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# RIS

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**Rail Industry Standard for Safe Use of Plant for Infrastructure Work**  
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Rail Industry Standard

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## Issue Record

Issue	Date	Comments
One	7 April 2007	Original document Replaces GM/RT1403 issue one and GM/RC1503 issue one
Two	03 October 2009	Replaces issue one Small scale change amendment – Appendix A withdrawn The revision also incorporates amendments to GN056 and 3.1.3, as set out in the amendment section of the Railway Group Standards Catalogue in August 2009.

Amended or additional parts of revised pages have been marked by a vertical black line in the adjacent margin.

## Superseded or replaced documents

The following Railway Group documents are superseded or replaced, either in whole or in part as indicated:

Superseded or replaced documents	Sections superseded	Date when sections are superseded
RIS-1700-PLT issue one Safe Use of Plant for Infrastructure Work	All	03 October 2009

## Supply

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# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## Contents

Section	Description	Page
<b>Part 1</b>	<b>Introduction</b>	<b>5</b>
1.1	Purpose and structure of this document	5
1.2	Application of this document	5
1.3	Health and safety responsibilities	5
1.4	Copyright	5
1.5	Approval and authorisation of this document	6
<b>Part 2</b>	<b>Requirements for Use, Approval and Maintenance of Plant</b>	<b>7</b>
2.1	Approval of plant	7
2.2	Identification	7
2.3	Maintenance of plant	7
2.4	Documentation	7
2.5	Urgent high risk defects	8
<b>Part 3</b>	<b>Preparing a Safe System of Work for Use of Plant</b>	<b>9</b>
3.1	Planning for use of plant	9
3.2	Documented safe system of work	10
3.3	Lift plan	10
3.4	Selection and planning of protection against rail movements	12
3.5	Railborne plant	13
<b>Part 4</b>	<b>Safety Requirements for Use of Infrastructure Plant</b>	<b>14</b>
4.1	All plant	14
4.2	Railborne plant	17
4.3	On-track machines	19
4.4	Possession-only rail vehicles	19
4.5	Manually propelled railborne plant	20
4.6	Non-railborne plant and road vehicles used lineside or on or near the line	21
4.7	Flails	21
4.8	Plant on or in rail vehicles	22
4.9	Disc cutters	23
<b>Part 5</b>	<b>Specific Safety Requirements for Use of Cranes</b>	<b>24</b>
5.1	Staff awareness	24
5.2	Lifting operations	24
5.3	Tandem and multiple lifting	25
5.4	Crane controller	26
5.5	Slinger	28
5.6	Crane operator	28
<b>Part 6</b>	<b>Specific Safety Requirements for Handling Rail</b>	<b>31</b>
6.1	Lifting of rail	31
6.2	Lifting track panels	32
6.3	Moving rails using a thimble	32
6.4	Moving rails using pulling gear	33
<b>Part 7</b>	<b>Specific Safety requirements for Track Jacks</b>	<b>34</b>
7.1	Track jacks	34
7.2	Type 1 jacks (obstructionless)	34
7.3	Type 2 jacks	34
7.4	Types 3 and 4 jacks	34
7.5	Placing and removing jacks	34
7.6	Maintenance	34

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

---

<b>Part 8</b>	<b>Competence and Fitness</b>	<b>35</b>
8.1	Ensuring competence	35
8.2	Frequency of competence reassessment	35
8.3	Specific competence requirements – on-track plant	36
8.4	Specific competence requirements – cranes	36
8.5	Fitness	38
<b>Appendices</b>		<b>39</b>
Appendix A	Appendix withdrawn	39
Appendix B	Plant Which Requires Operator Re-Assessment More Frequently Than Every Five Years	40
<b>Definitions</b>		<b>41</b>
<b>References</b>		<b>43</b>
<b>Tables</b>		
Table 1	LOLER and rail industry equivalent responsibilities	26

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## Part 1 Introduction

### 1.1 Purpose and structure of this document

- 1.1.1 This document has been published by Rail Safety and Standards Board (RSSB) to provide a voluntary standard on the safe use of plant for infrastructure work, for the rail industry to use if they so choose, as set out in clause 1.2.1.
- 1.1.2 This document details requirements for the safe use of plant (as defined in this document) on, or that could affect, Network Rail controlled infrastructure, used for all infrastructure related activities, including (but not limited to) maintaining, inspecting, measuring, renewing and installing infrastructure and its components. This document is particularly relevant to situations where plant has the potential to infringe running line clearances or where plant is used adjacent to an open running line.
- 1.1.3 The document is set out in the form of standard requirements followed by guidance notes. Guidance notes are marked by a grey bar in the margin with the letters GN and sequential numbering, to differentiate them from the standard requirements to which they relate.
- 1.1.4 This document contains requirements and guidance that are amended under the Railway Group Standards Code (Issue Three) as a small scale change. Reference to the amendments is made in the 'Issue Record'. All other parts of the document are unchanged from the previous issue.

### 1.2 Application of this document

- 1.2.1 Rail Industry Standards are not mandatory unless or until a duty holder specifies all or part of them in company procedures or contract conditions. Where this is the case the duty holder will specify the nature and extent of application.
- 1.2.2 Specific compliance requirements and dates have therefore not been specified since these will be the subject of the internal procedures or contract conditions of the companies which choose to adopt this standard.

### 1.3 Health and safety responsibilities

- 1.3.1 Users of documents published by RSSB are reminded of the need to consider their own responsibilities to ensure health and safety at work and their own duties under health and safety legislation. RSSB does not warrant that compliance with all or any documents published by RSSB is sufficient in itself to ensure safe systems of work or operation or to satisfy such responsibilities or duties.

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# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## **1.5 Approval and authorisation of this document**

1.5.1 The content of this document will be approved by:

Plant Standards Committee on 18 June 2009.

1.5.2 This document will be authorised by RSSB on 06 July 2009.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## Part 2 Requirements for Use, Approval and Maintenance of Plant

### 2.1 Approval of plant

- 2.1.1 All items of plant to be used on Network Rail controlled infrastructure, including lifting accessories designed specifically for lifting rail, shall have approval from Network Rail Product Acceptance Services prior to use, as set out in RIS-1530-PLT and RIS-1701-PLT.

### 2.2 Identification

- 2.2.1 Items of plant to be used on Network Rail controlled infrastructure shall be uniquely identified and shall have a contact telephone number displayed on each item.

GN001 The Provision and Use of Work Equipment Regulations 1998 requires all (safety) markings to be clearly visible. In addition all items of plant should be uniquely identified.

GN002 The telephone number should be a number that can be used to contact the owner of the item of plant or his representative.

### 2.3 Maintenance of plant

- 2.3.1 The requirements for maintenance of plant are set out in the Provision and Use of Work and Equipment Regulations 1998, GM/RT2004 and RIS-1530-PLT as applicable, and manufacturers' recommendations, where appropriate.

- 2.3.2 Maintenance of plant shall be recorded such that it is readily auditable. The maintenance arrangements, including the rectification of defects, shall address the safety requirements for the use of the plant in a railway environment, as detailed in this document for the specific types of plant. The maintenance arrangements shall include the reporting of safety-related defects, as set out in GE/RT8250.

- 2.3.3 When plant is hired and the hire company undertakes to perform maintenance, it shall be the employer's responsibility to ensure that the above maintenance requirements are met.

GN003 The 'employer' in this case is the company who procures the equipment from the hire company for use on the railway.

- 2.3.4 There shall be a system to ensure the operator is aware that the item of plant to be used is in date for its maintenance.

GN004 It is recommended that the next maintenance due date is displayed on each item of plant. For the purposes of this clause the maintenance due date is for examination / testing by skilled plant maintenance staff. It does not include pre-work checks by the operator.

### 2.4 Documentation

- 2.4.1 On-track plant shall carry with it the following documentation, as a minimum:

- a) Operating manual or instructions
- b) A valid Certificate of Engineering Acceptance (where the machine is not registered on the Rolling Stock Library)
- c) Machine logbook in which is recorded evidence of maintenance undertaken, including reporting and rectification of defects

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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- d) Where applicable, evidence of the last 'thorough examination', as required by the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)
- e) Where applicable, results of performance tests
- f) Where applicable, load radius charts (duty charts).

GN005 The load radius chart for knuckle boom cranes is often a label beside the controls. Requirements for duty charts of hydraulic excavators used as cranes are set out in RIS-1530-PLT.

GN006 Knuckle boom cranes includes machines formerly known as lorry loaders.

2.4.2 All items of plant shall, where applicable, carry documentation as evidence of:

- a) Performance tests
- b) Statutory examination.

GN007 Examples of performance tests are pressure holding tests for rail stressing equipment, sound level tests of automatic warning device (AWD), etc. Individual employers may combine this with the maintenance due date (see GN004).

GN008 Evidence should be provided on the item of plant that statutory requirements have been met, for example portable appliance testing (PAT) of electrical tools, examination by a competent person of lifting equipment etc.

