plant
P506	4	On-track machines
P508	4	Mobile elevating work platforms (MEWPs)
P509	4	Trailers and wheeled attachments
P511	4	Vegetation management
P513	4	Mobile plant (non-rail mounted) and road vehicles
P514	5	Hand-controlled trolleys
P515	4	Portable and transportable plant
P521	4	On-track plant operations scheme
P700	4	Plant maintenance

Table 1 – Index of modules

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5 Accountable and responsible roles

Table 2 identifies the competence required when working on Network Rail managed infrastructure and equivalent industry terms when involved with lifting operations.

Activity	Competence when working on Network Rail managed infrastructure	Equivalent competence / terminology used in;	
		LOLER	Construction Industry - BS7121
Produces and authorises lift plan	Lift Planner	Competent Person	Appointed Person
Amends and authorises lift plan on site	Lift Planner	Competent Person	Appointed Person
Safe control of lifting operations	Crane Controller	'Appropriately Supervised'	Crane Supervisor
Attaches/removes an accessory for lifting	Crane Controller or Slinger	Load Handler	Slinger/Signaller
Relays crane controller commands	Slinger	No equivalent term specified	Slinger/Signaller
Provides guidance for the movement of vehicles off track when manoeuvring	Banksman <i>Does not include lifting operations</i>	No equivalent term specified	Banksman <i>Does not include lifting operations</i>

Table 2 – Industry terminology associated with lifting operations.

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This standard and its modules is applicable to all personnel associated with build, operation, maintenance, specification and assurance of plant. A summary of which modules apply to which job roles is contained in Table 3. The contents of each module should be taken into account if creating separate job role specific handbooks.

Job Title	Module Number
All personnel involved in the build, operation, maintenance, specification and assurance of plant.	P100
Appointed Person	P503, P513
Area Plant Manager	P100, P101, P102, P301, P500, P501, P503, P505, P506, P508, P509, P511, P513, P514, P515, P521
Banksman	P501, P505, P511, P513
Competence Manager	P500
Competent Person	P500, P501, P505, P511, P513,
Contracts and Procurement	P300
COSS	P102, P501, P505, P506, P508, P509, P511, P513, P514, P515, P521
Crane Controller	P102, P301, P501, P503, P505, P509, P513
Crane Supervisor	P102, P503, P513
Designated Project Engineer	P501
E&P Engineer	P508, P521
Engineering Supervisor	P301, P501, P505, P506, P508, P509, P511, P513, P514, P515, P521
Hand Trolley Controller	P102, P514
Haulier	P501, P505, P513
Network Technical Head of Plant	P100, P101, P102, P300
Network Technical Head of Traction and Rolling Stock	P100, P102, P506
HSEA representative (or equivalent)	P100, P101, P102
Independent person	P101
Infrastructure Maintenance Delivery Manager	P102, P300, P500, P521
IWA	P102, P501, P505
Lift Planner	P501, P503, P505, P509, P521
Linesman (or other non-machine operator/controller personal)	P102, P501, P508
Machine Controller	P102, P301, P501, P505, P508, P509, P511, P513, P521
Machine converter	P100, P102, P300, P508, P509, P511, P515, P700
Machine driver	P102, P501, P503, P505, P513, P521

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Job Title	Module Number
Machine manufacturer	P100, P102, P300, P508, P509, P511, P515, P700
Machine Operator	P102, P501, P503, P505, P508, P509, P511, P513, P521
Machine Operators Manager	P101, P102, P521
Machine/trailer convertors	P100, P102, P300, P509, P700
Maintainer/Fitter	P102, P501, P505, P508, P509, P511, P513, P514, P515, P700
Maintenance Contractor	P100, P102, P700
Off Track Engineer	P102, P301, P505, P511, P515, P521
On Track Plant Specialist	P100, P102, P301, P501, P503, P505, P506, P508, P509, P511, P513, P514, P515, P517, P521
Person in charge (PIC)	P102, P501, P505, P506, P508, P509, P511, P513, P514, P515, P521
PICOP	P501, P505,
PICOS	P501, P502, P505, P507, P508
Planner	P102, P301, P501, P503, P508, P511, P513, P514, P515, P521
Plant Operations scheme provider	P100, P101, P102, P300, P301, P500, P501, P503, P505, P508, P509, P511, P513, P521
Plant operations scheme representative	P100, P102, P301, P501, P503, P505, P508, P509, P511, P513, P521
Plant supplier	P100, P101, P102, P300, P301, P500, P501, P503, P505, P508, P509, P511, P513, P515, P521
Portable, transportable and mobile plant operator	P100, P102, P501, P503, P513
Principal Contractor	P100, P101, P102, P301, P501, P503, P505, P508, P509, P511, P513, P521
Quick Hitch Manufacturers	P100, P102, P300, P503, P700
Rail Plant Support Engineer	P100, P101, P102, P300, P301, P500, P501, P503, P505, P506, P508, P509, P511, P513, P514, P515, P521
Safe work leader (SWL)	P102, P501, P505, P506, P508, P509, P511, P513, P514, P515, P521
Slinger	P102, P501, P503, P509,
SSWOP	P501
Track Maintenance Engineer	P102, P500, P501, P505, P521
Trackman	P301, P515
Trailer manufacturers	P100, P102, P300, P509, P700

Table 3 – Modules that are applicable to job roles.

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6 Risk mitigation

This standard and its modules mitigates a number of high level risks that are present in the build, operation, maintenance, specification and assurance of plant that is used on Network Rail managed infrastructure. The high-level risks that each module mitigates are detailed at the start of each module.

Table 4 identifies the modules that help to mitigate the high-level risks.

High level risk	Module number
Lack of RIDDOR/close call reporting e.g. Incidents not being reported	P100, P521
Lack of continuous improvement e.g. Mitigating factors from incidents not being introduced to the machine or operating procedures	P100, P521
Noncompliance with legislation; e.g. Incorrect lifting operations (LOLER)	P101, P102, P300, P301, P500, P501, P503, P505, P506, P508, P509, P511, P513, P514, P515, P521, P700
MEWPs becoming out of control e.g. MEWP operator being crushed under a structure	P300, P500, P501, P502, P503, P508, P513, P521
Runaway/failure to stop on demand e.g. OTP running away on a gradient	P300, P500, P501, P506, P508, P509, P514, P521, P700
Damage to assets e.g. RRV or its load hitting a passing train during ALO operation	P301, P500, P501, P503, P505, P506, P508, P509, P511, P513, P514, P515, P521, P700,
Collision e.g. Collision between a RRV and an OTM	P500, P501, P503, P505, P506, P508, P509, P513, P515, P521, P700
Staff injuries e.g. Operator being trapped between machine and infrastructure or machine and machine	P102, P301, P501, P503, P505, P506, P508, P509, P511, P513, P514, P515, P521, P700,
Overturning e.g. RRV overturning during lifting operations	P300, P500, P501, P503, P508, P513, P521
Derailment e.g. Trailer being loaded incorrectly	P301, P500, P501, P505, P506, P514, P515, P521, P700

Table 4 – Modules that mitigate high level risks.

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7 Safety critical work

The Railways and Other Guidance Transport Systems (Safety) Regulations (ROGS) requires that any person who carries out safety critical work is assessed as competent and fit to carry out that work (see NR/L2/RMVP/0200/P500).

It also requires that arrangements are made to manage the fatigue and working hours of persons who undertake safety critical work on NRMI or Network Rail projects. To fulfil this duty, apply the requirements of NR/L2/ERG/003 as a minimum to roles responsible for:

- a) the management of staff who undertake safety critical work; and/or
- b) arranging, placing, controlling or monitoring contracts which involve undertaking safety critical work on NRMI or Network Rail projects.

NOTE: For Network Rail infrastructure maintenance staff, refer to NR/L3/MTC/MG0224 and for Network Rail national supply centre staff, refer to NR/L3/NDS/006.

8 Arrangement of the manual

The modules of this manual detail requirements and guidance to support the design, acquisition, operation, maintenance and disposal of plant used in the installation, renewal and maintenance of the railway infrastructure.

The manual has been arranged to group various activities as shown in Table 5 in recognition of

PAS 55 -1 (2008) *Asset Management - Part 1: Specification for the optimised management of physical assets*,

PAS 55 -2 (2008) *Asset Management - Part 2: Guidelines for the application of PAS 55-1*

and Network Rail's Standards Management initiative to deliver documents that are accurate, brief and clear.

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Modules in this manual	Network Rail's standards management elements	PAS 55 elements
Safety Modules These are numbered in the P1xx series and include information on; Responding to incidents Defect reporting Monitoring in use	Safety	
Design Modules These are numbered in the P3xx series and include information on; Design Ergonomics Planning for acquisition Testing Installation Verification & Compliance	Ergonomics	Creation, acquisition and enhancement
	Design	
	Planning	
	Testing	
	Installation	
Operation Modules These are numbered in the P5xx series and include information on; Competence & Training Planning for use Safe use	Operation	Utilisation
Maintenance Modules These are numbered in the P7xx series and include information on; Inspection Maintenance	Maintenance	Maintenance
	Inspection	
See Design Module	Verification & compliance	

Table 5 – Framework of infrastructure plant manual

Standard and control document briefing note

Ref: NR/L2/RMVP/0200		Issue: 11
Title: Infrastructure Plant Manual		
Publication date: 04 June 2022		Compliance Date: 03 September 2022
Standard/Control Document Owner: Network Technical Head of Plant		
Technical lead/contact for briefings: Peter Stone – Principal Engineer		Tel: 07711600924
Purpose: This manual details the requirements and guidance when using plant for the installation, renewal and maintenance of Network Rail's managed infrastructure. Application of this manual will support a safe working environment, compliance with statutory legislation and Network Rail's Health and Safety Management System.		Scope: This Manual applies to all Network Rail functions and its contractors when using plant described as; a) on-track machines; b) on-track plant; c) portable and transportable plant; d) mobile plant and road vehicles. For infrastructure related activities, including but not limited to the installation, renewal, maintenance, inspection and measurement of the infrastructure and its components.

Overview of change:

The review of the document has been undertaken to incorporate lessons learned from recommendations, incidents, accidents and other safety related events involving plant. This demonstrates continual improvement and the application of new processes and procedures to improve plant safety.

Some modules have been reduced by amalgamating similar content into relevant modules. This will improve the ability of the reader to follow the correct processes when planning, operating and maintaining plant.

The historic focus of the modules has been on On-Track Plant, and the review has continued to expand the scope to include all plant that might operate on or near the infrastructure. Standards titles have been reviewed and amended as required. Module P521 – On Track Plant Operations Scheme has not been included in this revision, P521 will be revised separately.

Detail of change:

Module Number & Title	Summary of changes
NR/L2/RMVP/0200	Definitions updated
P100 Reporting and investigating plant related events	General update of terminology and correcting standard titles referenced. Added content relating to preservation of evidence when investigating plant events. Added requirement to include collisions in RIS-3350-TOM reporting.
P101 Monitoring plant activities	General update of terminology and correcting standard titles referenced. Added a revised recommended percentage of shifts to review as part of an assurance plan. Revised content covering continual improvement.
P102 Plant occupational health	General update of terminology and correcting standard titles referenced. Revised section relating to planning considerations. Moved content order around to make the document flow better.
P300 Plant approval and design	General update of terminology and correcting standard titles referenced. Revised content on identification and documentation of plant. Amended section to include Type 0D attachments.
P301 Road rail access points	General update of terminology and correcting standard titles referenced. Removed redundant tables. Revised section to include runaway risk. Added figure numbers to examples in the appendices.
P500 Competence and fitness	General update of terminology and correcting standard titles referenced. Removed redundant tables. Revised module title to include plant operations. Revised module to match requirements of NR/L2/CTM/025.
P501 Systems of work	General update of terminology and correcting standard titles referenced. Removed redundant tables. Revised section to include runaway risk. Added figure numbers to examples in the appendices.
P503 Lifting operations	General update of terminology and correcting standard titles referenced. Revised section to align with BS7121. Included updated information on thimbling and cropping of rail.
P505 Safe working with plant	General update of terminology and correcting standard titles referenced. Revised section regarding on/off tracking. Updated section on transiting in a worksite. Revised sections on movement over points and exclusion zones.
P506 On-track machines	General update of terminology and correcting standard titles referenced. Revised several standard references with new versions. Replaced references to OTP with OTM. Reference made to 'loading gauge'.
P508 Mobile elevating work platforms (MEWP)	General update of terminology and correcting standard titles referenced. Revised reference with more emphasis on fall restraint and not fall arrest. Additional requirement to have a emergency recovery plan.
P509 Trailers and wheeled attachments	General update of terminology and correcting standard titles referenced. Revised section to reference RIS-1710-PLT. Updated section to include checking ECC for personnel carriers.

P511 Vegetation management	General update of terminology and correcting standard titles referenced. Revised wording on brush cutter and shredder requirements. Included Reference to ALO working. Some photographs changed.
P513 Mobile plant (non-rail mounted) and road vehicles	General update of terminology and correcting standard titles referenced. Removed references to RRV and OTM. Amended some requirements to 'red' clauses. Moved content order around to make the document flow better.
P514 Hand-controlled trolleys	General update of terminology and correcting standard titles referenced. Updated section to include consideration of runaway risk. Added requirement to use MPRH with matching model numbers
P515 Portable & transportable plant	General update of terminology and correcting standard titles referenced. Updated reference to the disposal of redundant assets.
P700 Plant maintenance	General update of terminology and correcting standard titles referenced. Added requirements for maintaining MEWP anchor points. Improved section regarding LOLER examinations.

Reasons for change:

Periodic review requested by the Network Technical Head for Plant.
Incorporation of closed recommendations.

Affected documents

<i>Reference</i>	<i>Impact</i>
NR/L2/RMVP/0200 ISSUE 10	Superseded
NR/L2/RMVP/0200/P100 ISSUE 3	Superseded
NR/L2/RMVP/0200/P101 ISSUE 3	Superseded
NR/L2/RMVP/0200/P102 ISSUE 3	Superseded
NR/L2/RMVP/0200/P300 ISSUE 4	Superseded
NR/L2/RMVP/0200/P301 ISSUE 3	Superseded
NR/L2/RMVP/0200/P500 ISSUE 3	Superseded
NR/L2/RMVP/0200/P501 ISSUE 4	Superseded
NR/L2/RMVP/0200/P503 ISSUE 4	Superseded
NR/L2/RMVP/0200/P505 ISSUE 3	Superseded
NR/L2/RMVP/0200/P506 ISSUE 3	Superseded
NR/L2/RMVP/0200/P508 ISSUE 3	Superseded
NR/L2/RMVP/0200/P509 ISSUE 3	Superseded
NR/L2/RMVP/0200/P511 ISSUE 3	Superseded
NR/L2/RMVP/0200/P513 ISSUE 3	Superseded
NR/L2/RMVP/0200/P514 ISSUE 4	Superseded
NR/L2/RMVP/0200/P515 ISSUE 3	Superseded
NR/L2/RMVP/0200/P700 ISSUE 3	Superseded

Briefing requirements:

Will Briefing Management System be used to deliver the briefing to posts listed below? No

Technical briefings are given to those who have specific responsibilities within this standard/control document.

Awareness briefings are given to those who might be affected by the content but have no specific responsibilities within the standard/control document.

Details of the briefing arrangements are included in the associated briefing programme.

All posts identified for briefing must be as described in OrgPlus.

Briefing (A-Awareness/ T-Technical)	Post	Function	Responsible for cascade briefing? Y/N
T	Area Plant Manager	Regions	Y
A	Category Manager (C&P)	Route Services	N
A	Director Engineering and Asset Management	Regions	Y
T	Electrification & Plant Maintenance Engineer	Regions	N
T	Head of Training Services	Route Services	Y
A	HSEA Specialist	Regions	Y
A	Infrastructure Maintenance Delivery Manager	Regions	N
T	Infrastructure Maintenance Engineer	Regions	N

T	Infrastructure Maintenance Workforce HSE Advisor	Regions	Y
T	Infrastructure Maintenance Services Manager	Regions	N
T	National Training Manager	Route Services	Y
T	Network Technical Head of Plant	Technical Authority	N
T	Network Technical Head Traction & Rolling Stock	Technical Authority	N
T	On Track Plant Specialist	Regions	Y
T	Planner	Regions	N
T	Planner	Route Services	N
T	Programme Manager	Regions	Y
T	Programme Manager	Route Services	Y
A	Protection Controller	Regions	N
T	Rail Plant Support Engineer	Regions	Y
T	Track Maintenance Engineer	Regions	Y
Briefing (A-Awareness/ T-Technical)	Role	Function	
T	ALO co-ordinator	Regions	
T	ALO co-ordinator	Route Services	
T	Controller of site safety (COSS)	Regions	
T	Crane controller	Regions	
T	Crane supervisor	Regions	
T	Engineering supervisor	Regions	
T	Lift planner	Regions	
T	Machine controller	Regions	
T	Machine operator	Regions	
T	Machine/Crane Controller Operator Manager	Regions	
T	Person In Charge of Possession (PICOP)	Regions	
T	Person In Charge of Siding Possession (PICOS)	Regions	
A	Person In Charge (PIC)	Regions	
T	Plant operations scheme provider	Regions	
T	Plant operations scheme provider	Route Services	
T	Plant operations scheme representative	Regions	
T	Plant operations scheme representative	Route Services	
T	Portable, transportable & mobile plant operator	Regions	
T	Safe work leader (SWL)	Regions	
T	Safe Work Leader (SWL)	Route Services	
T	Slinger	Regions	

Ref:	NR/L2/RMVP/0200/P100
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Level 2

Module P100

Reporting and investigation of plant related events

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- Alternative solutions should be documented to demonstrate effective control.

Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out. Content added regarding retention of data in clause 3 <i>Clause 5 Management of signals passed at danger</i> added.
3	December 2018	Additional examples of safety critical systems added to Appendix A. Updated reference documents and terminology. Added reference to SME's. Added section relating to preservation of evidence and guidance on categorising derailments.
4	June 2022	Scheduled periodic review and update carried out.

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) lack of RIDDOR or close call reporting; and
- b) lack of continuous improvement e.g. mitigating factors from incidents not being introduced to machine/operating procedures.

2 Scope

This module defines the:

- a) type of defects occurring in rail mounted plant
- b) process for reporting; and
- c) actions to be taken following any occurrence that results in an accident, incident or Safety Related event when using plant.

This document applies to all organisations involved with:

- a) manufacturing or supply of rail mounted plant;
- b) carrying out or controlling rail mounted plant operations; or
- c) maintaining rail mounted plant used on Network Rail managed infrastructure and Network Rail projects.

3 Accidents and incidents

The reporting and investigation of any occurrence that results in an accident or incident when using rail mounted plant shall be carried out in accordance with: NR/L2/INV/002.

Contact the local Route Control to notify them of operational events affecting the safety of the line.

Report all close calls by:

- a) using the Network Rail Close Calls number 01908 723 500, if working on railway infrastructure, or in a Network Rail building; or
- b) via the Principal Contractor's Close Call system, if working on railway infrastructure managed by a Principal Contractor.

NOTE: Further information on close calls can be found on Network Rail's Safety Central website. The Reporting and Investigation Manual NR/L3/INV/3001 specifies requirements and guidance for the reporting and investigation of accidents and incidents. It applies to all safety and environmental investigations that are led by Network Rail.

4 Preservation of evidence

The following evidence shall be collected (as applicable) for undertaking an investigation, such as:

- a) Damaged components - locate and mark (where possible). If safe to do so, capture photographic evidence then collect and store components appropriately.
- b) Take measurements of the infrastructure such as Gradient/ Cant and Gauge.
- c) Measure and record the position of the failed plant to a known fixed datum if possible. Also measure record any marks on the track that were made as part of the failure.
- d) Attempt to preserve the machine in an 'as found' condition where possible. Transport, recovery and store in quarantine prior to any testing takes place.
- e) Site photographs – gather photographs of site, a wide view to give context, close up view of components (may require 'scaling' using a known size object such as a coin), photograph of key asset details such as ID numbers.
- f) CCTV footage – contact CCTV owners to request access to footage, download and store appropriately in accordance with any organisational standards relating to data storage and data protection act.
- g) Documentation, log books, defect logs, maintenance records – review log books and defect logs for entries that may be related to incident or accident
- h) Samples, materials, oils etc – if safe to do so, gather samples and store appropriately.
- i) Vehicle data logger data shall be secured to prevent overwriting or deletion until downloaded.

5 Investigations

Network Rail documents NR/L3/INV/3001 and NR/L2/INV/002 will provide further details for the structured process for investigation accidents and incidents.

6 Safety related events

These are events that either cause harm or have the potential to cause harm to employees, including the staff of TOCs and FOCs, contractors, passengers, members of the public or to the environment.

The reporting and management of such events shall be carried out in accordance with NR/L2/ELP/27307.

7 Defects occurring in plant

7.1 Classification of defects

The classifications of defects occurring in plant as defined by this and other modules are in accordance with RIS-8250-RST and Table 1.

Defect Type	Defect definition
Safety-related defect	A failure of, or damage to, plant or any component or system of the plant which prevents or impairs its intended function, and could cause an accident or incident.
High risk defect	<p>A safety-related defect that caused or had the potential to cause:</p> <ul style="list-style-type: none"> a) the death or injury of any person; b) an accident to the plant itself or other associated plant; c) damage likely to endanger the safety of: <ul style="list-style-type: none"> i) any person or animal; ii) trains; iii) the infrastructure; iv) the environment <p>This includes discovery of a deficiency in authorised documentation or systems that could if implemented, cause a high-risk defect as defined above.</p>
Urgent high-risk defect	<p>A high-risk defect that gives rise to the need to undertake an urgent campaign check, component replacement or repair programme, or plant withdrawal.</p> <p>Urgent in this context means an action taken immediately, or, additionally to any planned maintenance or repair.</p>

Table 1 Classification of plant defects

7.2 Assessment of safety related defects

All defects involving safety critical systems on plant shall be assessed to determine;

- a) whether the defect is high risk; and
- b) whether other parties in the rail industry need to be advised of the defect via NIR-Online.

7.3 Reporting safety related defects

Safety related plant defects shall be reported using NIR-Online and in accordance with RIS-8250-RST.

Other safety related plant defects, including high risk defects that do not require urgent advice transmittal via NIR-Online, shall be reported to Network Technical Head of Plant using:

- a) form NR/PLANT/0200_F022; or
- b) an equivalent if agreed in advance by Network Technical Head of Plant

7.4 Actions following reports of safety related defects

Safety related plant defects shall be actioned in accordance with RIS-8250-RST.

Network Technical Head of Plant, or nominated deputy shall respond to all safety related plant defects reported using Form NR/PLANT/0200_F022, as follows:

- a) acknowledge receipt of notification;
- b) review for applicability to plant suppliers supplying the railway;
- c) identify and inform affected plant owners of the defect and the actions required of them; and
- d) agree and progress actions to close out the defect report with relevant parties.

Plant owners shall carry out the agreed actions to close out the defect and inform the Network Technical Head of Plant or nominated deputy when their actions are complete.

The Network Technical Head of Plant or nominated deputy shall advise all affected parties when the actions to close out the defect have been completed.

7.5 Action to be taken on site in the event of safety related defects

All defects shall be recorded in the machine log book.

7.6 M&EE Networking Group review of safety related plant defects

All safety related plant defects should be reviewed at each M&EE Networking Group meeting to determine what action is required.

The group should agree a common course of action where possible.

7.7 Reporting safety related operational incidents

Safety related plant operational incidents shall be reported using NIR-Online and in accordance with RIS-3350-TOM.

NOTE 1: *The use of the process detailed in RIS-3350-TOM will facilitate the communication of operating incidents or irregularities that might lead to a serious incident to the rail industry.*

NOTE 2: *All collisions should be reported in accordance with RIS 3350-TOM.*

8 Derailments

All derailments that occur within a possession for OTM, OTP (Including RRVs, Demountable Machines, its trailers or attachments fitted with rail wheels) shall be reported and investigated appropriately.

Guidance on potential categories of derailment are shown in Table 2

The organisation shall have processes in place to report and investigate all instances of derailments.

NOTE: It would be beneficial for the results of investigations to be shared among industry partners to promote best practice from lessons learned.

Derailment Category	Description
Minor	A derailment resulting in no damage to infrastructure or plant. Plant is inspected and recovered by its own power then returned to operational status.
Moderate	A derailment resulting in some moderate damage to infrastructure or plant. Safety of the line is not affected and no injury to personnel. Infrastructure components and/or plant may require repair and inspection prior to return to operational status.
Severe	A derailment resulting in catastrophic damage to infrastructure which affects the safety of the line, damage to plant that renders it un serviceable or a requirement for recovery by external process (such as locomotive hauling or crane)
Derailment: Is the unplanned and unwanted action in a possession of the rail wheels leaving the rail on an item of OTM, OTP (Including RRVs, Demountable Machines and its trailers or attachments fitted with rail wheels).	

Table 2 - Derailment categorisation

9 Signals passed at danger

Report and investigate all instances of signals passed at danger (SPAD) without authority involving OTM or OTP working on Network Rail managed infrastructure or Network Rail projects.

If the cause of the SPAD is disputed, or there is insufficient information available to categorise the SPAD, it shall initially be treated as a Category A SPAD.

Any person appointed to investigate a SPAD shall be competent to do so in accordance NR/L2/OHS/032

The definitions, categorisation and investigation processes of SPADs, are detailed in NR/L1/OPS/010 Signals passed at danger and signal reversions.

Ref:	NR/L2/RMVP/0200/P101
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Level 2

Module P101

Monitoring plant activities

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Ref:	NR/L2/RMVP/0200/P101
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

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Ref:	NR/L2/RMVP/0200/P101
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out. Clause 3.1 <i>General principle</i> added to align requirements with NR/L1/RMVP/0001. Clause 3.2 <i>Monitoring plant assets</i> added. Clause 4 <i>Assurance</i> added. <i>Process</i> sections rationalised and moved into monitoring sections to remove duplication Removed references to Train Operations Manual
3	December 2018	Confirmed reference document titles correct. Addition of learning process from assurance events, continual improvement
4	June 2022	Scheduled periodic review and update carried out

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

Ref:	NR/L2/RMVP/0200/P101
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Ref:	NR/L2/RMVP/0200/P101
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) incorrect lifting operations (LOLER);
- b) lack of RIDDOR or close call reporting; and
- c) lack of continuous improvement e.g. mitigating factors from incidents not being introduced to machine/operating procedures.

2 Scope

This module defines the requirements for:

- a) monitoring the performance (safety, reliability and availability) of plant assets;
- b) monitoring of personnel directly involved in the supervision or operation of plant assets, for example, machine operator, crane controller;
- c) monitoring plant operations; and
- d) assurance and audit processes for plant.

This module applies to any organisations involved with any of the following:

- a) procurement or supply of plant;
- b) management and supervision of plant operations;
- c) carrying out plant operations; and
- d) maintenance of plant used on Network Rail managed infrastructure and Network Rail projects.

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3 Monitoring of plant assets

NOTE 1: *Plant assets include on-track machines, on-track plant, portable and transportable plant or other mobile machines including road vehicles operated on or near the railway and used for infrastructure related activities as described in the scope of this document.*

The performance measures when monitoring plant assets shall be categorised as follows:

- a) safety performance - for example, incidents, wrong side failures, adverse trends and limits and monitoring risks;
- b) reliability performance - for example, mean time between failure (MTBF), train delay, miles per casualty;
- c) business performance - for example, asset availability, condition, capability, utilisation, cost per unit of production, opportunities for value engineering.

NOTE 2: *This includes environmental incidents and asset condition.*

4 Monitoring of personnel

Arrangements shall be put in place to monitor personnel involved in the control or operation of plant assets (for example, machine operator, crane controller) if, due to their safety record, experience or personal circumstances:

- a) there is concern for the safety of the person; or
- b) there is a potential risk to Network Rail managed infrastructure or other staff.

Give particular consideration to the:

- a) level of experience of the machine operator;
- b) complexity of the operation being carried out;
- c) previous history of incidents or accidents;
- d) ability to achieve and maintain the required standard of competence;
- e) attendance for duty e.g. sickness records, other employment etc;
- f) attitude when working particular shifts e.g. have there been regular changes of duty to avoid certain shifts;
- g) personal circumstances.

The Sentinel primary sponsor shall implement a corrective action plan to control any risks and concerns identified.

NOTE: *See NR/L2/RMVP/0200/P521 for further information on monitoring personnel for on-track plant operations scheme (POS) providers.*

5 Monitoring plant operations

Arrangements shall be in place to monitor work activities when using plant.

NOTE 1: *See NR/L2/RMVP/0200/P521 for further information on monitoring plant operations for on-track plant operations scheme (POS) providers.*

Monitoring shall be:

- a) undertaken by a person deemed by the organisation as competent in plant operations and independent of those carrying out the work; and
- b) carried out at a frequency defined by the organisation, proportionate to the level of risk and volume of shifts completed.

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NOTE 2: *An organisation needs to demonstrate they have in place a robust competence framework, competence to undertake monitoring of plant operations should form part of that.*

Between 2% and 5% sample of all shifts shall be monitored..

Monitoring shall include a review of compliance with and practical application of:

- a) Rule Book modules and handbooks;
- b) the organisation's safety management system;
- c) NR/L2/RMVP/0200 and its modules; and
- d) any other applicable Network Rail requirements.

Monitoring activities shall be recorded in accordance with the organisation's Safety Management System.

NOTE 3: *An example of which could be NR/PLANT/0200_F021*

Details of all non-compliances shall be recorded. Any non-compliance identified during the monitoring activity that has a potential safety risk shall be addressed immediately by applying appropriate control measures.

A process shall be in place for investigating to conclusion all non-compliances or incidents reported.

Records of monitoring activities shall be retained for a minimum period as detailed in the organisations safety management system (further information can be found in NR/L3/INF/02226).

6 Assurance

Results of audits, self-assurance and verification activities shall be used to provide assurance reporting within the organisation to demonstrate compliance with requirements and identify opportunities for improvement.

Assurance plans shall be defined by the accountable person within the relevant organisation, for example, Head of Plant/Professional Head and reviewed annually.

NOTE: *Within Network Rail the assurance and audit processes are carried out in accordance with NR/L1/RMVP/0001.*

7 Continuous improvement

An Organisation shall determine, collect and analyse appropriate data to evaluate where continuous improvement can be implemented to enable the Organisation to meet its objectives.

The data can be obtained from many sources and may include:

- a) Feedback from staff
- b) Feedback from customers and suppliers
- c) Management aspiration
- d) Organisation development programmes
- e) Process performance and product conformity
- f) Investigations
- g) Industry initiatives.
- h) Operational/Maintenance feedback and work arising

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- i) Assurance findings – including internal audit, management checks, customer audits and regulatory audits, pre-qual audits.
- j) Safety Central i.e. safety bulletins, safety alerts, etc.
- k) NIRs
- l) Rail notices
- m) Revised standards and revised/new legislation.

The process does not necessarily require complicated systems to enable data management, see process given at figures 1 and 2.

NOTE: As an example, for operations, a weekly review of the control log/site feedback logs by key Managers may be sufficient to gain the understanding and allocate corrective and preventative actions leading to continual improvement.

It is recommended that regular minuted meetings are held where Managers use the inputs from the items above and identify any actions required to achieve continuous improvement. It is important that Lessons Learned are understood and communicated as required.

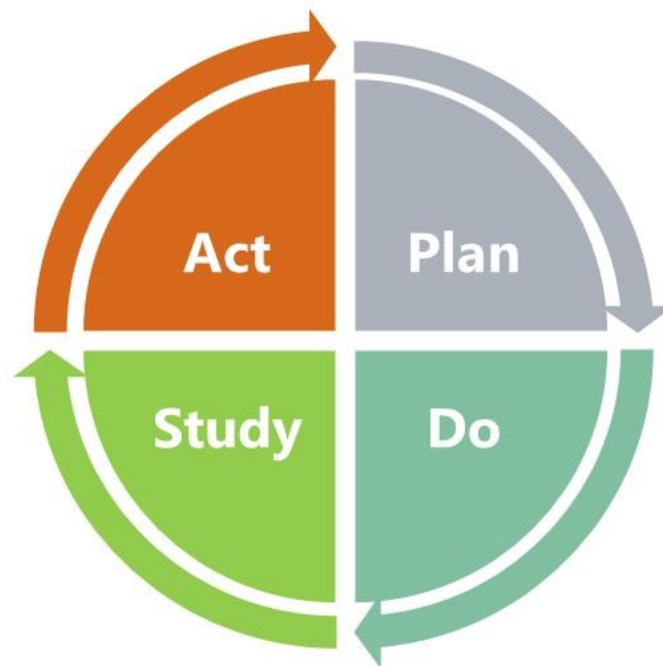


Figure 1 – Continuous Improvement Principles

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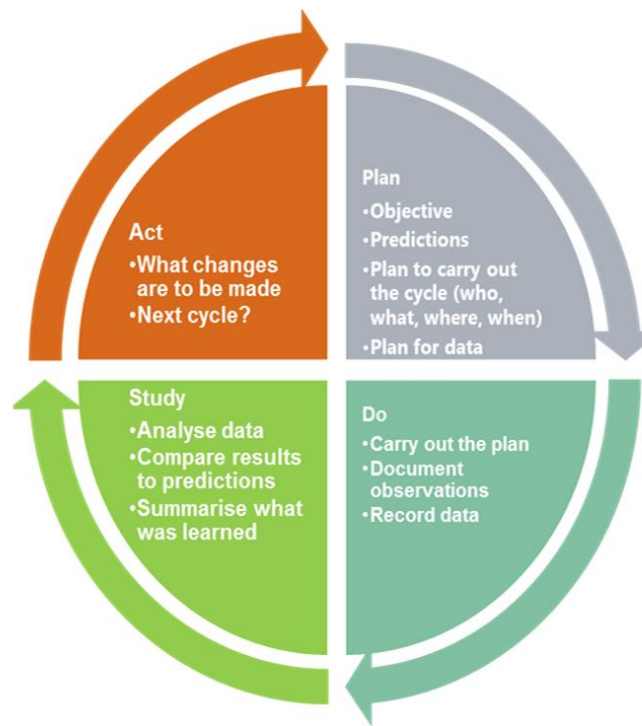


Figure 2 – Continuous Improvement Details

Ref:	NR/L2/RMVP/0200/P102
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Level 2

Module P102

Plant occupational health

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Ref:	NR/L2/RMVP/0200/P102
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

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Ref:	NR/L2/RMVP/0200/P102
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Issue record

Issue	Date	Comments
1	June 2016	First issue.
2	June 2017	Updated links to EAV and EAL data. Reworded sections relating to responsible staff for clarity
3	December 2018	Re titled document, updated reference documents, transferred some content to a Guidance Note. The module is more general to Occupational Health considerations
4	June 2022	General update to terminology and content. Section 6 transferred from NR/GN/RMVP/0200.

Reference documentation

All reference documents and legislation are given in:- NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

Ref:	NR/L2/RMVP/0200/P102
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

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Ref:	NR/L2/RMVP/0200/P102
Issue:	4
Date:	March 2022
Compliance date:	June 2022

1 Purpose

The Health and Safety at Work etc Act 1974 is the primary piece of legislation covering occupational health and safety in Great Britain and is referred to as HASAWA.

The implementation of this module contributes to the compliance with HASAWA legislative requirements (LOLER, PUWER, HAVs and COSHH) and to mitigate the occupational health risks:

- a) exposure of staff to hand-arm vibration (HAV);
- b) whole body vibration
- c) working at height;
- d) exposure to airborne particles and associated hazards;
- e) staff fatigue;
- f) hearing loss;
- g) exposure to noise (hearing loss);
- h) injury due to manual handling (e.g. lifting);
- i) exposure to substances hazardous to health (COSHH) substances.

2 Scope

This module applies to Network Rail Network Operations, Capital Delivery and Route Services only

It is expected that, Network Rail's Suppliers will have their own systems in place for health surveillance (Regulation 7), and the provision of information, instruction and training (Regulation 8) for work under their control.

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Date:	March 2022
Compliance date:	June 2022

3 Surveillance

Full details relating to the surveillance requirements, processes and recording of HAVS, Hearing Loss, Fatigue and Silica/Asbestos respiratory hazards can be found in:

- NR/L2/ERG/003 - *Management of fatigue: Control of working hours for staff undertaking safety critical work*
- NR/L3/MTC/RCS0216 - *Risk Control Manual*
- NR/L2/OHS/00102 - *Work Activity Risk Assessment*
- NR/L2/OHS/00102/F01- *Work activity risk assessment form*
- NR/L2/OHS/00106 - *Management of Manual Handling Risk*
- NR/L2/OHS/00113 - *Health surveillance and management of diagnoses for Hand-arm Vibration Syndrome (HAV)*
- NR/SP/OHS/00114 - *Specialist Risk Assessment - Hand Arm Vibration (HAV)*
- NR/L2/OHS/00123 - *Health Screening and Health Surveillance for Noise Induced Hearing Loss*
- NR/L2/OHS/157 - *Health surveillance for silica and asbestos and the management of diagnosed occupational respiratory conditions*
- NR/L2/ERG/003 - *Management of fatigue: Control of working hours for staff undertaking safety critical work*

4 Planning

When planning works you shall follow the hierarchy of control, see Appendix A, Figure 1.

When planning works involving plant:

- a) Identify tasks which expose individuals to risks to health and safety such as vibration, noise, COSHH substances and manual handling. Complete risk assessments to determine whether the exposure can be eliminated or reduced
- b) Are there alternative processes, better equipment and/or better working methods which would eliminate the risk.
- c) Exposure levels, and the control measures required to be followed
- d) Selection of work equipment (e.g. ear defenders)
- e) Task rotation

When planning works where airborne particulates may be present, consideration should be given to the following:

- a) Prevention or suppression – can the risk be eliminated in full or can suppression systems be employed to reduce respiratory risks.
- b) Work locations - will confined spaces such as tunnels increase potential exposure and how can these risks be managed.

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- c) Weather conditions – will heat and wind increase dust concentration and how can these risks be reduced.
- d) Adjacent work sites – will works undertaken in adjacent sites expose staff to potential ballast dust.

When planning works involving manual handling of plant

- a) Identify tasks which expose individuals to manual handling injury.
- b) If appropriate, complete a risk assessment to determine whether the exposure to injury can be eliminated or reduced. See *NR/L2/OHS/00106 - Management of Manual Handling Risk* for the requirements and guidance.
- c) Is there alternative equipment and/or better working methods which would eliminate the risk.

When planning work involving plant and COSHH substances, consideration should be given to the following:

- a) Identify/assess and prevent exposure, of employees to substances hazardous to their health, see *NR/L2/OHS/00103 - Specialist Risk Assessment – COSHH*

Prevention - can substituting the product for a less or non-hazardous one or changing the method of work to prevent or minimise exposure.

5 Risk assessment

A documented risk assessment shall be completed prior to works being undertaken and shall identify and include:

- a) where there may be a risk from an occupational health hazard;
- b) the available risk control measures to attempt to eliminate or manage risk;
- c) an estimate of the individual's potential exposures relating to that hazard;
- d) the identification of those individuals who might be more at risk to exposure;
- e) the steps planned to control and monitor the risks;
- f) a record of the assessment.

For example exposure values see Appendix B and Guidance Note *NR/GN/RMVP/0200*.

6 Occupational health HAVs

Organisations shall demonstrate processes to identify the tasks which expose individuals to risk of vibration.

Organisations shall complete risk assessments to determine whether the exposure to vibration can be eliminated or reduced by using alternative methods or

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tools.

Organisations shall detail the hazards relating to working with vibrating tools, exposure levels, and the control measures required to be followed as part of the planning process. Site supervisors shall brief these details.

Organisations shall manage processes so that no individual is exposed to a daily vibration value greater than the maximum ELV. See Appendix C for guidance on ELV.

Organisations should only use work equipment that has been approved for use on Network Rail managed infrastructure and Network Rail projects, and will endeavour to always select the lowest vibrating tool that is the right tool for the task to be carried out.

Organisations shall demonstrate a competence management system that provides training for every person required to use vibrating work equipment. This training should include methods to understand and manage the HAV risks involved in using that equipment.

Every person who regularly uses vibrating work equipment shall have access to a recognised method of recording personal HAV exposure levels. Records shall be stored and be accessible to any Network Rail health and safety professional. A copy also shall be provided to the individual when attending a HAV health surveillance appointment.

Organisations shall demonstrate that a process is in place for any employee who believes they have, or are about to breach their EAV to report exceedances. Any breach of ELV shall be investigated and reported as a close call.

NOTE 1: An equipment datasheet containing vibration information has been compiled and is available from Network Rail's Safety Central website.

NOTE 2: Information on vibration exposure is available on Network Rail's Health and wellbeing portal which can be found on Safety Central

NOTE 3: The method of recording HAV exposure levels will depend on local arrangements and can be undertaken manually or electronically. Manual recording may form part of the individuals completed job sheet or a specially designed booklet.

NOTE 4: The method of recording HAV exposure levels will depend on local arrangements and can be undertaken manually or electronically. Manual recording may form part of the individuals completed job sheet or a specially designed booklet.

6.2 Respiratory Hazards

Organisations shall demonstrate processes to identify the tasks which expose individuals to risk of respiratory hazards. See Appendix D for guidance on the management of respiratory hazards.