### 2.5 Urgent high risk defects

2.5.1 Urgent high risk defects shall be reported to NIR-Online using the system set out in GE/RT8250.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

## Part 3      Preparing a Safe System of Work for Use of Plant

### 3.1      Planning for use of plant

- 3.1.1      When planning work, consideration shall be given to additional requirements for using plant. These include, but are not limited to, the following:
- a)      The need for a site visit during daylight hours to identify the hazards at the site and the precautions that need to be put in place for using the particular item of plant
  - b)      The transport of plant to and from the site
  - c)      The ability of the plant to transport personnel and that it is certificated (or approved) to do this
  - d)      The loading and unloading of plant at the site
  - e)      Specific site lighting requirements for the plant
  - f)      The use that will be made of the plant, including, for example, noise and fumes generated by its use and any interaction between items of plant on the same site
  - g)      Access for the plant and positions of safety for personnel involved with using the plant and affected by the plant
  - h)      Any areas of limited space and clearance associated with the use of the plant
  - i)      Load carrying capacities of platform surfaces, bridges and other track supporting structures, and lifts that may be used
  - j)      Storage locations, including security of the plant on site.

GN009      Where a hazard is identified the relevant mitigations to be put in place to minimise the risks arising from the hazard should be documented.

GN010      Planners should give consideration to how personnel are to arrive at the worksite. Walking long distances along ballast / track should be avoided. Therefore the choice of plant to be used could be influenced by its ability to provide transport.

GN011      Planners should consider the number of personnel needed to be conveyed simultaneously to the worksite and back, and hence make sufficient provision for vehicles with adequate capacity to achieve this.

- 3.1.2      When the work requires the use of road vehicles the planners shall consider how the vehicles are to arrive at the location at which they are to be used. This shall include, but not be limited to:
- a)      Access point
  - b)      Vehicles with a wheel load over 3 t (or 6 t axle load) – see clause 4.1.1.2
  - c)      The potential for vehicles to damage ballast shoulders – see clause 4.1.1.3
  - d)      The need for vehicles to turn round at worksite to return to original access point, without fouling a line open to traffic, or causing damage to ballast or ballast shoulder.
  - e)      Cable troughing and drainage channels

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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- f) Overhead, third and fourth rail contact electrification systems.

GN012 Consideration of the electrical system should include the return conductor that is positioned along the side of the gantry structures. The return conductor is not in a fixed position and should be assumed to be at any height. Note also that the access road adjacent to the railway may be higher than rail level.

- 3.1.3 The planning process shall ensure that, unless this line is protected as set out in Rule Book modules T2, T3 or T4, the intended route of any road vehicle allows no part of the vehicle or any part of the load to encroach to closer than 6 feet 6 inches (2 m) to the closest railway line.

## 3.2 Documented safe system of work

- 3.2.1 The documented safe system of work shall include all requirements for the safe use of the plant.
- 3.2.2 The documented safe system of work shall require the use of plant, including the on and off tracking of plant, to be controlled by competent and certificated persons.
- 3.2.3 The documented safe system of work shall define the controls to address the general and specific risks associated with the operation of plant. Risk controls for specific types of plant are set out in Parts 4, 5, 6 and 7 of this document.
- 3.2.4 If circumstances dictate the need for a change to the documented safe system of work for the use of plant after work has commenced, only a competent person shall be permitted to make the change.

GN013 It is recognised that some safe system of work documents are very lengthy. It is recommended that where this is the case the document should be split into smaller sections for use by individual personnel at the worksite.

## 3.3 Lift plan

- 3.3.1 Every lifting operation using lifting equipment shall have a documented lift plan in addition to, or as part of, the documented safe system of work.

GN014 Generic lift plans are acceptable for routine lifting of a repetitive nature, such as in depots with overhead hoists, lorries unloading the same products etc. Each lift of equipment on a worksite should be planned and documented beforehand. An acceptable method of planning is set out in M&EE Group Code of Practice COP 011.

- 3.3.2 Equipment for which a lift plan is required shall include all machines used for lifting as follows:
- a) Purpose-built rail cranes
  - b) Road cranes working within the railway boundary
  - c) Hydraulic excavators used as cranes
  - d) Knuckle boom cranes
  - e) Jacks
  - f) All other items included within the definitions of lifting equipment set out in LOLER.
- 3.3.3 The lift plan shall incorporate the requirements of LOLER and BS 7121, and additionally include adequate control measures for the following railway specific risks:

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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- a) Infringement by the crane or the load of the gauge; horizontally to adjacent line(s) and vertically for height limit
- b) Control of stability on canted track and gradients
- c) Control over the safe working load related to rated duties
- d) Tandem lifting.

GN015 The lift plan for the crane should take into account the following:

- a) The weights and symmetry of the load(s) to be lifted, including any possible adhesion between the ground and load or load and structure. When a load cannot be weighed, calculated, or estimated accurately, technical assistance should be obtained.
- b) The weight of the lifting accessories to be used, for which due allowance should be made in the crane loading.
- c) The radius, track cant and track gradient (or ground slope if not rail mounted) on which the crane will be required to lift each load.
- d) The details of any special instructions which apply to the lifting equipment to be used, or to the method of lifting to be employed.
- e) The suitability of track and ground conditions to withstand the concentrated loads imposed by wheels or outriggers of the crane.
- f) The clearance between the crane and loads to overhead and adjacent structures, for example bridges, overhead line equipment, signal posts, lineside cabinets etc. Where applicable this should be indicated on a site diagram.
- g) Any sub-surface works or services eg culverts, drains, building construction, etc, which have the potential to be damaged by the lifting operation or affect the safe operation of the crane. Where applicable these should be indicated on a site diagram.
- h) All other rail vehicles in the vicinity. These should be listed, their use defined and their position and direction of approach clearly indicated.
- i) An assessment of the possession requirements of running lines upon which the crane stands and adjacent running lines, including electrical isolation.
- j) Any requirements for liaison with other parties responsible for work in the same possession.
- k) The requirement for removing or slueing OLE for the duration of the work.
- l) The provision for controlling the operation on site.
- m) Any requirements for cranes working independently but in close proximity on the same site. The limits of travel should be agreed in advance.
- n) Any requirements for tandem or multiple crane lifting. See also clause 5.3.
- o) The requirement to work on a bridge, arch, viaduct or embankment. Advice and authority of the relevant infrastructure manager should be obtained to ensure the structure is capable of supporting the crane and the assessed loads.
- p) The limits of the lifting operation and positions of safety for work groups.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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- q) Adequate resources (including sufficient slingers) are available.
- r) An assessment of the potential requirement to inspect the lifted components for damage caused by the lifting process.
- s) Method of communication (noting likely environmental conditions such as noise, lighting etc).

GN016 An acceptable method of establishing control measures for tandem lifting is set out in M&EE Group Code of Practice COP 008.

3.3.4 Lift plans shall be written by staff competent in lifting operations.

GN017 Lift plans should be written by staff competent as crane controllers, as set out in clauses 5.4.1.1 and 8.4.2. The crane controller (planning) should obtain all the necessary information to ensure a safe lifting operation and decide on a lift plan.

## 3.4 Selection and planning of protection against rail movements

### 3.4.1 Selection of protection arrangements when the work is on or near the line

GN018 A safe system of work for using plant should be decided with reference to safety against rail movements, as set out in Rule Book module T7.

3.4.1.1 When the use of plant is to take place in a red zone, outside of a possession, there shall be an assessment to determine the safety arrangements to ensure that all plant, except those items specifically designed to be used outside of possessions, such as rail grinders, can be cleared from the line and the associated personnel can reach a position of safety. This assessment shall, in addition to the factors referred to in the Rule Book, take account of the following:

- a) The weight of the plant and the number of people required to place it clear of the track. It is a condition of red zone working that any plant, its load and personnel associated with its use can be disengaged from and placed in a position of safety at least 10 seconds before the passage of a train.
- b) If the track geometry is to be altered by the use of plant and it affects a line open to traffic, then it shall be a condition of use that assurance is given that the track geometry is able to be returned to its original (or acceptably safe) state before the passage of a train, and where jacks are used they shall be used in accordance with the requirements of Part 7.
- c) If there is any doubt about the ability of the plant to return the track geometry to its original (or acceptably safe) state, then red zone working shall be prohibited.
- d) The mobility of the operation. Where the operation of plant is mobile (that is, moving along the track) red zone working shall be permitted only where the length of the movement is predetermined and within the distance such that the lookout, at a set location, is able to give an effective warning and where at all times the movements are made towards the lookout.

## 3.5 Railborne plant

### 3.5.1 Gauge

3.5.1.1 When operation of railborne plant involves movement of components to outside of the vehicle's travelling gauge, the safe system of work shall take account of clearances of infrastructure obstructions, for example, ground frames, shunting signals, lineside telephones, bridges and platforms; and passage of trains and other railborne plant on adjacent lines – see also clause 4.2.2.1.

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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### 3.5.2 Gradient and cant

- 3.5.2.1 The capability of plant to work safely on a gradient or on canted track shall be assessed and a safe system of work developed and documented such that the likelihood of a runaway or overturning event is eliminated. Where a vehicle has a Certificate of Engineering Acceptance it is permissible for the assessment to be limited to ensure it is used within the parameters set down in the certificate.
- 3.5.2.2 Where a vehicle pre-dates April 1994 and still does not have a current Certificate of Engineering Acceptance, a documented assessment shall be carried out for the capability of the vehicle for each site.

### 3.5.3 Axle counters

- 3.5.3.1 When work is to take place in an area with axle counters consideration shall be given to the potential for operation of the axle counters by various railborne items of plant.

GN019 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 item is removed from the track the section will continue to show occupied.

- 3.5.3.2 Work shall be planned to minimise the likelihood of damage to the axle counter equipment

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## Part 4 Safety Requirements for Use of Infrastructure Plant

### 4.1 All plant

#### 4.1.1 Prevention of damage to the infrastructure

4.1.1.1 Before using plant, an assessment shall be made to ensure that the track, lineside and under-track equipment, including supporting structures, will not be damaged by the use of the plant.

GN020 Particular attention should be given to ensure against damage that may be difficult to detect prior to the subsequent passage of rail vehicles.

4.1.1.2 Loads on sleepers shall be limited to avoid overstressing of sleepers and to prevent damage:

- a) Wheeled vehicles that have a loading greater than 6 t per axle shall not be permitted to run on sleepers or bearers
- b) Tracked vehicles shall not be permitted to run over rails, sleepers or other infrastructure components etc, without the use of suitable protection to prevent damage.

4.1.1.3 Plant shall be used such that it does not damage ballast shoulder.

4.1.1.4 Plant which grips or clamps to a rail shall be specifically approved by the infrastructure manager prior to use. It shall only be used in accordance with the manufacturer's approved documented instructions.

4.1.1.5 A site survey shall be undertaken before any activity where plant grips or clamps to the rail web to mitigate the risks of damaging:

- a) Axle counter equipment
- b) Force transducers
- c) Accelerometers
- d) Other items that may be fastened to the rail web.

4.1.1.6 The routes of cables and services shall be identified and a safe system of work adopted which prevents damage to them by the use of plant.

4.1.1.7 A site survey shall be undertaken before any excavation or anything is driven into the ground to avoid damage to underground pipework and cabling by the use of plant.

GN021 Network Rail has issued an instruction (NR/PRC/MPI/CP0026) that should be adhered to whilst using buried cable-locating equipment (commonly known as CAT scan equipment).

GN022 The positioning of temporary lighting poles and other items that have spikes should be considered where driving the spike into the ground could damage underground pipework and cabling.

4.1.1.8 Plant shall not be used on platforms, decks, bridges or other structures without confirmation that the structure is strong enough to bear the weight of the plant and any load it could be carrying.

4.1.1.9 The use of dynamic track stabilisers or machines with similar actions shall not be permitted unless an assessment of risk to the infrastructure has been carried out.

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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### 4.1.2 Transportation of site personnel on plant

4.1.2.1 Site personnel shall only travel or ride on any item of plant in areas of the vehicle specifically designed and approved for that purpose.

### 4.1.3 Site lighting

4.1.3.1 Where ground-based or machine-based site lighting is required for the safe operation of an item of plant, it shall light the area of the task being performed to a level established when identifying the safe system of work.

GN023 Consideration should be given when specifying site lighting to ensure it cannot be confused with or interfere with the operation of railway signalling, nor dazzle traincrew or plant operators.

### 4.1.4 Emission of gasses and fumes

4.1.4.1 The potential for plant to generate flammable atmospheres in the vicinity of heat or ignition sources, including passing trains, shall be assessed and preventative measures ascertained and implemented.

GN024 Consideration should be given to the potential for safety hazards arising through the accumulation of gases, fumes, including toxic or hazardous atmospheres in culverts, ducts, and similar depressions. Particular consideration should be given to the use of liquid petroleum gases (LPG) and their propensity to gather in holes and depressions.

4.1.4.2 The generation by plant of gases, fumes, poisonous or hazardous atmospheres within confined spaces (especially tunnels, overall station roofs etc) shall be assessed and a build-up of these gases shall be avoided. Plant which is required to operate in confined spaces shall have their exhaust emission assessed and operating periods limited to ensure that dangerous levels of gases can not build up.

4.1.4.3 Petrol engines shall not be used in:

- a) Tunnels (as defined in Sectional Appendix)  
or
- b) Under bridges where the length of the bridge has the potential to lead to a build-up of a noxious atmosphere  
or
- c) Stations with overall roofs, except those areas of stations specifically permitted for road traffic.

GN025 Petrol engines should not be used in confined areas because of carbon monoxide produced in exhaust. Carbon monoxide has the propensity to displace oxygen in the blood and is undetectable to human senses. Consideration should also be given to LPG engines, where the carbon monoxide levels in the exhaust are typically 66-75% less than petrol engines, but could still cause a build up in very confined unventilated areas.

4.1.4.4 Plant that emits large quantities of steam or exhaust shall not be permitted to exhaust directly onto insulators associated with OLE structures.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## 4.1.5 Use of plant producing debris

- 4.1.5.1 Where the operation of plant produces debris, for example flailing, an assessment shall be made and processes and procedures put in place to prevent injury to personnel and damage to the infrastructure, including, but not limited to, OLE and switches and crossings. The assessment shall include the potential for the work to be undertaken to cause obstruction to walkways and mitigating actions to avoid this.
- 4.1.5.2 Where the operation of plant produces sparks, for example rail grinding, an assessment shall be made to prevent damage to the infrastructure and passing trains including the potential to cause fires.

## 4.1.6 Security of plant

- 4.1.6.1 When left unattended, items of plant shall be secured against vandalism and / or inappropriate use. Small items shall be protected by either securing in locked accommodation or chaining items together.
- 4.1.6.2 When plant is to be left unattended, the plant operator shall ensure it is brought to rest in a safe position, free of any suspended load, the parking brake(s) applied and the engine or power isolated to prevent unauthorised movement.
- 4.1.6.3 When wheeled or tracked plant is left unattended it shall, where practicable, be parked off track, clear of and parallel to any adjacent railway lines. When parked off track the lights shall be turned off. When parked off track the plant shall be secured against unauthorised entry / use and all energised controls locked out of use.
- 4.1.6.4 When stabled, railborne plant shall have the parking brake(s) applied and properly secured in compliance with the relevant Rule Book module, operating instructions and local instructions. Plant shall be secured to prevent unauthorised use / abuse when left unattended.

GN026 An assessment of the plant, the worksite and the machine instructions should be made to decide what additional means of security are required if any. For example:

- a) Wheels scotched on both sides of a wheel
- b) Tail / slew locks in place
- c) Pins, chains, etc, located and stored.

## 4.1.7 Failure of risk control measures

- 4.1.7.1 In the event of failure of systems or equipment provided to control risks, the use of the plant shall not continue unless documented alternative safe systems of work are adopted in order to reduce the likelihood of an overall increase in risk. Requirements relating to certain specific items of equipment are set out in GO/RT3437.

## 4.1.8 Action required following an accident or defective safety device

- 4.1.8.1 When an item of plant is involved in an accident which has the potential to cause damage that may affect the safe operation of the plant or infrastructure, it shall be quarantined by being withdrawn from operation and suitably labelled until it has been inspected and the necessary repairs or adjustment have been completed.

GN027 This requirement is in addition to the requirements in the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR). Further advice for possession-only rail vehicles is given in M&EE Group Code of Practice COP 019.

- 4.1.8.2 Every derailment of plant shall be investigated by persons competent to assess potential for damage to plant and infrastructure.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

GN028 For all accidents involving plant the person in charge of the plant should report the accident to the Network Rail National Control Centre.

GN029 Further advice for possession-only rail vehicles is given in M&EE Group Code of Practice COP 019.

4.1.8.3 In the event of damage to, or a discovery of a defect in, a safety device, for example a rated capacity indicator (RCI), the item of plant shall be withdrawn from operation until the necessary repair or adjustment has been completed, unless an equivalent safe system of work is established by a competent person. The requirements for reporting such defects to industry are set out in GE/RT8250.

## 4.2 Railborne plant

### 4.2.1 Before working with railborne plant

4.2.1.1 Before work starts, a person competent to produce a safe system of work for the plant shall be identified who shall implement the safe system of work that shall include, but not be limited to, the following:

- a) Confirmation that the plant operator is certificated as competent to operate the specific item of plant.
- b) Testing, or witnessing the test, of (where applicable):
  - i) The operation of brakes both parking and dynamic as applicable
  - ii) The operation of all warning systems, for example, RCI, horns / sirens, buttons and wander leads
  - iii) Lights.
- c) Ensuring that safety devices, where provided, are placed across the cab doorway(s) and notices displayed to warn against the danger of leaving the machine on the side where rail vehicle movements (either in a possession or on an open line) have the potential to take place within 3 m (10 feet) of the line on which the railborne plant is situated.
- d) Ensuring that protection equipment, for example guarding, is in place as required.