Organisations shall complete risk assessments to determine whether the

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exposure to respiratory hazards can be eliminated or reduced by using alternative methods or equipment.

Plant used for ballast handling activities must be fitted with adequate engineering controls to reduce exposure to machine operators from respiratory risks, particularly Silica Dust (Ballast Dust) as required in Module P300

Organisations shall detail the hazards relating to working with respiratory hazards, exposure levels, and the control measures required to be followed as part of the planning process. Site supervisors shall brief these details.

6.3 Selection and adequacy of respiratory protective equipment (RPE)

Always Use approved and appropriate RPE for the task.

Where the risk assessment processes have identified the usage of RPE as mitigation, the subsequent selection of RPE should consider both adequacy and suitability.

Selection based on adequacy and suitable is important as there are many different RPE types designed to:

- a) protect the wearer from a variety of hazards and hazardous substances; and
- b) suit a variety of task requirements and environments.

RPE should provide protection to the wearer and reduce exposure to the hazard to a level required to protect the wearer's health. When undertaking the risk assessment, the adequacy selection should take into account:

- a) Toxicity of the hazard;
- b) Form of the hazard e.g. gas, vapour, fume, dust, aerosol, biological agent;
- c) Particle size (if relevant);
- d) The Workplace Exposure Limit (WEL) of the hazard (if it has one);
- e) Known or suspected concentration of the hazard in the working atmosphere.

6.4 Noise induced hearing loss

Hearing loss through exposure to noise is preventable but once your hearing is lost it won't come back. An organisation needs to demonstrate processes to:

- a) Follow work practices such as working in and around exclusion zones
- b) Limit the amount of time that you spend doing noisy jobs
- c) Choose the best type of hearing protection for your needs
- d) Provide appropriate ear protection, demonstrate when they are expected to be worn and maintain them so they function correctly
- e) Implement health surveillance events as and when they are required.

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7 Using work equipment

From initial training every person required to work with plant and equipment shall be made aware of the risks involved in using that equipment so that they have a clear understanding of:

- why it is important to their health to adhere to any applied control measures;
- the types of risks they may be exposed to, HAVS, respiratory, sight, fatigue, hearing, injury caused by manual handling etc;
- exposure levels they are likely to encounter within their working day;
- the control measures implemented to control the exposure; and
- the potential for damage to hearing from when not wearing appropriate PPE (Personal Protective Equipment), see Appendix E.

8 Employee responsibilities

Employees shall report any problems with their hands, hearing, breathing or general health to a supervisor, manager or the person who is responsible for health surveillance.

NOTE: Health, Safety and Environmental Advisers (or equivalent) can give advice about any aspect of Occupational Health risks.

Every person shall have access to a method of recording personal exposure levels. This shall be provided by the employee's organisation.

9 Breach of control measures

Any employee who believes they have, or are about to breach their personal exposure limit (Occupational health risk specific) shall immediately stop the task and inform the site supervisor in charge of the work activities. The site supervisor shall then arrange for another employee to perform the task being undertaken.

If an employee reaches or exceeds their personal exposure limit relating to the task (HAVS, Hearing, Respiratory etc), the employee shall cease working in that particular environment for the remainder of that working day.

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Appendix A - Hierarchy of controls

Hierarchy of controls

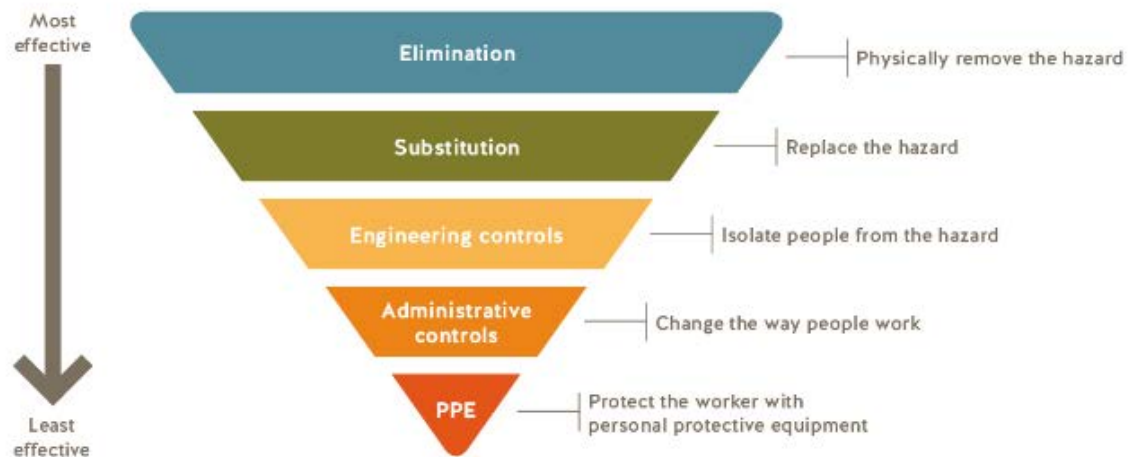


Figure 1 - Hierarchy of Controls

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Appendix B - Example exposure limits

Manufacturer	Image (where available)	Name/ Model	Category	Description	Weight (kg)	VIBRATION DATA				NOISE	
						Vibration Emission (m/s ²)	Trigger Time to EAV	Trigger Time to ELV	Exposure Points by Trigger Time 5min 1hour	Noise Emission Pressure (dB(A))	
Hitachi		DH24DVC	Drilling	Cordless Rotary Hammer Drill	3.6	13.2	17min	69min	29 348	92	
Husqvarna		K 1250	Cutting	Rail Saw RA 10 attachment 5.5 Kg RA 10 S attachment 5.7 Kg (Weight stated with RA 10 S clamping device)	21.2	8.3	78min	302min	7 79	102	
Husqvarna		K 1260	Cutting	Rail Saw RA 10 attachment 5.5 Kg RA 10 S attachment 5.7 Kg (Weight stated with RA 10 S clamping device)	21.2	5	120min	480min	4 50	104	
Husqvarna		K 1260	Cutting	Disc Cutter	14.4	4.1	178min	714min	3 34	104	
Husqvarna		K 760	Cutting	Disc Cutter	9.9	2.4	521min	>24h	1 12	101	

Figure 2 - Extract of Network Rail's equipment datasheet

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Appendix C - Common causes of accidents

The following lists are provided for guidance only and are not exhaustive:

Physical hazards

- a) manual handling e.g. heavy, awkward or hard-to-reach loads;
- b) slipping/tripping hazards e.g. poor ground conditions, ballast;
- c) falling from a height e.g. from vehicles or scaffolding;
- d) being struck by falling objects;
- e) getting caught or cut by machinery e.g. blades or rollers;
- f) equipment that is poorly maintained or whose guards have been disabled;
- g) being struck by vehicles on site (road or rail);
- h) fire from flammable or combustible materials and hot processes;
- i) ejection of material e.g. ballast cleaners, tampers;
- j) hot substances or surfaces;
- k) hand tools e.g. noise, vibration, eye injury; and
- l) suffocation from exposure to carbon monoxide e.g. from portable generators.

Health hazards

- a) noise;
- b) harmful dusts e.g. from grinding or ballast cleaning;
- c) unsuitable lighting levels;
- d) vibration e.g. from pneumatic hand tools;
- e) COSHH substances
- f) extremes of temperature; and
- g) injury through poor design of tasks or machinery.

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Appendix D - Respiratory hazards

Respiratory hazards are airborne substances or particulates emitted from dusts such as asbestos fibres or silica which may be found in ballast or other building materials, they may also present themselves in fumes and gases. If exposure is uncontrolled or prolonged, and inhalation occurs, this can have an adverse effect on your lungs. If you regularly work with these substances and exposure is inadequately controlled, you may be at risk of developing a respiratory illness.

Until its ban in 1999, asbestos was widely used in the construction of many commercial buildings. Asbestos only becomes a hazard when released into the air and inhaled.

Silica is a natural substance found in rock, sand and clay, and in products such as bricks, tiles and concrete. When these materials are worked on, respirable silica crystalline (RCS) is released as a fine dust which is hazardous when breathed in.

Work activities such as, but not limited to, cutting, surface grinding, welding, tunnelling, chasing mortar before re-pointing, aspects of handling of ballast, aspects of track renewal and undertaking buildings and civils remedial works can cause exposure to respiratory hazards.

When the ballast is disturbed (e.g. during ballast unloading or ballast tamping) it creates fine particles (dust). Ballast dust contains small quantities of RCS.

Breathing in this dust at high concentrations over prolonged periods of time may lead to the development of an illness known as 'Silicosis'. RCS scars the lung tissue and can lead to permanent breathing difficulties.

Through robust planning, avoid exposure to respiratory hazards where ever possible. If elimination is not possible, implement mitigations to reduce exposure so far as is reasonable practicable.

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Level 2

Module P300

Plant approval and design

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Ref:	NR/L2/RMVP/0200/P300
Issue:	5
Date:	04 June 2022
Compliance date:	03 September 2022

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- Amber requirements are presented with an amber sidebar.
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- Variations can only be approved through the national variations process.
- Non-approved variations will be investigated and corrective actions enforced.

Green guidance – to be used unless alternative solutions are followed

- Guidance should be followed unless an alternative solution produces a better result.
- Guidance is presented with a dotted green sidebar.
- Guidance is not monitored for compliance.
- Alternative solutions should be documented to demonstrate effective control.

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Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2016	Updated to mandate the use of RIS-1710-PLT
3	June 2017	Scheduled periodic review and update carried out. Clause 9 now titled portable and transportable plant, and trolleys re-titled to sub heading. Appendix A is a new section and is mandatory. New clause 10 <i>OTP for operation in electrified areas, incorporating content from emergency change NR/BS/LI/392.</i>
4	December 2018	Added electronic signatures from another module. Added requirements for marking of plant. Expanded scope to cover all plant. Addition of Occupational Health risks to be covered in design
5	June 2022	Scheduled periodic review and update carried out.

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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1 Purpose

The implementation of this module contributes to compliance with legislation (HASAWA, LOLER, PUWER, etc) and to mitigating the following risks:

- a) uncontrolled movements of MEWP's, e.g. MEWP operator being crushed under a structure;
- b) overturning, e.g. RRV overturning during lifting operations; and runaway/failure to stop on demand, e.g. OTP running away on a gradient.
- c) Occupational Health hazards which may result in physical injuries, short or long-term health issues sustained to staff by poor design or lack of engineering controls

2 Scope

This module defines the requirements for identification and marking of plant, and the documentation to be carried by on-track machines (OTM) and on-track plant (OTP).

This module applies to all organisations involved with the procurement, manufacturing or supply of plant. It also applies to those carrying out or controlling plant operations or maintaining plant used on Network Rail-managed infrastructure and Network Rail projects.

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3 Plant approval

All plant shall be accepted in accordance with NR/L2/RSE/100.

4 Electronic signatures

Electronic signatures may be used as an alternative to physical signatures to authenticate records used in the planning, implementation, operation and maintenance of plant in accordance with NR/L2/INF/02237.

5 Third party approval

All on-track plant (OTP), associated equipment and trolleys shall be certificated against the requirements of RIS-1530-PLT in accordance with RIS-1710-PLT.

On-track machines (OTM) in working and running modes shall be certificated against the requirements of RIS-1702-PLT in accordance with RIS-1710-PLT.

6 Plant design

All plant shall be designed in accordance with the relevant:

- a) European and national legislation;
- b) technical standards for interoperability;
- c) notified national technical rules;
- d) GE/RT8000, *Rule Book*;
- e) railway group standards ;
- f) rail industry standards (RISs);
- g) Network Rail standards and specifications; and
- h) international and national standards.

For clarity on standards and technical requirements for rail mounted plant also see NR/L1/RMVP/0001.

Any change or non-compliance to the baseline design, maintenance, overhaul and renewal requirements of plant and traction and rolling stock assets, shall be managed in accordance with NR/L1/RMVP/0001.

7 Modifications

Any modifications or alterations shall be approved in accordance with GM/RT2400, RIS-1702-PLT or RIS-1530-PLT as applicable. This shall be supported by a suitable Engineering Change Process.

8 Occupational Health

When designing On Track Plant, On Track Machines, Mobile and Portable Plant, relevant legislation, group standards and company standards shall be applied to control Occupational Health risks, such as, but not limited to:

- a. Respiratory risks, particularly Silica Dust (Ballast Dust) by providing adequate engineering controls to reduce exposure to machine operators by:

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- i. meeting the requirements for cabin filtration identified in BS EN 15746-2:2020 or BS EN 14033-3:2017 Clause 5.4.7 and/or;
- ii. providing dust suppression and/or extraction systems where dust is generated away from the operating cabin as detailed in BS EN 14033-3:2017 Clause 5.20.2.

NOTE 1: *This should also be applied to civil construction and mobile plant that might work on the infrastructure in environments where airborne dust may be present or generated.*

- b. Manual handling risks - weights and dimensions of plant and equipment shall be designed to mitigate risks to staff from lifting, carrying, installing and operating.
- c. Risks to eye sight - mitigate risks associated with the operation of plant that may lead to injuries or damage of eye sight.
- d. Hearing loss – components and power systems shall be designed to reduce the impact of risks to hearing
- e. Fatigue - mitigate risks of staff becoming unnecessarily fatigued through operation or control of plant.

NOTE 2: *The risks identified above are already controlled through the application of RIS-1530-PLT, BS EN 14033 (for OTP and OTM) and RIS-1701-PLT (Portable and transportable plant) where prescribed limits relating to these risks are detailed.*

Compliance to the risks identified shall be scrutinised as part of the Plant Approval Process (Product Acceptance).

9 Load lifting points

All load lifting points (including Quick hitches) shall be designed, marked and maintained in accordance with:

- a) on-track plant - RIS-1530-PLT; and
- b) all other cranes - BSEN13001 or equivalent; and

Each lifting point shall be marked in accordance with RIS-1530-PLT and the location and safe working load (SWL) shall be shown in the OEM operations manual.

Load lifting points shall be proof load tested to a minimum of 150% of SWL.

Burst hose protection shall be fitted to all load sustaining components of a machine's hydraulic system.

NOTE 1: *The described proof load tests are in addition to the thorough examinations by a competent person required under The Lifting Operations and Lifting Equipment Regulations (LOLER).*

Records of tests carried out shall be retained by the Machine Owner.

Testing shall be undertaken so that it does not damage or destabilise the machine.

NOTE 2: *This might involve additional support to the machine while testing is taking place.*

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10 Mobile elevating work platforms (MEWPs)

10.1 General principles

The combinations of base vehicle, module or attachment type permitted shall be specified on the Certificate of Engineering Acceptance/Engineering Conformance Certificate.

The thorough examination certification issued in accordance with LOLER shall include the base vehicle and module or attachment by serial number.

Where a base vehicle is capable of using more than one module or attachment, a thorough examination certificate shall be provided for each individual module or attachment.

Consult with the OEM or competent body (such as VAB/PAB) if undertaking modifications to a MEWP.

10.2 Work restraint anchor points

Work restraint anchor points on the work platform of a MEWP shall be:

- a) designed and verified in accordance with BS EN 280;
- b) identified and marked as dedicated points within the platform;
- c) attached to permanent parts of the platform unless specifically designed for movable components of the platform;
- d) marked with the number of persons for which they are rated; and
- e) designed to accommodate the wearing of personal protective equipment without catching or tearing.

11 Type 0D wheeled attachment braking systems

Attachments that have no carrying capacity (such as only having a gross weight) shall either:

- a) be fitted with a braking system where components enter into the ballast immobilising the vehicle; or
- b) be fitted with a braking system where the direct operation can be seen, for example movement of brake block or brake pad.

Brake tests on any such attachments, including dozer blade trolleys, shall be specified at a frequency of no greater than three months unless the attachment manufacturer has defined a particular brake test frequency.

12 Portable and transportable plant

12.1 General principles

Portable and transportable plant shall meet the requirements of:

- a) BS EN 13977; and
- b) RIS-1701-PLT.

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NR/L2/RSE/100/05 provides detailed information on product approval.

12.2 Trolleys

All trolleys shall:

- a) be fitted with fail safe brakes;
- b) be designed such that they cannot be placed in an un-braked condition during set-up or use;
- c) be fitted with non-insulated wheels to activate track circuits
- d) meet the stopping distances required by BS EN 13977; and

NOTE : The results of brake testing on a new trolley design should be submitted to Network Rail for product acceptance in accordance with NR/L2/RSE/100.

- e) have a documented pre-use and maintenance brake performance checks in the operating and maintenance instructions.

Where the design of the brake relies on a pin to lock the wheel, there shall be evidence that the equipment can be stopped during runaway and that the maintenance frequency is sufficient to cover potential use of the brake.

13 OTP for operations in electrified areas

All OTP that is required to operate in electrified areas shall:

- a) have equipotential bonding with a maximum earth loop impedance of 0.05Ω ; or
- b) where the design of the machine prevents this, then the plant cannot be operated in electrified areas.

NOTE 1: This applies wherever the OTP is required to on/off track, travel or work in electrified areas irrespective of the electrification system status.

NOTE 2: Guidance on equipotential bonding is detailed in GM/RT2111 clause 2.1.2.

14 Communication equipment

Where personnel are required to undertake controlling and operating activities involving OTMs, OTP and non-rail mounted plant (civils) on Network Rail construction sites (civils and rail), the Principal Contractor shall arrange for full digital duplex communication systems to be provided and used.

Full Duplex communication systems shall be product approved.

15 Identification of plant

Plant shall be marked with the following information:

- a) unique identification number (this might be different from the serial number) OTMs and OTP numbers are allocated by the Rolling Stock Library, and shall be displayed on both sides of the vehicle
- b) date of next maintenance and/or maintenance brake test;

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- c) statutory test/examinations; and
- d) asset owner name and contact details.

NOTE 1: Contact details should include a telephone number to contact the owner of the item of plant or his representative.

When using lifting equipment, check that a thorough examination has been completed and is in date in accordance with *The Lifting Operations and Lifting Equipment Regulations (LOLER)*. A record of the examination shall be available with the lifting equipment and shall include:

- a) information to identify the equipment;
- b) the date of the last examination;
- c) the date when the next examination is due; and
- d) the safe working load of the equipment or, where its safe working load depends on the configuration of the equipment, its safe working load for each configuration of equipment.

Other signs, notices and markings shall be affixed to plant as follows:

- a) OTMs in accordance with GM/RT2400, RIS-1702-PLT, GM/RT2453.
- b) OTP in accordance with RIS-1530-PLT; and
- c) portable and transportable plant in accordance with RIS-1701-PLT.

NOTE 2: All OTP that has been fully accepted to RIS-1530-PLT will be fitted with a data panel displaying information on its performance and limitations of use that need to be observed during operation.

16 Rail vehicle documentation

OTMs and OTP are required to the following documentation as a minimum:

- a) operating manual or instructions;
- b) a valid Certificate of Engineering Acceptance or Engineering Conformance Certificate ;
- c) a valid copy of the current brake test record - OTP only;
- d) machine logbook to record evidence of maintenance undertaken and the reporting and rectification of defects; and
- e) load-radius charts (duty charts), if the plant is to be used for lifting activities.
- f) Lifting accessories and attachment

NOTE: In the case of loader cranes the load-radius chart is often a decal alongside the controls.

Digital copies may be used via systems such as those incorporating QR Codes and access to asset databases. Considerations in the planning stages for areas of poor internet connectivity may be required, and hard copies may need to be provided.

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Level 2

Module P301

Road rail access points (RRAP)

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Issue:	4
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Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out.
3	March 2019	General update of terminology and content. Sections relating to RRAPs moved to guidance.
4	June 2022	General update of terminology and content.

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) failure of plant or its control or safety systems;
- b) operating error, operational error or equipment misuse;
- c) incorrect lifting operations (LOLER);
- d) lack of RIDDOR or close call reporting;
- e) lack of continuous improvement, such as, mitigating factors from incidents not being introduced to machine/operating procedures; and
- f) damage to buried services and fixed installations.

2 Scope

This document defines the requirements for:

- a) the type and selection of road-rail access points (RRAP);
- b) the construction of RRAPs and access routes;
- c) the registration of RRAPs in Ellipse; and
- d) involving property where land access rights, lease or purchase is necessary.

This document applies to all RRAP and all access points specifically used for on-track plant on Network Rail-managed infrastructure or Network Rail projects.

See the index of NR/PLANT/0200 for information on which:

- a) specific roles this module applies to; and
- b) modules that also apply to those roles.

It does **not** apply to:

- a) the management of public accommodation, highway or occupation level crossings used as on/off tracking points (see NR/L2/OPS/101 for further information); or
- b) the selection or management of pedestrian-only access points.

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3 Classification and construction of road-rail access points (RRAP)

The various types of RRAPs are detailed in Table 1

Access point type	Designed materials	Permanent	Semi-permanent	Temporary
Level crossing (inc occupation)	Tar, Concrete, Timber, Rubber	✓	N/A	N/A
Yard Surface	Tar, concrete, timbers, ballast	✓	N/A	N/A
Secured timbers (fixed timber infill) (Type B or C)	Secured timber panels of various constructions and installed to this module	N/A	✓	N/A
Ballasted area (Type A, B & C)	Ballast, Type 1 MOT stone	N/A	✓	N/A
Proprietary (e.g.):	Various systems for on/off & cross tracking	N/A	✓	✓
(Type A) <i>Direct loading rubber panel system which consists of end restraints and tie rods</i>	Installed to manufacturer's instructions and secure	N/A	✓	N/A
<i>Interlocking RRAP</i>	Semi-permanent panels installed <u>unsecured</u> . Remove at possession end	N/A	N/A	✓
<i>A modular system consists of single solid rubber panels</i>	Restrained and supported decking systems. Remove at possession end	N/A	N/A	✓
<i>Decking System</i>	Restrained and supported decking systems. Remove at possession end	N/A	N/A	✓
<i>Lesmac Matting</i>	Rubber/foam systems. Remove at possession end	N/A	N/A	✓
<i>Railability</i>	Metal access systems. Remove at possession end	N/A	N/A	✓

Table 1 Types of road-rail access points

NOTE 1: Proprietary access equipment shall be approved for use in accordance with the appropriate process detailed in NR/L2/RSE/100.

4 Placing of road-rail access points

Wherever possible, locate RRAPs on straight and level track.

Identify at the feasibility and design stages:

- where on-track plant will be delivered, off-loaded, stabled and collected;

NOTE 1: This should be inside the boundary fence which might require an additional standing area.

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- b) if stabling areas are located close to a RRAP, hazards such as OLE equipment and other third-party electricity cables;
- c) Any Line Open (ALO) restrictions;
- d) traffic management and signage on the public highway;
- e) the effects that putting in a new or upgraded RRAP might have on the public highway;
- f) delivery logistics; and
- g) The potential of introducing a runaway risk if a RRAP has to be positioned on a gradient.

NOTE 2: A record should be made (e.g. photographs or video) of the before and after condition of the road surface and verges in the vicinity of the access point in case damage is caused and the Highway Authority seeks reparations.

NOTE 3: When installing, maintaining or using a RRAP consideration should be given to how they are used if they are likely to be affected by poor weather conditions e.g. strong wind, heavy rains, electric storms, ice or snow. Consideration should also be given to factors that can produce unsafe conditions after inclement weather has ceased e.g. waterlogged and unstable ground following a period of heavy rain. The SSOW should set out what measures or actions need to be taken for weather conditions e.g. grit, snow clearance.

Relevant functions within Network Rail (for example, local NR Infrastructure Manager, Property, Community Relations Manager) and the OTP POS Provider and/or haulier where necessary, should be consulted when determining the type and location of RRAPs.

4.1 Exceptions

Road rail access points shall not be placed:

- a) on curves of 200m radius or less where continuous check rails are installed;
- b) where guard rails or lateral resistance end plates are present;
- c) on high ballast shoulder areas;
- d) over rail welds or rail joints unless the rail joint is in a siding and the access point has been subject to risk assessment and approval;
- e) over rail adjustment switches, treadles, axle counters, or hot axle bearing detectors;
- f) where cross track cables are present;
- g) where red or third rail impedance bonding is present;
- h) where overhead line equipment (OLE) is less than 4165 mm above rail level (ARL);
- i) where a non-level road could place any part of the OTP within 600 mm of the OLE; or
- j) as shown in NR/L2/TRK/2102

If a suitable risk assessment is undertaken, and it is identified it is safe to do so, it may be permissible to place a road rail access point:

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- a) less than a minimum of 20m from any switch and crossing unit;
- b) within 20m of a platform ramp;
- c) less than 20m from an underbridge or tunnel where there are vertical or lateral restrictions that could restrict vehicle manoeuvrability;
- d) where infrastructure assets such as lineside structures are located which could restrict vehicle manoeuvrability;
- e) next to, or over, under track crossings;
- f) where there is an excessive height difference between adjacent running lines (see NR/L2/TRK/2102);
- g) within trespass and vandalism hotspots; or
- h) where road access is hazardous (for example, access is directly from a dual-carriageway or areas of limited visibility).

5 Requirements in electrified line areas

In DC electrified (third and fourth rail) areas, RRAPs shall **NOT** be installed without the appropriate authorisation by the relevant responsible manager (electrification).

In overhead line electrified areas, position a RRAP so that:

- a) the approach to the RRAP when under OLE is level where reasonably practicable; and
- b) authorisation to install the RRAP has been given by the relevant responsible manager (electrification).

6 Requirements for the protection of cable routes

Lineside cables shall be installed to be protected, suitably supported and retained to mitigate the risk of crushing, cutting, stretching or any other foreseeable damage.

7 Requirements for rail head protection

Provide rail head protection at any RRAP where the type of OTP being used has the potential to cause damage.

An example of rail head protection is shown in **Figure 12**, Appendix A.

8 Requirements for vehicle access

Provide a level approach of at least five metres either side of the RRAP. The access road shall be a minimum of compacted Type 1 MOT fill with 150mm construction depth, laid in 75mm layers.

If using a level crossing as a RRAP, unobstructed road width is required to allow two-way traffic flow. Where such widths cannot be provided, traffic control will be required (see Code of Practice Safety at Street Works and Road Works published by The Department of Transport).

9 Temporary access for incident response

Temporary access points may be used to facilitate recovery after an incident.

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10 Maintenance requirements for road-rail access points

Carry out the maintenance of RRAPs in accordance with the manufacturer's instructions. Items detailed in Table 2 are in addition to any other requirements found in other Network Rail standards.

Infrastructure element	Maintenance requirements
Signs	Keep all safety instruction signs or labels clean and legible. Replace or touch up the sign or label if any of it is missing.
Road profile between the railway boundary and the RRAP	Maintain the road profile so that underside of the vehicles using it will not touch the ground.
Drainage (associated with the access point)	Keep clear of all debris to allow the water to be free flowing.
Permanent lighting (associated with the access point)	Maintain the permanent lighting in accordance with NR/L2/ELP/27238.

Table 2 Road-rail access point maintenance requirements

11 Acceptance of road-rail access point into infrastructure maintenance

Semi-permanent RRAPs shall only be authorised for use if they are recorded in Ellipse. Include the following in Ellipse for the maintenance schedule tasks:

- a) inspection of the RRAP surface at a minimum of every 6 months.

Include all details of the RRAP in:

- a) Ellipse; and
- b) The Hazard Directory.

12 Road-rail access point information

Semi-permanent RRAPs shall be registered in Ellipse.

Information to be displayed at a RRAP shall be:

- a) the access point unique identifier;
- b) a six-digit Ordnance Survey (O/S) grid reference (latitude and longitude); and
- c) the local name.

Provision of other useful information is recommended provided it is kept up to date, such as the phone number of the controlling signal box.

NOTE: Additional signage as mandated by GI/RT7033 should also be provided as appropriate for example, personal protective equipment (PPE) signs and warning signs.

13 Installing road-rail access points

Where the need for a RRAP has been identified, carry out investigations to determine whether at the proposed location access:

- a) already exists but needs to be upgraded
- b) does not exist and a semi-permanent solution is required; or

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- c) does not exist and a temporary solution is acceptable

14 Impact of road-rail access point installation on other planned works

14.1 Infrastructure maintenance works

Establish if asset maintenance work is planned in the vicinity of the proposed RRAP. Maintenance work that requires a semi-permanent RRAP to be temporarily removed shall either be planned so that:

- a) the RRAP is installed after the maintenance work is completed; or
- b) where this is not possible, arrangements shall be made for the RRAP to be temporarily removed as part of the maintenance work and reinstated on its completion.

14.2 Investment and project works

Project Interface Co-ordinators or Programme Managers (Delivery Unit), as appropriate, shall be advised of the construction of any RRAP.

The Project Interface Co-ordinators or Programme Managers (Delivery Unit) as appropriate shall inform any project working in the vicinity of a proposed new RRAP and when it is to be installed.

The Project Interface Co-ordinators or Programme Managers (DU) as appropriate and the IM project manager shall agree the removal/reinstatement and associated costs to facilitate the project works.

NOTE : *The interface between maintenance and project is defined in the Projects Asset Management Plan.*

15 RRAP construction

When installing, replacing or repairing a RRAP, the construction requirements in Figures 1-7 shall be followed.

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15.1 RRAP Construction Type A

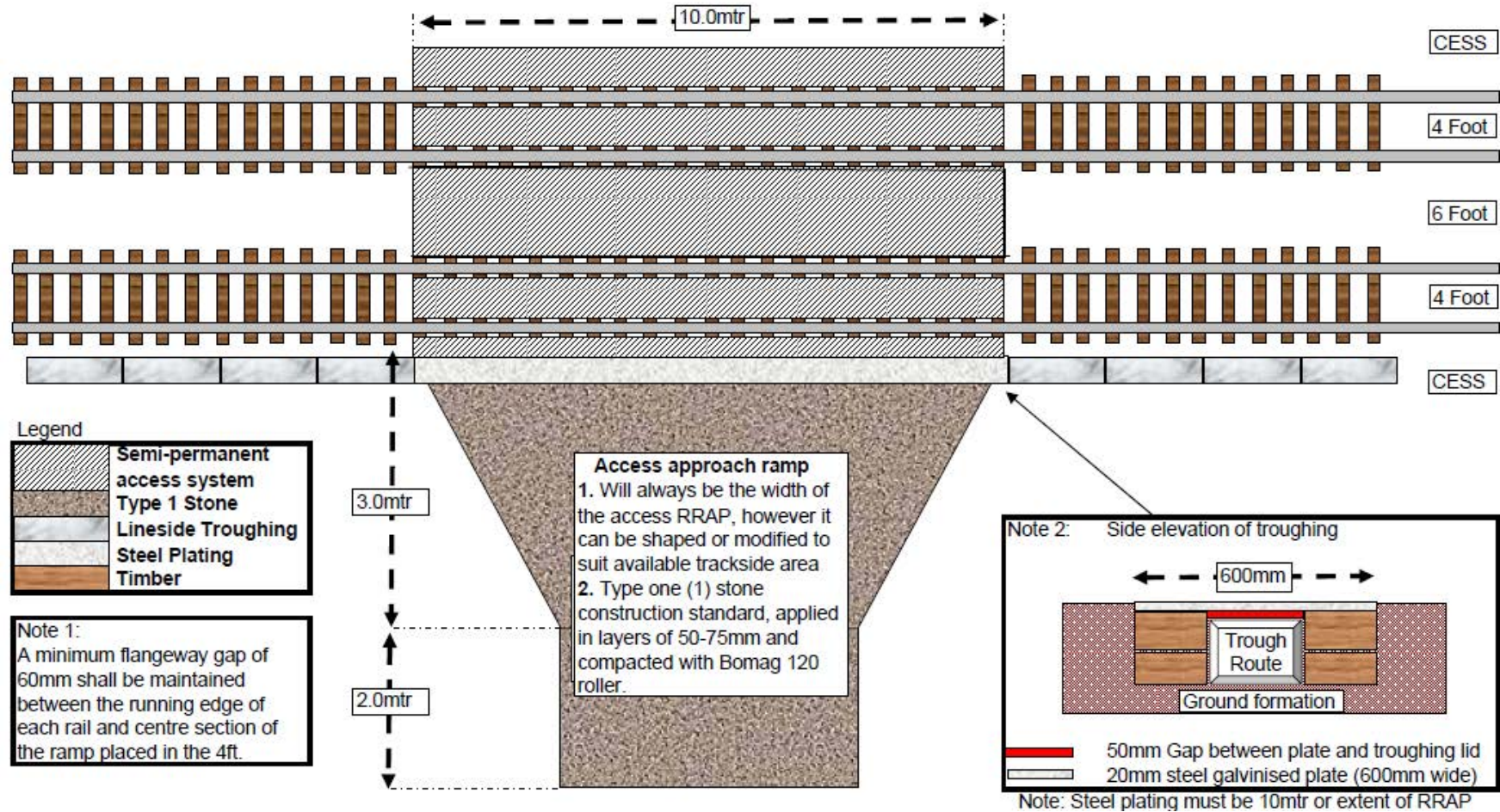


Figure 1 Construction type A

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15.2 RRAP Construction Type B

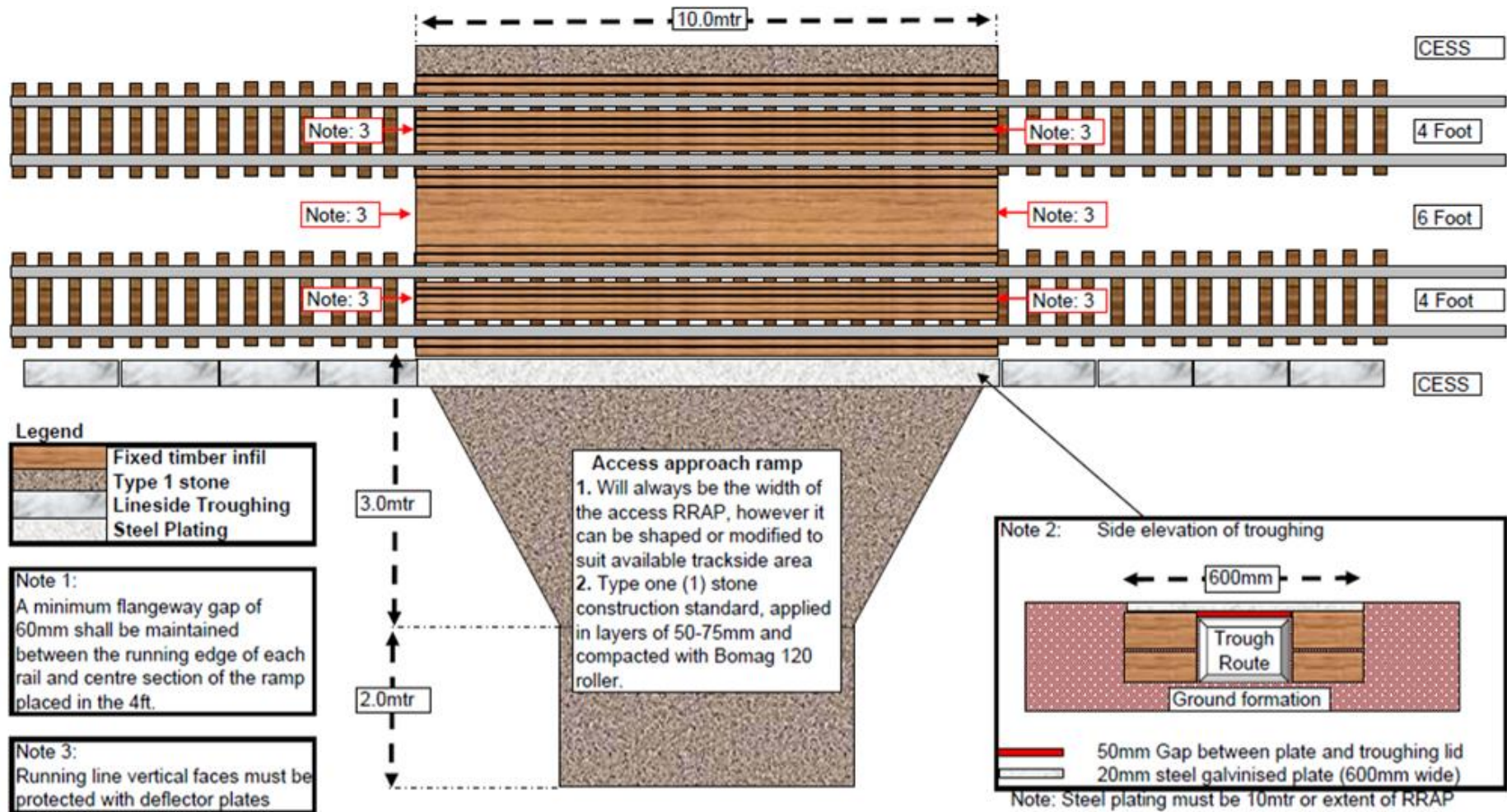


Figure 2 Construction type B

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15.3 RRAP Construction Type C

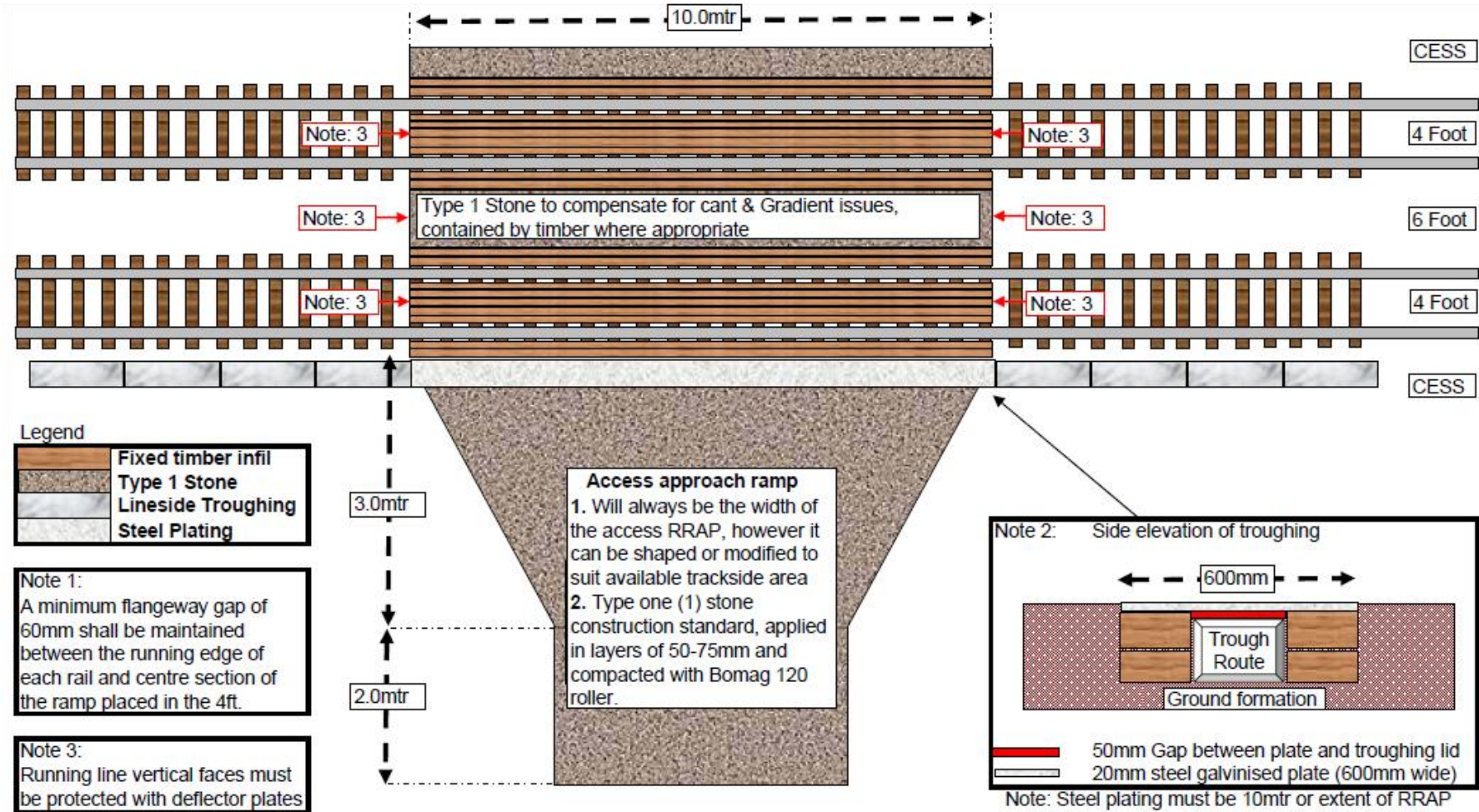


Figure 3 Construction type C

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15.4 RRAP Fixed timber

15.4.1 Infill



Figure 4 Fixed timber infill (plan)

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15.4.2 Infill side elevation

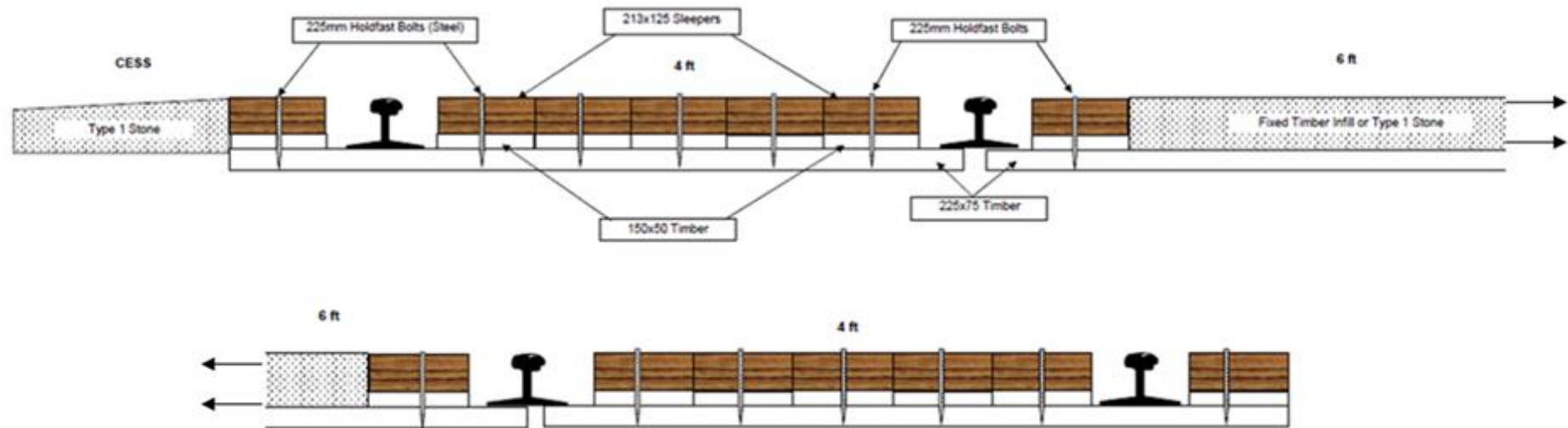


Figure 5 Fixed timber infill (side elevation)

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15.5 Third rail areas

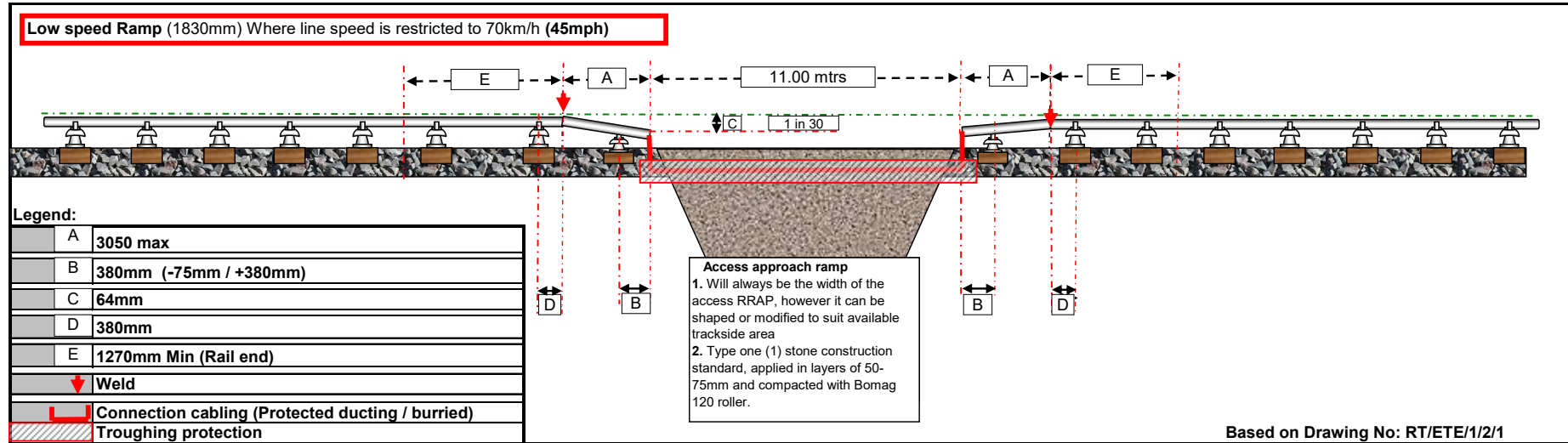


Figure 6 Arrangements for third rail areas

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15.6 OLE Clearances

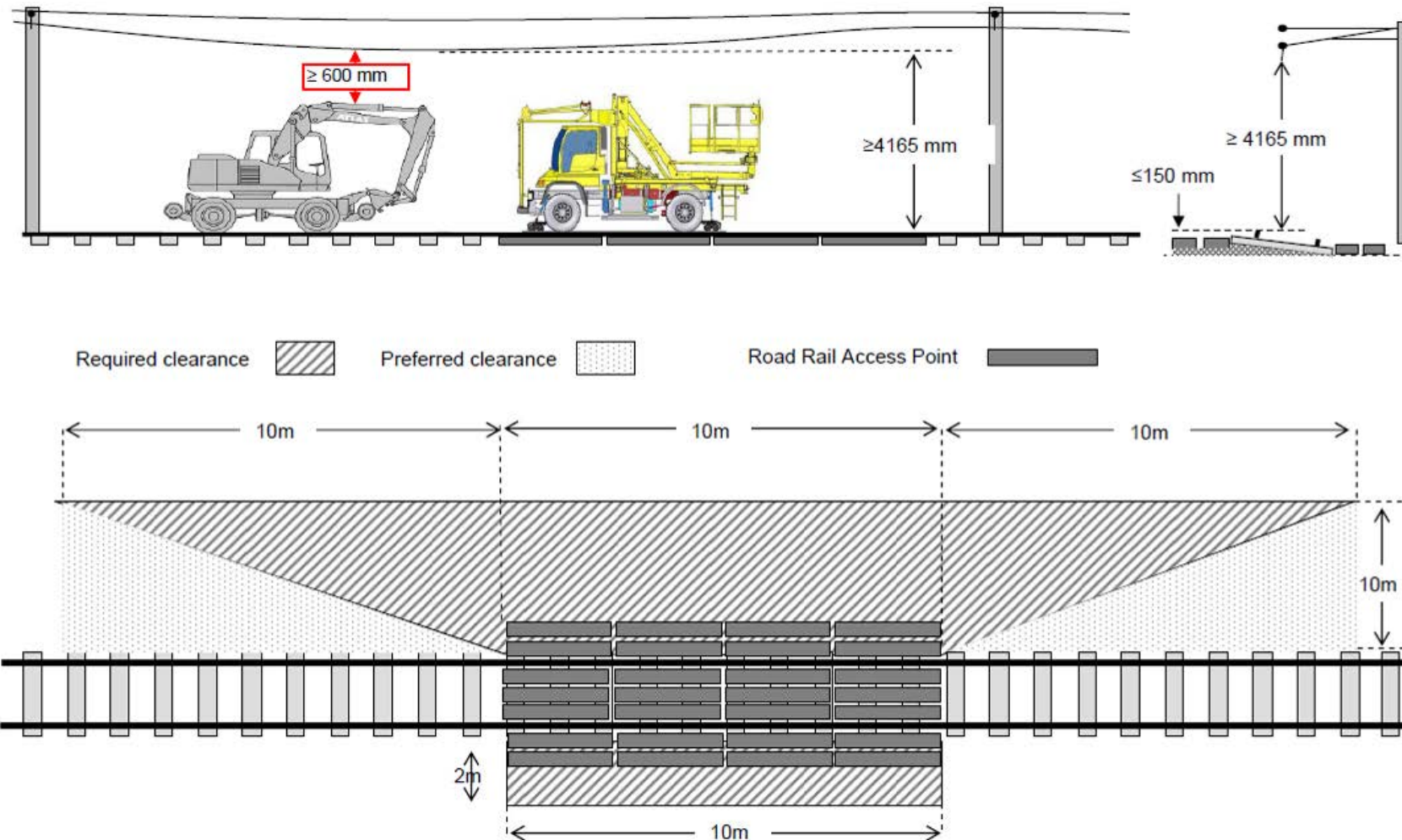


Figure 7 OLE clearance at all road-rail access points

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Appendix A - Approved Road Rail Access Points

Road rail access points (RRAPs) are either semi-permanent or temporary

Temporary RRAPs can be used to access a possession or worksite and are removed before handing back the possession.

If it is decided that a RRAP needs to be left in place, use a semi-permanent RRAP. Obtain the prior approval of the Network Rail Track Maintenance Engineer to do this.

Routes to and from the OTP road transport delivery/holding area and the lineside may require additional protection, such as traffic management or delivery point management.

Preferred locations to on/off or cross track OTP are:

- suitable level crossing (Figure 8);
- depot or yard where the road surface is level with rail top (Figure 9);
- secured timbers (fixed timber infill) level with the rail head (Figure 10);
- consolidated ballast to at least the underside of the rail head is only permissible within sidings and depots (Figure 11);
- proprietary Network Rail product approved track access system (Figure 12).
- When installing a temporary secured timber decking the following shall be implemented:
 - The ground shall be prepared so that it has a flat, even surface.
 - The temporary secured timber shall not sit on any track clips.
 - Consideration should be given to the method of lifting including size and weight of sections to be installed.
 - Lifting operations shall take into consideration the angle of any lifting accessories and the suitability of the lifting points.
 - There shall be no movement of the secured timber under the weight of the OTP once installed.



Figure 8 Level Crossing



Figure 9 Depot or Yard



Figure 10 Secured Timbers



Figure 11 Consolidated

NOTE 1: Some OTP can be on/off or cross tracked at other locations using approved methods, such as side shift jack leg systems.

NOTE 2: Temporary secured timber decking needs to be adequately supported and removed at the end of the possession.

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NOTE 3: The minimum requirement for OTP to on track at a RRAP should be identified from any restrictions there may be on the EAC/ECC, requirements within the OEM Operations manual or specification. Each specific item of plant may have different minimum requirements, and this should be established as part of the planning process for OTP, and the most appropriate access identified for use.



Figure 12 Examples of proprietary approved track access systems

If the rails and sleepers have been removed at a worksite where it is intended to on/off OTP, make provision to:

- a) allow the OTP to safely enter and exit the work site from the track; and

NOTE 4: This can be done by providing ramping at the beginning and end of the worksite (Figure 13).

- b) support the end of the rail.



Figure 13 Example of ramp for entry/exit to worksite

In the example shown in Figure 13, ballast has been provided:

- a) in the four-foot and over both ends of the sleepers for at least the length of the plant; and
- b) as a ramp into the worksite.

NOTE 5: As the plant approaches the worksite where the track has been removed, it is able to lift its rail guidance wheels and drive onto the ballast ramp and safely into the worksite.

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Level 2

Module P500

Competence, training and fitness for plant operations

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Ref:	NR/L2/RMVP/0200/P500
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

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- Red requirements are to be complied with and achieved at all times.
- Red requirements are presented in a red box.
- Red requirements are monitored for compliance.
- Non-compliances will be investigated and corrective actions enforced.

Amber requirements – variations permitted subject to approved risk analysis and mitigation

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Green guidance – to be used unless alternative solutions are followed

- Guidance should be followed unless an alternative solution produces a better result.
- Guidance is presented with a dotted green sidebar.
- Guidance is not monitored for compliance.
- Alternative solutions should be documented to demonstrate effective control.

Ref:	NR/L2/RMVP/0200/P500
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out. Additional clauses added.
3	December 2018	General update of terminology. New section relating to managing fitness to work.
4	June 2022	Alignment with updated competence standard NR/L2/CTM/025.

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) failure of plant or its control or safety systems
- b) operating error, operational error or equipment misuse
- c) multiple plant movements
- d) poor site or weather conditions
- e) incorrect lifting operations (LOLER)
- f) lack of safety reporting
- g) lack of continuous improvement, such as, mitigating factors from incidents not being introduced to machine/operating procedures.

2 Scope

This module defines specific competence requirements for the control, operation and maintenance of plant. It specifies the use of a documented process to manage staff competence and fitness.

This module applies to all organisations involved with the provision of staff for the control, operation or maintenance of plant used on Network Rail-managed infrastructure and Network Rail projects.

3 Requirements

3.1 Competence Management system

3.1.1 Implement a competence management system

Use CMS to manage the competence of all staff working with plant in accordance with NR/L2/CTM/201. As a minimum, assess and verify competence in the following areas:

- a) planning work and operations
- b) control and operation of the plant
- c) driving self-propelled plant
- d) maintenance and inspection of plant

3.1.2 Manage competence of persons undertaking safety critical work:

Manage the competence of persons undertaking safety critical work in accordance with:

- a) The Railways and Other Guidance Transport Systems (Safety) Regulations 2006
- b) ORR Railway Safety Publication 1, Developing and Maintaining Staff Competence.

Appendix A shows an example of a competence matrix that can be used for tracking the competence of staff.

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NOTE: Where a frequency is not stated in the appropriate competence standard; undertake a re-assessment at a maximum interval of five years.

If an individual has not used a plant competence for a period of 12 months or more check whether their competence:

- has degraded as a result of a lack of practice; or
- is no longer needed.

3.2 Specific competence

3.2.1 General

Individuals shall meet the requirements of 3.2.2 to 3.2.13 as part of the implemented competence management system and method of managing resource.

3.2.2 On-track plant machine operator

All persons operating on-track plant shall be competent to do so in accordance with NR/L2/CTM/025.

3.2.3 Maintenance of on-track plant

The approved maintenance plan shall detail the minimum level of competence of personnel responsible for the maintenance of OTP in accordance with RIS-1530-PLT.

For example, NVQ Lv3, Rail Plant Association OTP competence assessments or equivalent.

3.2.4 On-track plant core

Sentinel on Track Plant core competence shall be held by all persons before they can attain the machine and crane controller competences to undertake OTP activities on Network Rail managed infrastructure.

3.2.5 Machine controller

All persons competent to control on-track plant on Network Rail managed infrastructure shall be trained, mentored and assessed in accordance with the Sentinel Scheme machine controller competence.

Only persons 18 years of age or older shall hold the machine controller competence.

3.2.6 Crane controller

All persons competent to control lifting operations on Network Rail managed infrastructure shall be trained, mentored and assessed in accordance with the Sentinel Scheme crane controller competence.

All persons with the crane controller competence shall hold the machine controller and slinger competence as a pre-requisite.

3.2.7 Portable, transportable and mobile plant operation

All persons that operate portable, transportable and mobile plant shall be competent in accordance with NR/L2/CTM/220.

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3.2.8 Lift planning

All persons planning lifting operations shall hold the OTP and/or OTM Sentinel Scheme lift planning competence.

NOTE: This was formerly referred to as lift planner which is a specific railway term used to indicate a person who plans lifting operations.

3.2.9 On-track machine operator

All persons that operate on-track machines in working mode or travelling mode within a possession shall be assessed as competent to do so for each machine type that they operate in accordance with the original equipment manufacturers (OEM) instructions.

Only persons 18 years of age or older shall operate plant.

3.2.10 On-track machine driver

All persons that drive on-track machines on the operational railway or within a possession shall be competent to do so in accordance with:

- a) GE/RT8000 *Rule Book*;
- b) M&EE group document *Professional OTM driver handbook*

3.2.11 Maintenance of on-track machines

All persons that maintain on-track machines shall be competent to do so in accordance with NR/L2/CTM/205.

3.2.12 Thorough examination of lifting equipment

All persons that perform thorough examinations of lifting equipment as defined by *The Lifting Operations and Lifting Equipment Regulations 1998* shall be:

- a) competent to do so in accordance with M&EE group Code of Practice COP0029; and
- b) independent of the organisation who installs, repairs or maintains an item of lifting equipment in accordance with BS EN ISO/IEC 17020 and the M&EE group Code of Practice COP0029.

3.3 Managing fitness to work

Manage staff fitness to work using a documented process to comply with legislative requirements.

Medical fitness requirements are specified in NR/L2/OHS/00124:

Staff suitability and fitness requirements for on-track machine drivers (outside of possessions) are specified in GO/RT3451.

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Appendix A - Example of competence management matrix

Competence	Machine Operator (sentinel) 2 years		Machine Controller (sentinel) 2 years		Crane Controller (sentinel) 2 years		Lift Planner (sentinel) 2 years		Loading trailers (company) 5 years		Maintenance of OTP (company) 2 years	
Name	Assessed Date	Re-assessment due date	Assessed Date	Re-assessment due date	Assessed Date	Re-assessment due date	Assessed Date	Re-assessment due date	Assessed Date	Re-assessment due date	Assessed Date	Re-assessment due date
John Smith	02/01/15	02/01/17							30/06/11	30/06/16		
Joe Blogs			09/10/14	09/10/16	16/03/12	16/03/14						
David Jones											19/08/13	19/08/15
Jane Doe			12/12/13	12/12/15	16/12/13	16/12/15	06/05/13	06/05/15				
Barry South	25/11/12	25/11/14							29/02/12	28/02/17		

NOTE: Time frames and competencies are for demonstration purposes only.

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Date:	04 June 2022
Compliance date:	03 September 2022

Level 2

Module P501

Systems of work

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Ref:	NR/L2/RMVP/0200/P501
Issue:	5
Date:	04 June 2022
Compliance date:	03 September 2022

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Ref:	NR/L2/RMVP/0200/P501
Issue:	5
Date:	March 2022
Compliance date:	June 2022

Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2016	Scheduled periodic review and update carried out. New section 2.3 portable and transportable plant added. Requirements of Letter of Instruction NR/BS/LI/285 incorporated into Section 4. Requirements of Letter of Instruction NR/BS/LI/327 incorporated into Section 6.
3	June 2017	Added reference to M&EE COP0032. Changed term RRV Excavator for OTP in Clause 8. Updated terminology and wording for clarity.
4	March 2019	Removed content to form guidance note, ALO, Live OLE. Rationalised content. Moved content to make module flow better. Combined SSOW and OTP/Plant planning into one document. Updated section movement under Live OLE.
5	June 2022	General review and update, referenced NR/L2/RMVP/0200/F0462.

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) compliance with legislation
- b) runaway/failure to stop on demand, e.g. OTP running away on a gradient
- c) MEWPs becoming out of control, e.g. MEWP operator being crushed under a structure
- d) collision, e.g. collision between a RRV and an OTM
- e) overturning, e.g. RRV overturning during lifting operations
- f) damage to assets, e.g. RRV or its load hitting a passing train during ALO operation
- g) contact with energised Overhead Line Equipment (energised and de-energised)energised
- h) points run through; and
- i) derailment, e.g. trailer being loaded incorrectly and staff injuries.

2 Scope

This module defines the requirements for controlling risks when working with plant in particular situations, for example, on gradients and cants, in electrification areas or poor track conditions.

This module applies to all organisations involved with the planning or supply of plant or carrying out/controlling plant operations on Network Rail-managed infrastructure and Network Rail projects.

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3 Documented safe system of work

All work undertaken on NRMI (Network Rail Managed Infrastructure) shall have an associated documented SSOW (Safe System of Work)

A safe system of work is a formal procedure that is documented and followed to make sure that work is carried out safely. There are 6 stages to follow in the preparation of a system of work as shown in Figure 1.



Figure 1 - The 6 stages of a safe system of work

4 Planning the safe system of work

If the work is to be undertaken on or near the line, the safe system of work shall be planned in accordance with NR/L2/OHS/019.

When working at height, the requirements of NR/L2/OHS/022 and NR/L2/RMVP/0200/P505 shall be followed.

NOTE 1: Work at height is defined as any work activity where there is a need to control a risk of a person or object falling a distance liable to cause personal injury.

When work is to be delivered using plant, it shall be:

- notified to the planner; and
- planned in advance in accordance with the relevant modules of NR/L2/RMVP/0200.

The planner shall produce a system of work for using the plant. If lifting is required as part of the work, that part of the process shall be in accordance with NR/L2/RMVP/0200/P503 and completed by a competent lift planner holding the required competence as set out in NR/L2/RMVP/0200/P500.

The system of work shall identify the plant required to carry out the work and any arrangements required so that work can be completed safely.

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To complete emergency repairs to the infrastructure when no other system of work can be implemented, the requirements in NR/L2/OHS/019 are to be followed.

NOTE 2: The 'planner' is the person who produces the system of work (OTP work plan). This person may also complete Lift Planning if they hold the relevant competence to do so.

NOTE 3: the term Plant covers OTP, OTM, mobile plant and portable plant. All use of plant requires a documented system of work.

5 Site visit

A site visit shall be carried out at the planning stage.

Wherever possible this shall be undertaken during daylight hours and the findings recorded.

NOTE 1: This will help to develop a clear understanding of the site conditions and identify any hazards and control measures that will need to put in place.

Where hazards are identified, documented controls that minimise the risks shall be implemented.

NOTE 2: It is best practice for the site visit to be undertaken by the planner (planner with lift planning competence when lifting is involved).

NOTE 3: It might not be possible to collect all information needed to plan the system of work from the site visit alone. Reference documentation should be used to determine any missing information. Examples are the Hazard Directory, Geo-RINM Viewer (GRV) and load charts showing typical weights.

Considerations to be reviewed as part of a site visit should be as a minimum:

- a) the movement of trains and protection of any lines open to traffic
- b) the suitability of access points and the need to on/off track or turn vehicles without fouling a line open to traffic if using on-track plant
- c) the location of any level crossings, user worked crossings, foot crossings within the work site and any control that will be required
- d) the subsequent permissions and approvals relating to interaction with the public highway and delivery point management
- e) the levels of track cant and gradient at any on/off or cross tracking points and the work site where working movements may take place
- f) the potential for vehicles to damage the infrastructure whilst moving around the site
- g) the potential for vehicles to touch overhead electrification systems or conductor rail electrification systems during movements around the site

NOTE 4: The return conductor of OLE systems is positioned along the side of the gantry structures and is not in a fixed height position. The access road adjacent to the railway might be higher than rail level. These factors need to be considered when calculating a safe clearance to the return conductor.

- h) requirements for the system of work to be authorised by the Network Rail E&PME or the Designated Project Engineer (DPE) See NR/L3/ELP/29987, if the planned work involves operation of plant under live overhead line equipment

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- i) the potential for vehicles to touch third party power lines during movements around the site

NOTE 5: See HSE document GS6 Avoidance of danger from overhead electric power lines for further information on safe working near third party power lines.

- j) the numbers of persons involved and how they will arrive at the worksite from the access point

NOTE 6: Walking long distances along ballast/track should be avoided and the choice of plant to be used could be influenced by its ability to provide transport for the numbers of persons involved.

- k) requirements for effective communication between all parties operating and/or controlling machines on site
- l) the position of any cable troughing and drainage channels, lineside equipment or items fixed to the rail

NOTE 7: This could include axle counter equipment, force transducers, accelerometers or treadles.

- m) the location of any buried services if it is intended to excavate or drive anything into the ground

NOTE 8: Refer to Network Rail publications NR/L1/INI/CP1010, NR/L3/MTC/RCS0216/GA08 and HSE publication HSG47, avoiding danger from underground services, for more information on locating buried services safely.

- n) the load carrying capacity of platform surfaces, bridges or other track supporting structures, particularly if it is intended to carry out any lifting operations on or near such structures
- o) positions of safety for staff involved with using the plant and affected by the plant, and any areas of limited space or clearance associated with the use of the plant
- p) if working in tunnels, identify clearances, refuges and arrangements for sufficient ventilation (see NR/PLANT/0200/module P505 for further information)
- q) storage locations, including temporary refuelling facilities, environmental issues and security of the plant on site
- r) the potential to encroach third party properties and the need to obtain the necessary permissions before the plant is used
- s) the affects when using plant, for example noise, dust and fumes, and any interaction between items of plant on the same site or our neighbours
- t) that machine operators are competent to operate the plant selected.

Suitably sufficient records should be compiled as part of the site visit and used to complete planning processes.

6 Prepare a plant system of work

6.1 Documentation

The planner shall update the system of work to record the significant hazards and controls to be put in place as a result of completing the risk assessment for the work.

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A plant system of work created by Network Rail functions shall be documented using the combined OTP Work plan and Lift Plan document SMF/PL/0253 for all plant operations.

6.2 Authorisation

The plant system of work shall be reviewed and approved by staff the organisation identifies as competent do so

If the system of work is not authorised, the planner shall return to the planning stage and draft a new system of work .

If short notice work is identified, the system of work shall be authorised by a more senior manager than the responsible manager who would normally authorise the system of work before the plant is ordered. See Appendix A

7 Possession and protection requirements

The nature of the work and the proximity to Any Line Open (ALO) will affect the need for a possession of the line, line blockage, or line blockage with additional protection.

An assessment of ALO risks shall be undertaken as set out in NR/GN/RMVP/0200. Protection of the line shall be applied as set out in GE/RT8000/HB7 or GE/RT8000/HB20 as appropriate.

8 Working with lines open to traffic

8.1 General requirements

Only work with lines remaining open to traffic when there is no other system of work that can be implemented:

Where the risk assessment shows that a line can foreseeably be fouled by the plant and/or its load, work shall only be carried out:

- a) with all affected lines blocked; or
- b) with a documented and authorised ALO plan, and additional risk control measures in place.

8.2 Conditions when working with any line open to traffic

When planning and implementing ALO working by on-track plant (OTP), civil construction plant and on-track machines (OTM), the guidance note NR/GN/RMVP/0200 shall be followed.

When activities are being undertaken outside the railway infrastructure boundary where there is the potential to foul lines open to traffic the guidance note NR/GN/RMVP/0200 shall be followed.

NOTE: NR/GN/RMVP/0200_Guidance Note details the planning principles and risk mitigations for any activities undertaken on the rail infrastructure where plant could foreseeably foul any lines open (ALO) to traffic.

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8.3 Action in the event of fouling an open line

In the event of inadvertent fouling of an open line, the machine and load shall be immediately made safe by returning the machine and its load to a safe position or emergency protection shall be carried out as specified within GE/RT8000/HB2.

If a task cannot be completed as planned without fouling the adjacent line, the work shall be stopped and either re-planned, cancelled or a line blockage with the correct additional protection as detailed in GE/RT8000/HB7.

9 Use of plant without a line blockage

9.1 Inside a worksite

Do not leave plant in a worksite in a position where it could be struck by a train or other vehicle moving on any line.

NOTE: The safe system of work for the line under possession will detail how train movements are managed.

9.2 Outside of a possession worksite or line blockage

Plant used outside a possession worksite or without a line blockage shall:

- a) be under equipment or lookout protection; and
- b) have a safe system of work that is compliant with GE/RT8000

If the track geometry can foreseeably be affected, then the safe system of work shall detail whether:

- a) the track can be returned to its original or a safe state before the passage of a train; and
- b) any plant and persons involved with the operation can move to a position of safety within the time limits specified in GE/RT8000 *Rule Book* before the passage of a train.

If the track cannot be returned to a safe state, or people and plant cannot move to a position of safety before the passage of a train, a line blockage shall be taken, emergency protection shall be implemented in accordance with GE/RT 8000.

Where the operation of plant is mobile along the trackside, working without a line blockage shall only be permitted where the movement is defined in the safe system of work.

10 Working on gradient or cant

Where plant is used on gradients and cants, the system of work shall include measures to prevent the occurrence of a runaway, failure to stop or overturning event. This shall be planned in accordance with NR/L2/OHS/019.

NOTE 1: This includes the effects that poor/low adhesion will have on the braking performance of a machine.

Only use plant within its safe working limits.

Select on track plant appropriately based on drive type.

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NOTE 2: OTP Drive types are 9b High Ride, 9a Hydrostatic Drive and 9c Low Ride. see RIS 1539 PLT

NOTE 3: Considerations shall be given to the site conditions and limitations as stated on the EAC/ECC. In some cases, a 9c (low ride) may not be suitable for certain infrastructure limitations such as raised check rails.

11 Working in areas with axle counters

When working in areas fitted with axle counters, the potential for inadvertent operation or damage to the axle counters shall be assessed and control measures implemented to prevent this.

NOTE: This is especially relevant where an item of plant is placed on the track and passed over an axle counter which registers its presence. If the plant is then removed from the track the section will continue to show occupied. Apply the requirements of NR/L3/OCS/084 Line clear verification.

12 Working in electrified areas

12.1 General requirements

For electrified lines with conductor rail equipment, OTP shall not operate without an isolation in place.

NOTE 1: An isolation of DC equipment requires the issuing of a valid conductor Rail Permit (CRP) and the fitting of earthing straps in line with NR/L3/ELP/3091. Test before touch (reference DC standard)

NOTE 2: Other plant may work near DC lines, such as civil construction plant or vegetation management plant. Irrespective of the plant type, an isolation needs to be applied to permit planned works to be undertaken.

Any work undertaken in overhead electrified line areas for traction power, shall have a detailed safe system of work identifying isolation requirements.

Where an isolation is required, it shall be implemented in accordance with NR/L3/ELP/29987

Limitations shown on the Product Acceptance (PA) Certificate or Engineering Acceptance Certificate/Engineering Conformance Certificate (EAC/ECC) shall be adhered to.

NOTE 1: This could include the limitations relating to items of OTP for on/off, cross tracking and travelling

NOTE 2: An isolation is where the OLE is isolated, earthed and an Overhead Line Permit (Form C) is issued.

12.2 Planning

Work planners shall firstly apply for an isolation.

Where an isolation of the OLE is not possible to obtain follow the hierarchy of control detailed in Section 12.3.

A detailed risk assessment shall be completed as part of the safe system of work, and all relevant approvals shall be obtained prior to works commencing.

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Where isolations are obtained, all works involving OTP shall be planned to maintain a safe distance from the OLE.

NOTE 1: The processes for seeking approvals is detailed in Section 12.3.1.

NOTE 2: Contact with OLE whilst isolated can cause damage to components and equipment which could result in equipment failure, faults and delays. This could be achieved by utilising MLD's.

12.3 Movements under live OLE

OTP or OTM movements under Live OLE shall not be undertaken where the task requires the plant, any component or attachment to be moved from its 'stowed' position.

12.3.1 Working under Live OLE

Works undertaken with OTP or OTM shall not come within 600mm of live OLE.

OTP or OTM shall not work under Live OLE unless it:

- a) has been approved for this purpose (see NR/L2/RMVP/0200/P300 and any limitations on the EAC/ECC);

NOTE 1: For up to date and accurate details of approved plant available, contact the POS Providers and Plant Suppliers as they are required to maintain robust asset registers of all their plant assets.

- b) has been earth bonded in accordance with the requirements of RIS-1530-PLT and Module P300;
- c) has approved movement limiting devices (MLD) set and tested in an area of electrical safety prior to working; and
- d) has a detailed risk assessment and a safe system of work confirming all clearances to the OLE can be maintained, which is briefed to all staff concerned prior to working.
- e) approval shall be gained from the Network Rail E&PME or the Designated Project Engineer (DPE) See NR/L3/ELP/29987 Module 2, clause 4.3.

See NR/L2/RMVP/0200/F0462 for Movement of OTP Under Energised OLE, Planning and Approval

12.3.2 On/off and cross tracking

OTP shall only be on/off or cross tracked at RRAPs that meet the clearance requirements defined in NR/L2/RMVP/0200/P301.

All on and off tracking and cross tracking activities for OTP that encroach within 2.75m (9ft) of OLE shall be undertaken under isolated and earthed OLE.

Setting and testing of approved MLDs shall be undertaken under isolated and earthed OLE.

OTP shall only be on/off or cross tracked under Live OLE where the plant and activity meets requirements set out in section 12.3.1.

See NR/L2/RMVP/0200/F0462 for Movement of OTP Under Energised OLE, Planning and Approval

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NOTE: Access and egress to the plant by staff needs to be safe. This should be limited to access to the operating cab and/or access to personnel carrying areas fitted with correct roofing or covers to separate staff from the risks of contact with Live OLE.

12.3.3 Travelling under Live OLE

OTP and OTM shall only travel under Live OLE where the plant and activity meets the requirements set out in section 12.3.1.

See NR/L2/RMVP/0200/F0462 for Movement of OTP Under Energised OLE, Planning and Approval

12.4 External overhead lines

Safe systems of work shall detail areas where third party cables cross the railway.

NOTE 1: Further guidance can be obtained from Health and Safety Executive publication HSE GS 6, Avoiding danger from overhead electric power lines.

NOTE 2: Third Party cables could be power or communications cables. The cable owners should be contacted at the planning stage to inform them of any works that might foreseeably foul their assets, and gather any details relating to restrictions that would need to be applied. Generally, contact details for assets owners should be located on pylons or posts used to support the cables.

13 Working with on-track machines and on-track plant

When working with OTMs and OTP, the safe system of work shall include:

- a) confirmation that operator(s) are competent and authorised to operate the plant to be used;
- b) verification that any testing or witnessing of tests has been completed for:
 - the operation of parking and dynamic brakes;
 - the operation of warning systems for example RCI systems, internal and external warning lights, horns, sirens; and
 - the operation and cleanliness of all lights for example marker lights, head lights, working lights.
- c) details of any restrictions identified in the EAC/ECC that might affect the planned works;

NOTE: This could be speed restrictions relating to propelling movements where visibility does not allow for a clear view of the transiting route.

- d) verification that safety devices are placed across cab doorways and that notices are displayed to warn against the dangers of passing traffic where rail vehicle movements may take place within 3 metres of the plant;
- e) verification that all protection equipment is in place (for example fencing); and
- f) information relating to points within the possession and all movements over them.
- g) exclusion zone requirements see relevant Task Risk Control sheets contained within NR/L3/MTC/RCS0216/
- h) setting of movement limiting devices

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The safety arrangements put in place shall allow for any person to safely exit from the plant on at least one side to a position of safety without crossing a line open to traffic

14 Portable and transportable plant

If using portable or transportable plant (e.g. track jacks, hand tampers), the safe system of work (SSOW) shall include protection in accordance with GE/RT8000/HB7 or, GE/RT8000/HB20.

Portable and transportable plant should not be used with unassisted lookout warning protection.

Only work with lookout warning to make emergency repairs to the infrastructure when there is no other SSOW that can be implemented.

NOTE: Manual handling / HAVs assessment should be considered.

15 Transporting plant to site

The safe system of work shall include all movements of plant from the stabling point to the site access point. See NR/GN/RMVP/0200 clause 9.2

16 Site lighting

The safe system of work shall detail site lighting requirements for on/off tracking, undertaking works and setting up machines. See NR/GN/RMVP/0200 clause 9.3

17 First aid needs assessment

As part of the safe system of work the Principal Contractor (PC) shall carry out a 'needs assessment' to determine first-aid requirements that will be adequate and appropriate to the hazards and risks present at the work site.

***NOTE 1:** This 'needs assessment' is required by The Health & Safety (First Aid) Regulations 1981 and should be included as part of the emergency procedures in your documented safe system of work to deal with any injuries occurring.*

This procedure should also identify a designated person on site responsible for contacting the emergency services and the methods by which serious casualties can be evacuated and transferred to hospital.

***NOTE 2:** Further guidance on carrying out a first aid 'needs assessment' is given in:*

HSE document L74, Guidance on The Health and Safety (First-Aid) Regulations 1981.

HSE document, Case studies for first-aid at work. The Health and Safety (First-Aid) Regulations 1981.

18 Lifting operations

If the planned work involves lifting operations including the use of MEWPs, the safe system of work shall include a lift plan and a risk assessment of the factors that might affect the lifting operation

***NOTE:** (see NR/L2/RMVP/0200/P503 for further information).*

A lift planner shall additionally:

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- a) determine the most appropriate OTP for the work and confirm the machine will be capable of undertaking each lift within its safe working limits; and
- b) plan any lifting of rail as set out in NR/L2/RMVP/0200/P503;

Where generic or routine lift plans are available, they may be used to help identify the OTP required.

19 Selecting plant

NOTE 1: When identifying the most appropriate item of OTP it is best practice to consult with the OTP supplier/POS Provider who might be able to offer some expert guidance. They will also be able to provide information about any limitations or certification issues associated with their range of machines. For Network Rail functions the Rail Plant Support Engineers and/or Area Plant Managers should be consulted.

To determine the most appropriate plant for the work, the planner shall:

- a) review:
 - i) the range of work activities to be undertaken,
 - ii) the information obtained from any site visit(s);
 - iii) appropriate reference documentation (Hazard Directory etc.);
 - iv) local and personal knowledge; and
 - v) the requirements of relevant modules in this manual.
- b) produce a documented plan of the sequence of work activities and devise risk controls that will be required at each stage based on the hazards identified;
- c) identify machines that will have the capability of undertaking the work within their safe limits of operation; and
- d) check each Certificate of Engineering Acceptance of OTP, identify and confirm there are no restrictions on their use that would affect the work.

20 Ordering plant

When the plant has been selected, determine its availability and operational status from the supplier(s) for the period that work is to take place.

NOTE 1: If the selected plant is not available, the supplier might be able to provide alternative plant suitable for the work.

If alternative plant is to be used, the planner/lift planner shall check it can safely undertake the work activity as planned. If it can't, the planner/lift planner shall:

- a) re-plan the method of work and update the SSOW; or
- b) request other alternative plant that can safely undertake the work activity.

OTP shall be ordered no later than T-6 to allow robust planning.

NOTE 2: Agree with the supplier where and when the plant is to be delivered in accordance with NR/L2/RMVP/0200/P502. NOTE 3: Contractual arrangements require OTP suppliers to confirm receipt of an order or acceptance of a call off order within 24hours of the order being placed, and to confirm which plant is to be provided within a further 48hours.

Required information about the work being planned and a copy of the authorised SSOW shall be provided with the order so that the supplier can review the plan against the plant requested to confirm suitability.

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If an alternative item of plant is offered, the planner shall review the plant SSOW and check the new item identified can safely undertake the work activity as planned.

NOTE 4: The planner should have lift planner competence if planning lifting operations.

The POS provider, the OTP supplier (if not the same organisation) and the client shall agree where and when the plant shall be delivered.

NOTE 5: See NR/GN/RMVP/0200 clause 9.5 for delivery point management

21 Safe storage of plant and equipment on site

See NR/GN/RMVP/0200 clause 12.5 for storage of plant and equipment

22 Planning completion

On completion of the planning process, brief the SSOW to all persons required to implement it.

NOTE: It is best practice for the planner to brief those responsible on the plan. A site visit can be used as part of this briefing.

23 Records

All records of OTP SSOW shall be retained after use for 6 years as set out in NR/L3/INF/02226/Schedules.

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Appendix A - Procedure flow chart

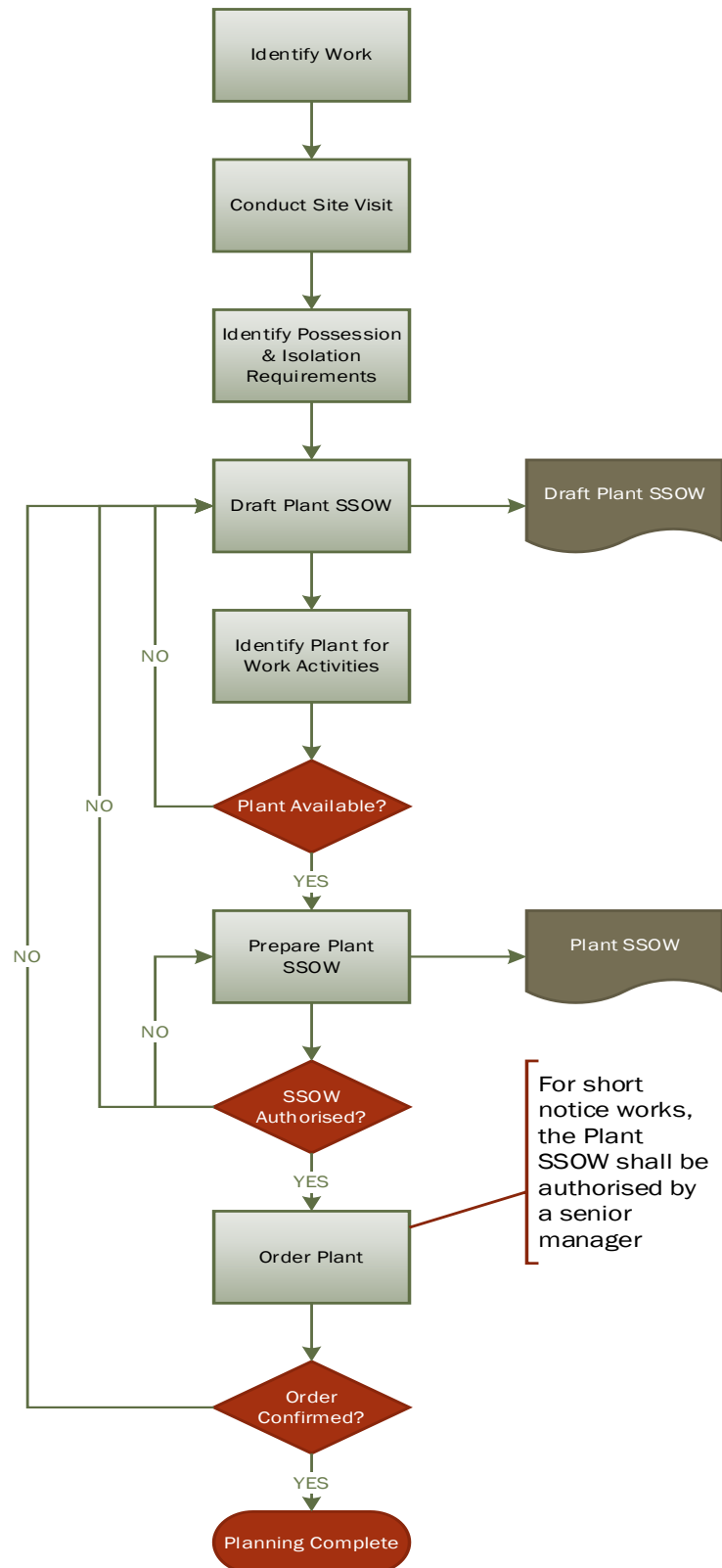


Figure 2 – Process flowchart

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Level 2

Module P503

Lifting operations

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Published and Issued by Network Rail, 2nd Floor, One Eversholt Street, London, NW1 2DN.