4.2.1.2 The safety arrangements shall make it possible for any person on an item of railborne plant to exit safely on at least one side to a position of safety without crossing a line open to traffic.

4.2.1.3 Immediately after placing any item of plant with more than two rail wheels onto the line, the brakes shall be tested to ensure functionality. This shall be carried out before moving the item of plant and with it incapable of running away in the event that brakes are inoperative. For example if plant is lifted onto the line the test should be done before the release of lifting chains.

GN030 A method for the testing of brakes on trailers for RRV or RMMM is set out in M&EE Group Code of Practice COP 014, and a method for the testing of brakes on rail-mounted manually propelled equipment is set out in M&EE Group Code of Practice COP 018.

4.2.1.4 Items of plant with defective brakes, or items of plant that fail the brake test described in clause 4.2.1.3, shall be removed from the line immediately, or if this is not possible it shall be secured with wheel-scotches and red lights at either end. Each item of plant with defective brakes shall be clearly marked as defective and not used until repaired.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## 4.2.2 Infringement of gauge

- 4.2.2.1 During operation of plant, where there is a possibility of fouling any line by any part of the plant or its load, or during reduced visibility, the line(s) shall be protected as set out in Rule Book modules T2, T3 or T4 including any additional adjacent lines that have the potential to be fouled, unless there are failsafe slew locks / slew limiters to prevent such movement.

GN031 Additional restrictions for working on or near AC or DC electrified lines are set out in Rule Book modules AC1, AC2 or DC and also in Network Rail standard NR/WI/ELP/3091 for dc electrified lines and local Network Rail instructions for Northern City Line and Liverpool area third rail electrification and 1500 V dc overhead line at Sunderland.

GN032 Additional restrictions for working in the vicinity of overhead electric supply lines that do not form part of the railway electrification system, are set out in HSE GS 6(rev).

## 4.2.3 Operators outside of railborne plant

- 4.2.3.1 When plant is being set up for operation, the requirements relating to the protection of an affected adjacent line are set out in Rule Book modules T2, T3 and T4.
- 4.2.3.2 When an operator is required on the outside of plant being set up for operation, personal protection in accordance with the requirements of Rule Book module T12 is permitted to be provided on any affected adjacent line.

## 4.2.4 Towing / propelling

- 4.2.4.1 Railborne plant shall not be towed or propelled by other plant or rail vehicle, unless:
- a) Both powered and non-powered vehicles are specifically designed or adapted for that purpose, and the movement complies with any restrictions imposed by the Certificate of Engineering Acceptance of any of the vehicles involved.

and

  - b) Means are used or available to prevent the runaway of any towed or propelled plant or rail vehicle in the event of a coupling failure.

GN033 It should be remembered that for some vehicles it is necessary for the vehicle drive system to be de-meshed, and emergency plans should take account of this.

- 4.2.4.2 In an emergency situation where it is necessary to clear the line of failed plant or railway vehicles and the conditions set out in clause 4.2.4.1 are not fulfilled, it is permissible to tow or propel the plant or railway vehicle providing it is done at slow speed and there is a safe means of stopping a runaway of the towed or propelled vehicle.

GN034 All personnel involved in emergency recovery should be reminded of any limitations of machine weights, line gradients, use of brakes and the correct use of any emergency drawgear.

## 4.2.5 Working on gradients and cants

- 4.2.5.1 Plant shall be used in accordance with any limitations identified in the Certificate of Engineering Acceptance, any other local restrictions and as set out in the documented safe system of work.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## 4.3 On-track machines

### 4.3.1 On-track machine - general

4.3.1.1 Before allowing any on track machine (OTM) to move out of, or travel outside a possession, all moveable elements with the potential to go out of gauge shall be correctly locked in their stowed position.

### 4.3.2 High risk areas of OTMs

4.3.2.1 When working with OTMs measures shall be in place to prevent anyone entering an area of unacceptably high risk.

GN035 Examples of unacceptable high risk areas are:

- a) Cutter bar area on a ballast cleaner when working, due to unexpected movement of ballast (commonly known as ground suck in)
- b) Satellite on continuous action tamper
- c) Workhead area on stone blower and tamping machine.

## 4.4 Possession-only rail vehicles

### 4.4.1 Specific gauge assessment for low ride road-rail vehicles

4.4.1.1 The road wheels of low ride road-rail vehicles (RRV) (where the road wheels ride along the rail top) have the potential to foul the W6a gauge (as set out in RIS-1530-PLT). For low ride RRVs an assessment of the route planned to be travelled shall be made for the potential to meet obstructions such as signalling and telecommunications equipment, hot box detectors etc. Low ride RRVs shall not be permitted to be used in third and fourth rail areas unless the Certificate of Engineering Acceptance permits this.

### 4.4.2 On and off tracking possession-only rail vehicles

4.4.2.1 When on and off tracking RRVs, at least one braked road axle shall be in contact with the ground, rail head or rail wheel, unless the rail wheels are braked.

4.4.2.2 Possession-only rail vehicles shall be placed on or taken off the rails only at sites that have been assessed as being suitable for this purpose and in accordance with the approved on and off tracking system of the possession-only rail vehicle.

GN036 The on and off tracking system is approved as part of the acceptance process for the vehicle. A description of the method to be used should be given in the instruction handbook or other manufacturer's documentation.

4.4.2.3 During on and off tracking of possession-only rail vehicles the machine controller and machine operator shall be present.

GN037 Acceptable methods for on and off tracking of RRVs are set out in M&EE Group Code of Practice COP 007.

4.4.2.4 The procedure for cross tracking of RRVs and RMMMs within possessions shall be treated the same as the procedures for off and on tracking.

## 4.5 Manually propelled railborne plant

### 4.5.1 General requirement

4.5.1.1 All manually propelled railborne plant shall only be used at walking pace. In all circumstances and conditions such plant shall never be allowed to travel faster than 3 mph (5 km/h).

GN038 The brakes on manually propelled railborne plant are generally only designed to cope with walking speeds. There is a very significant risk that the brakes of a manually propelled

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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item of railborne plant could not prevent the plant running away if used at higher than walking speeds on gradients.

## 4.5.2 Rail skates

4.5.2.1 Requirements in this section relate specifically to an item of plant that consists of two double flanged wheels attached to a metal frame forming a single unit which can be used for carrying loads along a single rail. The design shall be such that it can be speedily lifted and removed, without dismantling, within the warning time given by the lookout.

4.5.2.2 When skates are being used under red zone conditions on lines open to traffic, the following requirements shall be met:

- a) A skate shall only be used on a rail, where a position of safety for staff in attendance, for the object being carried and for the skate itself is immediately available.
- b) Skates shall only be used singly. Their use in tandem on the same rail or in pairs (side by side on opposite rails) is prohibited.
- c) A skate shall be used only for the movement of single items of heavy material running on the head of one rail only. In these circumstances, 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 ensure stability of the load in transit.
- d) The use of skates for the handling of rails shall not be permitted.

4.5.2.3 There are other types of skate which fall outside the type described in clause 4.5.2.1 and they shall only be used in accordance with the protection arrangements set out in Rule Book modules T2, T3 or T4.

## 4.5.3 Rail scooters

4.5.3.1 Risk controls set out in this section relate specifically to an item of plant that provides a manual leverage for lifting a load, and uses the head of one rail to provide a running surface to enable the load to be transported along the railway, and can be manually placed on and removed from the rail.

4.5.3.2 Rail scooters shall be treated as trolleys for the purposes of protection and therefore shall be used in accordance with the protection arrangements set out in Rule Book modules T2, T3 or T4. It is not permissible to use rail scooters under red zone conditions only.

## 4.5.4 Trolleys

4.5.4.1 All manually propelled trolleys shall only be used if fitted with brakes that automatically apply when the trolley handle is released.

4.5.4.2 Trolley brakes shall be tested each time the trolley is placed on the track.

GN039 An acceptable method for checking and maintaining brakes on trolleys is set out in M&EE Group Code of Practice COP 018.

4.5.4.3 Trolleys shall only be loaded to the limit marked on the trolley or less if sufficient manpower is unavailable.

GN040 Consideration should be given to the number of personnel who can comfortably push the trolley simultaneously, and the number required to move the trolley taking into account the load and gradients to be encountered. Further guidance on manpower requirements is set out in M&EE Group Code of Practice COP 018.

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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### 4.6 Non-railborne plant and road vehicles used lineside or on or near the line

4.6.1 Where plant is used adjacent to a line that could be open to traffic an assessment shall be made to determine if the line would be fouled during the operation. The assessment shall consider all component parts of the plant, including but not limited to, jibs, booms, extending conveyors etc. If the line could be fouled the line shall be appropriately protected as set out in Rule Book modules T2, T3 or T4.

GN041 The plant referred to in clause 4.6.1 includes but is not limited to, tracked vehicles, wheeled vehicles, cranes on fixed bases, RRVs not in rail mode, trailers.

GN042 Rule Book modules T6 and T7 set out the requirements that a COSS is to be appointed if work is to take place on or near the line and the COSS is responsible for setting up a safe system of work for protection of the railway line from non-rail mounted plant and road vehicles.