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User information

This Network Rail document contains colour-coding according to the following Red–Amber–Green classification.

Red requirements – no variations permitted

- Red requirements are to be complied with and achieved at all times.
- Red requirements are presented in a red box.
- Red requirements are monitored for compliance.
- Non-compliances will be investigated and corrective actions enforced.

Amber requirements – variations permitted subject to approved risk analysis and mitigation

- Amber requirements are to be complied with unless an approved variation is in place.
- Amber requirements are presented with an amber sidebar.
- Amber requirements are monitored for compliance.
- Variations can only be approved through the national variations process.
- Non-approved variations will be investigated and corrective actions enforced.

Green guidance – to be used unless alternative solutions are followed

- Guidance should be followed unless an alternative solution produces a better result.
- Guidance is presented with a dotted green sidebar.
- Guidance is not monitored for compliance.
- Alternative solutions should be documented to demonstrate effective control.

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Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2016	Reference added to exclusion zones and restricted areas in clause 3 Requirement to include lifting accessories as part of load clarified. Reference to 'Tandem lift' replaced by 'Multiple lift' to align terminology with BS7121.
3	June 2017	Removed reference to Jacks in Clause 4. Added reference to wind effect in Clause 6. Added details of landing legs and pad configurations in Clause 6. Mandated the requirement for site visit. Updated wording and terminology for clarity.
4	March 2019	General update of terminology and standards references. Combined content of P516 and P517 into this module
5	June 2022	General update of terminology and content.

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) failure of plant or its control or safety systems;
- b) operating error, operational error or equipment misuse;
- c) poor site or weather conditions;
- d) incorrect lifting operations (LOLER);
- e) lack of RIDDOR or close call reporting; and
- f) lack of continuous improvement, such as, mitigating factors from incidents not being introduced to machine/operating procedures.
- g) compliance with legislation (LOLER, PUWER, HASAW);
- h) damage to assets, e.g. RRV or its load hitting a passing train during ALO operation;
- i) overturning, e.g. RRV overturning during lifting operations;
- j) MEWPs becoming out of control, e.g. MEWP operator being crushed under a structure; and
- k) collisions, e.g. collision between a RRV and an OTM; staff injuries, e.g. Operator.

2 Scope

This module applies to all lifting operations carried out on Network Rail managed infrastructure and Network Rail projects when using on-track machines, on-track plant or any non-rail mounted mobile plant or road vehicle.

This module details the requirements for lifting operations to be carried out:

- a) under the control of a competent person (normally a crane controller or crane supervisor); and
- b) in accordance with a safe system of work which includes a lift plan.

It details the responsibilities of key personnel and provides recommendations for safe working on site. It includes specific requirements for multiple lifting, lifting track panels, lifting with flexible intermediate bulk containers, and lifting with magnets.

See the index of NR/PLANT/0200 for information on which:

- a) specific roles this module applies to; and
- b) modules that also apply to those roles.

This module does not apply to MEWPs, see NR/PLANT/0200/modules P508.

This module defines the requirements for a documented lift.

This module applies to all organisations involved with the planning or supply of plant, and those carrying out or controlling plant operations on Network Rail managed infrastructure and Network Rail projects.

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3 Roles

Roles affected by this module are detailed in the NR/L2/RMVP/0200 Introduction section.

4 Legislation

Organisations shall demonstrate compliance with LOLER and PUWER when planning and undertaking lifting activities on NRM1

All lifting operations shall be:

- a) Under the control of a trained and competent person (normally a crane controller or crane supervisor); and
- b) Carried out in accordance with an authorised safe system of work that includes a lift plan

5 Competence

Organisations shall demonstrate a suitable competence management system in line with the requirements of P500.

Organisations shall demonstrate systems that allow competence to be evidenced on site for Sentinel core competencies:

- Lift Planner
- Machine Operator/Crane Operator
- Crane Controller
- Slinger
- Crane Supervisor
- Appointed Person

Persons creating or authorising lift plans for OTP shall hold the relevant Sentinel Lift Planning competencies

6 Lifting Activities

6.1 Planning Lifts

All lifting operations, including the use of MEWPs, shall be planned in advance of any work being undertaken. Prepared lift plans shall be treated as controlled documents. Any lift that exceeds 90% of a crane's capacity requires approval from the relevant Professional Head or equivalent senior engineer.

NOTE 1: MEWPs are covered in Module P508

NOTE 2: See Module P501 for planning Safe Systems of Work

A documented lift plan shall be created when using any lifting equipment in accordance with *The Lifting Operations and Lifting Equipment Regulations (LOLER)*.

NOTE 3: A lift plan is part of, but additional to, the documented safe system of work.

Routine lift plans may be acceptable for lifting activities which are classified as basic.

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NOTE 4: Lifts are categorised as:

- **Basic** – A lifting operation where the characteristics are considered straightforward and there are no significant hazards.
- **Intermediate** - lifting operation where significant hazards have been identified with the load or with the working area or access route of the crane.
- **Complex** - Lifting operation where significant hazards have been identified with the load or with the working area or access route of the crane, and the crane is used to lift complex loads or persons, or where two or more cranes are used to lift the load, or where the lifting operation is carried out at a location with exceptional hazards.

A competent lift planner shall decide whether such plans can be used.

Each lift on a worksite shall be planned in advance of undertaking the activity.

NOTE 5: Activities of a repetitive nature could be lorries frequently unloading the same products in the same or similar location.

The lift plan describes when and where a crane controller is required and the considerations for planning multiple lifting or lifting with magnets.

When planning a lifting operation, a site visit shall be undertaken (see NR/L2/RMVP/0200 P501).

NOTE 6: This would be preferable that the Lift Planner undertakes the site visit, but it may be possible for another person with suitable knowledge to complete the site visit and provide that detail to the Lift Planner.

Examples for the minimum requirements for lift plans are described in Appendix A

6.2 When a crane controller is required

A crane controller shall be provided for all OTP/OTM lifting operations carried out on Network Rail managed infrastructure or Network Rail Projects.

When civil, non-rail mounted mobile plant or road vehicles & machines are undertaking lifting operations then a competent person shall be appointed to supervise the lifting operation in accordance with BS 7121-1 and LOLER Regulation 8 (1). An individual with rail competence shall be appointed to manage the railway risks e.g. COSS or Crane Controller is required when any part of the load or machinery comes within 4m of any line.

NOTE 1: Where the lifting equipment operator is a third-party employee, the procurer is responsible for providing the required documentation.

NOTE 2: 4m distance is consistent with CPA Guidance (reference: CPA 1801).

6.3 Undertaking lifting activities

The crane controller or crane supervisor shall:

- a) be briefed and understand the safe system of work;
- b) hold a copy of the latest lift plan to be used;
- c) brief all staff involved in the work task with the method of working;
- d) brief all staff involved in the work task following any changes to the system of work: and

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- e) ensure that lifting accessories are included within the lift plan.

When using outriggers, carry out an initial trial lift and re-pack the outriggers where necessary before slewing the machine.

Always raise and lower loads vertically. Use lifting accessories in accordance with the manufacturer's instructions making sure they are:

- a) suitable for the lift being undertaken;
- b) in a serviceable condition;
- c) in date for their statutory thorough examination; and
- d) included within the lift plan.

Carry out all lifting operations with the RCI and other safety devices switched on, operational and fully functional.

Never override or disregard any warnings given by the RCI and other safety devices.

During lifting operations, the maximum capacity of the crane at the selected duty shall not be exceeded.

NOTE 1: This could be confirmed by carrying out test lifts with no weight on the hook to confirm the radius capability of the machine being used.

NOTE 2: Considerations should be given to conditions and loads that might increase the radius of the lift beyond the planned safe operation, such as landing loads or inertia of slew movements.

When working with OTP only use lifting points that are approved in accordance with NR/PLANT/0200/module P300.

The location and safe working load of approved lifting points will be shown in the OTP operations manual.

Do not lift or lower a load from any other part of the machine (for example, bucket tooth).

Do not work a machine fitted with a motion cut system to the limits of the motion cut. Work inside the safe limits of the machine at all times.

If the motion cut is activated, it might not be possible to lower the load to the ground.

For details of hazards relating to weather conditions to be considered whilst undertaking lifting activities, see NR/L2/RMVP/0200 Module P505.

6.4 Multiple lifts (tandem lift)

When a tandem lift has been planned and authorised it shall be carried out under the control of one competent person. For OTP this shall be the tandem lift crane controller.

The person in charge of the tandem lift shall:

- a) follow the authorised lift plan;
- b) brief all affected staff of the plan and potential movements;
- c) set up the method of communication with each machine operator;

NOTE 1: duplex comms should be set up for 3-way communications.

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- d) make sure movements of the respective cranes are co-ordinated and controlled smoothly;
- e) stop the operation if any warnings or alarms are activated on either lifting machine and investigate the cause; and
- f) complete the crane controller checklists for both items of OTP.

Do not use OTP for tandem lifting unless they are fitted with a tandem lift mode function and ensure that the tandem lift duty charts are used when planning.

For non-rail mounted mobile plant or road vehicles the SWL shall be downrated by 33% at the radius that the lift is to be carried out for both static and dynamic (lift and carry) duties.

To determine the minimum SWL of the machines to be used, calculate how much load each of the machines will be lifting. This shall include the mass of any lifting accessories used by the machines when lifting the load. Increase the heaviest lift from this assessment by 50% to determine the SWL required for both machines to be used. Examples of this are shown in Table 1.

NOTE 2: Increasing the load to be lifted by 50% is the same as down rating the SWL by 33% but is easier to apply when calculating the required SWL of the machine to be used. This is the method used in Table 1.

If the tandem lift involves the use of panel grabs a flexible link (chain or cable) of minimum length 500 mm shall be fitted to both machines between the crane lifting point and the panel grab.

NOTE 3: The flexible link is fitted to provide a visible indication of any side loading from one machine to the other, which will be indicated by the link not hanging vertically.

When planning to use lifting equipment for multiple lifts (including powered portable rail gantries, switch handling units etc.), the SWL of each machine shall be reduced to prevent any potential for overloading during the operation.

NOTE 4: This does not apply to groups of equipment which are designed specifically for multiple lifting operations, for example PEMs, LEMs, rail movers and side rail loaders.

Example	Total load to be lifted including all lifting accessories	Total load to be lifted by each machine		Heaviest load to be lifted by one machine	50% of heaviest load to be lifted	Required SWL of both machines at the working radius
		No 1	No 2			
1. Load to be lifted is equally shared between both machines	8.0 tonnes	4.0 tonnes	4.0 tonnes	4.0 tonnes	2.0 tonnes	6.0 tonnes
2. Load to be lifted is not equally shared between both machines	8.0 tonnes	5.0 tonnes	3.0 tonnes	5.0 tonnes	2.5 tonnes	7.5 tonnes

Table 1 Examples of down rating machines for tandem lift operations

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6.5 Multiple Lifting

Lifts of a single load by three or more lifting machines shall only take place when authorised by the organisations' (plant owner and principal contractor) relevant Professional Head. Do not lift with any more than 2 machines if the load is rigid; multiple machines can be used on flexible loads.

6.6 Amending lift plans on site

Any amendments to a lift plan on site shall only be undertaken by a competent lift planner.

Any changes shall be documented and signed, and the relevant staff shall be briefed on the requirements of the revised lift plan.

NOTE 1: Examples of relevant staff include the crane controller, crane supervisors, operators, POS Rep, Slingsers.

NOTE 2: It may be possible for the competent lift planner to be an on-call member of staff, and could direct staff on site (such as Crane Controllers) to make the relevant amendments to the plan and undertake the briefings.

6.7 Communications

Only use product approved digital full duplex communication systems (see NR/PLANT/0200/module P505) when undertaking lifting operations.

If hand signals are used to supplement the control of lifting operations, they shall conform to those set out in BS 7121.

6.8 Work of a repetitive or low risk nature

Temporary control of a lifting operation shall only be delegated by a crane controller to a slinger where:

- the work being undertaken is of a repetitive and low risk nature;
- there is no risk of Any Line Open to Traffic; and
- the crane controller can maintain visual contact with the lifting operation and remains responsible for the lifting operation at all times.

NOTE 1: The crane controller remains responsible for the lifting operation at all times.

NOTE 2: If there is more than one slinger present, only one slinger can be appointed to take temporary control. This person needs to be clearly identified to the machine operator.

6.9 Slingsing

When slinging loads, confirm that the load is safe and secure when raised from the ground. Sling loads in accordance with the following basic principles of good slinging practice:

- the sling and its method of application shall be suitable for the load;
- slings shall not damage the load, or be damaged by the load being lifted;
- the method of attaching the sling shall prevent load movement;
- the sling shall not be overloaded; and

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a) the load shall be balanced when lifted.

Further guidance on the selection of lifting slings is given in:

BSEN 818-1

BSEN1492-1

BSEN1492-2

BSEN13414-1

BS ISO 23853

The Lifting Equipment Engineers Association: Code of Practice for the safe use of lifting equipment.

7 Lifting with flexible intermediate bulk containers

When moving materials using four-point flexible intermediate bulk containers (FIBCs) with cranes or hoists, use an appropriate spreader bar designed for handling FIBCs which is fitted with safety hooks to prevent the bag loops from slipping off the hooks.

When the FIBC is lifted, the lifting loops shall not be twisted when attached to the lifting frame.

All spreader bars are classed as accessories for lifting and are subject to compliance with NR/PLANT/0200/module P700.

Never drag FIBCs. If re-righting a FIBC that has toppled over onto its side, do this using an endless fabric sling wound through all the lifting loops.

FIBCs shall be inspected for condition prior to lift.

Only lift the FIBC by attaching all the lifting loops to a lifting frame.

NOTE 1: Any attempt to lift the FIBC using fewer loops than those provided might result in the loops being torn off or damaged.

Only lift FIBCs if they have been stored in accordance with BS EN ISO 21898 and contain their original contents.

All FIBCs should be disposed of after they have been emptied of their original contents.

NOTE 2: FIBCs degrade through contact with water and in sun light as well as through other mechanisms.

More detailed guidance on the use and handling of FIBCs can be obtained from the Flexible Intermediate Bulk Container Association

8 Lifting with magnets

The selection of an appropriate magnet for the work task to be completed shall be undertaken during the planning process.

NOTE 1: Under SI 1998 No. 2307 - The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER), magnetic lifting devices that are an integral part of a machine are classed as 'lifting equipment', whilst those that can be fitted to and taken off the lifting equipment are considered to be 'accessories for lifting'.

Lifting equipment used for magnetic lifting duties shall be:

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- a) fitted with warning devices and indicators to show when the magnet(s) are magnetised or operating at a reduced power level;
- b) protected against failure of electrical supply, for example, by means of batteries which come into operation automatically on the failure of the mains supply. Such systems shall support the load for up to 20 minutes to enable it to be manually lowered to the ground;

NOTE 2: *This does not apply to permanent magnet type of lifting equipment.*

- c) fitted with suitable power failure warning devices for both mains supply and stand-by equipment; and
- d) incapable of being energised if the stand-by equipment is below the required power level.

When lifting material from a stack (for example, rail or plates), the magnetic field might result in more material than required being magnetised and lifted, with those items furthest from the magnet liable to be easily displaced. A reduced-power or similar facility should be used to avoid lifting excess material.

Further guidance on the use of magnets for lifting see NR/GN/RMVP/0200 Guidance Note and HSE document OC234/16.

9 Lifting with gantries

Lifting activities undertaken using gantry crane equipment shall have an approved lift plan in place.

NOTE 1: *There may be various types of gantry lifting devices used on Network Rail Managed Infrastructure (NRMI). These may be mechanical lifting devices or powered plant.*

Lifting activities undertaken using gantry crane equipment shall be controlled by competent staff.

Operations of powered gantry systems shall be in accordance with a SSOW.

NOTE 2: *It is important to maintain the safety of the infrastructure, staff and member of the public when undertaking activities on NRMI. When operating mechanical or powered gantry equipment, the principles of operating OTP on NRMI should be applied.*

10 Failure of equipment on site

10.1 Failure of safety devices when working

If the RCI or load limiting device fail whilst work is in progress, the lifting operation shall only continue in order to make the worksite safe:

- a) if all of the relevant parameters of the lift are known and are within the limits of the authorised lift plan; and
- b) if no further work is undertaken until the RCI or LLD has been repaired, tested and calibrated.

NOTE 1: *The minimum number of lifts needed, which will depend upon the conditions prevailing at the site, should be agreed between the crane controller or crane supervisor and the crane operator.*

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10.2 Failure of Lifting Machines

If a lifting machine fails whilst using tandem lift mode, attempt in the following order to:

- a) repair the failed OTP;
- b) replace the failed lifting machine with a like for like machine fitted with tandem lift mode;
- c) replace both lifting machines with two machines fitted with tandem lift mode; or
- d) where possible, reduce the size and/or weight of the load to allow a single machine to complete the task.

It shall only be permitted to utilise two single lift machines (as defined on the ECC as not having Tandem Lift Mode fitted) to complete the lift, if the processes above cannot be met, and only if:

- a) planned and documented in accordance with 6.1; and
- b) approved by the organisation's Professional Head, relevant senior engineer or infrastructure manager.

10.3 Contingency plan

The contingency lift plan shall contain the details of the authorising manager/engineer.

Any additional control measures that might be required shall be:

- a) documented on the lift plan; and
- b) briefed to all relevant staff.

11 Handling rail

11.1 General

Rail handling operations shall be carried out in a way that prevents damage or distortion to the rails and in accordance with NR/L2/TRK/3419.

Only use lifting equipment to handle rail that:

- a) has relevant approval or certification;
- b) is appropriate for the rail section and method of lifting; and
- c) has the capacity to undertake the duties proposed.

Plan and undertake lifting operations in accordance with NR/PLANT/0200/modules P501 and the content of this module.

Use Table 1 to select the method of handling the rail.

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Rail length	Pick & lift	Pick & carry	Thimbling	Lifting accessory
Up to 6m	Yes	Yes	No	Chains, camlocks, web slings, approved rail lifting beams.
6m to 20m	Yes	Yes	No	Beams required with camlocks or web-slings; approved rail lifting beams.
20m to 90m Not Bullhead	Yes Laterally only	Single lift: No Multiple lift: Yes, up to 30m max rail length.	No	Multiple lift; beams and camlocks or web-slings; approved rail lifting beams.
Above 90m Not Bullhead	Yes Laterally only	No	Yes	Thimbling; max height of lift 500mm.
<p>NOTE 1: Where the rail being lifting is bullhead section, arrangements should be made to verify the rail can be retained safely in the upright position.</p> <p>NOTE 2: Chains should not come into contact with any part of the rail during lifting operations.</p> <p>NOTE 3: If Multiple lifting rail lengths, see para 11.2</p>				

Table 1 - Methods of handling rail based on rail length

11.2 Lifting rails

When lifting rails:

- use a two-point lift for rails longer than six metres and confirm that the weight has been evenly distributed;
- select equipment in accordance with section 11.1 table 1;
- position rails for lifting using an approved turning bar, and constrain by wedges, chocks or approved rail clamps specifically designed for the rail section;
- position lifting accessories at the centre of balance of the rail to be lifted so that when lifted, the rail is in a horizontal position;
- unless lifting rails using the long-welded rail train or thimbling operations, check the balance of the rail after it has been raised slightly off the ground. If imbalance is observed, lower the rail and reposition the lifting accessory to obtain a balanced lift;
- lift rails in the "head up" position;
- mark rails to be lifted with the lifting attachment points. Attach accessories for lifting within 25mm of these marked points;
- attach slings so that the rail will not twist as it is raised; and
- do not walk or stand under a rail when it is being raised or suspended.

Log grabs and grapples shall not be used when lifting new or serviceable rail.

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11.3 Landing rails

When lowering and landing rails:

- a) use timber bearers placed on the ballast whenever possible;
- b) do not land rails onto unstable supports; and
- c) do not land rails on to infrastructure assets, e.g. cables, TPWS racks, AWS magnets, or in a position where they could be accidentally moved onto such equipment.

11.4 Attachments

Check the EAC/ECC of the plant to determine whether the RCI should be in dig or lift mode whilst using a particular attachment.

Attachments that may be used in rail mode with the RCI in dig mode will be identified on the EAC/ECC.

In all other cases, the attachment shall be treated as a load, or part of the total load. The RCI shall be in lift mode and operational.

11.5 Pick and lift

Only use lifting equipment fitted with a rated capacity indicator (RCI) for static pick and lift duties (normally a road-rail excavator crane).

For rail lengths up to 20m, balance and restrain the rail by either a controlled handling device or the use of tag lines. Undertake a test lift to check the balance and correct the attachment of the lifting accessory; re-adjust if necessary.

11.6 Lift and carry

Use lifting equipment fitted with a RCI with 'lift and carry' capability for pick and carry duties (often a road-rail excavator crane).

Carry out an assessment of the cant encountered over the distance to be travelled with the load. Select lifting equipment with the capacity for the most adverse cant identified.

For rail lengths up to 20m, grip, balance and restrain the rail by either a controlled handling device or the use of tag lines. Make an initial lift to check balance and correct the attachment of the lifting accessory, re-adjust if necessary.

Where practicable, keep the rail parallel to the running line and as low as possible.

Lift and carry activities should be completed at walking pace only.

11.7 Pre-curved plain rail

Lift pre-curved rail using a two-point lifting method or device.

Transport and handle pre-curved rail in the same manner as straight plain rail, and take into account the position of the centre of gravity of the rail prior to any lift being carried out.

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11.8 Insulated rail joints

Handle standard length insulated rail joints (IRJs) using a lifting beam with a minimum of two lifting points.

NOTE 1: Additional lifting points might be necessary if the IRJ is non-standard length.

Lift and handle the IRJ in a way that prevents damage occurring to the insulated joint.

11.9 Lifting track panels

New or serviceable track panels shall only be lifted using specially designed accessories for lifting. Scrap track panels may be lifted with chain slings.

NOTE 1: Lifting track panels out of ballast can increase the load due to adhesion between the ballast and sleepers. This is especially the case in winter or when ballast conditions are poor. A method of overcoming this is to jack the panel free before lifting. A second method can be used and is completed under the crane supervisor/controller's direction. The first lift breaks the track panel out of the ballast to a point at least half-way along the track panel. Again, under the crane supervisor/controller's direction the second lift breaks the other end of track panel out of the ballast to a point at least halfway along the track panel. At this point the whole panel should be released from the ballast, any cleaning or scraping off the panel can be undertaken at this point with the panel released.

If the crane is unable to break the track panel out of the ground without triggering the RCI then jacking of the panel out of the ground to release it shall be undertaken prior to further attempting a lift.

Before lifting any track panel, the integrity of the rail fasteners shall be checked to confirm if they are capable of supporting the weight of the sleepers. If the fasteners are not capable of supporting the weight of the sleepers, the panel shall be dismantled and removed as separate components.

Do not attach a hook under the foot of the rail as a means of lifting the panel.

When selecting a sling for the lift, assess and confirm the:

- weight of the track panel;
- reduction in sling SWL due to the type of sling used; and

NOTE 2: For example, if using multi-legged slings, the load in each leg will increase as the angle between the legs increases.

- reduction in sling SWL due to method of attaching sling to load.

NOTE 3: For example, if using a chain sling for lifting scrap track panels which is attached to the panel by the choke-hitch method (also known as 'snickling').

Where the choke-hitch method is used, the SWL of the chain sling shall be no more than 80% of that marked (see BSEN 818-6 for further information).

NOTE 4: The use of the choke-hitch method might cause abrasion around the first five links in each chain and can lead to failure due to deformation of the chain links. When attaching the hook around the chain to form the choke-hitch, do not use force to move the hook closer to the load. Allow the bight to assume its natural angle which will be approximately 120 degrees.

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11.10 Thimbling rail

11.10.1 Rail Thimble attachments

Thimbles are lifting accessories which shall:

- a) have a safe working load of at least two tonnes;
- b) be capable of securely gripping the rail under the rail head and providing a pick and lift capability;
- c) be designed so that the rail cannot be accidentally released e.g. the integrity of the opening/closing circuits of a hydraulically operated thimble shall be protected to avoid accidental opening under load e.g. hose failure); and
- d) be suspended either:
 - i. directly from the main lifting hook; or
 - ii. from a dipper arm nose pin.

In both cases, the thimble shall be able to swivel freely.

11.10.2 Planning for thimbling

When using rail thimbles to move rail:

- a) a lift plan shall be prepared;
- b) lifting equipment specified for the operation shall meet the requirements of 11.6;
- c) the rail thimble shall be suitable for the type of rail being moved;

NOTE 1: The majority of thimbles require the rail to be raised and placed on blocks to allow the thimble to be correctly closed around the rail. The lifting of the rail to place it on blocks can be carried out in a number of ways, including using the thimble located only under the head of the rail. The suitability of the thimble for this duty should be determined and if not suitable, other means of lifting the rail should be planned and allowed for.

- d) determine the type, section and size of rail;
- e) rails less than 90m long shall not be moved by thimbling;
- f) do not thimble proprietary coated rail;
- g) do not use thimbling if the rail-head is badly lipped or side cut;

NOTE 2: The condition of the rail should be determined during a site visit prior to planning the operation.

- h) a crane controller specifically trained and authorised for thimbling shall be in control of the operation; and
- i) adjacent lines within 5m from the end of the rail shall be protected.

NOTE 3: Extreme caution should be taken at the end of the rail as there is a risk of rail whip as it lifts off the ground. This has the potential to cause injury to personnel and/or foul an adjacent line. Exclusion zones (see NR/PLANT/0200/module P505) should be enforced.

When planning the safe system of work, control measures shall be incorporated to avoid the following as a minimum:

- a) overstressing the rail;

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- b) uncontrolled movement of the rail;
- c) overturning the plant lifting the thimble; and
- d) damage to the infrastructure caused by the operation.

When using a thimble for laterally moving rail lengths of over 20m, (e.g. in a direction away or towards the machine, see appendix A) sufficient length shall remain on the ground to act as a restraint.

All ground personnel shall be at least 3m from the rail and at least 5m from the end of the rail when the free end is being raised off the ground due to the risk of rail whip.

11.10.3 Machine capacity and selection

Lifting equipment selected for the task shall:

- a) be fitted with an RCI with 'lift and carry' duty;
- b) have a minimum lifting capacity of 2 tonnes at a radius as defined in the lifting plan; and
- c) be capable of handling the length of rail to be lifted, from and to the positions required.

11.10.4 Site preparation

All rail welds and other obstructions that cannot be removed shall be clearly marked, briefed to ground staff, and indicated to the crane operator before the thimbling operation begins.

Pads, fastenings, bonds, fishplates, creep adjusters and other loose material shall be removed from rail or clearly marked. Blocks shall be available for:

- a) landing rail;
- b) passing obstructions; and
- c) use when attaching the thimble.

11.10.5 Thimbling process

Exclusion zones shall be applied so that personnel are:

- a) at least 3m from the rail being thimbled; and
- b) at least 5m from the free end of the rail when the thimble approaches this is due to the possibility of rail whip.

The crane controller shall confirm that the thimble is correctly closed on the rail before commencing each lift during the thimbling operation.

The Crane Controller shall maintain contact with the OTP operator using an approved full Duplex communications system.

Before moving a rail:

- a) remove any attached ballast, mud or rail pads;
- b) check and mark any further protrusions that cannot be easily removed which might snag the thimble; and

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NOTE 1: *Markings should be clearly visible to the Crane Controller and Machine Operator.*

- c) protect any signal, telecommunication or similar equipment close to the rail.

When an obstruction is reached, the rail shall be lowered onto blocks, the thimble opened and moved past before continuing with the operation.

During the operation, the load on hook indicator shall be monitored and the load not allowed to exceed the safe working load of the thimble or the lifting equipment.

NOTE 2: *This should be limited to a maximum of two tonnes.*

If the load approaches two tonnes this might indicate:

- a) that an obstruction has been encountered e.g., welds and pads;
- b) that the rail is fixed in position (for example, keyed up); or
- c) that the rail is snagged in some other way.

If the load approaches two tonnes, travel shall be stopped, the load lowered and the cause identified and rectified.

The rail shall be kept as low as possible at all times and shall not be lifted above 0.5m. The amount of bend in the rail shall be kept to a minimum, especially at joints, so that the rail is not overstressed.

NOTE 3: *The height of the rail being thimbled will affect the load placed on the crane, the higher the rail is lifted the greater the load on the crane.*

The operator shall orientate the crane to give maximum vision in the direction of travel and of the rail being handled.

The load shall be carried over the end of the crane undercarriage which has the greatest lift capacity.

NOTE 4: *For a road-rail excavator crane, this will normally be over the fixed axle end. This should be taken into account when on-tracking the machine so that the thimbling operation is undertaken over the correct end of the machine.*

Infrastructure restrictions such as OLE (Overhead Line Equipment) might influence the load/radius capacity of the crane.

The speed of the thimbling operation shall be limited to walking pace (3mph maximum) so that the crane controller can observe and control the operation. This shall include stopping the machine if the thimble:

- a) approaches any marked obstructions;
- b) snags on any obstructions that have not been identified and removed; or
- c) if personnel encroach within the three metres and five metre exclusion zones.

When landing the rail, it shall be stable enough to allow safe release of the lifting accessory and avoidance of damage to existing track components.

11.11 Rail cropping

When cropping rail:

- a) only work to the approved SSOW and method of work;

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- b) only use attachments approved and certificated to undertake cropping activities;
- c) establish and clearly mark the required rail length for cropping;
- d) maintain the correct exclusion zones around the work activity that will mitigate the risk of staff being struck by debris;
- e) do not crop rail within 10m of an under bridge in case any disturbed material falls in a public place below: and
- f) keep all staff (including the MC) at least 20m from the cropping head and at least 5m from ends of LWR being cropped.

11.12 Handling scrap rails

When lifting, handling, loading and unloading scrap rails:

- a) a documented SSOW and associated lifting plan shall be produced relating to the specific type of plant to be used for the task;
- b) only use items of plant that have the required lifting capacity and compatibility with attachments to complete the lifts;
- c) the dimensions of rail lengths and total weights to be handled shall be identified as part of the planning process; and
- d) the method of securing or retaining the lengths of scrap rail shall be identified and detailed in the SSOW. The specific process implemented shall mitigate the risk of rail lengths moving laterally as well as longitudinally.

Only use attachments, such as log grabs and grapples in the following circumstances:

- a) if they and any associated attachments have been product accepted and meet required legislation to handle rail;
- b) where only single sections of scrap rail up to 6m (20ft) are lifted at any one time unless the conditions in item c) are met; and
- c) to lift up to a **maximum of three lengths** of scrap rail of a similar length up to 6m, using log grabs of the over-lapping jaw type in a single lift where:
 - i) the risk assessment shows no other feasible option is available.

NOTE 1: If using an OTP Excavator crane to load multiple lengths of different size rail, best practice would be to retain the rails within a suitable container, such as ballast box.

NOTE 2: When loading trailers with rail, the correct sequence and stacking methods are detailed in NR/L2/RMVP/0200 Module P509.

NOTE 3: Other OTP systems such as gantry lifting devices will require a process to secure the rail for transit.

NOTE 4: Confirm the maximum permissible weight trailers or gantries are permitted to carry with the details/limitations on the ECC/EAC or details in the OEM Operations Manual.

NOTE 5: Longer lengths of scrap bull head rail may require alternative methods to load and unload due to the nature where the rail has a tendency to 'bow'.

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Appendix A - Lift Plan details

A lift plan should contain as a minimum, details of any equipment, hazards or conditions that might affect the planning and undertaking of lifting activities, such as:

- Machine type and lifting accessories (model, fleet ID, asset ID);
- Track geometry i.e. cant, curve and gradients;
- Electrification present at site (DC and/or AC) and subsequent isolation requirements;
- Buried services, culverts, catch pits etc so that it is confirmed the ground stability is adequate for the planned lifts;
- Any lines open to traffic and how they are managed;
- Lifting methods (single or multiple);
- Any special slinging requirements for the planned load(s);

Associated risk assessments of site hazards should detail:

- Delivery Point management, including the collection points, traffic management requirements or any other special requirements relating to the location;
- Limited clearances;
- Transit routes to site;
- Proximity to line side furniture;

NOTE 1: The lists above are not exhaustive.

NOTE 2: There are various templated examples of Lift Plans that are available through the RPA and M&EE Networking Group. For Network Rail functions, the SMF/PL/0253 Combined Method Statement and Lift Plan document is to be used.

NOTE 3: Special requirements for S&C such as spreader beams should be specified within the lift plan.

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Level 2

Module P505

Safe working with plant

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User information

This Network Rail document contains colour-coding according to the following Red–Amber–Green classification.

Red requirements – no variations permitted

- Red requirements are to be complied with and achieved at all times.
- Red requirements are presented in a red box.
- Red requirements are monitored for compliance.
- Non-compliances will be investigated and corrective actions enforced.

Amber requirements – variations permitted subject to approved risk analysis and mitigation

- Amber requirements are to be complied with unless an approved variation is in place.
- Amber requirements are presented with an amber sidebar.
- Amber requirements are monitored for compliance.
- Variations can only be approved through the national variations process.
- Non-approved variations will be investigated and corrective actions enforced.

Green guidance – to be used unless alternative solutions are followed

- Guidance should be followed unless an alternative solution produces a better result.
- Guidance is presented with a dotted green sidebar.
- Guidance is not monitored for compliance.
- Alternative solutions should be documented to demonstrate effective control.

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Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out. Clause 3 Principal Contractor Licensing (PCL) Scheme added. Clause 4 Safety critical work added. Reference to restricted area added to 9.3. Clause 9.4 now shows separate sub-headings, risks from diesel exhaust emissions expanded. Clause 9.8 Ballast dust added. Additional requirements added to clause 12. New clause 21 Weather conditions added.
3	March 2019	General update of terminology and standards references. Some sections moved to Guidance Note. Re ordered sections to improve content flow.
4	June 2022	General review and update as required. Update guidance for exclusion zone and referenced task risk control sheets

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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1 Purpose

This module manages controls relating to these risks:

- a) failure of plant or its control or safety systems
- b) operating error, operational error or equipment misuse
- c) multiple plant movement and collisions
- d) poor site or weather conditions
- e) incorrect lifting operations (LOLER)
- f) lack of RIDDOR or close call reporting
- g) lack of continuous improvement such as mitigating factors from incidents not being introduced to machine/operating procedures.

2 Scope

This module applies to:

- a) those undertaking Principal Contractor duties to be licensed as set out in NR/L2/INI/CP0070
- b) all organisations involved with the planning or supply of plant
- c) those carrying out or controlling plant operations on Network Rail-managed infrastructure (NRMI) and Network Rail (NR) projects.

It defines requirements to:

- a) manage employees who undertake safety critical work
- b) create and accept a Safe System of Work (SSOW)
- c) use appropriate communications and lighting systems on site
- d) mitigate hazards that arise when using plant
- e) prevent damage to the infrastructure during work operations
- f) protect against hazards arising from the infrastructure or environmental conditions when using plant.

See the index of NR/L2/RMVP/0200 for information on which:

- a) specific roles this module applies to; and
- b) modules that also apply to those roles.

3 Principal Contractors Licencing scheme (PCL)

Any organisation undertaking Principal Contractor (PC) duties where Network Rail is the client shall comply with NR/L2/INI/CP0070.

Principal contractors shall demonstrate they have arrangements in place within their organisation to identify and maintain competence as set out in the On-Track Plant Operations Scheme rules.

NOTE: Further information can be found in NR/L2/RMVP/0200/module P101 and P521.

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4 Safety critical work

Any person who carries out safety critical work shall be assessed as competent and fit to carry out that work using the process set out in NR/L2/RMVP/0200/module P500.

NOTE: This is a requirement of the Railways and Other Guidance Transport Systems (Safety) Regulations (ROGS).

5 Implementing a safe system of work

The SSOW created for a particular work task shall be created, accepted and verified in accordance with NR/L2/OHS/019 prior to implementation.

The Person in Charge (PIC) shall check they have access to, and use of, any relevant sources of local knowledge required to implement the SSOW.

NOTE 1: There is a specific requirement within NR/L2/OHS/019 for a Responsible Manager to appoint a PIC who is familiar with the location of the work for which they have been provided a SWP. This familiarisation may be undertaken by studying the content of the pack, other sources of information, and where necessary due to the complexity of the work and/or site, a site visit prior to the work taking place.

NOTE 2: The SWP planning process is not complete and ready for implementation until a plan has been accepted. Only the PIC who has verified the SWP may implement the SSOW. This is carried out using the process set out in NR/L2/OHS/019.

6 On-Track Plant Operations Scheme (POS)

NOTE: The On-Track Plant Operations Scheme (POS) is a certification scheme operated by Network Rail that defines the management framework requirements for the provision and operation of on-track plant (OTP) on NRMI and NR Projects.

7 On, off and cross tracking

Only place OTP on or off the track:

- a) at approved road rail access points identified in the safe system of work; and
- b) in accordance with the operating instructions and Engineering Conformance Certificate (ECC) for the OTP

OTP shall not be placed or removed from track by:

- a) using a dipper arm to elevate and align the plant onto the rail; or
- b) placing vehicle jacking legs (not outriggers) on sleeper ends

Report all cases where road rail access points identified by the safe system of work are not provided at the site to the Route Control Centre.

One braked road axle shall remain in contact with the ground, rail head or rail wheel at all times when on or off tracking the OTP.

NOTE 1: Some OTP may have axle interlocks

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Check OTP for correct functionality before and immediately after placing on track. Results of these checks shall be recorded using NR/L2/RMVP/0200_F027.

Remove any OTP with defective brakes from service, mark them as defective, and apply the process detailed in NR/L2/RMVP/0200/module P100.

OTP found not to be compliant with the requirements of NR/L2/RMVP/0200_F027 shall be removed from the track and left in a position of safety. If this is not immediately possible, the plant shall:

- a) have one end off-tracked to prevent inadvertent movement and have a red light fitted at both ends until it is removed to a position of safety; or
- b) be secured with wheel-scotches and have a red light fitted at both ends until it is removed to a position of safety.

NOTE 2: Permanent RRAP's such as Level Crossings may require additional protection and traffic management in line with Highways Act, Road Traffic laws, CDM Regulations. Guidance on Delivery Point Management see NR/GN/RMVP/0200

Temporary RRAPs and Proprietary systems shall be installed according to the OEM instructions

NOTE 3: Modular units are required to be installed in full as per OEM instructions

8 On site communications

Only use an approved digital full duplex communication system when undertaking safety critical activities with plant either on or off the track.

NOTE 1: Further information can be found in NR/L2/RMVP/0200/module P300.

Check the communication system for correct functionality prior to any work commencing. Check it again if a change in conditions that could affect the method of communication occurs.

If a full duplex communication system fails after work has started and the problem cannot be resolved, the machine or crane controller shall:

- a) attempt to source replacement equipment

NOTE 2: Consideration should be given as part of a contingency plan to plan for extra units being available in case this safety critical equipment fails.

- b) agree an alternative safe system of work with the operator if the time required to source alternative equipment will import risk to completing the task within the given possession working time

NOTE 3: The use of hand signals is permissible in this instance except in poor visibility or weather conditions as described in 27.3.

- c) record why an agreed alternative SSOW is being used on the OTP Work Plan/Work Package Plan (WPP)/POS checklist/Machine/Crane Controller (MC/CC) checklist. Report the defect to the site or line manager
- d) report the failure and consequent actions through the Close Call system.

OTP operations shall not commence if the full duplex communications system fails prior to the start of work.

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There may be circumstances where full duplex communication equipment might not be required e.g. where both the machine controller and machine operator are in the same cab.

If full duplex communication equipment is not required, the arrangements shall be risk assessed and authorised in the SSOW prior to commencing work.

9 Transit in a worksite

Considerations shall be given to transit speeds within a worksite.

Movement speeds shall be agreed by all parties (this may include the POS, ES, Operator, etc) and authorised by the ES.

The machine controller shall have a clear view of the planned movements.

At the planning stage, the location of the controller shall be detailed.

If systems are available to allow the controller to travel in the plant, these shall be tested and confirmed before any movements take place.

Any restrictions relating to the plant detailed on the EAC/ECC shall be applied.

See NR/L2/RMVP/0200 Guidance note - Appendix A

10 Movement of multiple on-track plant within a possession

10.1 General principles

Multiple OTP movements shall be identified at the planning stage and shall be recorded within the safe system of work.

Carry out multiple movements of OTP in accordance with the GE/RT8000/HB15.

10.2 Maintaining a safe distance between plant

When travelling with multiple items of plant on the same track, unless it is planned to work in tandem or in close proximity to each other.

- maintain a minimum distance of 100 metres between each item of plant.
- Do not exceed speed as per GE/RT8000-HB15 or any lower speed restriction that might apply

NOTE: Speed restriction may be due to limitations detailed on an EAC/ECC of the plant, or identified as part of the worksite and communicated from the Engineering Supervisor (ES). Plant / machine should default to the lower working / operational speed as stated in the limitations of the attachment

Use full duplex communications systems between travelling machines

Regulate movements at a distance and speed so that it shall be possible to stop clear of any other item of plant or obstruction, or before reaching any hand signal that is being displayed.

Table 1 shows the maximum braking distance for OTP from RIS-1530-PLT, when working on level track in dry conditions. When working in wet conditions or on gradients allow for greater stopping distances.

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Speed (km/h)	Max stopping distance (metres)	Speed (miles per hr)	Max stopping distance (yards)
8	6	4.97	6.56
16	18	9.94	19.69
24	36	14.91	39.37
32	60	19.88	65.61

Table 1 Maximum braking distance for OTP

11 Using plant in degraded rail head conditions

The safe system of work shall include appropriate mitigations to reduce extended braking distances where rail head conditions might deteriorate.

NOTE 1: This could be due to other activities being undertaken within the worksite that might affect the rail head condition.

The safe system of work shall assess extended braking distances when:

- working on wet track
- working on contaminated (slippery) track
- working on gradients; and
- towing or propelling other vehicles.

Where rail head contamination or track conditions adversely affect braking distances:

- reduce speed
- make allowances for extended stopping distances
- leave a greater distance between vehicles or other equipment on track; and
- carry out running brake tests at regular intervals during the shift to test the effectiveness of the brakes.

NOTE 2: Braking distances can be considerably extended if the wheels of the vehicle stop rotating and slide along the rail head during a brake application. If this condition occurs, optimum braking performance will not be achieved and a 'release and reapply' or cadence braking technique should be used to regain control of the OTP.

12 Moving people on plant

Only travel or ride on a machine:

- in accordance with the GE/RT8000/HB15;
- when permitted by the machine's Engineering Acceptance Certificate/Engineering Conformance Certificate (EAC/ECC)
- in accordance with the safe system of work produced for the work task
- in areas of the machine specifically designed and approved for that purpose
- when authorised to do so.

NOTE: for travelling or riding in MEWP see NR/L2/RMVP/ 0200 Module P508

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People shall not be raised or lowered in plant not specifically designed for that purpose.

13 Travelling without a machine controller (MC)

13.1 Risk assessment before travelling

Before authorising any OTP to travel without a MC (sometimes known as Send & Receive), confirm that as part of the planning process that the following have been assessed:

- a) the complexity of the route to be travelled over

NOTE: The level of complexity might be affected by adjacent lines, switches and crossings, signalling, tunnels, stations and gradients.

- b) whether a load is to be carried on a trailer during the movement. An inventory of the load shall be available to the dispatching MC; and
- c) wherever possible the termination point of the movement should be indicated by a significant infrastructure item (such as a signal, station, signal box, level crossing).

Plant shall only traverse switches and crossings, and level crossings with a MC present to control the movement from a position on the ground.

Where the risk assessment concludes that the OTP can travel without an MC, the MC shall be given details of the arrangements of the planned movements to be put in place.

13.2 Briefing requirements

The briefing requirements in this clause are in addition to the general requirements for briefing in GE/RT8000/HB15.

The MC shall brief the machine operator on the arrangements for the movement.

The MC shall confirm the machine operator understands the arrangements for the movement.

The OTP operator shall not go beyond the briefed termination point until authorised by an MC.

The briefing shall include all information relevant to the movement and route including:

- a) confirmation that the MLD travel slew lock (where fitted) is engaged
- b) position and instructions relevant to all signals including ERTMS block markers and shunt entry markers where provided
- c) position and instructions regarding any signage
- d) details and instructions regarding any switches and crossings
- e) the location and associated instructions concerning the movement over any level crossings (including user worked crossings) and footpath crossings
- f) details of emergency arrangements

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- g) details of communication systems to be used
- h) the maximum speed authorised for the movement and estimated travel time shall be clearly directed, communicated and controlled both in written arrangements, risk assessments and in practice..
- i) inventory of any load being carried and the need to check this before dispatch and at the termination point
- j) adjacent lines and their operational status; and
- k) details of the termination point.

NOTE: The briefing might be supplemented by a diagram and/or written instructions as defined by the risk assessment.

13.3 Conditions for travelling

OTP shall only travel in rail mode without a MC where:

- a) the route to be travelled over is not a safe environment for the MC
- b) the OTP being used is not able to accommodate the MC
- c) it has been shown to be safe by a risk assessment
- d) the machine operator is competent to carry out the unaccompanied movement
- e) the PIC, ES or PICOP has confirmed that no work activity has been authorised on the portion of line required for the movement, and that the line is clear for the OTP movement to take place
- f) the movement will not pass over any automatic level crossing, unless the crossing has been closed to road traffic

NOTE 1: Closed to road traffic means that the highway is closed in accordance with the New Roads and Street Works Act 1991.

- g) the OTP, including any attached vehicle(s) and any load being carried by those vehicles is within the plant gauge

NOTE 2: Plant gauge is a combination of the W6a gauge for use on Network Rail, the LG2 gauge for use on London Underground and the Lower Sector Vehicle gauge.

- h) emergency equipment is carried on the OTP including:
 - i) suitable communications capable of covering the extent of travel between dispatch and termination point are provided and functioning correctly

NOTE 3: Duplex communications might not be suitable due the limitation of range.

- j) the machine operator has been given full details about the movement and been briefed
- k) an MC is located at the termination of movement point before the dispatch takes place
- l) the MC at the termination point of the movement will be clearly visible and displaying a stop hand signal to the machine operator upon approach.

The MC shall only travel on the OTP where the engineering acceptance certificate (ECC) indicates the OTP is able to accommodate the MC.

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14 Exclusion zones,

Before starting work,:

- a) the MC/CC shall set up any required exclusion zone around the machine, the attachments and any load
- b) the MC/CC shall set up any attachment to the machine that is appropriate to the task to be undertaken
- c) the minimum exclusion zone shall be defined by the OTP's maximum working radius + length of any load (irrespective of orientation of the load) or 10m unless a specific activity or attachment stipulates a required exclusion zone see Risk Control manual NR/L3/MTC/RCS0216
- d) the MC/CC shall brief any staff that might be affected by the work on the limits of the exclusion zone and reach a clear understanding.
- e) Only personnel authorised by MC/CC shall be permitted to access the agreed exclusion zone

During work:

- a) continually maintain the exclusion zone ;
- b) continually assess the worksite for any changing conditions; and
- c) change the exclusion zone should this be necessary.

NOTE: The size and shape of the exclusion zone or restricted area will depend on the activity being undertaken and the attachment being used.

15 On site lighting

Any lighting required for the safe operation of plant or work being carried out shall be identified during preparation of the SSOW.

16 Discharge of gases

16.1 Flammable atmospheres

Assess the potential for plant to generate flammable atmospheres in the vicinity of heat or ignition sources, including passing trains. Identify and implement preventative measures as part of the SSOW.

If there is a fire on site, do not put anyone at risk.

An initial attempt at immediately extinguishing a fire may be made providing it is small and safe to do so.

If this is not possible raise the alarm and evacuate the area.

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16.2 Diesel engine exhaust emissions

When planning to use, or using, diesel powered plant, undertake an assessment of the risks to health arising from exposure to exhaust emissions of plant. Prevent or control exposure to this hazard and maintain any controls implemented.

16.3 Petrol engines

Unless a documented safe system of work and COSHH based risk assessment have been undertaken and the risks have been shown to be acceptable, or suitable and sufficient controls have been put in place, do not use petrol engines in these locations:

- a) in tunnels (as defined in Sectional Appendix);
- b) under bridges where the length of the bridge has the potential to lead to a build-up of a noxious atmosphere; or
- c) on stations with overall roofs, except those areas of stations specifically permitted for road traffic.

17 Discharge of debris

Where the operation of plant produces debris and/or sparks, undertake an assessment of the process and site conditions.

NOTE 1: An example is flailing. Further information can be found in NR/L2/RMVP/0200/Module P511 and other activities can be found within other modules

Identify arrangements in the SSOW to remove risks wherever practicable. Detail the briefing arrangements for other risk mitigation measures. The assessment shall include measures to prevent injury to personnel and damage to the plant, passing trains or infrastructure (including potential fire risks).

Unless required by duties as part of planned works, do not enter an area where ballast dust is present.

NOTE 2: Further information on working with ballast can be found on the BDWG page on Network Rail's Safety Central web site. It includes information on ballast handling activities within the Rail Industry, identifying the risks, establishing controls and working towards risk avoidance for ballast dust.

The web site can be found by following the link; <https://safety.networkrail.co.uk/>

18 Protecting the infrastructure

18.1 Infrastructure and equipment

The use of plant on platforms, decks, bridges or other structures shall not be undertaken without confirmation that the structure is strong enough to bear the weight of the plant and any load it might carry.

NOTE 1: Unless an assessment of risk to the infrastructure has been carried out, dynamic track stabilisers or machines with similar actions should not be used.

NOTE 2: The assessment should include risks to any adjacent structures.

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18.2 Points

Observe information in the SSOW relating to points within the possession and movements over them.

A movement over points shall not be authorised unless the points are set correctly for that particular movement, and the machine controller is required to check that points are in the correct position prior to movements over them. See NR/L3/OPS/255

18.3 Overhead line components

Plant that might emit steam or exhaust gases directly onto insulators associated with OLE structures shall be managed to mitigate the risk of corrosion, fire or general damage.

18.4 Lineside equipment

Plant that might emit steam or exhaust gases directly onto line side equipment shall be managed to mitigate the risk of corrosion, fire or general damage.

18.5 Lines open to traffic

If the process of setting up or packing away the plant:

- a) will affect any line open to traffic; or
- b) requires persons to go to the side of the plant adjacent to an open line,

follow the requirements set out in:

- a) GE/RT8000/HB7 Rule Book; Handbook 7 General duties of a controller of site safety (COSS);
- b) GE/RT8000/HB8 Rule Book; Handbook 8 IWA, COSS or PC blocking a line

If work is to be carried out with any line open to traffic, then the arrangements detailed in NR/L2/RMVP/0200/module P501 shall also apply.

NOTE: Further guidance on planning and managing any line open activities, see NR/GN/RMVP/0200 - Guidance Note

19 Working in electrified areas

19.1 General

Do not use any plant or equipment in an electrified area without an isolation unless the safe system of work states that it is safe to do so. Adhere to the requirements of the Rule Book GE/RT8000/HB16 AC electrified lines and GE/RT8000/HB17 DC electrified lines.

NOTE: Further guidance on planning and managing plant movements in electrified areas, see NR/GN/RMVP/0200/Module P501 – Systems of Work

19.2 Overhead electric power lines

In areas where third party overhead, electric power lines cross the railway, follow the requirements of the Health and Safety Executive Guidance Note GS6.

NOTE: Take note of the sections described as:

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- a) working near but not underneath overhead lines: the use of barriers
- b) passing underneath overhead lines
- c) working underneath overhead lines.

20 Working at height

If working or controlling work at height, adhere to the requirements of NR/L2/OHS/022.

21 Shunting movements

Only attach, detach or move rail vehicles in accordance with the GE/RT8000/SS2.

Do not tow or propel any plant or rail vehicle with other rail mounted plant unless:

- a) the powered and non-powered vehicles are specifically designed or adapted for that purpose
- b) each vehicle is equipped with a tow bar or other coupling device that provides a safe and secure attachment; and
- c) all limitations shown on the vehicle's Product Acceptance Certificate or EAC/ECC are observed.

22 Transporting plant and materials by rail

When loading plant and materials on rail vehicles, OTP and rail trailers, undertake in accordance with NR/L2/RMVP/0200_Module P509.

Follow the requirements of NR/L2/SCOSCO/203 and NR/L3/SCOSCO/308 when loading plant or materials on rail vehicles. Check that bulk loads are spread evenly within a wagon and that any spillage is cleaned away before allowing the vehicle into transit.

NOTE: The examination of certain types of load carried by rail vehicles, and the acceptance of out of gauge loads on rail vehicles, are set out in GE/RT8000/TW4.

When loading or unloading plant or materials from rail vehicles where they could foreseeably foul an adjacent line, then:

- a) an approved ALO plan shall be in place
- b) a competent person shall be appointed (e.g ALO Coordinator)
- c) the lines affected shall be protected in accordance with the GE/RT8000/HB7 or GE/RT8000/HB21 as appropriate.

The method adopted for loading or unloading plant and materials from any vehicle shall not cause damage to the infrastructure.

23 Plant used on or in rail vehicles or rail trailers

Only use plant on or in rail vehicles or rail trailers if:

- a) its use has been assessed and authorised at the planning stage; and
- b) any required control measures have been identified in the safe system of work.

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Apply all the required control measures during work and assess the work and worksite throughout the operation for any change in conditions that could affect or require changes to the control measures.

24 Recovery of rail mounted plant

Recover rail mounted plant which has failed on the track as set out in the OEM approved recovery procedure for that plant,

NOTE 1: Consider any limitations on its' PA certificate or EAC/ECC that might affect the method of recovery.

Apply measures to prevent the runaway of any towed or propelled plant in the event of a coupling failure.

NOTE 2: For some machines, it is necessary for the travel drive system to be disengaged and emergency plans will need to take account of this to prevent runaways, for example, by use of wheel scotches.

Only recover on-track plant following an incident using the process set out in NR/L2/RMVP/0200/module P100.

NOTE 3: Further information and guidance on best practice on dealing with the recovery of on-track plant can be found in the M&EE group publication COP0027 Code of Practice for OTP Recovery.

25 Leaving plant unattended

Only leave on-track plant unattended in rail mode in accordance with GE/RT8000/HB15.

26 Checking the infrastructure on completion of work

26.1 Removing plant, tools or equipment on completion of work

Before handing back a track possession, check confirmation has been given that:

- a) everyone is clear of the line and all plant, tools and equipment have been removed or safely secured; and
- b) equipment that might have fouled the line has been moved and secured clear of the line.

Prior to departing the site, check in the vicinity of all RRAPs, including the route from the lineside access point to the track for:

- a) any damage to the infrastructure caused by on or off tracking
- b) any damage to track components caused by on or off tracking
- c) that track geometry and track stability has not been affected by the on or off tracking process.

Inform the Person in Charge (PiC) or Engineering Supervisor (ES) of the outcome of the checks. The Person in Charge (PiC) or ES shall report any damage to the Person in Charge of Possession (PICOP) and the Route Control Centre.

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27 Weather conditions

27.1 General

Consider the operation of cranes and MEWPs if they are likely to be affected by poor weather conditions e.g. strong wind, heavy rains, electric storms, ice or snow. Each of these conditions might impose loads on a machine that adversely affects its safe operation or present hazards to the people operating them.

Also consider factors that can produce unsafe conditions following bad weather e.g. waterlogged and unstable ground after a period of heavy rain. The SSOW should set out what measures or actions need to be taken for weather conditions.

27.2 Wind

Do not operate lifting machines in wind speeds that exceed those specified by the manufacturer in the operating instructions.

Take extra care when handling loads that present a large surface area. Such loads can catch the wind and affect its safe handling or the stability of the crane.

NOTE 1: Limitations on wind speed for erecting, testing and dismantling cranes might be lower than those for normal operation. Advice in these situations should be sought from the crane supplier.

NOTE 2: Make allowances for gusting wind conditions which might further adversely affect the safe handling of loads.

Follow any advice from the machine manufacturer regarding out-of-service conditions.

If machines are placed where they might be affected by high winds, fit an anemometer at a suitable location on the machine.

NOTE 2: This is usually in the most exposed position.

Monitor the wind speed throughout the lifting operation with the fitted anemometer. Where not fitted or defective, use a handheld anemometer(s).

NOTE 3: Wind speed increases with height and so will be a greater risk on larger and taller cranes and any loads.

NOTE 4: The calculated maximum permitted wind speed for a particular load is based on the formula given in BS 7121-1:2016 Annex D.

27.3 Poor visibility or weather conditions

Approved Full Duplex communication systems shall be provided to maintain contact between Machine/Crane Controller and Machine Operator.

In extreme conditions where the safety of other people on site might be endangered, stop operations until there has been sufficient improvement in visibility to enable work to be resumed safely.

NOTE: Take reasonable precautions to reduce the risks to staff, equipment and loads.

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Date:	04 June 2022
Compliance date:	03 September 2022

Level 2

Module P506

On-track Machines

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Ref:	NR/L2/RMVP/0200/P506
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

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Ref:	NR/L2/RMVP/0200/P506
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out. Reference to competent staff, route conductors and NR/L3/NDS/308 added to Section 8. Section 6Working within a possession added. Section 9Working with 'wagons' added. Section 10Twin jib cranes added.
3	December 2018	General update to terminology and content.
4	June 2022	General update to terminology and content.

Reference documentation

All reference documents and legislation are given in: - NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) compliance with legislation (LOLER, PUWER, COSHH, HASAWA);
- b) damage to assets, e.g. OTM's incorrectly stowed equipment hitting a passing train during ALO operation;
- c) runaway/failure to stop on demand, e.g. OTM running away on a gradient;
- d) derailment, e.g. OTM being loaded incorrectly; and
- e) staff injuries, e.g. Operator being trapped between machine and infrastructure or machine and machine.

2 Scope

This module defines the requirements for using on-track machines (OTM) including:

- a) setting up appropriate exclusion zones;
- b) working under live overhead line equipment, including third-party lines;
- c) operating an OTM both within and outside a possession; and
- d) the actions to be taken before allowing a machine into traffic.

This document applies to organisations involved with the following:

- a) planning or supply of OTMs; and
- b) carrying out or controlling of operations involving OTMs on Network Rail managed infrastructure and Network Rail projects.

This module also applies to rail vehicles on which plant is mounted (wagons).

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3 General principles

The lights displayed by an OTM should not be relied upon to determine whether it is moving in any particular direction.

NOTE 1: *Whilst OTMs normally display white lights to the front and red to the rear when moving on the track, they can show these lights in reverse if undertaking a wrong way movement.*

Do not use an OTM for the movement of other rail vehicles unless a working and approved compatible brake system is connected and the machine is designed or adapted for that purpose.

If you are the machine operator:

- before commencing or changing the direction of movement of a machine, confirm that it is safe to do so and give warning of your intentions by using the horn in accordance with the convention used for on-track plant in GE/RT8000/HB15
- if leaving the cab temporarily, check that the machine has been brought to rest in a safe position and the hand brake is applied;
- do not operate the machine with access panels or machine guards removed. Materials or equipment shall not be carried on the OTM unless it is safely stowed or secured; and

NOTE 2: *Stowed or secured means within the confines of a purpose designed loading area, using correct load restraining equipment attached to approved lashing points.*

- do not allow other persons to travel on the OTM unless provision has been made for this purpose.

4 Exclusion zones

When working with OTMs, exclusion zones shall be put in place in accordance with NR/L2/RMVP/0200/P505.

Examples of areas where exclusion zones should be implemented might include:

- the cutter bar area of a ballast cleaner due to unexpected movement of ballast (commonly known as ground suck in);
- the satellite on continuous action tampers;
- the work head area of a stoneblower or tamping machine; and
- the slewing area of a crane's counterweight or superstructure.

5 Working in electrified areas

If OTMs are to work under live OLE:

- comply with the requirements for working in electrified areas in accordance with NR/L3/ELP/29987;
- carry out a risk assessment in accordance with NR/L3/ELP/29987;
- detail the method of working and the safe system of work in accordance with NR/L2/RMVP/0200/P501;

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- d) set all height limiters to maintain the required clearance to live overhead line equipment; and
- e) do not climb above the warning line painted at cant rail height. In the absence of such a line, do not climb onto platforms or decks that are greater than 1.4m above rail level unless they are covered and approved for working beneath live overhead equipment.

NOTE: The warning line at cant rail height is normally orange but can be black or white depending upon the background colour of the machine.

6 Working within a possession

If work cannot be carried out without fouling another line, plan any line open (ALO) working in accordance with NR/L2/RMVP/0200/P501 and GE/RT8000/OTM, *Rule Book, Module OTM, Working of on-track machines (OTM)*.

Work to be carried out outside of the work site but within a possession shall be planned and undertaken in accordance with GE/RT8000/HB9. *Rule Book, IWA or COSS setting up safe systems of work within possessions*.

Transiting between work sites within a possession shall only be carried out with the agreement, and on the instruction of the Person In Charge Of a Possession in accordance with GERT8000/HB11, *Rule Book, Duties of the person in charge of the possession (PICOP)*.

7 Working outside a possession

Only work an OTM outside a possession if it is allowable in accordance with the requirements of:

- a) GE/RT8000/OTM, *Rule Book, Module OTM, Working of on-track machines (OTM)*; and
- b) GE/RT8000/HB20, *Rule Book, Handbook 20, General duties of a safe work leader (SWL) working outside a possession*.

8 Preparing for transit

Before allowing an OTM into traffic:

- a) confirm all moveable elements are stowed and locked within the loading gauge;
- b) confirm that any travel drive systems have been disengaged and locked in the disengaged position as required;
- c) carry out a running brake test in accordance with GE/RT8000/OTM, *Rule Book, Module OTM, working of on-track machines (OTM)*;
- d) carry out all checks required by the operating instructions for the OTM to verify that the OTM is ready for in train movements;
- e) confirm that vehicles have been loaded and examined in accordance with NR/L3/SCO/308; and

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- f) confirm that OTM drivers are competent in accordance with NR/L2/RMVP/0200/P500 and are permitted to drive an OTM on the operational railway or within a possession.

NOTE: A route conductor is provided to assist a driver that does not have route knowledge for a section of route. The route conductor will provide the driver with information in sufficient time to enable the driver to comply with signals, reductions in permissible speed and scheduled stopping points.

9 Working with 'wagons'

Rail vehicles on which plant is mounted (wagons) shall be classified as an OTM if:

- the wagon can move or be moved by rail outside a possession; and
- the plant is rail mounted whether directly or indirectly on the wagon when operating.

NOTE 1: for further details see BS EN 14033-1 - Track. Railbound construction and maintenance machines - Technical requirements for running.

The same rules and controls that apply to the operation of OTMs shall also apply to any vehicle that has been modified using a conventional 'wagon'

NOTE 2: Examples include side loaders, side tippers, rail delivery trains and drain trains.

10 Twin jib cranes

Where a purpose built twin jib crane is controlled by one operator, the lifting operation is classed as a single lift and only one crane controller with (OTM-TRM) competence is needed.

NOTE: The crane controller's certificate or Sentinel competence might not necessarily reference tandem lift competence.

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Compliance date:	03 September 2022

Level 2

Module P508

Mobile Elevating Work Platforms

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Published and Issued by Network Rail, 2nd Floor, One Eversholt Street, London, NW1 2DN.



Ref:	NR/L2/RMVP/0200/P508
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

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Ref:	NR/L2/RMVP/0200/P508
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out. Additional requirement regarding use of tool safety lanyards added to Section 5.3 New Section 3 safe system of work added and Section 5 re-titled to work safe.
3	December 2018	General update of content and terminology. Enhanced sections relating to maintenance. Some content moved to guidance note.
4	June 2022	General update of content

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

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Date:	March 2022
Compliance date:	June 2022

1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) failure of plant or its control or safety systems;
- b) operating error, operational error or equipment misuse;
- c) multiple plant movement;
- d) poor site or weather conditions;
- e) incorrect lifting operations (LOLER);
- f) lack of RIDDOR or close call reporting; and
- g) lack of continuous improvement.

It emphasises the application of the Work at Height Regulations 2005 and the need for selection and operation of a MEWP to be properly planned, supervised and conducted in a safe manner

2 Scope

This module defines the general principles of operation and maintenance for mobile elevating work platforms (MEWP).

This module applies to all organisations involved with:

- a) planning or supply of any MEWP;
- b) carrying out or controlling operations; or
- c) maintaining plant involving MEWP on Network Rail-managed infrastructure (NRMI) and Network Rail projects.

NOTE: See the index of NR/L2/RMVP/0200 for information on which:

- a) specific roles this module applies to; and
- b) modules that also apply to those roles.

This module applies to MEWP installed or fitted to any plant or machine.

It describes factors to be considered during the planning stage. It also defines safety considerations, as well as requirements for an emergency rescue.

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3 Planning the work

3.1 Safe system of work

The operation of a MEWP shall be planned, supervised and carried out in a safe manner.

Before using a MEWP, a safe system of work that includes a documented lift plan and recovery plan shall be prepared by a competent person (see NR/L2/RMVP/0200/P501).

NOTE: Assistance to complete this task can be sought from a MEWP owner and/or POS provider who has the knowledge and experience in the selection and use of MEWPs.

4 Selecting the correct machine

Some MEWPs have a variable capacity depending on the configuration of the work platform (for example, platforms with side shift). Always consult the Plant Supplier/ POS Provider to confirm the capability and capacity of the specific machine.

5 Assessing the load

When planning the work, calculate the combined weight of staff (including any PPE worn) and the equipment and/or tools and materials to be carried.

They should not exceed 90% of the maximum Safe Working Load (SWL) of the MEWP. This will provide SWL contingency when on site.

6 Operations

6.1 General principles of operation

MEWPs shall only be operated using the appropriate controls located in the work platform or original equipment manufacturer (OEM) fitted remote control which might be used for some on/off tracking activities.

NOTE 1: This does not apply in an emergency rescue situation.

It is only permitted to travel in an elevated work platform of a MEWP in working mode if the machine has been specifically designed and certificated to be operated in this manner.

Do not travel in a work platform if movement of the MEWP in travel mode is controlled from a position other than the main controls in the basket.

A machine controller (or person capable) to implement the emergency rescue procedure shall be identified and available on the ground and in close proximity of the machine whenever the MEWP is in working mode.

NOTE 2: Being in close proximity of the machine will allow the identified member of staff to react in the event the emergency recovery procedure is required to be implemented.

MEWP operations shall be under the control of a machine controller from a safe position on the ground, this includes:

- a) movements along the track when the MEWP is in travel mode;

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- b) travel movements in road mode where any part of the MEWP can come within 3 m of the line; and
- c) working mode on rail or road where any part of the MEWP can come within 3 m of the line.

Communications between the machine controller and machine operator shall be in accordance with NR/L2/RMVP/0200/P501.

6.2 Before starting work

Confirm the SWL of the MEWP to be used is sufficient for the combined weight of persons and equipment to be carried.

Check the emergency control (usually a foot switch) is operating correctly and that the machine can be stopped in an emergency.

If there is any doubt about the positive operation of this control, the vehicle shall not be used until it has been examined by the MEWP's maintainer and passed as 'fit for use'.

6.3 When working

Attach and wear a harness and work restraint at all times whilst in the MEWP work platform. Do not stand on guardrails or toe boards.

NOTE 1: The wearing of a harness and work restraint is a Network Rail Safety Life Saving Rule.

Look around before moving an elevated work platform to make sure that:

- a) the platform will not hit or snag any part of the infrastructure;

NOTE 2: Pay particular attention to any parts of the infrastructure that might have been temporarily suspended and not in their normal position.

- b) people will not become trapped. To avoid the risk of entrapment, do not raise the platform directly under a structure, instead:
 - i) raise the platform to the side of the structure to a height just above the desired work height; then
 - ii) lower and manoeuvre the platform towards or under the structure by either slewing the basket or travelling the machine in creep drive.

Do not support the weight of the conductor or any other cables being installed or removed either:

- a) directly on the handrails of the machine; or
- b) on any person within the platform.

This can significantly add to the load being carried by the platform and can result in severe overloading or overturning of the MEWP.

Do not allow equipment with cables or hoses attached to hang on the outside of the platform. Pay particular attention to prevent objects striking or interfering with the controls of the MEWP.

Do not apply any manual forces, including sideways forces, to the work platform that exceed those permitted by the manufacturer.

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Only use the work platform in a manner that exerts a horizontal force if it is specifically permitted by the MEWP manufacturer. This can be monitored by the MEWPs RCI or by some other means of load limitation.

Secure hand tools and other small equipment by personal tool safety lanyards when using such equipment outside the perimeter of the basket to prevent them being dropped and injuring staff below.

Do not operate a MEWP in wind speeds that exceed the maximum specified by the manufacturers and detailed in the EAC/ECC. Take the effects of funnelling of buildings, tunnels and natural structures in the landscape such as cuttings or valleys into account. Measure wind speeds with an anemometer.

Table 2 shows examples of wind descriptions and speeds/Beaufort scale

Description of wind	Effect of wind on the environment	Wind speed (mph)	Wind speed (m/s)	B'fort Scale
Calm	Calm, smoke rises vertically	0 - 1	0 – 0.2	0
Light Air	Direction of wind shown by smoke	1 - 3	0.3 – 1.5	1
Light Breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind	4 - 7	1.6 – 3.3	2
Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag	8 - 12	3.4 – 5.4	3
Moderate Breeze	Raises dust and loose paper; small branches are moved	13 - 18	5.5 – 7.9	4
Fresh Breeze	Small trees in leaf begin to sway; crested wavelets form on inland waterways	19 – 24	8.0 – 10.7	5
Strong Breeze	Large branches in motion; whistling heard in telephone wires	25 – 31	10.8 – 13.8	6
Near Gale	Whole trees in motion; inconvenience felt when walking against wind	32 – 38	13.9 – 17.1	7
Gale	Breaks twigs off trees; generally impedes progress	39 – 46	17.2 – 20.7	8
Strong Gale	Slight structural damage occurs (chimney pots and slates removed)	47 – 54	20.8 – 24.4	9

Table 1 – Estimated wind speeds

7 Installing materials or equipment

Exercise extreme caution when taking loads into the work platform at height.

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If the weight of the load is not accurately known it can lead to overloading or overturning of the MEWP. Load sensing systems may not provide protection in these situations.

8 Emergency and rescue procedure

An emergency and rescue plan shall be put in place whenever operating a MEWP.

Emergency descent controls and systems are often specific to individual MEWPs. People who have on-site responsibility for the rescue of a trapped/injured person should therefore complete periodic drills using the ground and emergency controls to maintain familiarity with the machine. Figure 1 shows the standard emergency descent decal.



Figure 1 – Standard Emergency descent decal

9 Fitting additional equipment to a MEWP

Do not carry tools or materials on the work platform guardrails unless they are designed, approved and certificated to do so.

10 Maintenance and thorough exam

Carry out pre-use checks in accordance with:

- the manufacturer's instructions for the particular machine; and
- in accordance with the requirements of NR/L2/RMVP/0200/P700.

Check the logbook for the MEWP. If it shows any defects seek confirmation from the MEWP owner or maintainer that they have been remedied.

NOTE 1: MEWPs are subject to *The Lifting Operations and Lifting Equipment Regulations (LOLER)*, It is a requirement that they be thoroughly examined at least every 6 months by a competent person and their certification be available.

In the event of operational overloading of the MEWP basket, the plant shall be brought into a safe position and inspected in line with OEM instructions.

NOTE 2: This may require thorough examination prior to returning to service.

Data loggers shall be downloaded to review overload events stored.

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11 Work restraint anchorage points on MEWPs

Check the anchorage point(s) and fixings prior to use in accordance with the guidance given for the use of restraint devices in the MEWP operating instructions. Record any defects in the machine logbook. Do not use the anchorage points if they do not conform to the manufacturer's recommendations.

fall arrest equipment must not be used in place of a work restraint.

NOTE 1: *In the majority of railway MEWP applications there is a limited height of work and hence fall arrest equipment is not appropriate. A risk assessment should be carried out if fall arrest is considered necessary. This should include the use of MEWPs specifically designed for the use of this type of equipment.*

The number of staff attached to an anchorage point shall not exceed the number that it is rated for.

NOTE 2: *Each anchorage point should be marked with "Restraint only" (by words or symbol) and the number of persons who can attach to it at the same time.*

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Date:	04 June 2022
Compliance date:	03 September 2022

Level 2

Module P509

Trailers and Wheeled Attachments

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Date:	04 June 2022
Compliance date:	03 September 2022

Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out. Module updated in line with current industry practice regarding use of trailers.
3	December 2018	General update of terminology and standards references. Added content of Module P518
4	June 2022	General update to terminology and content.

Reference documentation

All reference documents and legislation are given in:- NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) compliance with legislation (LOLER, PUWER, HASAW);
- b) runaway/failure to stop on demand, e.g. OTP running away on a gradient;
- c) poor site or weather conditions;
- d) damage to assets, e.g. RRV, trailer or its load hitting a passing train during ALO operation;
- e) collision, e.g. collision between a RRV and an OTM; staff injuries, e.g. Operator being trapped between machine and infrastructure;
- f) operating error, operational error or equipment misuse;
- g) lack of RIDDOR or close call reporting; and
- h) lack of continuous improvement, such as, mitigating factors from incidents not being introduced to machine/operating procedures.

2 Scope

This module describes the minimum requirements for the planning and safe operation of On Track Plant (OTP) trailers and wheeled attachments.

This module applies to all organisations that are involved with any of the following:

- a) planning or supply of any trailer or attachment;
- b) carrying out or controlling of operations involving any trailer or attachment; and
- c) maintenance of trailers or attachments used on Network Rail managed infrastructure and Network Rail projects.

This module applies to:

- a) trailers and attachments with more than two rail wheels, towed or propelled by on-track plant (OTP);
- b) OTP that is towed as a trailer; and
- c) failed OTP that is being recovered from Network Rail managed infrastructure.

It does not apply to trailers with braking equipment to UIC (International Union of Railways) specifications.

Guidance is given on the appropriate loading and unloading sequences of trailers and the securing of all loads.

See the index of NR/L2/RMVP/0200 for information on which:

- a) specific roles this module applies to; and
- b) modules that also apply to those roles.

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3 Competence

Persons involved in the undertaking of Plant activities involving trailers or wheeled attachments shall hold the relevant competencies as defined in NR/L2/RMVP/0200/P500.

4 Risk mitigations and control measures

Working with trailers and wheeled attachments can pose a number of risks to health.

Control measures shall be implemented where there are risks identified that work activities associated with Working at Height or Occupational Health are present.

NOTE 1: When coupling or uncoupling stacked trailers or materials/equipment on loaded trailers, a Safe System of Work should cover controls for Working at Height risks. See NR/L2/RMVP/0200/P501

NOTE 2: When working with wheeled attachments that might produce airborne particulates (such as ballast regulation equipment), a Safe system of Work should cover controls for managing the occupational health of staff. See NR/L2/RMVP/0200/P102

5 Planning

Persons planning and carrying out the loading of trailers require adequate knowledge of:

- a) assessing weight of materials and equipment and their centre of gravity;
- b) infrastructure hazards, obstructions and plant gauge;
- c) the capabilities of the trailers, limitations on the Engineering Acceptance Certificate (EAC)/Engineering Conformance Certificate (ECC) and manufacturer's instructions;
- d) load behaviour and principles of uniformly distributed loads (UDL);
- e) load restraining devices and principles;
- f) the characteristics of different load materials (for example, steel on steel); and
- g) the use of chocks and dunnage.

6 Using trailers and wheeled attachments

6.1 General

Trailers and attachments used on Network Rail managed infrastructure and Network Rail projects shall be approved for use in accordance with NR/L2/RSE/100/05 and RIS-1530-PLT.

Vehicles towed as a planned move shall be classed as a trailer and meet the requirements of a trailer.

Do not ride on any part of a trailer or its load unless it has been specifically designed for this purpose as per NR/L2/RMVP/0200/P501.

Dozer blade trolleys shall be marked with an identification number.

A functional parking brake test shall be carried out:

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- a) immediately after placing a trailer or attachment on the track and before releasing the trailer; and
- b) after coupling or uncoupling a trailer or attachment.

Do not use trailers or attachments on track if the braking system is defective.

NOTE 1: *The reference to attachments in this instance means attachments with more than two rail wheels.*

Remove trailers or attachments that develop defective brakes in service from the track as soon as practicable. Do not disconnect them from the host machine until they are to be removed.

NOTE 2: *It might be necessary to unload them first.*

If the trailer or attachment cannot be removed from the track or the towing vehicle is incapable of lifting the trailer, the consist shall remain coupled to the host vehicle until a lifting machine can be used to remove the trailer. At all times the trailer shall be secured to prevent runaway.

NOTE 3: *For the purpose of this module, a trailer consist is defined as one or more trailers coupled to a towing vehicle*

Only leave trailers or attachments unattended on track in accordance with the Rule Book GE/RT8000/HB15, *Rule Book, Handbook 15 Duties of the machine controller (MC) and on-track plant operator*. The requirement to check that the parking brake is correctly applied shall be undertaken by the machine or crane controller in accordance with clause 4 of this module.

DC isolation shall be in place at all times whilst a trailer is on the track in DC electrified line areas (3rd and/or 4th rail). This includes on and off tracking operations and is in addition to the possession.

Certificates of Engineering Acceptance (EAC) or Engineering Conformance Certificates (ECC) for the trailer or attachment shall be available on site to the machine controller and/or crane controller.

If the EAC or ECC is not available, then the trailer or attachment shall not be used.

Further information on OTP attachments can be provided by POS providers, or from Network Rail's *On-Track Plant Attachments Handbook*, published on Safety Central.

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6.2 Trailer types

There are two principal trailer types that will determine the way in which the load is distributed:

- trailers with a three-point suspension arrangement with one oscillating axle, where the load should be concentrated as shown in figure 1; and
- trailers with a four-point suspension arrangement where the load should be distributed evenly as shown in figure 2.

Figure 1 Trailer with three-point suspension arrangement

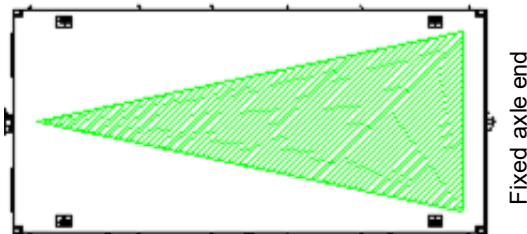
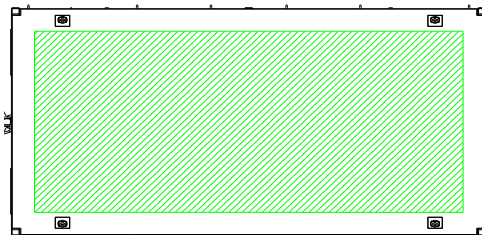


Figure 2 Trailer with four-point suspension arrangement



Information regarding the use and limitations of individual trailers can be found:

- in the appropriate operator's manuals and training instructions;
- on the vehicle (for example, data panel showing speed, carrying capacity); and
- in the EAC/ECC.

6.3 Compatibility of trailers and wheeled attachments

Only tow or propel trailers or attachments that are compatible with the towing machine. Trailers shall be attached as shown in Figure 3.

Only plan to couple trailers of different makes and/or model where the owners have declared the brake systems to be compatible.

The maximum brake system operating pressure of the towing vehicle shall be:

- within the operating pressure range of the trailer or attachment to be towed; and
- no greater than the maximum allowable operating pressure of the trailer or attachment to be towed.

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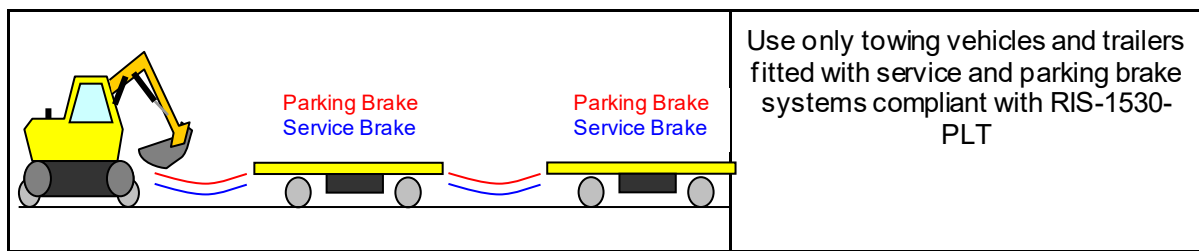


Figure 3 Attachment of trailers and towing vehicles

NOTE: The maximum towing capability of the towing vehicle and speed is defined on its EAC or ECC.

Speed of movements display of head and tail lights and forward visibility shall be in accordance with GE/RT8000/HB15. If an overhanging load obscures any light, an alternative shall be provided to maintain compliance.

Make sure the load carrying area is free from debris before loading trailers.

Only use fibre straps when strapping rail down for transportation purposes.

6.4 Coupling and uncoupling of trailers

The machine operator shall carry out the coupling and uncoupling procedure.

The machine/crane controller shall be present to verify the procedure has been carried out correctly.

Carry out a functional brake test in accordance with the manufacturer's instructions and clause 5 of this module whenever a trailer is on tracked or uncoupled.

Only use trailers that pass a functional brake test.

When uncoupling trailers:

- bring the vehicles to a stand;
- apply the towing vehicle parking brake and stop the engine (where necessary);
- release the brake pressure in accordance with the manufacturer's instructions;

NOTE: There is usually a time delay for line pressure to decay after stopping the engine.

- disconnect the brake hose and restart the engine (where necessary);
- undertake a functional trailer parking brake test in accordance with clause 4 of this module, to verify that the parking brake is effective; and
- uncouple the tow bar.