4.6.2 Except in a protected designated parking area, when road vehicles are left unattended they shall be parked parallel to the railway line.

### 4.7 Flails

4.7.1 The person appointed to take charge of flailing operations shall walk through the site in daylight prior to any work and identify any potential obstructions to the flail and any item of lineside equipment, for example, unprotected cables, which have the potential to be damaged by the flail or debris.

4.7.2 Where danger or damage has the potential to arise from the flail striking any object, the object shall either be removed or marked clearly. Particular attention shall be given to marking of obstructions if the work is to be undertaken at night.

4.7.3 Before commencing operation the condition of the flail shall be examined to ensure all safety equipment, such as roller, rubber skirting etc is correctly fitted and in good condition.

4.7.4 Prior to the commencement of flailing, consideration of the capacity of the flail unit, for example, the size of tree / scrub that it is capable of cutting, shall be taken into account. Any tree / scrub outside the capacity of the unit shall be cut down prior to the commencement of the work. If this is not possible, such items shall be treated as an obstruction.

4.7.5 When working on track, a possession of the line on which the flail works shall be arranged, as set out in Rule Book module T3.

4.7.6 When a flail is working, a restricted area shall be established around the flail. No persons shall be permitted to enter the restricted area when the flail is working. The size of the restricted area shall be sufficient to contain the debris from flailing, depending on the type of flail unit being used.

GN043 The flail manufacturers give guidance in their operating instructions on how far debris will be ejected, which in turn indicates the necessary size of the restricted area to be established.

4.7.7 Where the restricted area extends across other railway line(s), they shall be protected in accordance with the requirements set out in Rule Book modules T2, T3 or T4.

4.7.8 The flail head shall not be left running when the flail is not engaged in cutting vegetation.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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- 4.7.9 The flail head shall be stopped from rotating prior to lifting if ballast has been encountered.
- 4.7.10 The rail head and switch and crossing areas shall be cleared of any debris following flailing work and before the passage of trains. Walkways shall be kept clear – see also clause 4.1.5.1.

## 4.8 Plant on or in rail vehicles or trailers

### 4.8.1 Transportation of plant and materials

- 4.8.1.1 Plant and materials moved on or in rail vehicles or trailers shall:
- Be secured and be within the relevant load gauge (unless the fouled line is protected from rail movements, in accordance with Rule Book modules T2, T3 or T4).
  - Be loaded such that the weight is distributed in accordance with the loading requirements of the rail vehicle.
- 4.8.1.2 The requirements for some specific loads (set out in clause K2.1 of GO/RT3056/K) and for accepting out of gauge loads are set out in GO/RT3056/K.

GN044 Loading of plant onto rail vehicles should be accomplished in accordance with Network Rail's Loading Manual as mandated in Network Rail company standard NR/CS/OPS/071.

- 4.8.1.3 When loading or unloading plant and materials from rail vehicles where there is a possibility of the adjacent line(s) being fouled by that plant or materials, then such lines shall be protected by following the requirements of Rule Book modules T2, T3 or T4.
- 4.8.1.4 The method adopted for loading or unloading plant and materials from rail vehicles shall ensure that the infrastructure is not damaged.

### 4.8.2 Plant used on or in rail vehicles

- 4.8.2.1 When plant is used on or in a rail vehicle the following risks, which form a non-exhaustive list, shall be assessed:
- The possibility of fouling adjacent lines by the configuration of the plant
  - Where plant, or part of the plant, is designed to move whilst on a rail vehicle, the stability and ride effect on the vehicle
  - The stability of the combination of the rail vehicle and plant, and load where applicable
  - The potential for exceeding permitted axle weights during operation and forces on the track
  - Movement of, or collision with, the rail vehicle potentially causing damage to the plant.

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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- 4.8.2.2 The following controls shall be applied, where applicable, to the specific item of plant:
- a) Slew locks / slew limiters to be used to prevent uncontrolled movement of the superstructure during transit and / or limiting arc of slew when operating close to adjacent lines or other structures
  - b) A means of limiting jib height etc when proposing to work under electricity supply lines, OLE or other structures
  - c) Where necessary, the safe working load of the plant reduced to mitigate risks above
  - d) Consideration of the position of the plant to evenly distribute the load on vehicles to improve axle loading etc
  - e) Any limitation stipulated on the Certificate of Engineering Acceptance.

### 4.9 Disc cutters

- 4.9.1 If a disc cutter is to be used on a piece of rail forming part of the running railway, the line shall be protected, as set out in Rule Book modules T2, T3 or T4.
- 4.9.2 Precautions shall be taken when cutting running rails on electrified railways, where the rail could be necessary to maintain traction return continuity.

GN045 The necessary precautions are set out in Network Rail documents:

- a) NR/OLE F04 clause 2.3
- b) RT/E/S/29987 module 4, issue E2, clause 6.3.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## Part 5 Specific Safety Requirements for Use of Cranes

### 5.1 Staff awareness

5.1.1 All affected personnel shall be briefed on the content of the lift plan.

GN046 All personnel involved should be fully briefed and understand their part in the lift plan, including those coming on to the job part way through.

GN047 All personnel should be aware of the intended crane movements, as indicated in the lift plan.

GN048 If a locomotive is attached to a crane, the locomotive driver should be briefed in the lift plan, made aware of signals to be used in the operation, verbally instructed to commence operation and work to the signals given.

### 5.2 Lifting operations

#### 5.2.1 Use of crane

GN049 Loads should only be lifted vertically. Non-vertical lifting is only allowed if previously assessed and an engineering justification made on the lift plan.

GN050 Where a crane is equipped with two hooks on a single jib (main and auxiliary) only one hook should be used for the lifting operation.

GN051 Care should be taken when lifting loads on the high side of canted track or ground slope. Where used, outriggers should be repacked firmly after the first lift, and before slewing on to the low side.

5.2.1.1 Where hand signals are required for controlling lifting operations they shall conform to the guidelines set out in BS 7121, and where they are required to control the movements of rail vehicles they shall conform to the requirements of the appropriate parts of the Rule Book modules OTP and SS2.

#### 5.2.2 Use of rated capacity indicator

5.2.2.1 Lifting operations shall only be undertaken with the RCI or other safety devices fully functioning, ie it should not be turned off, overridden or disregarded.

5.2.2.2 When using attachments, except where the attachment is specifically mentioned on the Certificate of Engineering Acceptance for use with the vehicle, the attachment shall be treated as a load, ie the RCI shall be switched on and operational.

#### 5.2.3 Load lifting points

5.2.3.1 Only specific authorised load lifting points shall be used for lifting. The maximum load stated on the lifting point shall not be exceeded.

5.2.3.2 All points used for lifting on a possession-only rail vehicle are marked with the safe working load and any restriction of its use. Any point not marked shall not be used for any lifting operation.

#### 5.2.4 Lifting accessories

5.2.4.1 Every lifting accessory to be used shall be checked to ensure that it is suitable for the lift, in a serviceable condition and used in the correct way.

5.2.4.2 The use of log grab-type lifting attachments shall be assessed for their ability to lift the load securely without inadvertent opening of jaws and without damage to either load or grab.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

## 5.3 Tandem and multiple lifting

5.3.1 Tandem and multiple lifting shall be under the control of one person.

- GN052 Tandem lifting is a potentially hazardous operation and should be avoided if possible, it is the least favourable method of lifting due to the increased risks involved.
- GN053 Tandem lifting should be under the control of one crane controller who holds crane controller tandem lifting competency in the Sentinel scheme for tandem lifting, for each specific type of crane involved.
- GN054 All factors and constraints should be accurately assessed as far as possible and the cranes down rated as appropriate for the task. Where all the factors have been identified and the lift is being monitored on instruments, it is permissible for the cranes to be used up to their down-rated safe working load.
- GN055 When using two cranes, except as shown in GN056, in multiple the safe working load of each crane should be reduced by 25% for static lifting, or 50% if moving along the track (known as lift and carry). These recommendations only apply if a RCI is fitted and operational in each cab, where this is not the case the crane should not be used.
- GN056 Where excavators are used, the preferred method of using them for tandem lifts is set out in M&EE Group Code of Practice COP 008.
- GN057 The use of more than two cranes together is completely discouraged, except for gantry / cantilever type equipment set out in clause 5.3.2.

5.3.2 Where cranes are being used in multiple, for example, side rail loaders, portable rail gantries etc, the safe working load shall be reduced to allow uneven distribution of load and any potential failure of an individual crane during the lift.

- GN058 Where portable rail gantries, switch handling units and other similar items are used for multiple lifting then the planning of the lift should be carried out by staff competent in the equipment concerned.
- GN059 Except for purpose made delivery systems of multiple lifting machines, where more than two lifting machines are used together it is recommended that the safe working load of each individual lifting machine should be reduced so that it is no greater than one third of its safe working load. An assessment should be carried out to establish the level of such reduction which will be based on, but not limited to:
- a) Number of lifting machines
  - b) Position of lifting machines
  - c) Flexibility of the load
  - d) Method of control of simultaneous lift
  - e) Method of supervision of lift
  - f) Speed of operation.