6.5 Loading trailers

When loading trailers, or planning the use of trailers, the following shall be reviewed:

- any limitations applied by the EAC/ECC.
- the maximum carrying capacity of the trailer;
- any stated requirements for loading, unloading or distributing the load on the trailer;
- the effect that cant and/or gradient, switches and crossings might have on the trailer and load;

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- e) the effect that start-up acceleration forces and braking might have on the load; and

Loads carried by trailers shall be kept as low as possible and uniformly distributed about the centre of the loading area to maintain maximum stability.

When trailers are loaded, a competent person shall confirm that the:

- a) load is stable and not liable to shift or fall;
- b) the load shall not present a risk of collision with persons, trains, or the infrastructure whilst travelling;
- c) the load remains within plant gauge;
- d) the load shall not excessively overhang if carried over multiple trailers; or
- e) be subject to external forces.

6.5.1 Loading and unloading sequence

When loading or unloading either:

- a) follow the sequences given in the Original Equipment Manufacturer (OEM) or vehicle convertor's literature where these are given; or
- b) where no specific sequence is given, follow the requirements in Appendix B.

Make sure that trailers remain as evenly loaded as possible; and stable during the loading and unloading sequence.

Where a trailer is being loaded on the same track as a road-rail vehicle that does not have the lifting capacity to use all the loading area of the trailer, the load shall be stacked symmetrically around the centre of the trailer as shown in figure 10.

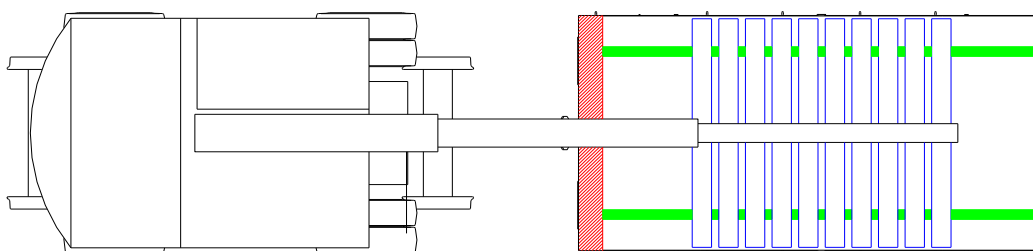


Figure 4 Loading a trailer with limited load/outreach capacity

6.5.2 Loading and unloading plant

When loading or unloading mobile plant onto a trailer, make sure that:

- a) the trailer being loaded has sufficient support to prevent tipping, for example, jack legs. Do not use an excavator arm to stabilise the trailer during loading/unloading;
- b) approved ramps and trailer combination are used for both loading and unloading

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- c) there are no freely suspended loads or attachments on the plant being loaded that may affect stability, gauge or tractive effort;
- d) protection is in place to prevent damage to the infrastructure or any part of the machine fouling lines open to traffic;
- e) the operator is competent in the loading and unloading of mobile plant onto OTP trailers; and
- f) a risk assessment has been completed and a safe system of work is employed.

6.6 Oversized loads

On-track plant is normally built to plant gauge which provides rail vehicles trailers and their loads with adequate clearance to prevent them from coming into contact with railway infrastructure and other rail vehicles.

NOTE: Improved technology used in recent years to measure the infrastructure and analyse clearances to plant gauge has shown that there are many structures on the network that are foul to plant gauge. Some structures are foul in the upper sector (more than 1100 mm above rail level) but most are foul in the lower sector (such as platforms and underbridge girders)

If exceeding plant gauge with a load, see figure 10, either reduce the size of the load, or split the load into smaller component parts.

Where it is not possible to do this, the loading arrangements shall be planned in advance. Include a site walk through as part of the pre-start site visit (see NR/L2/RMVP/0200/P501) and use the factors in table 1 to identify any limitations that need to be included in the loading plan.

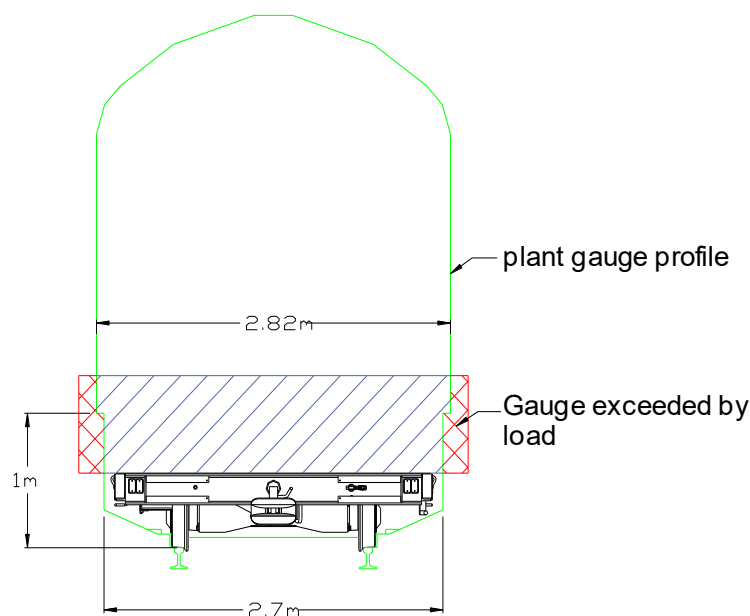


Figure 5 Illustration of load exceeding plant gauge

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When travelling with oversize loads	Actions to consider
a) Identify minimum clearances to the infrastructure throughout the route to be travelled. b) Verify that adequate clearances can be maintained to other engineering trains, OTM or OTP movements on adjacent lines. c) Declare the maximum permitted travel speed. d) Consider the safety of staff during movements particularly in areas where clearances are restricted.	a) Pre-plan and document the movement as part of the safe system of work. b) Reduce travel speed to walking pace. c) Block adjacent lines to traffic on the side of the vehicle that plant gauge is exceeded. d) Stop engineering movements on the adjacent line whilst the load passes. e) Re-position the load if necessary to pass restricted clearances.

Table 1 – Factors when moving oversize loads

6.7 Carrying rail

Do not overhang rails at the end of a trailer by more than 3 m and allow a minimum clear space of 500 mm at each side of the trailer.

Rails longer than 30ft shall be carried over multiple trailers spaced at no more than 5m apart.

NOTE 1: *Rails up to 30ft in length can be accommodated on one trailer.*

Stack multiple layers of rails in a pyramid fashion to maintain stability of the load and trailer.

See Appendix C

NOTE 2: *Use suitable dunnage on the trailer deck and between the layers.*

When using multiple trailers, do not rigidly secure the rails to the trailers as this might cause derailment.

6.8 Load retention

Always identify the need and appropriate method of securing a load at the planning stage. Make provision for the necessary equipment to be available at the loading point.

Methods of load restraint include:

- straps;
- chains;
- twist locks;
- ropes;
- stanchions;
- ballast boxes;
- removable side boards; and
- chocks.

Assess the potential risk of damage to the load or trailer when using containment methods.

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If the load is left un-secured within a box or the sides of a trailer, restraint might be required.

Always fully restrain and secure wheeled plant or other vehicles carried on trailers. Where available, apply the parking brake.

6.9 Cable drums and carriers

Position and secure cable drum carrier frames on trailers in accordance with the trailer or carrier frame manufacturer's instructions where available. If such instructions are not available, the following shall be applied:

- a) secure the cradle to a trailer using through-bolts, twist-locks, chains, straps, shackles or similar.

NOTE: Horizontal and lateral restraint is required. ;

- b) where possible, position the drum centre of gravity over the trailer centre line to minimise the risk of destabilising the trailer;
- c) when large or tall drums are used, the potential of wind loads that could destabilise the trailer shall be identified and mitigated; and
- d) where possible, angle the cradle towards the deployment area to reduce the potential for wire snagging.

Include the following in stability calculations:

- a) the effect of loading and unloading a drum in a fully loaded condition;
- b) operation of the trailer and drum in both full and empty conditions on the worst track conditions that the host trailer is permitted to negotiate; and
- c) the effect of forces generated as a result of the cable snagging on the drum as it is being deployed.

If personnel are required to stand on the trailer to operate the cable deployment equipment, the cable drum carrier and trailer assembly shall be approved in accordance with the current versions of RIS-1530-PLT and RIS-1710-PLT.

6.10 Personnel carriers

6.10.1 Planning

When planning for the use of personnel carriers, the planner shall:

- a) identify the number of staff required to be transported;
- b) identify available approved trailer and host machine for transportation of personnel;
- c) include arrangements for staff welfare; and
- d) assess and record the risks to personnel of any additional loads that might need to be moved on the same trailer into account.

Personnel shall only be transported on a compatible and approved host machine /trailer consist in accordance with the EAC/ECC. Both host machine and trailers shall be configured in accordance with the OEM operations manual.

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Figure 6 – Incorrectly secured cage



Figure 7 – Correctly secured cage

6.10.2 During work

Machine Operator

The on-track plant operator shall:

- a) correctly install and remove the personnel carrier; and
- b) complete all pre- operational checks in accordance with the OEM instructions,

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Note: The operator shall check the vehicles' ECC / EAC allows for man carrier/personnel carrier.

See figures 6 and 7.

Machine Controller

The machine controller shall:

- a) brief personnel being transported including the contingency plan;
- b) pre-use test the host machine and trailer consist; and
- c) use full duplex communications.

The machine controller shall travel in the personnel carrier in a position where they have access to the emergency stop. Prior to any movement over points, the machine controller shall:

- a) stop the consist,
- b) exit the transporter; and
- c) confirm that the route is set correctly for the direction of travel from a suitable position on the ground.

6.11 Wind loading

The effect of wind or passing train drafts on loads which have a large surface area shall be identified and the correct methods of securing shall be implemented.

6.12 Effects of speed

The speed of travel is a major factor in assessing whether or not restraint or containment of a load is necessary. A load that is unlikely to move whilst travelling at walking pace might present a more serious risk if travelling at a higher speed, or if an emergency brake application is applied.

Where loads are required to be carried at speeds in excess of walking pace, appropriate risk assessments shall be made. Maximum speeds shall be documented in the safe system of work; and the Engineering Supervisor advised.

6.13 Hazardous loads

When moving hazardous loads, carry out an assessment of the potential secondary risks associated with the load if it becomes displaced or falls from the trailer. This shall include:

- a) the environmental impact of fuel spillage from powered plant;
- b) the risk of fire or explosion from ruptured fuel tanks;
- c) the transport of wheeled vehicles (for example, bowsers, generators);
- d) the carriage of gas cylinders; and
- e) any other hazardous substances.

Always fully restrain or secure powered plant or other potentially hazardous equipment before moving it on trailers or other plant.

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Only carry gas cylinders in a secure cage or rack appropriate to the type of cylinder. Cylinders shall be carried:

- a) upright; and
- b) secured to prevent any potential movement.

6.14 Coupling and uncoupling of wheeled attachments

The machine operator shall carry out the coupling and uncoupling procedure.

The machine/crane controller shall be present to verify the procedure has been carried out correctly.

When placing an attachment on track, carry out a functional brake test in accordance with the manufacturer's instructions before releasing the attachment from the vehicle.

NOTE 1: The plant owner/supplier is responsible for confirming that the manufacturer's instructions are equivalent to those detailed for trailers in clause 4.2 of this module.

NOTE 2: Always assume that the braking mechanism is in the 'off' position until the functional test has been completed.

If the brakes are found to be defective, off-track the attachment to a safe position and secure it to prevent any uncontrolled movement.

Only use attachments that pass a functional brake test.

Off track all attachments to a safe position when not in use.

6.15 Attaching and detaching a dozer blade trolley

Only trained and competent staff shall undertake the attaching and detaching procedures for dozer blade trolleys.

Before on-tracking a dozer, attach the trolley to the dozer blade in accordance with the manufacturer's instructions. Off track the dozer before detaching the trolley.

The trolley may be left on the ballast or other suitable safe location clear of the track.

Do not leave a trolley on the track on its own.

7 Brake test requirements for trailers and attachments

7.1 Types of brake tests and when they are required

Carry out brake tests on trailers and attachments in accordance with Table 2.

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Type of Test	When
Functional parking brake test	Immediately after placing an item on the track and before releasing the item, and after coupling or uncoupling an item.
Functional brake test	Whenever a trailer is on tracked or uncoupled, and when placing an attachment on track.
Maintenance brake test	In accordance with the approved maintenance plan for the trailer or attachment
Parking brake maintenance test	In accordance with NR/L2/RMVP/0200/P701
Service brake maintenance test	In accordance with NR/L2/RMVP/0200/P701

Table 2 Brake test requirements for trailers and attachments

7.2 Functional brake testing

7.2.1 General

Record functional brake tests in accordance with Machine/Crane Controller Check List NR/PLANT/0200_F027.

If the brakes are found to be defective, remove the trailer or attachment from the track.

7.2.2 Functional testing when on-tracking

When placing a trailer or attachment on the track, before releasing it and connecting any brake hoses or cables, attempt to move it along the track by pulling it with lifting chains, or manually pushing it.

The brakes shall resist the movement and the braked wheels shall not rotate.

NOTE: *Not all wheels are braked on some items, therefore only braked wheels should resist movement.*

7.2.3 Functional testing when coupling and uncoupling

When coupling an item (except where attachment of the tow bar will release the parking brake, see note below):

- connect the trailer tow bar to the on-track plant, but do not connect the brake hoses or cables;
- carry out a pull test and check that the brakes resist the movement;
- connect the brake hoses and cables;
- release the trailer or attachment parking brake from the towing machine; and
- repeat the pull test allowing for any time delay in the brake system and check that the wheels rotate freely.

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NOTE: *On some mechanically braked trailers and attachments, the attachment of the tow bar will release the parking brake. In these circumstances, the functional brake test should be carried out without the tow bar attached, with the trailer or attachment restrained to prevent it from running away if the brakes are not functioning correctly.*

When uncoupling an item (except where attachment of the tow bar will release the parking brake):

- a) disconnect the brake hoses and cables to the towing vehicle, but do not disconnect the tow bar;
- b) carry out a pull test and check that the brakes resist the movement.

7.3 Maintenance brake testing

Carry out maintenance brake tests of the parking brake and service brake in accordance with NR/L2/RMVP/0200/P700.

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Appendix A - Trailer load stability

Trailers and the loads they carry might become unstable for a number of reasons. Table 3 lists some examples that cause instability; the effects that instability can have; and the actions that can be taken to prevent instability.

Cause of instability	Effect of instability	Actions to prevent instability
a) Loads with a high centre of gravity such as lighting towers. b) Uneven distribution of load. c) Irregular shaped loads such as those with an offset centre of gravity. d) Loads with a moving centre of gravity, such as liquids. e) Travelling over track cant, gradients, twist or S&C. f) Harsh acceleration or braking.	a) The load and vehicle tip over. b) The vehicle derails during movement. c) The load topples or collapses.	a) Secure the load adequately. b) Load the heaviest or largest items on the bottom and the lightest or smallest items on the top. c) Verify that the load's centre of gravity is as near to the centre of the carrying vehicle as possible. d) Reduce transit speed. e) Use adequate dunnage between layers of material carried. f) Use packing to support irregular shaped loads. g) Secure any moving parts of the load. h) Reposition loads as necessary during the unloading sequence, to maintain stability of the vehicle. i) Use liquid tanks fitted with baffle plates.

Table 3 – Examples of cause, effect and prevention of trailer instability

It is important that appropriate loading and unloading sequences are followed when using trailers to avoid the:

- a) load toppling over or collapsing;
- b) load and trailer tipping over; or
- c) trailer derailing during movement.

Figure 8 shows an example of poor unloading



Figure 8 Results of poor unloading sequence (Historical photograph)

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Appendix B - Trailer loading sequences

The loading patterns shown in figures 5 to 9 inclusive will reduce the risks identified.
The unloading sequence is the reverse of the loading sequence shown.

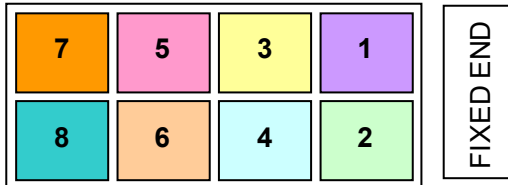


Figure 9 Loading sequence for a full trailer

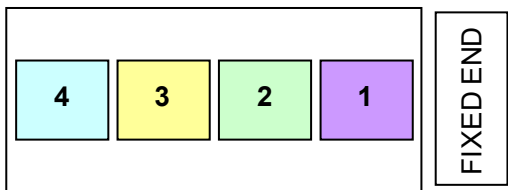


Figure 10 Loading sequence for a partial load

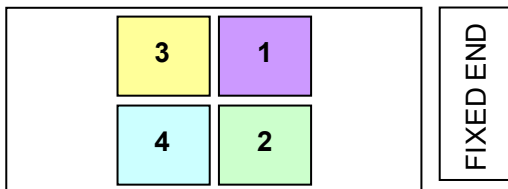


Figure 11 Alternative loading sequence for a partial loads



Figure 10 Loading a second layer in a pyramid formation



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Appendix C - Carrying rail

Figures 11 show typically how 30ft and 60ft lengths of rail can be carried using trailers following these principles.

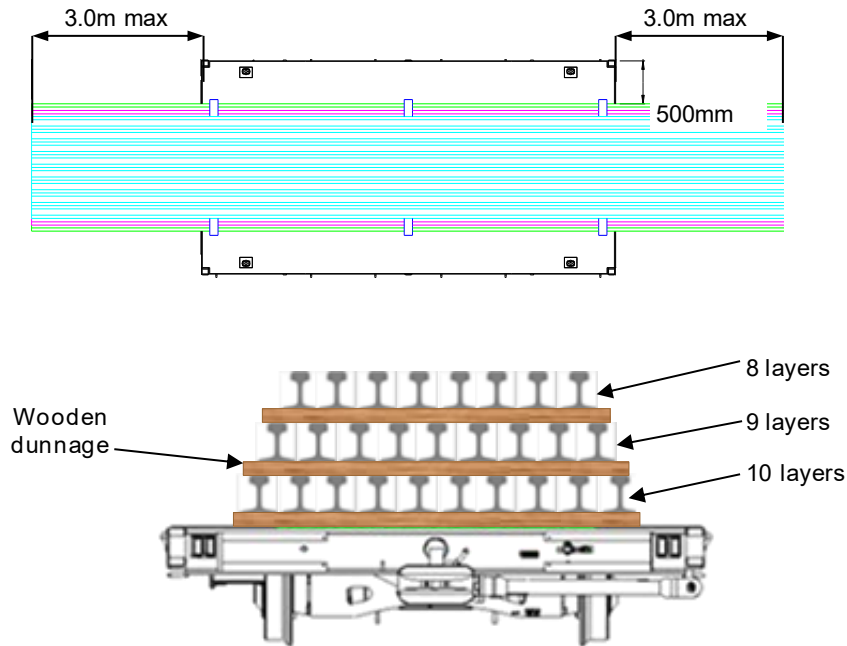
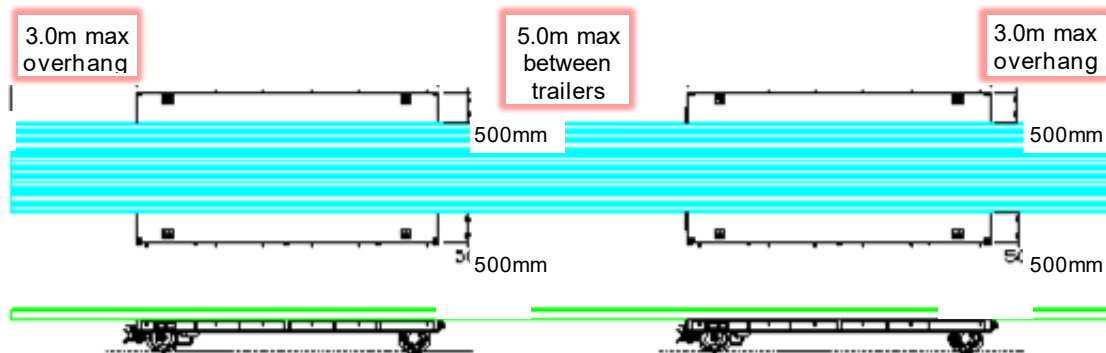


Figure 11 Carrying '30ft' rails



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Level 2

Module P511

Vegetation management

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Published and Issued by Network Rail, 2nd Floor, One Eversholt Street, London, NW1 2DN.



Ref:	NR/L2/RMVP/0200/P511
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

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Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out. New clause clarifying scope of application added. Emergency procedures section clarified.
3	December 2018	Re titled, and combined content of P512.
4	June 2022	Scheduled periodic review and update carried out.

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) failure of plant or its control or safety systems;
- b) operating error, operational error or equipment misuse;
- c) poor site or weather conditions;
- d) incorrect lifting operations (LOLER);
- e) lack of RIDDOR or close call reporting; and
- f) a lack of continuous improvement, such as, mitigating factors from incidents not being introduced to machine/operating procedures.

2 Scope

This module defines the requirements for developing a safe system of work for vegetation management operations. It includes:

- a) requirements to plan all work and to mitigate potential hazards;
- b) guidance on selecting the right machines;
- c) carrying out or controlling operations using powered cutters or saws; and
- d) requirements that a site visit is carried out prior to starting any work.

This module applies to all flailing and mulching operations carried out on Network Rail managed infrastructure (NRMI) and Network Rail projects when using on-track plant or any non-rail mounted mobile plant.

NOTE: This module should be read in conjunction with NR/L2/OTK/5201.

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3 Competence

All staff undertaking vegetation management activities shall hold the relevant competencies required to complete those tasks. See NR/L2/RMVP/0300/P500 and for chainsaw operators document 'E – PTMP Units of Competence' in Safety Central.

4 Planning work

4.1 Check the site

Inspect the area to be cut and identify any hidden debris, obstacles or variations of ground level. Ecology checks are to be carried out for Sites of Special Scientific Interest (SSSI's) and bird nesting season pre-checks included and recorded.

NOTE 1: All obstructions and their locations should be specifically detailed in the safe work pack.

The safe system of work shall include instructions for:

- a) preventing or limiting the discharge of debris into any watercourses, public areas and switches and crossings; and

NOTE 2: Particular care should be taken where residential or commercial properties are located immediately adjacent to the infrastructure.

- b) working near overhead line equipment including third party power lines that might cross the railway.
- c) Working near an open line, accounting for the possibility that an uncontrolled movement of the equipment could foul the open line.

4.2 Potential hazards

Assess potential hazards during vegetation management operations at the planning stage by a documented site visit/survey. Develop a safe system of work that addresses the potential hazards, such as:

- a) Machine/plant operators or ground staff being hit by flying debris
- b) Machine/plant operators or ground staff being caught by moving parts (e.g. Power Take Off (PTO) shafts, belt and pulleys);
- c) machines/plant coming into contact with overhead line equipment or other infrastructure furniture;
- d) members of the public/ground staff being hit by flying debris;
- e) trapping hazards between the plant/machinery and the infrastructure or vegetation during operation;
- f) host machines becoming unstable whilst working; and
- g) derailment of other vehicles due to debris on the rail

4.3 Selecting equipment

Carry out a site visit during daylight hours prior to the planned works to identify and document:

- a) the range of work to be completed

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- b) any potential obstructions, or any lineside equipment which might be damaged by the operation;
- c) any large tree or scrub that is outside the capacity of the plant, and the arrangements to deal with this; and

NOTE 1: Large trees or scrub might need to be cut down prior to work commencing. If this is not possible, regard such items as obstructions.

Identify the correct equipment required to complete the planned work, and procure in accordance with NR/L2/RMVP/0200/P521 & P501

NOTE 2: All equipment shall be accepted in accordance with NR/L2/RSE/100.

5 Flailing operations

5.1 Flailing Equipment Requirements

If determined in Section 4.3 as the most suitable equipment for the task, the plant used for flailing shall:

- a) be fitted with an operator protective structure (OPS) appropriate to the task;
- b) not have doors or windows removed;
- c) have adequate hydraulic capacity or compatible power take-off (PTO) for the duties involved and the type of flail or mulcher being used;
- d) have guards compliant with BS EN ISO 5674 fitted around any PTO.

NOTE: An OPS is designed to minimise the risk of injury from flying debris entering the cab. The level of protection provided should be determined by the risk assessment, but consider the operator's requirement for all-round visibility.

5.2 Before starting work

Examine the machine or plant to confirm that all safety features and equipment are in place and are in serviceable condition. As a minimum include checks that confirm:

- a) guards are undamaged and have been maintained in accordance with the manufacturer's instructions;
- b) flails and their fixing heads are the right size for the task;
- c) machine hoses, fittings and couplings are in good condition and routed correctly;
- d) the following are correctly fitted and in good condition:
 - i) ground roller or skid;
 - ii) rubber skirting or chain mail deflectors;
- e) all relevant safety/warning decals are in position and legible;
- f) the Certificate of Engineering Acceptance/Engineering Conformance Certificate (EAC/ECC) does not restrict the use of the machine; and
- g) machine limiters (where fitted) are set to the appropriate limit for safe working radius and cant through the worksite. See Appendix A

Set up the correct exclusion zone for the equipment prior to the start of work.

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5.3 During work

Only operate a flail or mulcher from the approved operating position.

Work at a safe speed taking account of the conditions (for example, the terrain, proximity to infrastructure equipment or obstacles).

Look out for obstructions and other hazards in the work area.

Maintain the exclusion zone when working.

Do not leave a flail heads running when not engaged in cutting vegetation.

Always stop the flail head from rotating prior to lifting.

Stop work and disengage the drive to the machine immediately if any part of the flail or mulcher becomes loose or is damaged.

Do not leave the vehicle cab until the cutting head has stopped rotating, using the manufacturer's safe stop procedure, and has been lowered to the ground.

Set up an appropriate exclusion zone in accordance with the manufacturer's instructions

A minimum exclusion zone of 100 m around the area being worked when flailing shall be maintained.

NOTE: The exclusion zone distance should be considered in all directions from the flailing head. See Appendix A

If the exclusion zone extends across other railway line(s), protect them in accordance with the GE/RT8000 - Rule Book.

A site-specific risk assessment shall identify controls to be implemented to control the risk associated with machine flail operations if a third party property is within 100m of the operation.

If an obstacle is encountered during cutting:

- a) stop the flail or mulcher immediately;
- b) reverse to disengage the obstacle;
- c) where possible do not lift the cutting head until it is completely stationary; and
- d) stop the machine using the safe stop procedure (see 5.1) and inspect the flail or mulcher for damage. Only resume work if it is safe to do so.

Reduce speed when using forward-mounted flails or mulchers as visibility might be restricted. Stop immediately if unusual vibration occurs.

Reduce the risk of flying debris by:

- a) working at a slower speed; and
- b) making two or more passes over a work area.

Be aware of the risk of flying debris when breaking out into open spaces.

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6. Chainsaws

Chainsaws shall not be used by people working alone.

Work shall be carried out ideally during daylight hours or, if carried out at night, lighting levels shall be assessed in accordance with NR/L3/MTC/RCS0216/SP02.

Lighting conditions shall be adequate to check moving parts of the chainsaw are visible to the operator.

Planners or supervisors of chainsaw work shall check that operators allocated a task hold the correct chainsaw competence.

7 Brush cutters

7.1 Blades and guards

Brush cutters shall be provided with the correct shredder type blade and matching protective guard, which must be properly fitted and undamaged(see *figure 1*)

Only the correct metal blades are to be used on brush cutters used for vegetation management work, with the appropriate control measures put in place.



Figure 1: Brush cutter with shredder blade and correct protective guard fitted

7.2 Planning

Use of brush cutters for vegetation management shall be determined during the task planning process.

A site survey shall be undertaken to identify and remove or mark, any hazards, debris or obstacles that might become dislodged during operations. The safe system of work shall identify requirement to mark and record these locations.

7.3 Working

A full prestart check shall be undertaken by the competent operator. Check that blades and guards are in good condition and fitted correctly. If either of the above is defective, the brush cutter must be quarantined until repaired.

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Operators shall work their way down into the vegetation in layers enabling the identification of 'hidden' items inside the brush that were not visible when the original survey was undertaken.

The minimum exclusion zone shall be 15 metres.

Where personnel on site have to work within the 15 metre exclusion zone they must be wearing the appropriate PPE. If anyone not wearing the appropriate PPE comes within 15 metres of the operator the cutting operation shall be stopped immediately. The Team Leader/Supervisor shall be responsible for ensuring this exclusion zone is enforced at work sites.

7.4 Additional PPE requirements

When using or working within 15m of Brush Cutter equipment, PPE shall be worn as set out in NR/L3/MTC/RCS0216/SP21.

NOTE: This is to ensure adequate protection for all parts of the body. PPE is available on the Network Rail catalogue for Network Rail functions.

8 Chippers

Only use equipment with the relevant approvals to operate on NRMI.

A site survey shall be undertaken to identify any banks, obstacles or uneven transit routes that might affect the stability of the plant. ALO risks shall also be considered.

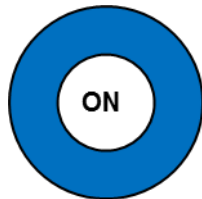
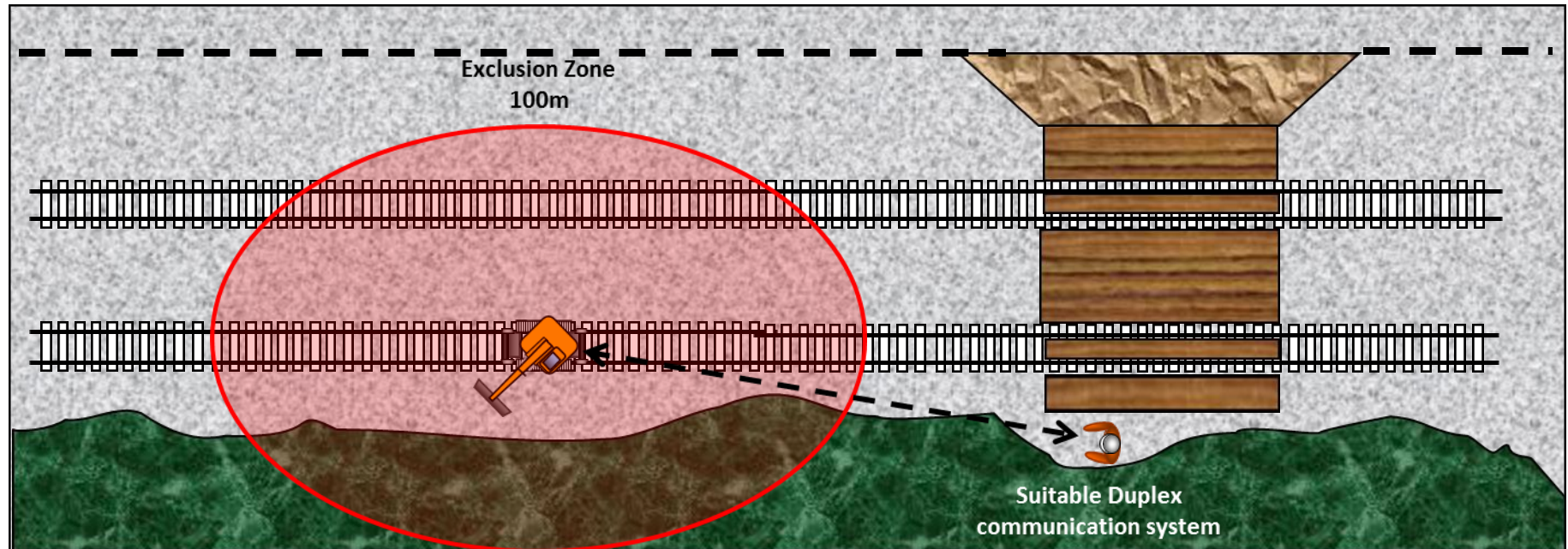
All staff required to operate chippers on NRMI shall hold the relevant competencies.

Work shall be undertaken in line with the Original Equipment Manufacturers operating instructions.

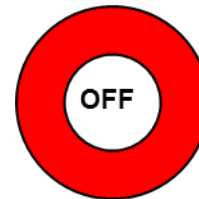
NOTE: Network Rail functions reference Task Risk Control Sheet NR/L3/MTC/RCS0216/OT08.

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Appendix A - Example exclusion zones for flailing operations



When RRV is on track, engage RCI to 'Lift' mode. Set RRV to desired Radius and Hook Height to operate Flail Head. Complete a FULL 360° Rotation at a controlled speed to demonstrate that the SWL of the machine is not exceeded at any point during the movement



When all relevant checks with RCI switched on are complete, and it is proved safe to complete a full 360° Rotation, the RCI can then be switched to the non lift setting (Dig) and work can begin

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Level 2

Module P513

Mobile plant (non-rail mounted) and road vehicles

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Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out. Tower cranes added.
3	March 2019	General update of content and terminology.
4	June 2022	General update of content and terminology. References to OTPs, OTMs and RRVs removed.

Reference documentation

All reference documents and legislation are given in: - NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

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1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) compliance with legislation (LOLER, PUWER, HASAW);
- b) Mobile plant becoming out of control, e.g. telehandler or dumper truck operator being crushed under a structure;
- c) collision, e.g. collision between a telehandler and another vehicle or structure ;
- d) overturning, e.g. telehandler overturning during lifting operations;
- e) damage to assets, e.g. a telehandler, tower crane or its load hitting a passing train during Any Line Open (ALO) operation; and
- f) staff injuries, e.g. Operator.

2 Scope

This module specifies requirements and guidance for using mobile plant:

- a) on or near the line;
- b) lineside; and
- c) when transporting plant.

This module applies to organisations involved with the planning or supply of any mobile plant, carrying out or controlling operations using mobile plant, or maintaining mobile plant used on Network Rail Managed Infrastructure and Network Rail projects. Mobile plant is any item of plant not classed as OTP or OTM.

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3 Using plant 'on or near the line' or 'lineside'

When using any plant or vehicle 'on or near the line' or 'lineside', determine whether any lines open to traffic (ALO) could foreseeably be fouled during any part of the work activity. Include this in the safe system of work.

NOTE 1: This includes on and off loading of plant and materials as well as operation of the plant.

Where mobile plant is to be used 'on or near the line' and there will be an interaction with on-track plant operating on track, operations shall be carried out in accordance with NR/PLANT/0200/module P521. If there is no interaction with OTP, the organisation shall apply suitable control measures to manage the plant and maintain the safety of the railway.

Approved full Duplex communications systems shall be used to maintain communications between operators and controllers.

NOTE 2: For example, construction excavators working on or near the line could apply the principles of managing OTP excavators due to the similar risk profile.

If any lines open to traffic could be fouled, then the planning of operations of mobile plant shall be undertaken in accordance with the requirements in NR/PLANT/0200/module P501.

NOTE 3: When planning the work activity to be undertaken, take account of any plant with fittings such as jibs, booms, extending conveyors, or wood chippers that are to be used, and the range of which such equipment and any associated loads can move. The planning should also take into account the output of work that may not be directly attached to the plant, i.e. output from wood chipping, spraying or flailing.

Assess and record the environment in which road vehicles will be required to travel and work, for example gradients or embankments (see NR/PLANT/0200/module P501 for further information on systems of work).

Undertake lifting operations in accordance with NR/PLANT/0200/module P503.

Unattended road vehicles should be parked in a protected designated parking area where ever possible. Where this is not possible, road vehicles should be parked parallel to the railway line allowing clearance for other vehicles to pass.

4 Transporting plant and materials

When transporting plant and materials to and from a work site, loading and unloading shall:

- be undertaken using lifting equipment (such as lorry mounted cranes, tail lifts, fork lift trucks) in preference to manual methods
- include a lifting plan for the operation which identifies the lifting accessories to be used for the plant or materials being loaded or unloaded;
- include a safe system of work (for example, using ladders, harness) where work is to be performed at height;
- include the provision of lighting where work is to be undertaken at night; and
- be undertaken in accordance with NR/PLANT/0200/module P501 if working in electrified areas.

Only choose vehicles that are capable of moving the selected plant or materials.

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NOTE: This should consider the physical size, shape and weight of the items to be moved, and the methodology of loading and unloading.

Do not load road vehicles beyond the cab of the vehicle. Rear overhangs are permitted, but if this exceeds two metres a marker board shall be used.

5 Telehandlers

5.1 Telehandlers principles

Telehandlers are generally designed to work fitted with forks when they are stationary and lifting on flat, level and compacted ground with stabiliser legs deployed (if fitted).

Assess the risks if a telehandler is used in other circumstances, such as travelling with loads on the forks, travelling or lifting on slopes, or with attachments other than forks.

5.2 Lifting with telehandlers

All lifting operations using telehandlers shall be planned before work is undertaken. If lifting a suspended load, a documented lift plan shall be completed.

NOTE: This is a requirement under The Lifting Operations and Lifting Equipment Regulations 1998.

Lifting operations using telehandlers shall be planned in accordance with NR/PLANT/0200/module P503.

Do not carry out tandem lifting with telehandlers on NRMI

When planning work for telehandlers, determine:

- is the site of adequate size for the use of telehandlers?
- is a telehandler an appropriate machine for this application?
- what are the weight, dimensions and characteristics of both the telehandler and the load(s) to be lifted?
- what are the radii and height of lift required?
- how far will the loads have to be carried and over what sort of terrain?
- what are the number, frequency and types of lifting operation?
- what space is available for telehandler access, deployment, operation and stowage, including the space required for correct deployment of stabilizers?
- is there a need for attachments such as buckets, work platforms or lifting hooks?
- effects of the operating environment on the telehandler and vice versa?
- is there a need for the telehandler to travel on public roads?
- will the operator have adequate visibility for the location in which it will be used?
- is a telehandler still an appropriate machine for this application?

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NOTE: All wheel steer variants may be beneficial in areas of restricted access. Appropriate management of exclusion zones and robust communication systems need to be implemented.

For further information on the selection and use of telehandlers see:

- Construction Plant Hire Association document CPA 1101 Good practice guide.
- and
- Construction Plant Hire Association Document Good practice guide..

5.3 Stability of telehandlers

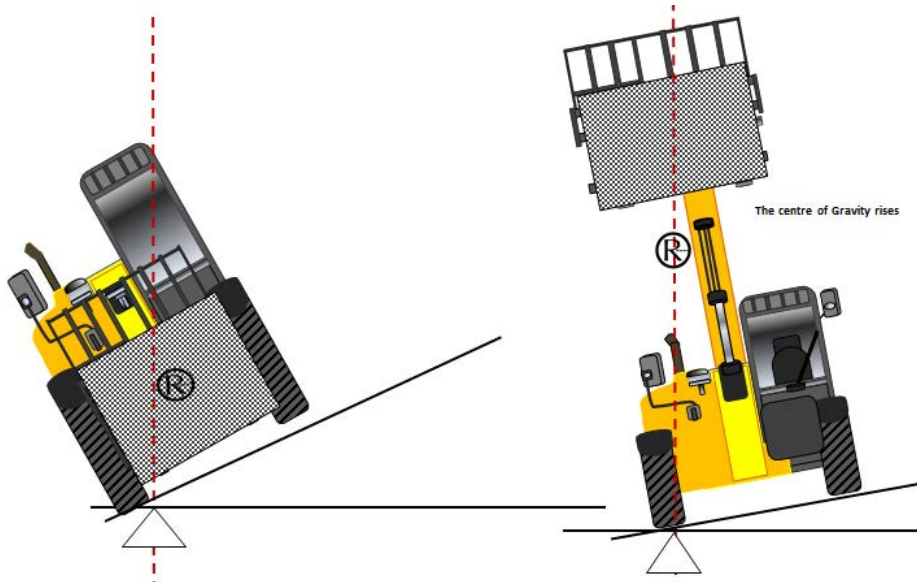
Before and during works, assess the effects that terrain and any load might have on the stability of the plant.

Longitudinal stability is the stability of the plant along its centre line. Poor longitudinal stability can cause plant to tip forwards or backwards.

Lateral stability is the stability of the plant at 90° to its centre line. Poor lateral stability can cause plant to slip sideways. Figure 1 gives an example of this.

Before work begins, check the condition and inflation of tyres as they can adversely affect the stability of the plant in static and transit modes.

NOTE: This risk applies when plant is both loaded and unloaded.



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Any dynamic motion will introduce instability over the ground. Any attempt to steer will introduce an extra 'centrifugal' force. Even steering the wheels when stationary can cause an overturn! A suspended load will swing moving the centre of Gravity even further

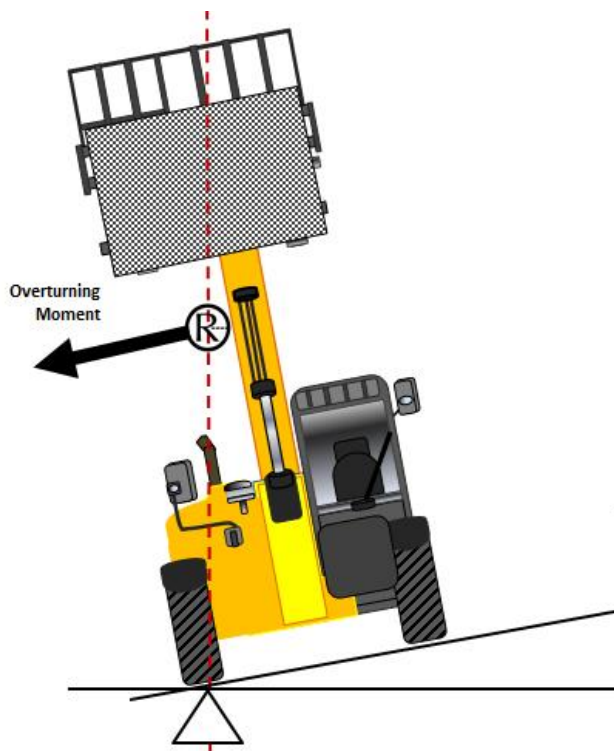


Figure 1 – Lateral stability example

5.4 Visibility, communications and exclusion zones when using telehandlers

Take into account that visibility is restricted when the boom of a telehandler is raised.