## 5.4 Crane controller

### 5.4.1 Terminology

5.4.1.1 The person competent to plan the lifting operation shall be known as the crane controller.

- GN060 The term crane controller is used within the rail industry and is equivalent to 'Competent Person' in the LOLER regulations. Other equivalent responsibilities are shown in Table 1.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

LOLER	Construction industry BS 7121	RIS-1700-PLT	Activity
Competent Person	Appointed Person	Crane Controller	Produce / authorise lift plan
Competent Person	Appointed Person	Crane Controller	Amend lift plan on site
'appropriately supervised'	Crane Supervisor	Crane Controller	Safe control of site operations
	Slinger / Signaller		Attaches / removes lifting accessories Relays crane supervisors commands
		Slinger	Attaches / removes lifting accessories
	Banksman		Provides guiding hand signals in road mode only

**Table 1 LOLER and rail industry equivalent responsibilities**

5.4.1.2 The person competent to supervise the lifting operation shall also be known as the crane controller.

## 5.4.2 Control of lifting operations

5.4.2.1 Except as set out in clause 5.4.2.2 lifting operations shall be under the control of a crane controller.

GN061 The operation should be under the control of a crane controller on site. It is permissible for this person to be different from the crane controller who produced the lift plan. On jobs of a long duration, more than one crane controller could be necessary to complete the operation.

5.4.2.2 In the specific case of unloading a lorry by a known lorry driver or location it is permissible for a crane controller not to be present.

GN062 The exception for not having a crane controller is where the crane involved is:

- a) A knuckle boom crane
- and
- b) The overturning moment is limited by means of a hydraulic relief valve or similar
- and
- c) A risk assessment has been undertaken to show that unloading and placement of a load presents little risk to the crane or infrastructure.

then it is acceptable for the crane operator to unload a vehicle unaccompanied. This means that a delivery lorry driver would not be able to operate the knuckle boom crane alone on Network Rail controlled infrastructure unless:

- i) A previously agreed assessment has demonstrated that it is not possible to foul any railway line during loading / unloading
- or
- ii) The delivery driver has competence as machine controller, crane controller and crane operator.

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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### 5.4.3 Duties of a crane controller

- GN063 The crane controller controlling the operation on site should remain within the immediate vicinity of the crane operation, such that communication can be maintained with the crane operator.
- GN064 The crane controller should ensure that:
- a) There is no possibility that adjacent lines are fouled by any part of the crane, equipment or its load, unless suitable protection has been taken in accordance with Rule Book modules T2, T3 or T4.
  - b) Before lifting commences steps are taken to see that the load is free and neither pinned down, nor jammed in any way.
  - c) When lifting or lowering loads through hatchways, they will not foul the sides / tops of openings, or rigging.
  - d) If a load is found to be out of balance it is lowered and suitably balanced before resuming the lifting operation.
  - e) The load is not lifted higher than is necessary to clear obstructions.
  - f) Persons do not stand below or touch a suspended load. Where there is a need to guide a load, or prevent it swinging, this should be achieved by the most appropriate and safe means, involving if necessary the attachment of bars or ropes and assistance of other slingers or staff.
  - g) When chains or slings are being removed, care is taken to prevent catching the load.
  - h) Loads are not allowed to remain suspended longer than absolutely necessary for the operation.
  - i) The cab or crane controls are not vacated whilst the crane is working.
  - j) Cranes or lifting points are not overloaded or the indicated rated capacity exceeded. If any inadvertent overloading occurs, this should be reported to the crane maintainer.
- GN065 The crane controller should check for the most restrictive track cant on the track on which the crane is to travel during the lifting operations, and ensure that the work is carried out within the duty dictated by that cant.
- GN066 Where the work is of a repetitive and low risk nature, the crane controller is permitted to delegate the control of the operation to a slinger with the following provisos implemented:
- a) The crane is not required to work where it or the load could foul a line on which trains are required to run
  - b) The crane controller maintains visual contact and overall control of crane work within the lifting area.
- GN067 The crane controller should ensure that match wagons and / or relieving bogies have been detached and properly secured at a safe distance as laid down in the lift plan.
- GN068 The crane controller should ensure that when the crane is slewing towards the high side of a canted track or ground slope, care is taken to ensure that the load does not foul the crane (due to change of radius), or that the jib is not brought inside the minimum working radius with the resulting danger of the crane falling backwards.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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- GN069 The crane controller should ensure that cranes which are designed not to be moved under their own power are only moved when coupled to a locomotive.
- GN070 The crane controller should brief the locomotive driver if a locomotive is attached to a crane. The locomotive driver should be briefed on the lift plan, made aware of signals to be used in the operation and verbally instructed to commence operation.
- GN071 The crane controller should ensure that clearance is allowed between any part of the load, crane and adjacent vehicle or obstruction, to ensure the safety of persons. If the clearance is less than 600 mm (24 inches) then the area should be designated a no go area.
- GN072 Where there is a possibility of the load fouling lines open to rail movements the crane controller should ensure that the load is grounded before a train is allowed to pass on adjacent lines.

## 5.5 Slinger

### 5.5.1 Terminology

- 5.5.1.1 The person responsible for attaching the load to the crane shall be known as the slinger.

### 5.5.2 Duties of a slinger

- GN073 The slinger is responsible for attaching and detaching the load to the crane and for using the correct lifting gear and equipment in accordance with the lift plan.
- GN074 For repetitive work and where delegated by the crane controller, it is permissible for the slinger to control the operation and direct the safe movement of the crane in accordance with the lift plan. If there is more than one slinger, only one of them should control such work at any one time, ie it should be clearly identified to the crane operator which one individual is to give instructions. Note that the crane controller should remain responsible for the operation as set out in clause 5.4.2.
- GN075 The recommended minimum attributes of the slinger are those set out in BS 7121.

## 5.6 Crane operator

### 5.6.1 Terminology

- 5.6.1.1 The person who physically moves the crane controls shall be known as the crane operator.

### 5.6.2 Duties of a crane operator

- 5.6.2.1 The crane operator shall prepare the crane in accordance with the specific procedure for that crane, and ensure that:
- a) The parking brake is applied on the crane and any associated match wagons.
  - b) Carry out specific instructions for the crane concerned as given by the crane operations manual.
- GN076 Before commencing work the crane operator should carry out a full functional travel brake test.
- GN077 Before commencing work the crane operator should carry out a full functional machine test without load and should ensure that all motions and safety devices are functioning correctly.
- GN078 Crane operators should not start work until they have been briefed on the lift plan and understand from whom they will receive their instructions.

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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- GN079 Before commencing work the crane operator should select the appropriate setting for the RCI or other warning device where fitted.
- GN080 The crane operator should be vigilant at all times especially when working where the track is in poor condition.
- GN081 The crane operator should be aware that when slewing on canted track or sloping ground, or when travelling with the jib over the side on track where the cant or slope changes, the true radius to the hook will change, ie the actual distance from centre of crane to the hook.
- GN082 Where a crane is equipped with two hooks on a single jib the crane operator should ensure the hook not in use is free of load, lifting accessories and is elevated to its maximum height.
- GN083 Crane operators should not rely solely on safety devices operating and should be able to stop the movement before the limits of the crane are reached.
- GN084 Before commencing or changing the direction of movement of a load, the crane operator should ensure it is safe to do so and give ample warning of his intention. Traditionally on-track plant within a possession use the horn code:
- a) One short blast for move forward
  - b) Two short blasts for moving in reverse,
- however this has the potential to cause confusion if an agreed method of working has not been set up and briefed before work commences.
- GN085 If a load becomes jammed during a lifting operation, the crane operator should cease operations and inform the crane controller immediately.
- GN086 The crane operator should follow the lift plan and any proposed changes or deviations to the lift plan should only be authorised and documented by the crane controller on site.
- GN087 When travelling with a suspended load the crane operator should ensure the load is carried as low as possible and the load is not allowed to swing excessively. Swinging will not only influence the possibility for overturning but also derailment due to wheel unloading.
- 5.6.2.2 When travelling with a suspended load with a hydraulic excavator RRV, the crane operator shall ensure that the vehicle has one of the following:
- a) Data panel as set out in RIS-1530-PLT
  - b) A green stability label on the side
  - c) If fitted with an orange label the load is only suspended within defined areas.
- 5.6.2.3 The crane operator shall not allow any person to travel upon a crane or any attachment except:
- a) Where there is an authorised designed provision for the carrying of personnel
- or
- b) For the purpose of instruction, or technical investigation and where sufficient safety precautions are being taken.
- GN088 The crane operator should not leave the crane unattended, even for short periods, unless:

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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- a) The load has been removed from the hook, beam or bales and the jibs have been brought in line with the track  
and
  - b) The hook, beam or bale has / have been placed in a safe position clear of other operations  
and
  - c) The parking brake applied.
- GN089 When leaving the cab consideration should be given to stopping the engine to avoid unnecessary noise and fumes (pollution).
- GN090 When it is necessary for the crane operator to park the crane for longer periods, in addition to the guidance in GN088, the following should also be carried out:
- a) The crane should be either off tracked or parked on a line or siding not required for traffic during the period of parking, and protected as set out in the Rule Book and machine operating instructions  
and
  - b) The jib is lowered  
and
  - c) Outriggers / tail / slew locks or chains, where provided, should be properly secured and the crane cab doors and tool boxes locked  
and
  - d) All air pressure should be released from the air receivers of air braked vehicles.
- GN091 The crane operator should not permit the crane to be used for the movement of other plant or rolling stock, unless specifically designed or modified for that purpose. In an emergency it is acceptable to tow a RRV with another vehicle of similar weight to clear the line, providing the Certificate of Engineering Acceptance states it has a towing capacity to do so.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

## Part 6 Specific Safety Requirements for Handling Rail

### 6.1 Lifting of rail

6.1.1 Adequate arrangements shall be provided to prevent crippling or other adverse damage to rails when they are being lifted using lifting equipment.

GN092 A method of achieving safe working is set out in M&EE Group Code of Practice COP 005.

GN093 When lifting rail one of the following methods should be utilised:

- a) A suitable lifting beam
- b) Suitable strap lifting slings (for example WEDCO type, fibre slings (which should not be used without external protection against the sharp rail edges))
- c) A single point lifting accessory (for rails up to 6 m - 20 feet long).

GN094 When lifting rails, the following should be observed:

- a) When positioning the rails prior to lift, rails should be turned by use of an approved turning bar and suitably constrained by wedges or chocks.
- b) Rails should always be lifted in the 'head up' position.
- c) The lifting accessory should always be located over the centre of balance of the length of rail to be lifted to ensure that the rail is lifted vertically and is maintained in a horizontal position (excluding when involved in long welded rail train or thimbling operations).
- d) Where rails are to be lifted, they should be marked to indicate the lifting accessory attachment points (lifting accessories to be attached within 25 mm of the marked lifting points).
- e) Chain sling legs should not be twisted as the lifting beam is raised.
- f) Rails being lifted should be checked for balance after being raised slightly off the ground. Where imbalance is observed the rail should immediately be lowered back onto the ground and the lifting accessories repositioned accordingly.
- g) Where it is required to lift a section of rail using a single lifting point, then the length of rail should not exceed 6 m (20 feet) and the method of attachment / lift should be by use of a single railhead lifting clamp or single suitable strap lifting sling (75 mm / 3 inches wide - heavy mesh).
- h) Where rails over 6 m (20 feet) are being lifted, a lifting beam should be used.
- i) Wherever possible timber bearers should be used for landing rails.
- j) No person should remain under the lifting operation or load when the rail is suspended.

6.1.2 Log grab type devices shall not be used for lifting new or serviceable rails (an exception is permitted for scrap rail only).

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## 6.2 Lifting track panels

6.2.1 Lifting of new or serviceable track panels shall only be carried out using specially designed lifting accessories.

- GN095 Lifting of track panels out of ballast can increase the load due to adhesion between 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.
- GN096 When using a chain sling for the lifting of scrap track panels, the most common method of attachment to the panel, is by the choke-hitched method (also known as 'Snickling'). Under no circumstances should a hook be attached under the foot of a rail as a means of lifting.
- GN097 Where the choke-hitch method is used, the rated safe working load of the chain sling should be twice that of the load.
- GN098 The use of the choke-hitch method can cause abrasion around the first five links in each chain and can lead to failure due to deformation of the chain links. The user should ensure that there are no signs of damage to the chain links prior to each lift. Where any signs of abrasion or deformation of the links is apparent the sling should be removed from service for repair. Where considered necessary, protectors for chain slings should be used and be positioned between the chain and the contact points with the load.
- GN099 It should be ensured that when selecting a chain sling it has sufficient capacity for the proposed lift, taking into account the following:
- a) Weight of the track panel
  - b) Chain sling spread
  - c) Allowance for choke-hitched method of lifting (50% reduction on capacity).
- GN100 In the forming of the choke-hitch, when attaching the hook around the chain it should be ensured that force is not used to move the hook into closer contact with the load. The bight should be allowed to assume its natural angle which equates to approximately 120 degrees.

## 6.3 Moving rails using a thimble

6.3.1 Where rails are to be moved by means of a rail thimble, the safe system of work shall incorporate adequate control measures for the following railway specific risks:

- a) Avoidance of overstressing the rails
  - b) Uncontrolled movement of the rail
  - c) Overturning the rail vehicle or plant lifting the thimble
  - d) Damage to the infrastructure caused by the operation.
- GN101 The rail thimble should be of a suitable type for the type of rail being moved.
- GN102 Prior to the thimbling operation the following points should be addressed:
- a) A crane controller specifically trained, authorised and certificated for thimbling should be appointed to take control of the operation
  - b) The lifting equipment should be fitted with a form of load on hook indication
  - c) Rails less than 100 m (300 feet) long should not be moved by thimbling.

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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- GN103 During the thimbling operation the following points should be followed:
- a) All personnel, other than the operator, should be at least 3 m from the thimble when it is moving along the rail and at least 5 m from the end of the rail when the thimble approaches it. Adjacent lines within these distances should also be protected.
  - b) Extreme caution should be taken at the end of the rail as it is likely to whip as it lifts off the ground. This has the potential to cause injury to personnel and foul an adjacent line.
  - c) Prior to moving a rail it should be checked for any protrusions which may snag or jam the thimble when passing over them and any attached ballast, mud or rail pads removed. Protrusions should be marked so that they can be seen by the person controlling the operation.
  - d) During the operation the load on hook indicator should be monitored and the load not allowed to exceed the safe working load of the thimble or the lifting appliance; this should be limited to a maximum of 2 t.
  - e) If the rail is near any signal or telecommunication equipment or similar obstructions, precautions should be taken to protect them.
  - f) When an obstruction on the rail is reached, the operation should be stopped, the rail lowered on to blocks, the thimble opened and moved to the other side of the obstruction before continuing with the operation.
  - g) The rail should be kept as low as possible at all times and not go above 0.5 m. The amount of bend in the rail should be kept to a minimum, especially at joints, to ensure that the rail is not overstressed.
  - h) The speed of the thimbling operation should be limited to walking pace.

### 6.4 Moving rails using pulling gear

- GN104 Rails should only be pulled on rollers with special pulling gear.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## Part 7 Specific Safety Requirements for Track Jacks

### 7.1 Track jacks

7.1.1 The use of mechanical and hydraulic jacks for work on tracks shall be restricted to the following criteria set out in this section.

### 7.2 Type 1 jacks (obstructionless)

7.2.1 Type 1 jacks do not protrude above rail height or come within 50 mm of the running edge (when lifting the rail) and can be lowered from full height within 10 seconds, under load. They shall be permitted for use either:

- a) With the line open to traffic providing:
  - i) Adequate warning of approaching trains is provided
  - ii) The track is lowered for the passage of trains
  - iii) The requirements regarding the unclipping of track are established and complied with.

or

- b) With the work protected, as set out in Rule Book modules T2, T3 or T4.

### 7.3 Type 2 jacks

7.3.1 Type 2 jacks will cause an obstruction to traffic (that is, falling outside the scope of Type 1) when placed under the rail but with a quick release mechanism enabling the jack to be immediately lowered from full height, and be removed from under the track within a maximum of 10 seconds. They shall be permitted for use either:

- a) With the line open to traffic providing:
  - i) The speed of trains is restricted to no more than 40 mph
  - ii) A minimum of 35 seconds warning is provided
  - iii) The requirements regarding the unclipping of track are established and complied with.

or

- b) With the work protected, as set out in Rule Book modules T2, T3 or T4.

### 7.4 Types 3 and 4 jacks

7.4.1 Types 3 and 4 jacks will cause an obstruction to traffic (that is, falling outside the scope of Type 1) when placed under the rail but cannot be quickly lowered from full height. Both types shall only be used when the work is protected as set out in Rule Book modules T2, T3 or T4.

### 7.5 Placing and removing jacks

7.5.1 The safe system of placing and removing all types of jacks under the track shall be specified.

### 7.6 Maintenance

GN105 As set out in clause 2.3.1 jacks should be maintained and tested, a way of achieving this is set out in M&EE Group Code of Practice COP 013.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## Part 8 Competence and Fitness

### 8.1 Ensuring competence

- 8.1.1 Employers shall have processes in place which ensure that their employees and those of their contractors required to plan work using plant, or operate, control or maintain plant, are competent for such work.
- 8.1.2 All staff involved with plant operations shall be competent to use the equipment, with particular reference to the risk controls identified in Parts 3, 4, 5, 6 and 7.
- 8.1.3 Processes shall be in place to ensure the competence of staff involved in (as a minimum):
- a) Planning plant operations
  - b) Operation and control of plant for engineering tasks that affect site operations (including on and off tracking)
  - c) The driving of self-propelled plant
  - d) Maintenance of plant.

GN106 The requirements for managing the competence of persons required to undertake safety-critical work are set out in GO/RT3260.