The risk of collision with pedestrians, structures, and other plant can be reduced by:

- checking windscreens and other windows are clean;
- checking that operational and warning lights/beacons are functioning correctly;
- using full duplex communications;
- exclusion zones;
- adequate site lighting; and
- additional visibility aids fitted to plant such as wide-angle mirrors, CCTV, and proximity warning systems.

Full Duplex communications shall be used to maintain communications between operators and controllers.

6 Tower cranes

6.1 Principles of installation and use

Tower cranes might be located directly on Network Rail managed infrastructure, or adjacent to it. In either case there may be risks to the infrastructure that need to be managed and controlled.

The installation and use of tower cranes is subject to legislation and standards, and should be undertaken by approved suppliers.

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6.2 Tower cranes on or alongside Network Rail infrastructure

Guidance has been published by the Construction Plant-hire Association (CPA) to provide clarity about the over sailing of Network Rail infrastructure by tower cranes due to the risks to Network Rail, personnel and the public.

The Principal Contractor (PC) shall be consulted at the earliest stage of planning where tower cranes will be used to carry out lifting operations, or where its load can collapse within 4m of a railway asset or property boundary, over or adjacent to a live railway or railway public areas.

The PC will determine what measures are required to mitigate the risks associated with using tower cranes. This might include a railway possession and/or isolation. Network Rail contact details can be found at

The PC shall be consulted by the user of the crane.

NOTE 1: *The crane user might be the person hiring in a crane from a supplier, or a person using a crane which they own.*

NOTE 2: *CPA documents can be downloaded from the CPA website www.cpa.uk.net.*

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Level 2

Module P514

Hand controlled trolleys

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Issue	Date	Comments
1	March 2013	First issue.
2	June 2016	Scheduled periodic review and update carried out. Additional requirement added to Sections 2 Safe System of work, 4 Placing a trolley on and off track and 9 Requirements for manually propelled rail handlers.
3	June 2017	Aligned content with regulator recommendations. Updated terminology and references for clarity.
4	March 2019	General update of terminology and standards references. Re ordered some sections to improve content flow.
5	June 2022	General update of terminology and content.

Reference documentation

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1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) compliance with legislation (LOLER, PUWER, HASAW);
- b) runaway/failure to stop on demand, e.g. OTP running away on a gradient;
- c) collision, e.g. collision between a RRV and an OTM;
- d) damage to assets, e.g. RRV or its load hitting a passing train during ALO operation;
- e) derailment, e.g. trailer being loaded incorrectly; and
- f) staff injuries, e.g. Operator being trapped between machine and infrastructure or machine and machine.

2 Scope

This module:

- a) defines the meaning of the term 'trolley', as well as the requirements for their acceptance and use in service;
- b) provides guidance on the number of persons required to move a trolley on rail;
- c) specifies requirements for the safe use of trolleys;
- d) specifies requirements for developing a safe system of work;
- e) specifies how to safely put a trolley on track;
- f) specifies requirements for pre-use checks; and
- g) specifies requirements for particular types of trolley.

This module applies to organisations who are involved with any of the following:

- a) planning or supply of any trolley;
- b) carrying out or controlling operations using trolleys; and
- c) maintenance of trolleys used on Network Rail managed infrastructure and Network Rail projects.

Ref:	NR/L2/RMVP/0200/P514
Issue:	5
Date:	04 June 2022
Compliance date:	03 September 2022

3 Using trolleys

3.1 General

Hand-controlled trolleys and other manually propelled equipment mounted on rail wheels or runners are referred to as trolleys.

Trolleys shall:

- a) be accepted for use in accordance with NR/L2/RSE/100/05. Trolleys which do not have product acceptance shall not be used;
- b) be used in accordance with:
 - GE/RT8000/HB10 *Rule Book, Handbook 10, Duties of the COSS and person in charge when using a hand trolley*;
 - manufacturer's operating instructions; and
 - any limitations of use on the product acceptance certificate.
- c) not be moved above a maximum speed of walking pace;

NOTE: The brakes on this type of plant are only designed to cope with walking speeds. Any prolonged exceedances to walking speeds, particularly when on a gradient, could significantly increase the risk that the brakes will not function as designed.

3.2 Planning

When planning work that includes the use of a trolley, include the following in the safe system of work:

- a) the size and weight of items to be carried, this should be recorded (see Appendix B);
- b) the loading sequence or limitations as defined in the Product Acceptance certificate;
- c) whether more than one trolley will be required to carry a single load;
- d) site conditions on which it will be operated, for example, gradients, ballast shoulders, switches and crossings
- e) the potential for the trolley gaining speed above maximum walking pace and mitigations;
- f) weather conditions, such as wet or frosty sleepers; and
- g) the number of persons required to load and control the trolley

For each trolley a person shall be nominated as being in control with another person nominated as their deputy. This is to be recorded in the safe system of work.

When planning to use manually propelled trolleys on gradients follow the requirements in NR/L2/OHS/019 to manage the risk of a runaway.

NOTE 1: The role of the deputy is to take control only when the nominated staff member is no longer able to fulfil the role.

NOTE 2: Form NR/PLANT/0200 F026 contains the template for a trolley load plan

All staff members nominated to fulfil these roles shall hold the relevant trolley competence.

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Determine the staff requirements when planning to push a hand controlled trolley, particularly when a gradient is identified.

Where it is not practical to increase personnel allocation then either the load shall be reduced or an increased number of trolleys shall be allocated to the work.

Plan to check that the brakes operate correctly before placing a trolley on the track.

Any trolley found with defective brakes, or one that has failed the brake test shall be:

- a) removed from the track and secured in a position of safety to prevent its use on the work site; and
- b) marked as defective and processed in accordance with NR/L2/RMVP/0200/ Module P100.

Always follow the Original Equipment Manufacturer (OEM) Operating Instructions.

3.3 Operation

3.3.1 Pre-use checks

Before assembling or placing a trolley on the track, check that:

- a) each part of the trolley is labelled with unique identification number, owners name and contact details;
 - b) where applicable, the maximum uniformly distributed load (UDL) is shown; and
 - c) the maintenance brake test has not expired, see NR/L2/RMVP/0200/ Module P700.
- c) Do not use the trolley if any of the above are missing or out of date.

Assembly of the trolley shall be undertaken by a competent person (normally the user) in accordance with the manufacturer's instructions, and shall include:

- a) use of the correct braking lever;
- b) fitting push bars, side and end boards where applicable; and
- c) verification that the assembled trolley is fit for purpose.

Prior to the start of each shift and before placing a trolley on the track, verify that the trolley brakes are in working order as follows:

- a) **trolleys with braked wheels:** attempt to turn the braked wheels using one hand as shown in Figure 1. The braked wheels shall resist movement. Always wear gloves for this task.

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Figure 1 – Undertaking a pre use brake test using one hand only

- b) **trolleys where the design prevents uncontrolled movement:** verify that the mechanism operates correctly.

NOTE 1: For example, trolleys fitted with a restraining device that has to be supported in a raised position to allow movement of the trolley.

- c) **trolleys that are braked other than by using rail wheels** (for example, by a friction pad on the rail head. See Figure 2): verify that the braking system operates correctly before the trolley is placed on rail, or that component parts are assembled on rail so that the trolley cannot run away if the brake was not working.

NOTE 2: For trolleys that have separate component parts, this might be achieved by placing the braked part on one rail without placing the stabilising arm on the other rail.



Figure 2 – Pre use check of a trolley without rail wheel braking

- a) Withdraw any trolley from service that fails these pre-use checks. Label the trolley as defective and process in accordance with NR/L2/RMVP/0200/Module P100.

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3.3.2 Placing a trolley on and off the track

To manage the risks associated with manual handling, confirm that sufficient resources are available to handle a trolley before placing and removing it from the track.

This includes carrying the trolley or trolley parts between a vehicle used to bring it to site and the track access point.

Check that the trolley brakes or holding devices are functioning correctly as soon as the trolley has been placed on the track as follows:

- a) **trolleys with braked wheels;** carry out a push test to verify that the braked wheels do not rotate unless the brake lever is operated. The brake lever shall be in place when this test is carried out;
- b) **trolleys where the design prevents uncontrolled movement:** check that the holding mechanism, where one is fitted, drops to the ballast when released.

NOTE: For example, trolleys fitted with a restraining device that has to be supported in a raised position to allow movement of the trolley.

- a) Withdraw any trolley from service that fails these on-tracking checks. Label the trolley as defective and process in accordance with NR/L2/RMVP/0200/ Module P100.

Always use the push bar and correct brake handle to operate the equipment.

Always push trolleys, when moving them along the track. Do not pull them.

Do not adjust or interfere with the braking mechanism of a trolley.

Do not ride on any part of a trolley or its load.

Do not push or pull a trolley using on-track plant or on-track machines unless it is certificated to do so.

Do not use a trolley in third or fourth rail areas unless isolations are in place.

Load and unload trolleys correctly, and in the right sequence, in accordance with the manufacturer's instructions. If required, secure loads correctly.

Do not exceed the maximum capacity of a trolley

Remove trolleys from the track to a position of safety on completion of work.

Trolleys are to be secured to prevent unauthorised use when left unattended.

4 Maintenance

- d) Trolleys shall be maintained in accordance with NR/L2/RMVP/0200/ Module P700.

5 Requirements for hand trolleys

Hand trolleys have a flat load area on which tools and materials can be carried and transported along the track. They are also sometimes known as rail trolleys, track trolleys and plate layers trolleys.

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The maximum load to be carried by any hand trolley shall not exceed 1000kg, uniformly distributed across its load area.

NOTE 1: *This applies to any hand trolley used on Network Rail managed infrastructure irrespective of its manufacturer, type or capacity when in excess of 1000kg.*

Reduce the load to be carried if the safe system of work identifies that this is required based on the number of people who can push the trolley simultaneously, or the site conditions on which it is to be used.

Distribute the load uniformly across the trolley load area, and check that the brake handle is not obstructed.

Do not allow a load to overhang the sides of a trolley unless a risk assessment has been completed and any necessary protection of adjacent lines has been arranged in accordance with the *Rule Book*.

Do not carry any load that overhangs a single trolley:

- a) by more than 50% of the trolley's deck length at one end; and
- b) by not more than 100% of the trolley's deck length where the overhang is equal at both ends.

NOTE 2: *The overhang principle of 50% and 100% still applies if the trolleys are linked together.*

Carry the load over two trolleys if loads longer than this are to be transported, but do not use two trolleys with unlinked brakes to move a load.

6 Manually propelled rail handler

Manually propelled rail handlers (MPRH) are trolleys that can be used to transport lengths of rail along the track.

Determine whether it is suitable to use MPRH using the planning tool in Appendix A.

MPRH Lift plans shall be prepared using NR/L2/RMVP/0200 F026 form or equivalent

Confirm the correct staff resource is available to undertake the lifting and transiting activities. This is identified in the OEM Operating Instructions.

NOTE 1: *Lift plans for a MPRH will not require Sentinel Lift Planner competence. The initial training for the MPRH covers the requirements for planning lifts and not exceeding the unit SWL.*

When planning to use MPRH on gradients follow the requirements in NR/L2/OHS/019 to manage the risk of a runaway.

MPRH shall only be operated in accordance with the original manufacturers instructions

When using MPRH:

- a) a competent person per unit shall be appointed to undertake the operation of the lifting equipment, transposing mechanism and brake lever;
- b) only use units from the same manufacturer;
- c) Only use models of the same model number;
- d) Use a minimum of four persons when lifting an assembled unit;
- e) always move the units with the bottom beam in place;

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- f) do not move the units with rail in the rail storage bracket;
- g) check that the SWL is shown, and the 'Next Brake Test Due' has not expired; and
- h) complete a brake test at the start of every shift;
- i) use an adequate communication system/protocol to manage the lifting and transiting activities.

NOTE 2: This could be the use of full Duplex communications systems if the distance between units is deemed as excessive to utilise verbal communication or hand signals

7 Requirements for rail skates

Rail skates consist of two double flanged wheels attached to a metal frame which form a single unit that can be used to carry a load along a single rail. The design is such that it can be speedily lifted and removed, without dismantling, within the warning time given by a lookout.

Where a rail skate is to be used without a line blockage.

- a) assess the suitability of using rail skates at the planning stage and include in the safe system of work;
- b) only use rail skates where a position of safety for staff, the item being carried and the skate itself is immediately available;
- c) only use rail skates for the movement of single items. The number of staff required to load the skate shall be in attendance at all times throughout the operation, both to lift off the load if required, and to maintain stability of the load in transit;
- d) only use rail skates singularly (do not use in tandem on the same rail or in pairs, side by side on opposite rails; and
- e) do not use rail skates to handle or transport rail.

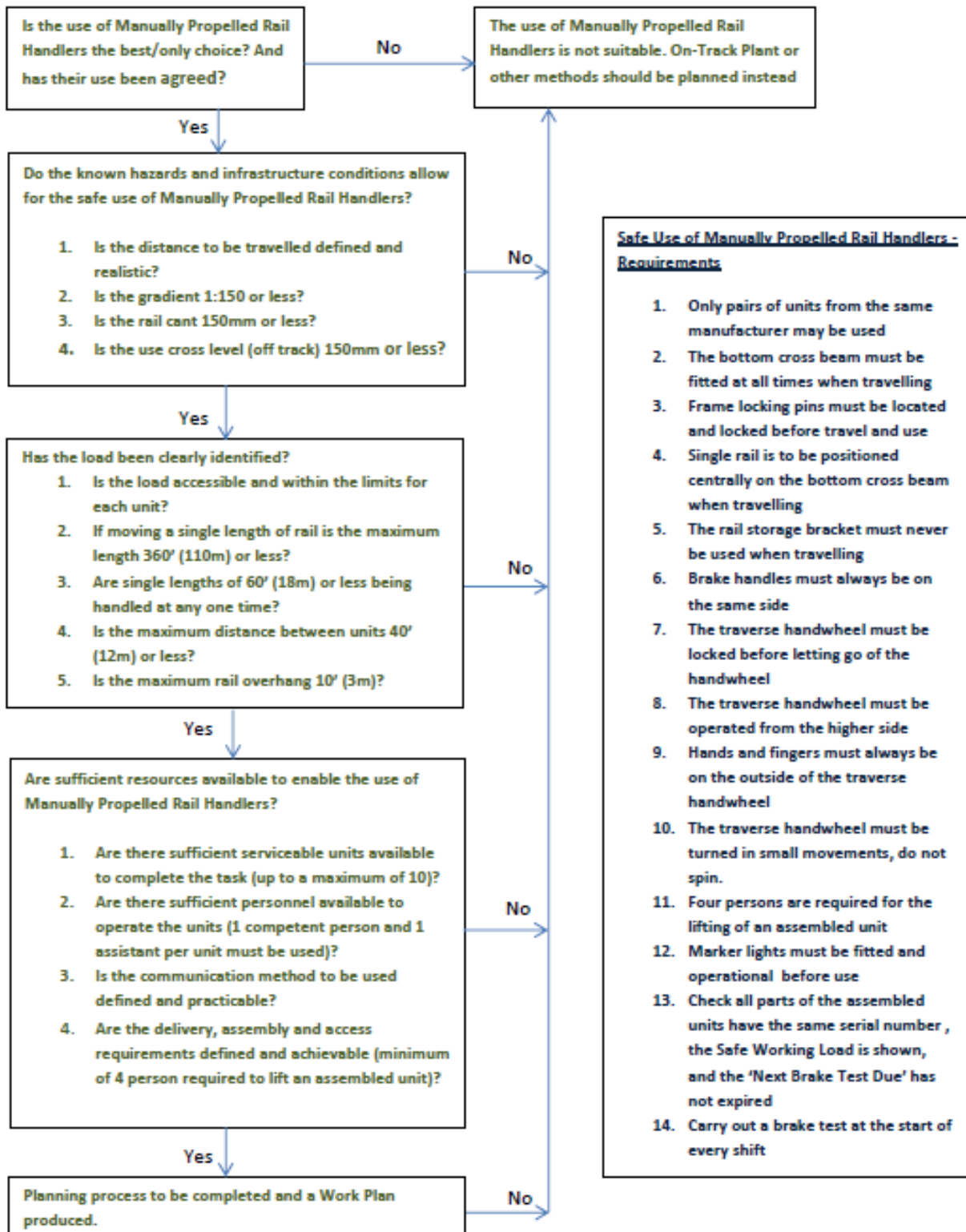
8 Requirements for rail scooters

Rail scooters provide manual leverage for lifting a load and use the head of one rail to provide a running surface enabling the load to be transported along the track.

Protection of the line shall be in place in accordance with the GE/RT8000/HB10 Rule Book, Handbook 10.

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Appendix A - Use of Manually Propelled Rail Handlers Planning Tool



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Appendix B - Example of a Trolley load plan and Risk Assessment

Part 1					Site Details						
Originator		Site Visit		Delivery Unit Depot/Function		Dates of work	From :		Time :		
Site Location					P Way	To :			Time :		
						Post Code		Week Number			
Part 2					Work Details						
Activity 1					Activity 2						
Activity 3					Activity 4						
Fleet Number 1		Owner	Network Rail/Torrent/Other -				Plant Service Date				
Fleet Number 2		Owner	Network Rail/Torrent/Other -				Plant Service Date				
Part 3					Work Site Details						
Work Site Mileages	ELR 1 :		ELR 2 :		Worksite Protection	Worksite Protection					
	From :		From :			Adjacent Line Protection					
	To :		To :			Time & Details					
Part 4					Trolley Load Plan (Loads not to exceed Max 450kg)					Operators	
Trolley Load Plan/Itinerary	Item	Description	Individual (Kg)	Qty	Total (Kg)	Trolley Operators	Name		PTS		
	1				0						
	2				0						
	3				0						
	4				0						
	5				0						
	6				0						
	7				0						
	8				0						
Total Weight					0						

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Part 5		On Site Risk Assessment (In addition to other appropriate Risk Assessments inc OHS_019)								
Item	Description of Hazard	Hazard (H) Severity (1 to 4)	Likelihood (L) (1 to 4)	Risk Factor (H x L)	Result	Control Measures/Mitigations	Hazard (H) Severity (1 to 4)	Likelihood (L) (1 to 4)	Risk Factor (H x L)	Result
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
Comments:										
Brake Tests Undertaken & OK.		Max Gradient		1 IN :		Reviewed		Date:		
		Cant			0-100mm	by:				

Ref:	NR/L2/RMVP/0200/P515
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Level 2

Module P515

Portable and transportable plant

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Ref:	NR/L2/RMVP/0200/P515
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

User information

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Red requirements – no variations permitted

- Red requirements are to be complied with and achieved at all times.
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- Non-approved variations will be investigated and corrective actions enforced.

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Ref:	NR/L2/RMVP/0200/P515
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out.
3	December 2018	Removed the content relating to track jack inspection/maintenance. Incorporated the content relating to design, maintenance and disposal of assets. Re titled module
4	June 2022	General update of terminology and content.

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

Ref:	NR/L2/RMVP/0200/P515
Issue:	4
Date:	04 June 2022
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Ref:	NR/L2/RMVP/0200/P515
Issue:	4
Date:	March 2022
Compliance date:	June 2022

1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) compliance with legislation (LOLER, PUWER, HASAW);
- b) damage to assets;
- c) staff injuries, e.g. staff being trapped between plant and infrastructure.

2 Scope

This module describes the requirements for design, maintenance and management of Portable and Transportable plant, such as:

- Powered Plant
- Non- Powered Plant
- Manually Propelled Plant (Powered)
- Manually Propelled Plant (Non- Powered); and

This document applies to organisations that are involved with any of the following:

- a) planning or supply of any of the categories above;
- b) carrying out or controlling operations using any of the categories above; and
- c) maintenance of any of the categories above.

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Date:	March 2022
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3 Competence

All staff operating Portable and Transportable plant shall hold the relevant competencies to do so. This shall be demonstrated by an appropriate Authority to Work system or via Sentinel (if the competence forms part of the Sentinel Scheme).

Competence requirements are referenced in NR/L2/CTM/220 and NR/L2/RMVP/0200/P500.

4 Asset management

The organisation shall have in place a systematic process of deploying, operating, maintaining, upgrading, and disposing of assets.

5 Specification, design and procurement

Existing approved products shall be sourced through an existing approved supplier in accordance with any contractual arrangements

New products shall be introduced in accordance with the requirements specified in NR/L2/RSE/100/05.

6 Engineering change

When the need for change of the design of equipment is identified, this shall be undertaken in accordance with NR/L1/RMVP/0001 and NR/L2/RSE/100/05.

7 Maintenance

All plant used and operated on Network Rail Managed Infrastructure (NRMI) shall be correctly maintained in line with the OEM Maintenance schedule, statutory regulations and Network Rail standards. This shall be demonstrated by valid service labelling containing at least

- a) Last service date;
- b) Next service date;
- c) Unique Asset Identification Number;
- d) Details of any relevant statutory testing (e.g. LOLER); and
- e) Clear safety labelling.

Requirements for Plant Maintenance are detailed in NR/GN/RMVP/0200 Guidance Note and NR/L2/RMVP/0200/P700.

8 Planning

When planning the use of Portable and Transportable plant, the work plan shall include details relating to:

- a) adequate staff resource and associated competencies;
- b) correct transport, storage and re fuelling within a work site;
- c) correct and suitable storage of plant line side;
- d) combustion engine emissions in confined spaces or regulatory restrictions for industry bodies such as Transport for London (TFL); and

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- e) occupational health, such as HAVS, ballast dust suppression requirements.

The safe system of work shall include:

- a) type of plant to be used;
- b) method of access and egress from site;
- c) conditions under which they are to be used;
- d) any protection arrangements necessary;
- e) protection of staff in the vicinity of the work area from flying debris, dust and noise;
- f) first aid and emergency procedure requirements (see also NR/L2/RMVP/0200/P501); and
- g) arrangements for the safe re-fuelling of the plant (see also NR/L2/RMVP/0200/P505).

9 Disposal

Any lost or stolen equipment should be reported to the asset owner for removal from the appropriate database and subsequent suspended from any maintenance arrangements.

Any damaged plant deemed beyond economical repair (BER) should be reported to the asset owner for assessment of financial values, strategic worth and a decision on disposal. These assets should be removed from the appropriate database and suspended from any maintenance arrangements.

Any end-of-life equipment should be reported to the asset owner for removal from the appropriate database and suspension from any maintenance arrangements.

Network Rail's plant and equipment assets that have reached the end of their serviceable life shall be disposed of in accordance with NR/L1/RMVP/0001.

NOTE: All plant assets should be disposed of ethically and environmentally responsibly.

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Issue:	3
Date:	01 December 2018
Compliance date:	02 March 2019

Level 2

Module P521

On track plant operations scheme

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Ref:	NR/L2/RMVP/0200/P521
Issue:	3
Date:	01 December 2018
Compliance date:	02 March 2019

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Ref:	NR/L2/RMVP/0200/P521
Issue:	3
Date:	01 December 2018
Compliance date:	02 March 2019

Issue record

Issue	Date	Comments
1	December 2015	First issue.
2	June 2017	Terminology and references updated for clarity.
3	December 2018	General update of terminology. New requirements for POS provider to provide MC/CC provision. New sections on investigations and formal reviews

Reference documentation

NR/L2/RSE/100/05	<i>Product acceptance and change to Network Rail operational infrastructure</i>
RIS-1530-PLT	<i>Rail Industry Standard for Technical Requirements for On-Track Plant</i>
RIS-3350-TOM	<i>Communication of Urgent Operating Advice</i>
RIS-8040-TOM	<i>Low Adhesion between the Wheel and the Rail - Managing the Risk</i>
GE/RT8000/HB15	<i>Duties of the machine controller (MC) and on-track plant operator</i>
RIS-8250-TOM	<i>Urgent Safety-Related Defect Report Form</i>
NR/L2/RMVP/0200/P100	<i>Reporting and investigation of plant related events</i>
NR/L2/RMVP/0200/P101	<i>Monitoring plant activities</i>
NR/L2/RMVP/0200/P300	<i>Plant approval and design</i>
NR/L2/RMVP/0200/P500	<i>Competence and fitness</i>
NR/L2/RMVP/0200/P700	<i>Plant maintenance</i>
NR/L2/RMVP/0200/P701	<i>On-track plant maintenance</i>
NR/GN/RMVP/0200	<i>Infrastructure Plant Manual Guidance</i>

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Issue:	3
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1 Purpose

The application of this module contributes to the control of the following risks:

- a) risk of runaway, uncontrolled movement and collisions by on-track plant (OTP) with infrastructure, workforce or other vehicles;
- b) risk of personal injury within a worksite: slips, trips and falls, struck by OTP; and
- c) risk of implementing ineffective management control and supervision of OTP operations.

2 Scope

This module defines the on-track plant operations scheme (POS) for the provision and operation of OTP on Network Rail managed infrastructure (NRMI) and Network Rail projects.

This document applies to organisations carrying out OTP operations on NRMI and Network Rail projects. The following are pre-requisites for compliance with the POS:

- a) safe use of plant for infrastructure work, as set out in this manual NR/L2/RMVP/0200;
- b) product introduction and change, as set out in NR/L2/RSE/100/05;
- c) engineering acceptance, as set out in RIS-1530-PLT; and
- d) specific rules controlled through the Sentinel scheme.

Arrangements for the operation of on-track machines (OTM), portable and transportable plant, whether operating inside or outside of a possession, are outside the scope of this module

The Network Rail POS review panel act as the owners and administrators of the POS.

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3 The on-track plant operation scheme rules

OTP operations on NRMI and Network Rail projects shall be carried out by an approved POS provider.

POS providers are approved by the POS review panel.

To gain approval a POS provider shall demonstrate to the POS review panel that they have:

1. a fully documented management system and framework for the safe delivery of OTP operations;
2. a competence management system for assuring the competence and fitness of their employees and contracted staff involved in the operation, maintenance and supervision of OTP operations in accordance with the Sentinel scheme rules;
3. adequate processes to enable effective communication and co-ordination on site;
4. an adequate number of POS representatives present on each site to act as the point of contact. POS representative shall be employees of the POS provider and not be engaged in any other concurrent safety critical duties on site;
5. arrangements in place for the proactive and reactive monitoring of their own performance and that of their suppliers;
6. arrangements in place to respond to emergencies while undertaking OTP operations;
7. title of ownership of operational OTP and have adequate and fully documented processes in place for the approval, acceptance, operation and maintenance of their OTP;
8. adequate arrangements in place for the selection and use of suitable suppliers, including safety critical goods, products or services. Suppliers used to provide OTP shall be Network Rail approved through the Railway Industry Safety Qualification Scheme (RISQS);
9. adequate arrangements for the operational control, preparation, development, communication and implementation of the safe system of work for OTP operations; and
10. identified and maintained information relating to the scope of the OTP operations they undertake.

NOTE: In the above rules, the term adequate is a risk based assessment that determines suitable and sufficient means to eliminate risk involved in an operation, or to reduce the risk to an acceptable level if elimination is not possible.

Clause 5 contains requirements and guidance on demonstrating compliance with the POS rules.

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4 POS providers' responsible roles

4.1 On-track plant operations

POS providers shall nominate a person to be responsible for OTP operations and the continued competence of all individuals involved with the work. The person fulfilling this role shall be:

- a) competent in managing the planning, operation and maintenance of OTP operations; and
- b) responsible for the management and compliance with POS requirements
- c) responsible for assigning competent OTP personnel including Machine Operator's, Machine/Crane Controllers and POS representatives.

4.2 On-track plant engineering

POS providers shall nominate a person to be responsible for OTP engineering and the continued competence of all individuals involved with the work. The person fulfilling this role shall:

- a) competent in the design, manufacture, maintenance and engineering change aspects of OTP engineering;
- b) have been trained in the use of the safety systems used on items of OTP that are owned directly by their employing company or might be used in OTP operations within the POS provider's scope of work; and
- c) be responsible for the product approval and engineering acceptance of OTP including engineering change.

If this role is sourced from an external organisation, the POS provider shall identify a person within their organisation to be responsible for liaising with the external organisation.

4.3 On-track plant operations scheme representative

POS providers shall nominate at least one POS representative on each site where OTP is being utilised. The person(s) fulfilling this role shall be:

- a) trained, and assessed as competent in the POS provider's management systems for delivery of the OTP plan and arrangements made by the POS provider;
- b) the single point of contact for the Safe Work Leader(SWL) or Person In Charge (PIC) for OTP operations;
- c) assist in the planning of OTP operations and the documenting of these in the OTP plan; and
- d) an employee of the POS provider.

A POS representative shall not be engaged in, or be responsible for any other site safety critical duties except as a machine controller (MC) or crane controller (CC), when only a single item of OTP is in use and they hold the corresponding competence.

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5 Management system requirements

5.1 Plant operations scheme provider approval

POS providers shall comply with the requirements of NR/L2/RMVP/0200 and have passed the assurance requirements for POS qualification.

5.2 Organisation

POS providers shall have a management system and framework for the safe delivery of OTP operations.

They should have arrangements in place to:

- a) document the organisational structure to demonstrate it is adequate for OTP operations and planning;
- b) keep their organisational structure current;
- c) obtain the acceptance of responsibilities from all post holders;
- d) set up a means of communication with suppliers where key health, safety, quality, environmental or technical expertise is procured from outside the organisation;
- e) demonstrate their understanding of the roles and responsibilities of a principal contractor (PC) in relation to the POS provider; and
- f) risk assess, validate and brief out material changes to the management system. Proposed material changes should be notified to the POS administrators in sufficient time for review and approval prior to the material changes being implemented.

5.3 Training and information

POS providers shall have documented operational and resource arrangements in place to demonstrate that all employees and suppliers' staff have their rail related competencies maintained and developed in line with new requirements or technological change.

They should demonstrate that appropriate training:

- a) is delivered to employees and supplier's staff working (or about to work) on OTP operations;
- b) is provided to employees and suppliers for the management of health and safety requirements appropriate to the activities being undertaken;
- c) is available to the POS representative including an assessment of competence resulting in an Authority to Work to carry out the role; and

NOTE: Suitable arrangements for providing and signing off an Authority to Work should include the issue of an Authority to Work card detailing the specific assigned duties relating to OTP operations e.g. POS Representative.

- d) includes a framework that enables feedback on content and effectiveness of safety training and briefings.

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5.4 Communication and co-ordination

POS providers shall demonstrate their processes for communication and co-ordination within possessions and worksites.

These should be documented and include:

- a) a POS representative(s) acting as the point of contact during the course of OTP operations;
 - b) accident and incident reporting arrangements, including directly reporting accidents or incidents to NIR-online;
- NOTE:** NR/L2/RMVP/0200/P100 contains further information on incident reporting.
- c) emergency and contingency planning arrangements;
 - d) arrangements for assessing information on risks provided by the PC and from the POS provider's own site walk out and the incorporation of any resulting information into the OTP plan and the method statement;
 - e) essential communication and liaison between all those involved in the work takes place as planned; and
 - f) where the POS provider is also undertaking the role of the PC, the representatives of the POS provider and PC should be separate.

5.5 Monitoring of effectiveness of on-track plant planning

POS providers shall demonstrate that they have arrangements in place for the proactive and reactive monitoring of their own performance and that of their suppliers.

These arrangements should be documented and include:

- a) obtaining and collating their own and their supplier's monitoring data, e.g. site inspection reports, audits, accident reports, etc;
- b) analysing and reviewing performance data and other key performance indicators (KPIs), including OTP reliability and the identification of trends;
- c) conducting an annual management review of the POS provider's processes and arrangements;
- d) obtaining and reviewing the results of their supplier's Railway Industry Safety Qualification Scheme (RISQS) codes and technical audits;
- e) reviewing and discussing supplier performance with their suppliers; and
- f) identifying and closing out corrective actions in a timely manner.

Refer to NR/L2/RMVP/0200/P101 for additional information on monitoring plant activities.

5.6 Emergency preparedness

POS providers shall have documented arrangements in place for responding to emergencies when undertaking work on NRMI and Network Rail projects.

This should include:

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- a) co-operating and co-ordinating with the organisation undertaking the role of PC in the preparation and distribution of emergency response plans for all personnel involved in the work;
- b) briefing personnel on the plans and testing the understanding and effectiveness of such plans;
- c) production and distribution of an emergency contact list;
- d) provision of equipment for use in the event of an emergency;
- e) interfacing with, and assisting the organisation undertaking the role of PC, Network Rail, regulatory authorities and the emergency services etc.; and
- f) review and revision of the plans, particularly after an accident, incident or emergency.

5.7 Insurance arrangements

POS providers should demonstrate that appropriate contract specific insurance arrangements are in place before commencement of works.

5.8 On-track plant acceptance and maintenance

A POS provider shall demonstrate that they have documented processes in place for the approval, acceptance and maintenance of OTP.

This should include:

- a) Network Rail product approval;
- b) engineering acceptance of OTP;
- c) a process for managing engineering change following OTP modification or upgrade;
- d) development and implementation of maintenance plans for each type of OTP;
- e) provision of suitable and sufficient maintenance facilities;
- f) control of maintenance periodicity;
- g) monitoring and reporting of maintenance performance;
- h) the regular review of maintenance plans and a process for amending or updating maintenance plans;
- i) maintenance of safety critical systems (e.g. RCI calibration);
- j) implementation of these requirements for hired in OTP through assurance and monitoring; and
- k) maintaining an up to date register of all OTP subject to these arrangements.

NR/L2/RMVP/0200 modules P300, P700, P701 and RIS-1530-PLT provide additional information on the acceptance and maintenance of OTP.

5.9 On-track plant scope of operation

POS providers should have a documented system that identifies the:

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- a) number of items of OTP operated per week;
- b) number and types of OTP owned, including their date of introduction;
- c) number and types of OTP hired;
- d) number of possessions operated per year;
- e) number of OTP operating hours per year;
- f) details of all maintenance facilities; and
- g) details of all accidents and close calls in the last 12 months.

The documented system should be subject to management review at least annually.

5.10 Selection and use of suppliers of plant, products and services

POS providers should be able to demonstrate their processes for the selection and use of suppliers, including safety critical goods; products; or services. These arrangements should be documented and include:

- a) OTP used on NRMI and Network Rail projects should only be hired in from approved suppliers with the necessary RISQS codes;
- b) all hired in OTP and attachments used on NRMI and Network Rail projects are Network Rail approved and have a valid Certificate of Engineering Acceptance (where applicable);
- c) additional hired in resources e.g. OTP or personnel, are subject to the same arrangements for the planning of OTP operations as their own, and are documented in the OTP plan under the responsibility of the POS representative;
- d) additional supporting services e.g. mobile cranes, general construction plant, etc., are subject to the same arrangements for the planning of OTP operations as their own, and are documented in the OTP plan under the responsibility of the POS representative;
- e) hired in supporting services and goods utilised on NRMI and Network Rail projects are fit for purpose and properly maintained in a serviceable condition that meets the required standard of performance and reliability accepted by Network Rail; and
- f) hired in plant, equipment and attachments will only be operated by competent personnel.

5.11 Operational arrangements and requirements

A POS provider shall demonstrate the arrangements in place for implementing operational requirements.

These arrangements should be documented and include elements for:

5.11.1 Operational control including:

- a) communications processes;

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- b) the exchange of information with Network Rail regarding diversions, speed restrictions, late notices and infrastructure failures;
- c) interface with Network Rail's National Control regarding urgent operating advices (RIS-3350-TOM) and defect reports (RIS-8250-TOM). See also NR/L2/RMVP/0200/P100; and
- d) communicating conditions of low rail adhesion (RIS-8040-TOM).

5.11.2 Planning including:

- a) involvement in possession planning and input to the method statement;
- b) advising on the selection of OTP for the work to be carried out;
- c) selecting and controlling all OTP personnel including POS Representatives, Machine Operators and Machine/Crane Controllers
- d) attending pre-possession meetings;
- e) attending site walkouts; and
- f) involvement in the selection and use of competent lift planners to plan lifting operations.

5.11.3 Control and supervision including:

- a) pre-use checks;
- b) setting up of OTP;
- c) OTP movements (as required by Rule Book Module GE/RT8000/HB15);
- d) reports of OTP faults or defects; and
- e) exclusion zones and full duplex communications.

5.12 On-track plant planning

The POS provider should assist in the development of an OTP plan that includes all information relevant to the safe operation of the OTP.

The OTP plan should be included in the final work method statement by the PC and communicated to machine and crane controllers by the POS representative(s) to enable them to implement the OTP plan on site.

The documented OTP plan shall comply with all modules of NR/L2/RMVP/0200.

The plan shall include the following as a minimum:

- a) description of work to be undertaken and the use that will be made of the plant;
- b) safe system for operations affecting any line open (ALO), overhead line equipment (OLE) or third and fourth rail areas including third party owned OLE;
- c) limitations and obstructions to space and clearance such as gauge restrictions, bridges, platforms, buried cables and troughing etc;

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- d) identification of road-rail access point (RRAP) locations for on/off/cross tracking of OTP;
- e) the transportation of OTP to and from the site access point.;
- f) worksite details and the movements involved, including to and from the worksite;
- g) details of where different modes of operation are to be undertaken.;
- h) site briefing arrangements and responsibilities;
- i) emergency information and the emergency plan applicable including contacts and recovery arrangements;
- j) storage and stabling locations including security requirements on site;
- k) communications including full duplex communications equipment;
- l) arrangements for traffic management planning including exclusion zones and safe movement of personnel and OTP from the delivery point and throughout the site; and
- m) contingency planning arrangements in place for preventing the operation of defective OTP performing a safety critical function.

5.13 Competence of on-track plant personnel

POS providers shall document their arrangements for assuring the competence and fitness of their employees and hired-in staff involved in the operation and maintenance of OTP.

This should include elements for:

5.13.1 Competence including:

- a) determining the specific competence requirements for OTP personnel including maintainers and logistics staff;
- b) specific training for the POS representative including an assessment of competence;
- c) selection of new OTP personnel including maintainers;
- d) provision of training on the operation and maintenance of OTP;
- e) training and briefing on the risks associated with OTP;
- f) training and briefing on avoiding points run through and incident awareness;
- g) re-assessing competence periodically and retraining following identification of poor performance; and
- h) awareness of behaviour based safety for OTP personnel.

NOTE: NR/L2/RMVP/0200/P500 contains further information on OTP competences.

5.13.2 Managing directly employed personnel including:

- a) checking of depots and sites;

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- b) booking-on procedures;
- c) monitoring of fitness and fatigue;
- d) managing notice boards/late notice cases (where applicable); and
- e) distribution of operational information and briefings.

5.13.3 Managing hired in personnel including:

- a) assuring competence;
- b) assuring fitness and monitoring fatigue;
- c) monitoring performance; and
- d) sharing performance data.

5.13.4 Monitoring performance of on-track plant personnel including:

- a) compliance with operational arrangements;
- b) booking on arrangements;
- c) plant preparation;
- d) machine operating techniques;
- e) movement speeds of OTP;
- f) taking action when non-compliance is identified;
- g) frequency of monitoring; and
- h) posts responsible for monitoring.

NOTE: NR/L2/RMVP/0200/P101 contains further information on monitoring OTP personnel performance.

5.13.5 Special monitoring of on-track plant personnel that are either newly qualified or poorly performing including:

- a) criteria for instigating special monitoring;
- b) additional monitoring to be carried out;
- c) additional controls that may be required; and
- d) criteria for ending any special monitoring.

5.14 Reliability of on-track plant

POS providers should be able to demonstrate that documented arrangements for monitoring the reliability of OTP are in place which includes:

- a) a reporting system in use to report faults accurately and in a timely way;
- b) a reliability improvement plan to detail proactive efforts in overcoming reliability issues and show any actions planned or taken to overcome OTP reliability issues;
- c) analysis of reliability data collected to support continuous improvement against performance criteria;

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- d) actions taken to minimise damage during transit to ensure OTP remains fit for purpose prior to the start of work;
- e) actions taken to manage all attachments supplied when not in use including provision of storage facilities; and
- f) an assessment as to whether there is a need for an on-site fitter to be available throughout the work, and the provision of a contingency spares/tools pack of commonly used items.

6 Investigation and review of breaches of the POS

6.1 Reporting a breach of the POS

Any breach of the POS (e.g. misuse of OTP, failure of, or deviation from, the OTP plan etc.) shall be investigated by the POS provider. The POS provider shall provide their investigation report to the POS review panel at Network Rail.

Where Network Rail receives notification of a breach of the POS through the close call system, or anonymously through the whistle-blowing process, they shall inform the POS provider and request they conduct a local investigation.

NOTE: The email pos@networkrail.co.uk can be used to report breaches.

6.2 Local investigation by a POS provider

POS providers shall commence a local investigation of any breach of the POS (see Figure 1) in accordance with their management system processes making sure that:

- a) the investigation is independent and considers any process or management failures within the alleged breach; and
- b) an action plan is produced that identifies any necessary improvements or remedial actions they will undertake to prevent a reoccurrence.

6.3 Third party investigations

Where a third party has completed an investigation related to a breach of the POS e.g. damage or injuries investigated by the Rail Accident Investigation Branch (RAIB), the results of the investigation may be used in a formal review by Network Rail.

6.4 Formal review by Network Rail

Notification of a breach of the POS rules might be received from a number of sources including:

- a) PC or POS provider reporting;
- b) outside party investigation;
- c) whistle-blowing process; and
- d) accident/incident reporting.

Any such report shall be subject to a formal review process as shown in Figure 1.

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The POS provider shall provide a detailed statement to enable a fair process through the formal review stage.

All evidence is subject to a formal review and shall result in one of the following decisions:

- a) no further action required;
- b) further investigation by Network rail required;
- c) evidence indicates a breach of the PC's licence;

NOTE: In this case evidence is submitted to Network Rail PC Licensing team for consideration.

- d) evidence indicates a breach of the Sentinel Scheme Rules;

NOTE: In this case evidence is submitted to Network Rail Sentinel team for consideration.

- e) insufficient evidence is available to determine an outcome

NOTE: Table 1 contains guidance on these outcomes.

6.5 Further investigation by Network Rail

Where the formal review requires further investigation, Network Rail shall appoint a lead investigator.

The lead investigator shall provide feedback to the formal review panel to enable an outcome to be reached.

Where the statement submitted by the POS provider at formal review does not include sufficient information for an outcome to be determined, a further investigation by Network Rail including an investigatory hearing may be conducted.

6.6 Conclusion and notification of an outcome

Where an outcome is concluded from a formal review all decisions on outcomes shall be communicated to the POS provider in writing, along with the process for lodging an appeal against an outcome.

6.7 Formal review appeals

A POS provider has a right of appeal as shown in Figure 2, providing the appeal is lodged within four weeks of the outcome being communicated to the POS provider.

Formal review appeals shall only take place where new information or mitigating circumstances not available at the formal review stage is submitted.

Formal Review appeals shall be reviewed by persons within Network Rail who were not involved in the initial formal review process.

7 Scheme assurance arrangements

7.1 Scheme assurance

POS providers registered to undertake OTP Operations are subject to an annual assurance process consisting of three separate audits.

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7.1.1 Minimum requirement for management system audits

Management system audits shall check that the POS providers documented management systems and processes are suitable and sufficient to meet the minimum requirements of the POS.

7.1.2 Minimum requirement for technical audits (condition monitoring)

This shall be carried out in support of the management system audit of OTP acceptance and maintenance arrangements. The technical audit protocol shall be determined by Network Rail's Head of Plant and T&RS.

7.1.3 Minimum requirement for on-site audits

On-site audits shall check the application of the management system processes and demonstrate that they are being applied.

They shall be conducted following award of the first contract where the company is discharging the role of a POS provider.

During on-site audits POS providers are observed and should be able to provide evidence of adherence to the POS rules.

7.2 Plant operations scheme monitoring process

Network Rail shall proactively and reactively monitor activities carried out at both the POS provider's locations and on site in support of the scheme assurance arrangements.

NOTE: Monitoring activities might be unannounced.

POS providers shall allow Network Rail unrestricted access to worksites and documentation for these assurance activities.

Monitoring activities might include inspections, tours or sampling as appropriate.

Network Rail normally advises the POS provider of planned monitoring activities to agree the aspects to be monitored and the date, time and composition of the monitoring team.

Proactive monitoring shall be carried out to check that the POS rules continue to be implemented and that the management systems are effective. This shall include identifying potential problems and taking action to prevent them becoming reality.

Reactive monitoring shall be completed to examine any OTP related events after they have occurred. This shall include provision for learning from any mistakes whether they have resulted in injuries, damage, or are close calls.

7.3 Transfer or change to POS provider approval

Where a POS provider is acquired by another company or group the POS review panel shall be notified in advance of the acquisition.

The acquiring organisation shall produce a material change report to detail how the POS processes will be merged and the POS provider's approval transferred in practice.

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The POS review panel shall review the material change report to determine if the POS provider approval can be transferred to the acquiring organisation.

- Acceptance of the material change report might be subject to an assurance audit within three months of acquisition to assure that the measures outlined within the material change report have been adequately implemented.

7.4 Validation audits

Network Rail's internal audit function shall audit the POS rules annually. Results of these verification audits shall be made available to all POS providers to demonstrate the consistent application of POS rules.

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Appendix A - Local investigation process

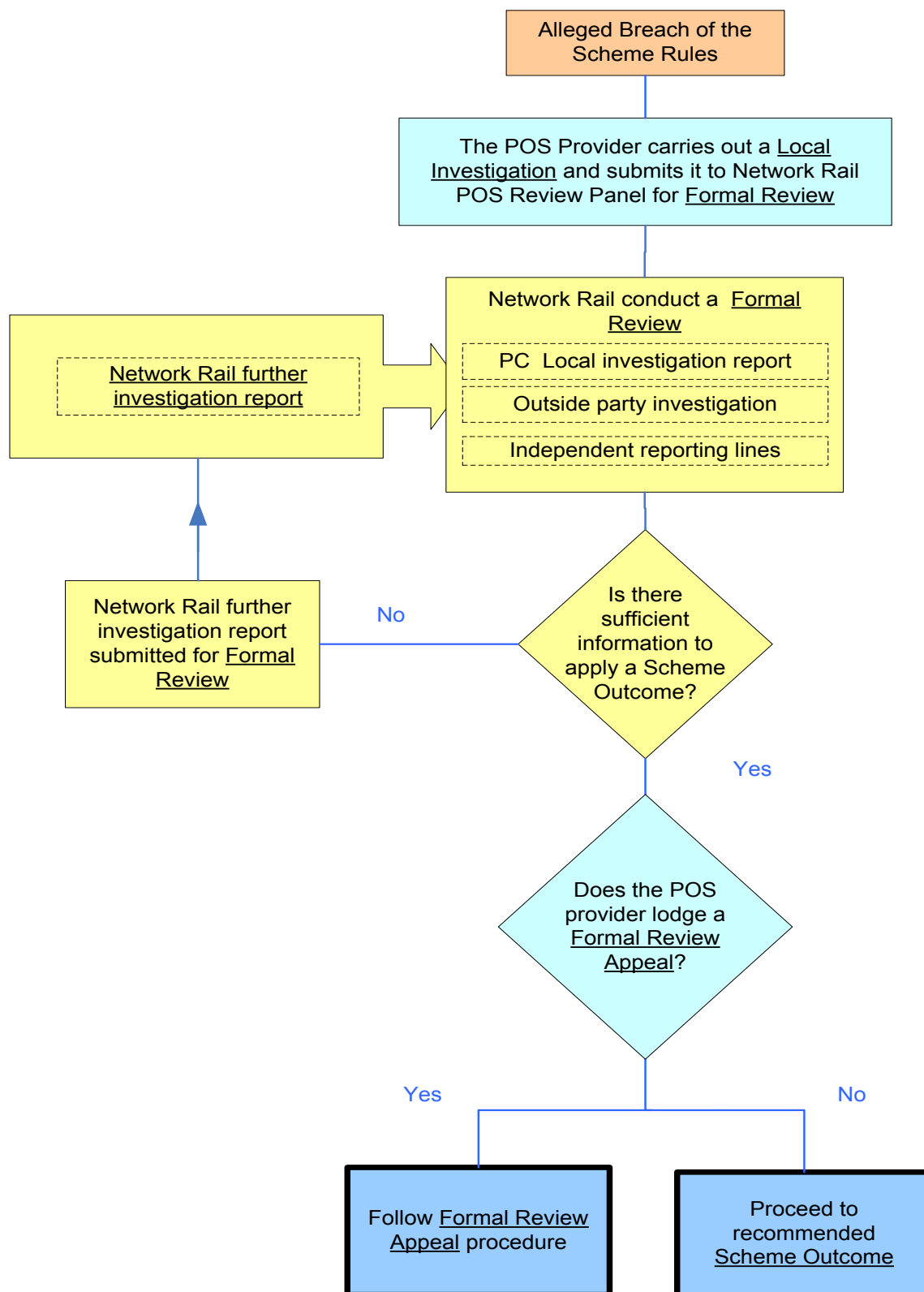


Figure 1 Local investigation and formal review process

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Appendix B - Formal review and appeals process

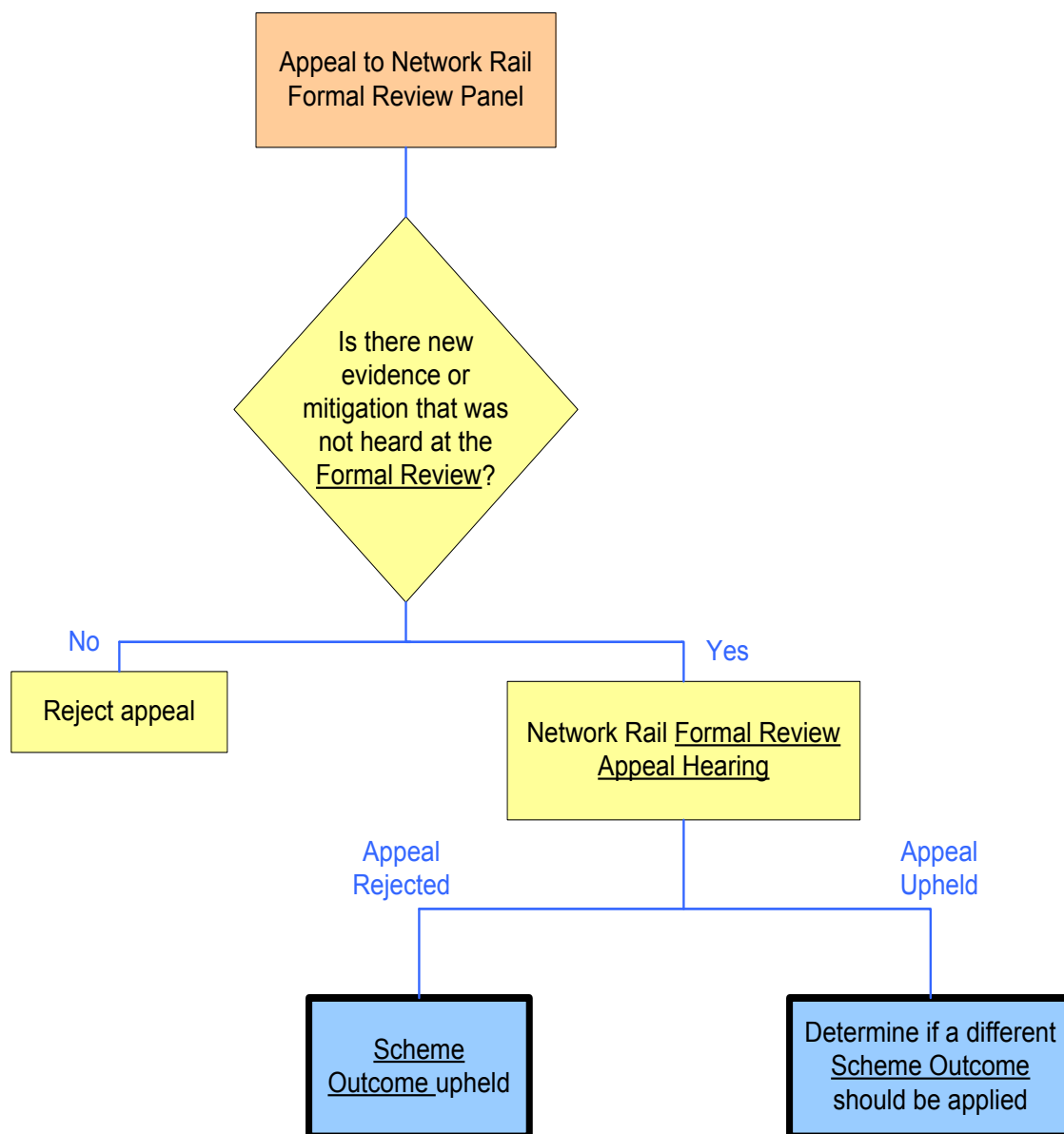


Figure 2 Formal review appeals process

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Appendix C - Breaches of POS

Event	POS Provider Action (Local Investigation)			Network Rail POS Review Panel Action (Formal Review)		
	Investigate and Report	Update Arrangements	Management Review	Approval Re-Audit	Restricted Scope of Work <i>*See Note</i>	POS Provider Suspension
Breach of POS Rules	Breach or mistake (first occurrence)			Multiple Occurrence		
Breach in maintaining the POS rules approval requirements			Breach	Single Occurrence	Multiple Occurrence	
Breach of Network Rail Product Approval or Engineering Acceptance limitations			Breach	Single Occurrence		
Breach of machine maintenance requirements and arrangements	First Occurrence			Single Occurrence	Multiple Occurrence	
Falsification of safety critical documentation e.g. MC/CC checklist	Falsification or mistake (first occurrence)			Single Occurrence /Deliberate Breach		
Infringement of Method Statement or OTP Plan	Infringement or mistake (first occurrence)			Multiple Occurrence/ Deliberate Breach		
Negligence by OTP personnel leading to damage or injury	Negligence or mistake (first occurrence)			Multiple Occurrence/ Deliberate Breach		
Breach in providing the correct or competent personnel required	Breach or mistake (first occurrence)			Single Occurrence	Multiple Occurrence	
Breach in reporting or investigating an alleged POS Rules breach			Breach	Single Occurrence /Deliberate Breach		
<i>*Note A Restricted Scope of Works may include specific machine(s) take-down</i>						

Table 1 Breaches of on-track plant operation scheme rules – outcome guidelines

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Date:	04 June 2022
Compliance date:	03 September 2022

Level 2

Module P700

Plant Maintenance

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Published and Issued by Network Rail, 2nd Floor, One Eversholt Street, London, NW1 2DN.



Ref:	NR/L2/RMVP/0200/P700
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

User information

This Network Rail document contains colour-coding according to the following Red–Amber–Green classification.

Red requirements – no variations permitted

- Red requirements are to be complied with and achieved at all times.
- Red requirements are presented in a red box.
- Red requirements are monitored for compliance.
- Non-compliances will be investigated and corrective actions enforced.

Amber requirements – variations permitted subject to approved risk analysis and mitigation

- Amber requirements are to be complied with unless an approved variation is in place.
- Amber requirements are presented with an amber sidebar.
- Amber requirements are monitored for compliance.
- Variations can only be approved through the national variations process.
- Non-approved variations will be investigated and corrective actions enforced.

Green guidance – to be used unless alternative solutions are followed

- Guidance should be followed unless an alternative solution produces a better result.
- Guidance is presented with a dotted green sidebar.
- Guidance is not monitored for compliance.
- Alternative solutions should be documented to demonstrate effective control.

Ref:	NR/L2/RMVP/0200/P700
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

Issue record

Issue	Date	Comments
1	March 2013	First issue.
2	June 2017	Scheduled periodic review and update carried out. Section 6.3 safety critical work added.
3	December 2018	Incorporated all the Maintenance modules content into one location. Addition of Torque testing for 9b machines
4	June 2022	Scheduled periodic review and update carried out.

Reference documentation

All reference documents and legislation are given in: NR/L2/RMVP/0200/MANUAL - Infrastructure Plant Manual

Ref:	NR/L2/RMVP/0200/P700
Issue:	4
Date:	04 June 2022
Compliance date:	03 September 2022

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1 Purpose

The implementation of this module contributes to mitigating the following risks:

- a) compliance with legislation (LOLER, PUWER, HASAW);
- b) damage to assets, e.g. RRV or its load hitting a passing train during ALO operation; and
- c) staff injuries, e.g. Operator being trapped between machine and infrastructure or machine and machine.
- d) failure of plant or its control or safety systems;
- e) incorrect lifting operations (LOLER);
- f) lack of RIDDOR or close call reporting; and
- g) lack of continuous improvement, such as, mitigating factors from incidents not being introduced to machine/operating procedures.

2 Scope

This module details Network Rail's requirements for the maintenance of plant used on Network Rail managed infrastructure and Network Rail projects.

This module applies to organisations that are involved with any of the following:

- a) manufacture or supply of OTP and Portable & Transportable Plant;
- b) carrying out or controlling operations using OTP and Portable & Transportable Plant; and
- c) maintenance of OTP and Portable & Transportable Plant used on NRMI and NR projects.

NOTE: Maintenance activities included within individual vehicle maintenance plans should be equivalent to, or better than, the requirements of this module.

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3 Competence to carry out maintenance activities

All persons undertaking maintenance activities on plant shall be competent as detailed in NR/L2/RMVP/0200/P500.

4 Management and control of plant maintenance

Maintenance of rail mounted plant shall be managed in accordance with the requirements of legislation, Railway Group standards, Network Rail standards and approved OEM procedures by either:

- a) contractual arrangements with approved suppliers of maintenance services; or
- b) direct management by the Asset Owners staff.

NOTE: Where the control of maintenance is contracted to a supplier, the Asset Owner of the machine retains responsibility for the maintenance.

All staff undertaking the maintenance shall hold the required competencies, and this shall be identified in the Asset Owners competence framework.

Clear maintenance control requirements shall be provided as part of the procurement specification; and updated during the life of the asset.

Plant shall be maintained to enable Network Rail to demonstrate compliance with the requirements of the appropriate:

- a) statutory regulations;
- b) Network Rail standards; and
- c) manufacturers' recommendations.

Auditable maintenance records shall be retained for all plant to provide evidence of compliance with the requirements of the associated maintenance policy for a minimum of 6 years after disposal.

Maintenance of Network Rail owned plant shall be managed in accordance with NR/L1/RMVP/001

5 Facilities to carry out maintenance activities

Facilities required to carry out maintenance of rail mounted plant are detailed in:

- a) NR/L2/RVE/01327 for on-track machines;
- b) RIS-1530-PLT for on-track plant.

Facilities required to carry out maintenance of portable and transportable plant will be included in the written maintenance plan provided by the manufacturer.

NOTE: NR/L2/RVE/01327 is only applicable to Network Rail owned or leased assets.

6 Maintenance plans

Plant shall be maintained in accordance with an approved maintenance plan.

Maintenance plans shall comply with the standards listed in Table 1.

Maintenance plans shall be reviewed periodically, as detailed in RIS-1530-PLT.

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Plant type	Applicable standards if plant owned by:	
	Plant Supplier	Network Rail
On-track machines	GM/RT2004 GM/RT2400 RIS-1702-PLT	NR/L2/RMVP/0090
On-track plant and associated equipment	RIS-1530-PLT	NR/L2/RMVP/0090
Portable and transportable plant	RIS-1701-PLT	RIS-1701-PLT
On-track machine wheelsets and associated components	GM/RT2466	NR/L2/RMVP/1332

Table 1 Standards applicable to maintenance plans

Templates for the maintenance records shall be included within each maintenance plan.

NOTE 1: On-track plant maintenance manuals/plans may be produced by converters by using both RIS-1530-PLT requirements and original equipment manufacturer specific requirements.

NOTE 2: It is considered good practice to include the service checklist templates within the approved maintenance plan.

NOTE 3: The service checklists used to maintain the vehicle should include both the maintenance requirements specified by the converter/upgrader and those specified by the OEM.

7 Statutory requirements

7.1 Provision and use of work equipment

The provision and use of work equipment, including mobile and lifting equipment on NRMI and NR projects shall comply with the following legislation:

- The Provision and Use of Work Equipment Regulations 1998 (PUWER);*
- The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER);*
- The Control of Substances Hazardous to Health Regulations 2002 (COSHH) plus amendments 2003 and 2004;*
- The Work at Height Regulations 2005 plus amendment regulation 2007;*
- The Railways and Other Guidance Transport Systems (Safety) Regulations 2006. (ROGS) plus amendment regulations 2006, 2011 and 2013;*
- Supply of Machinery (Safety) Regulations 2008 plus amendment regulation 2011; and*
- The Railways (Interoperability) Regulations 2011 plus amendment regulation 2013.*

All work equipment used to carry out lifting operations shall be examined as follows:

- lifting equipment used for lifting persons and all accessories for lifting as defined in LOLER - at least every 6 months;
- other lifting equipment including all load lifting points, anchor points and quick hitches where permanently installed - at least every 12 months. In either case, this shall be in accordance with an approved examination scheme.

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7.2 Lifting modules and attachments including all cranes and MEWPs

The Engineering Acceptance Certificate (EAC)/Engineering Conformance Certificate (ECC) of a base vehicle shall specify the only combinations of base vehicle and module or attachment type that can be used together.

Each combination of base vehicle and module or attachment shall have a LOLER thorough examination certificate where lifting operations can be carried out. Include the serial number of the base vehicle and module or attachment on the LOLER thorough examination certificate.

Only fit modules or attachments to base vehicles in accordance with the manufacturer's instructions, and if competent to do so. A LOLER thorough examination shall be undertaken each time the module is fitted to the base vehicle.

To confirm the correct functionality of a base vehicle and module or attachment combination, carry out a functional check after attachment. Follow the OEM Operations or Maintenance Manual for required functional checks.

Carry out a thorough examination following attachment of modules or attachments that lift people or loads.

NOTE 1: Only competent people can undertake thorough examinations.

NOTE 2: Attachments have thorough examinations as stand-alone items and the certificate will not reference a base machine.

Record the results of the thorough examination in the base vehicle log book and vehicle history file.

A copy of the current thorough examination certificate must be retained with the vehicle document folder.

Form F023 or equivalent can be used to record the results of the functional check and thorough examination.

Add the completed form to the vehicle history file

7.3 Safety critical items and spares

Some maintenance elements and systems of assets are considered safety critical. The control of maintenance on these items and those carrying out the maintenance is therefore essential to minimise the risk that these products might import to NMRI or NR projects. Refer to NR/L2/RMVP/0200/P500 when maintaining safety critical items.

If OEM safety critical spares become unavailable due to obsolescence for any Plant asset the Owner shall have in place a procedure to cover the verification of Non OEM spares. Non OEM parts that have not been verified as equivalent to the OEM part shall not be fitted.

7.4 Permit to work system

Some assets may need the maintenance system to be controlled via the use of a permit to work, particularly when the maintainer is working in a confined space, out of sight of other staff in the vicinity of the plant.

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8 Particular maintenance requirements

8.1 Lifting points including quick hitches

All lifting points fitted to plant, including permanently attached quick hitches, shall be:

- a) included in the machine's maintenance plan;
- b) thoroughly (LOLER) examined by a competent person at least every 12 months.
- c) All lifting points should be listed on the Engineering Conformance Certificate.

The thorough examination and report shall include:

- a) fitness for purpose;
- b) deformation;
- c) unacceptable wear;
- d) each load lifting point; and
- e) serial number of the quick hitch.

Wear limits shall be specified in the maintenance plan.

If a quick hitch is not permanently attached to a machine it is classed as a lifting accessory and shall have a thorough examination at least every 6 months

8.2 Work restraint anchor points

Include inspection of the work restraint anchor points as part of the machine's maintenance plan.

MEWP anchor points shall be thoroughly examined as part of the six monthly thorough examination.

If any structural repair of restraint anchor points is undertaken, carry out inspection and approval in accordance with BS EN 280.

An anchor point shall not be used if any permanent deformation occurs.

An unused anchor point shall be blanked off or otherwise permanently precluded from use.

Record the results of inspections and testing in the maintenance records.

8.3 Limiting devices

Maintain all limiting devices, as listed below, in accordance with the maintenance plan and the manufacturer's instructions:

- a) rated capacity indicator;
- b) automated safe load indicator;
- c) total movement indicator;
- d) load moment indicator;
- e) overload warning system;
- f) motion limiters, for example, derricking, telescoping, slewing, travelling or slack rope; and
- g) wheel/axle blocking systems.

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8.4 Audible warning

Any warning devices or equipment fitted with an audible warning shall be functionally tested to the maintenance plan or manufacturer's instructions.

If the sound levels are different to those stated in the manufacturer's instructions, change the volume as per the maintenance plan or manufacturer's instructions.

8.5 Operational maintenance

The vehicle maintenance plan shall include, or reference, all the tasks contained in the original equipment manufacturers (OEM) maintenance manual.

Carry out these tasks at the periods specified in the OEM maintenance manual.

Keep all signs or labels detailing safety instructions, notices or information, clean and legible. Replace or repair any sign or label if any of it is missing.

8.6 Safety-related defects

Report all safety-related defects found whilst carrying out maintenance, functional checks and thorough examinations in accordance with NR/L2/RMVP/0200/P100. Whenever circumstances have occurred that might affect the safety of the lifting equipment, such as damage and subsequent repairs, the thorough examination process should be followed. This should be detailed in the OEM (Original Equipment Manufacturer)/converter maintenance documentation.

All subsequent repair shall be undertaken in accordance with an approved procedure prepared by the machine converter using a suitably qualified welding/fabrication body.

9 Road-rail vehicle brake tests

9.1 Test procedure

Carry out all road-rail vehicle (RRV) brake tests using the following principles (see also figure 1):

- if the brake performance data for the RRV is available, carry out a routine maintenance brake test; or
- if the brake performance data is not available, or the braking system has been modified, carry out a reference brake test; and
- record the RRV speed during all brake tests using a calibrated speed gun or similar device.

NOTE 1: The operator should have a speed indicator or there should be an engineering control to limit the maximum speed.

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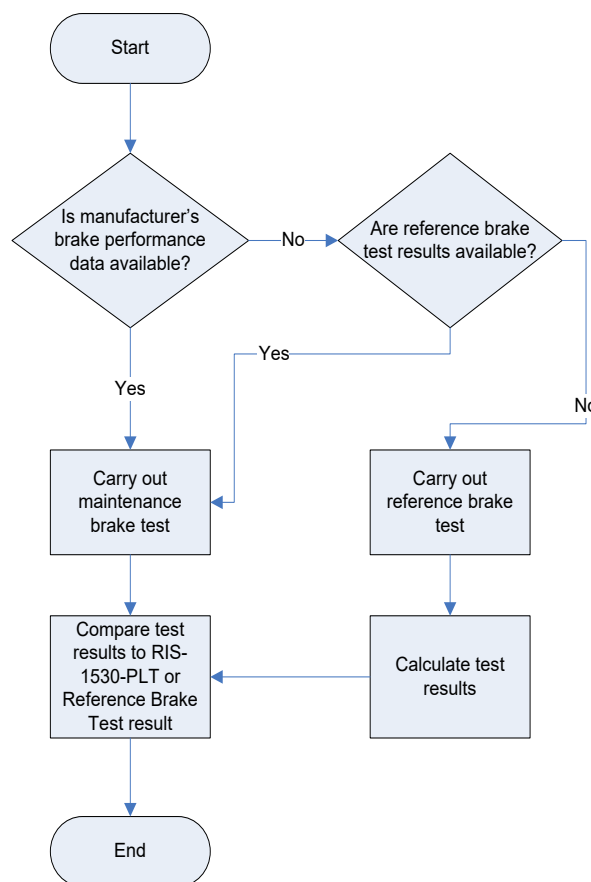


Figure 1 - Road-rail vehicle brake testing process

Carry out the tests using the RRV orientation that has the worst stopping distance. Record the orientation of the RRV in the test records.

Apply the brakes at the same point on the test track for each test. In all tests, brake the RRV from a steady state speed by coming off the 'throttle' and applying full braking force at the brake application point. Do not feather or release the brakes.

Measure the stopping distance from the brake application point to the point where the RRV comes to a complete stop.

Carry out each test until three results are within 10% of each other. The final test result shall be the average of three test results that are within 10% of each other.

Use the following forms (or equivalent) to record brake test results:

- NR/PLANT/0200_F015 Maintenance parking brake test record – trailer or attachment
- NR/PLANT/0200_F016 On-track plant reference brake test report
- NR/PLANT/0200_F017 On-track plant routine maintenance brake test report

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9.2 Test conditions

Only carry out RRV brake tests if the following conditions can be met:

- a) the brake tests can be carried out on dry and level track;

NOTE 1: This allows for compliance with RIS-1530-PLT in a repeatable manner.

NOTE 2: Level track is a gradient up to 1 in 750; gradients steeper than this are not considered level.

- b) all obvious railhead contamination including rust has been removed; and

NOTE 3: A period of running over the test track might be needed to remove rust covering the railhead before brake testing is attempted.

- c) a track is available that is long enough to allow for a margin of error for unexpected reduced braking performance, and that is long enough to carry out the following:

- i) acceleration of the RRV up to steady state speed;
- ii) brake application; and
- iii) deceleration under braking for the RRV to come to a stop.

9.3 Routine maintenance brake test

Carry out a routine maintenance brake test:

- a) as a minimum every 12 months; and
- b) after all brake repairs, modifications or brake incidents.

NOTE 1: This includes brake repairs carried out after brake test failure.

NOTE 2: For Routine Maintenance Brake Tests on 9b machines fitted with Direct Wheel Braking see Section 9.4

Measure and record the stopping distance of the un-laden machine without a trailing load from 10mph or maximum speed, whichever is smaller.

Record the results on form F017 or equivalent.

Record whether the machine exceeds the maximum stopping distance stated in RIS-1530-PLT; and the stopping distance achieved in the reference brake test or previous routine maintenance brake test by more than 10%.

If the RRV's stopping distance is 10% greater than the reference or previous test, the reason shall be investigated and repaired or justified.

9.4 Torque Testing

9b configuration Road Rail Vehicles fitted with Direct Wheel Braking (DWB) systems shall have the capability for braked wheels to be tested by torque method as detailed in RIS-1530-PLT.

Torque brake testing shall be conducted in line with OEM instructions detailed in approved VMI's (Vehicle Maintenance Instruction). The frequency shall be in line with the OEM instructions.

Torque figures shall be recorded at the prescribed frequency in line with the OEM maintenance record sheets. (See Appendix B for example)

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NOTE 1: If an approved VMI from a manufacturer does not identify the relevant details for torque testing, the organisations professional head can approve the methodology and required test figures using the torque test calculations in Appendix D in conjunction with a robust engineering change process.

NOTE 2: A 3-month frequency is identified as the good practice to undertake torque testing.

9.5 Reference brake test

9.5.1 General

Carry out a reference brake test:

- if previous braking performance figures are not available; or
- the braking system has been modified.

A reference brake test should be carried out at the same interval as a routine maintenance brake test or after brake modification.

On completion of a reference brake test, record the braking performance figures in the RRV's maintenance plan for future reference.

9.5.2 Step 1: measure stopping distance

Measure and record the following stopping distances:

- Test 1. RRV plus maximum service braked trailing load (maximum number of trailers permitted at front and rear of RRV) at maximum permitted speed;
- Test 2. RRV plus maximum non-service braked trailing load at 10mph (or maximum permitted speed if this is less than 10mph);
- Test 3. RRV fully laden, without trailing load, at maximum permitted speed;
- Test 4. RRV unladen, without trailing load, at maximum permitted speed; and
- Test 5. RRV unladen, without trailing load, at 10mph (or maximum permitted speed if this is less than 10mph).

NOTE: The maximum permitted speed is the speed shown on the ECC/EAC, displayed on the vehicle side; or shown in the VMI.

Record the results on Form NR/PLANT/0200_F016 or equivalent.

9.5.3 Step 2: calculate maximum stopping distance

Use the data collected during step 1 in the following calculations to calculate the maximum stopping distance of the RRV:

- divide the stopping distance in RIS-1530-PLT by the measured stopping distance for each of the five tests shown in step 1; and
- multiply the lowest value obtained in a) with the brake distance measured in test 1 to find the maximum stopping distance of the RRV.

Only use the calculated maximum stopping distance of the RRV in subsequent maintenance brake tests if the value is less than the stopping distance shown in RIS-1530-PLT (see table 2).

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Test parameters	Initial speed (mph)	Stopping distance (m)		Brake performance factor (A ÷ B)
		Permitted by RIS-1530-PLT (Value A)	Measured during reference brake testing (Value B)	
Test 1. RRV plus maximum service braked trailing load at maximum permitted speed.	15	36	26.3	1.37
Test 2. RRV plus maximum non-service braked trailing load at 10mph.	10	18	15.1	1.19
Test 3. RRV fully laden without trailing load at maximum permitted speed.	20	60	42.7	1.41
Test 4. RRV unladen, without trailing load at maximum permitted speed.	20	60	41.2	1.46
Test 5. RRV unladen, without trailing load at 10mph (or maximum permitted speed).	10	18	8.2	N/A
<p>Maximum stopping distance for routine maintenance:</p> <p>$= 1.19 \times 8.2$</p> <p>= 9.8 metres</p>				

This is the calculated stopping distance of the RRV. It is less than RIS-1530-PLT so can be used in future routine maintenance brake testing.

Only use the measured values if they are less than the maximum permitted by RIS-1530-PLT

This is the lowest brake performance factor calculated from the reference brake test results. This will be used to calculate the maximum stopping distance of the RRV for maintenance brake testing.

Table 2 – calculating maximum stopping distance

10 Trailer and attachment brake tests

10.1 Trailer or attachment parking brake test

Carry out a parking brake test on all trailers and attachments capable of carrying a load:

- a) at least every 12 months;
- b) following all brake repairs or approved modifications; and
- c) following any brake related incident.

Carry out the test in accordance with either the manufacturer's brake test procedure, or the push-pull test procedure detailed in 10.2, depending whichever is the greater requirement.

Carry out brake tests on all attachments (wheeled type 0D) that have no load carrying capacity at least every three months or when specified by the manufacturer.

NOTE 1: These attachments are fitted with braking systems where components enter into the ballast or the movement of brake block or pad can be seen. They include dozer blade trolleys.

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At the frequency detailed in the maintenance plan, check the brake system pressure using a calibrated test gauge.

Record results for the brake tests and retain in the machine's maintenance records. Form NR/PLANT/0200_F015 or equivalent can be used for this purpose. The record shall be available to the machine controller on site.

If the trailer or attachment fails any brake test, or the brake system pressure is lower than the minimum stated in the maintenance plan, investigate and fix the cause.

Undertake a compliant brake test before allowing the equipment back into service. Retain all test results in the maintenance records.

NOTE 2: There may be convertors or OEMs who facilitate torque testing for trailers. Always follow the test procedures as detailed in the approved VMI.

10.2 Push pull brake test

A trailer or attachment shall withstand a minimum push or pull force on a level surface as shown in table 3.

The wheels shall not turn or slide during the test.

NOTE: This might require the unit to be loaded to prevent wheel slide.

Certified speed of trailer or attachment	Parking brake type	Push-pull force to be applied to trailer or attachment
N/A	Non breakaway brake	3% of gross weight
10mph	Breakaway brake	6% of gross weight
20mph	Breakaway brake	7% of gross weight
35mph	Breakaway brake	8% of gross weight

Table 3 Trailer or attachment push pull test

10.3 Trailer or attachment service brake test

Carry out a service brake test to the manufacturer's service brake test procedure:

- a) at least:
 - i) every 12 months; or
 - ii) where specified, in accordance with the manufacturer's specific brake test period;
- b) after all brake repairs;
- c) approved modifications; and
- d) brake related incidents.

If the trailer or attachment fails any service brake test investigate and fix the cause. Undertake a compliant brake test before allowing the equipment back into service. Record all test results in the maintenance records.

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11 Rail wheels

Inspect all rail wheels to the requirements contained in the OEM maintenance plan.

Inspect all rail wheels as a minimum every 3 months for damage, wear or deformation.

Record all the required dimensions on an appropriate maintenance record sheet (see Appendix A)

Where damage or wear is identified that does not meet the limits specified, repair where the limits allow or renew with new wheels.

NOTE 1: It is advised that both wheels on an axle are renewed at the same time.

NOTE 2: RIS-1530-PLT and GM/GN2497 can be used as reference to show the damage that can occur to wheels.

12 Manually propelled equipment

Carry out a brake performance test on each item of manually propelled equipment at least each 3 months in accordance with either the:

- test specification provided by the manufacturer as part of product acceptance (see NR/L2/RMVP/0200/P300); or
- where a maintenance brake test has not been provided by the manufacturer, the braking distances given in BS EN 13977.

Mark the equipment with the due date of the next brake performance test in a clearly visible location.

An example of a brake test record sheet is detailed in NR/PLANT/0200_F018.

13 Track jack maintenance

13.1 Visual checks

Check that each jack :

- Is clearly marked with a unique identification number;
- has the correct handle, and is free of defect;
- is clearly marked with the safe working load (SWL); and
- is within date for its next thorough examination or test.

NOTE: Where there are different SWLs for the toe and head, these should be clearly shown on the jack together with the location that the SWL refers to.

13.2 Functional testing

Complete a functional test:

- before first use;
- at thorough examination; and

NOTE: Jacks are classed as lifting equipment in SI 1998 No. 2307 The Lifting Operations and Lifting Equipment Regulations (LOLER) and are therefore subject to a thorough examination at least every 12 months.

- following repair.

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As part of the functional test, carry out the checks shown in table 4 for type 1 and type 2 jacks.

Functional check	Type 1 jack	Type 2 jack
Check that the jack will support the SWL	✓	✓
Load the jack and check that the relief valve is set to SWL + 5%	✓	n/a
Load jack to either 1% of SWL or 50 kg whichever is least	✓	✓
Operate the release control	✓	✓
Check that the jack retracts from maximum to minimum height in less than 10 seconds	✓	✓

Table 4 – Functional checks to be carried out on type 1 and type 2 jacks

Record the results of all functional tests, thorough examinations and details of all repair work carried out.

14 Calibration

Only equipment that is within its calibration date shall be used to carry out the maintenance of plant used on the infrastructure. All calibration shall meet the requirements of NR/L2/RMVP/0172 and NR/L3/RMVP/0201. Carry out functional testing as part of the calibration where appropriate.

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Appendix A - Example template for rail wheel measurements

Item	Tolerance/Limit		N/S/F	O/S/F	N/S/R	O/S/R
‘Road’ Tyre Tread						
‘Road’ Wheel Rim						
Rail Wheel Flange Thickness						
Rail Wheel Flange Height						
Rail Wheel Diameter						
Rail Wheel Flats						
Rail Wheel Back to Back						
Comments:						

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Appendix B - Example of brake torque testing record sheet

	Brake Pressure	Min Torque Figure NM	Achieved
Wheel 1		Park:	
		Service:	
Wheel 2		Park:	
		Service:	
Wheel 3		Park:	
		Service:	
Wheel 4		Park:	
		Service:	
Torque Wrench Serial Number			
Calibration Test Date Expiry			
Comments:			

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Appendix C - Example of brake test record sheet

Vehicle Speed		Service Brake Stopping Distance (Forward)			Average	Average from Previous Test	Service Brake Stopping Distance			Average	Average from Previous Test	Max Permitted Stopping Distance (RIS-1530-PLT)
MPH	KM/h	1 st	2 nd	3 rd			1 st	2 nd	3 rd			
4	6											5m
5	8											6m
10	16											18m
15	24											36m
20	31											60m

Vehicle Speed		Park Brake Stopping Distance (Forward)			Average	Average from Previous Test	Park Brake Stopping Distance			Average	Average from Previous Test	Max Permitted Stopping Distance (RIS-1530-PLT)
MPH	KM/h	1 st	2 nd	3 rd			1 st	2 nd	3 rd			
4	6											5m
5	8											6m
10	16											18m
15	24											36m
20	31											60m

If the stopping distance increases by more than 10% over previous average test result, the reasons should be investigated and corrected.

Comments:

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Appendix D - Example of Torque testing calculations (from the M&EE Networking Group)

RIS-1530-PLT braking requirement based on park brake hold requirement & service brake nominal deceleration requirement.			
Vehicle Speed 10mph	4.470 m/sec	Vehicle Gross Weight	28600 Kg
Deceleration Rate 12%g	-1.177 m/sec^2	No of Simultaneously Braked Wheels	4 qty
Stopping Distance	8.49 m	Minimum Diameter Rail Wheel (Reprofiled)	680 mm
Effective Brake Diameter	680 mm	Incline hold percentage	6.00%
Dynamic Brake Torque	11447 Nm	Calculated Brake Torque	5724 Nm
Brake Torque Per Wheel Min.	2862 Nm	Calculated Brake Torque Per Wheel Min.	1431 Nm
Emergency Brake		Service Brake	
Deceleration Rate 13%g	-1.275 m/sec^2	Deceleration Rate 8%g	-0.785 m/sec^2
Stopping Distance	7.83 m	Stopping Distance	12.73 m
Dynamic Brake Torque	12401 Nm	Dynamic Brake Torque	7631 Nm
Brake Torque Per Wheel Min.	3100 Nm	Brake Torque Per Wheel Min.	1908 Nm
The above calculations establish the brake torque requirements for the various functional braking on rail plant. The above calculated figures are the minimum required to theoretically achieve the stated stopping distance assuming no skid / slide. To demonstrate compliance to RIS-1530 the adopted torque values will require validation against dynamic / static brake testing			
Park / Emergency Brake Torque per Wheel	3100 Nm	Adjusted Torque	3100 Nm
Estimated Annual Brake Degradation	0.00%		
Service Brake Torque per Wheel	2862 Nm	Adjusted Torque	2862 Nm
The above allows a percentage increase in torque to accommodate for brake degradation on none auto adjusting brake systems			