- 8.1.4 Requirements for persons to drive OTMs outside of possessions are set out in GO/RT3251.

### 8.2 Frequency of competence re-assessment

- 8.2.1 For persons required to operate or control the operation of on-track plant, re-assessment of competence shall be carried out at least every two years, unless an assessment of risk indicates that a higher frequency is necessary.
- 8.2.2 Users, operators and controllers of other items of plant shall be re-assessed for competence at a frequency established by an assessment of each item. The frequency shall be at a maximum interval of five years unless the assessment of the item of plant indicates a more frequent re-assessment is required. Operation of specific items of plant for which the competence shall be re-assessed at intervals more frequent than every five years are listed in Appendix B.

GN107 The re-assessment of competence set out in clauses 8.2.1 and 8.2.2 should be commensurate with the potential for loss of competence. For example it is probable that an assessment of Rule Book knowledge will need more frequent checking than the operators ability to control the vehicle. It is not therefore the intention that a full re-assessment needs to be carried out for all operators at prescribed frequencies. The supervisor / manager of an operator should assess the individual needs of employees at a frequency of no greater than two years. A full re-assessment of their competency, including reissue of any pertinent certification, should be carried out at a frequency no greater than five years.

- 8.2.3 Where a gap occurs of 12 months or more in the use of plant, the employer shall ensure that competence has not degraded as a result of lack of practice.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## 8.3 Specific competence requirements - on-track plant

8.3.1 Processes shall be in place to ensure that plant operators and machine controllers are competent. This shall include training, both theoretical and practical; the detail of which depends on the role for which the person is being trained, so that the person can work safely and competently with the on-track plant and demonstrate, where applicable, adequate knowledge and understanding of:

- a) The relevant parts of the Rule Book
- b) Maintenance and pre-use checks
- c) Function of all controls available to the plant operator
- d) The on and off tracking process
- e) Movements within possessions
- f) Certification requirements of the vehicle
- g) Vehicle / machine limitation
- h) Protection arrangements
- i) Communication
- j) Accident and defect reporting systems
- k) Safety systems
- l) Emergency procedures (including recovery of failed vehicle)
- m) Use of fire extinguishers
- n) Attachment of trailers / attachments.

This list is not exhaustive.

## 8.4 Specific competence requirements - cranes

8.4.1 Crane controllers shall be competent as both a crane and machine controller of the equipment being used.

GN108 Each employer should assess the competence needs of the employee to carry out the duties of crane controller and machine controller. Network Rail has mandated the Sentinel scheme for use on its infrastructure for competence of machine controller and crane controller.

8.4.2 Processes shall be in place to ensure that lift planners, crane controllers, crane operators and slingers are competent. Such processes shall include training; the detail of which depend on the role for which the person is being trained, so that the person can work safely and competently with the crane. The person shall demonstrate adequate knowledge and understanding of (where it is applicable to the plant to be used):

- a) The significance and working of the RCI or the load protection device
- b) The protection of vehicles on running lines
- c) The principles of lifting, slewing and craneage of loads, with special emphasis to rail

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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- d) The risks associated with the thimbling of rails
- e) The safety of passengers and persons on platforms, on or near the line or the lineside
- f) The full appreciation of the principles and modes of operation of the crane, as applicable
- g) Determining the weight of the load and the load / radius relationship
- h) Lifting of non-uniform loads
- i) Determining the centre of gravity of loads
- j) The use of the crane's emergency equipment and procedures
- k) The fire and other emergency procedures
- l) The function of all controls available to the crane operator
- m) The use and purpose of warning devices
- n) Hand signals, as set out in BS 7121
- o) Methods of slinging
- p) Precautions to protect slings, straps, webs etc from sharp edges
- q) The safe control of the plant while performing its full range of duties
- r) Working on cant and gradients
- s) Multiple crane lifting
- t) The reporting of defects
- u) The safety precautions to be taken when working in the vicinity of overhead power lines, including OLE equipment
- v) The safety precautions to be taken when working in third and fourth rail electrified areas
- w) Consideration to be given to adjacent structures
- x) Working on bridges, viaducts, culverts and embankments
- y) The correct use of a two-way radio to control lifting operations
- z) The use of authorised load lifting points for lifting loads
- aa) Judging distances
- ab) The planning of lifting operations.

This list is not exhaustive.

- 8.4.3 The employer shall assess and establish the emphasis for items in relation to the skills being taught, that is, lift planner, crane operator and slinger. The training shall be both practical and theoretical in content and shall also entail classroom activity.

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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### 8.5 Fitness

- 8.5.1 Employers shall have documented systems in place to ensure the fitness of plant operators, maintainers and controllers required to operate or control plant within the scope of this document.
- 8.5.2 The minimum medical fitness requirements that shall be met are set out in GE/RT8067.
- 8.5.3 Personnel operating or controlling on-track plant shall have:
- a) Colour vision assessed as normal
  - b) Hearing assessed as normal
  - c) Any other requirements identified as necessary to minimise the likelihood of an increase in risk caused by lack of medical fitness.

GN109 Colour vision is allowed to be assessed as normal by one of the following:

- a) The Issihara plate test
- b) Edridge-Green lantern test
- c) The City University test
- d) Farnsworth DI5 test.

GN110 Hearing aids are permitted to achieve acceptable hearing, provided that the hearing aid is tuned to hear emergency signals and a spare battery is carried.

GN111 Each employer should decide the degree of medical incapacity acceptable for the individual circumstance.

8.5.4 Requirements for medical fitness of persons required to drive OTMs outside of possessions are set out in GO/RT3251.

8.5.5 Personnel shall be at least 18 years of age before they are permitted to operate plant or supervise plant operations.

Rail Industry Standard for  
Safe Use of Plant for Infrastructure Work

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**Appendix A    Appendix withdrawn**

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## **Appendix B Plant Which Requires Operator Re-Assessment More Frequently Than Every Five Years**

Clause 8.2.2 requires that the operators of certain items of plant are re-assessed for competency at a period of between two and five years (the actual periodicity being decided by the employer) the following list are the items of plant for which the operator shall be re-assessed more frequently than five years. Each employer is permitted to add additional items to the list as they see fit.

- a) Chain saw and pole saw
- b) Clearing saw and strimmers
- c) Stressing equipment
- d) Rail saw
- e) Rail drill
- f) Portable ballast tamping equipment
- g) Track jacks
- h) Rail skates
- i) Impact wrench
- j) Cold bolt hole expansion equipment
- k) Rotabroach
- l) Boring rigs
- m) Iron man lifting gantry
- n) Rail grinders.

This list is not exhaustive; each employer shall establish their own list of items.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## Definitions

### **Competent person**

A person who has been assessed as being qualified and having required practical and theoretical knowledge, experience and skills to carry out a particular rule, regulation, instruction or procedure.

### **Certificate of Engineering Acceptance**

A document granted to show that the item of plant complies with Rail Industry Standard RIS-1530-PLT. Operators of on-track machines will need similar evidence for compliance of the OTM to GM/RT2400.

### **On-track machine**

An on-track machine (OTM) is a vehicle that can only travel on-rail by virtue of a rail wheel guidance system; it is allowed to travel in and outside of possessions.

### **On-track plant**

On-track plant is OTMs, RMMMs and RRVs when in rail mode, and their trailing loads.

### **Overhead line equipment**

Overhead line equipment (OLE) is the combination of structures and contact wires for supplying electrical traction power to trains (normally supplied at 25 kV 50 Hz).

### **Plant**

All portable, transportable and mobile machines (this includes railborne plant, powered portable hand-drills, road vehicles, etc).

### **Possession-only rail vehicle**

Vehicles with rail wheels capable of running on railway track, limited by their engineering acceptance to running within a possession only. For the purposes of this standard they are split into three main groups: rail mounted maintenance machines (RMMMs), road-rail vehicles (RRVs), and trailers.

### **Railborne plant**

Plant which has rail guidance wheels and hence can run along the railway track (this includes on-track plant, trolleys, skates, scooters etc).

### **Rail-mounted maintenance machine**

A rail-mounted maintenance machine (RMMM) is a vehicle that can travel on-rail only, under its own power system. Such vehicles are not allowed to operate, work or travel outside possessions. Rail in this definition refers to permanent rails intended for use by normal rail vehicles.

### **Rail vehicle**

A rail guided vehicle registered on Rolling Stock Library. For the purposes of this standard it includes locomotives, coaches, wagons, multiple units, OTMs etc, but excludes possession-only rail vehicles (as defined in RIS-1530-PLT).

### **Road-rail vehicle**

A road-rail vehicle (RRV) is one that can travel on the road under its own power and also travel on-rail by virtue of a rail wheel guidance system under its own power system. Such vehicles are not allowed to operate, work or travel outside possessions in rail mode.

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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### **Stabling**

Leaving the vehicle in a safe condition unattended. Note that a trailer left unattended in a worksite is not stabled but can be regarded as a shunting movement and therefore has to comply with the appropriate parts of the Rule Book modules SS2 and OTP.

### **Wheel-scotch**

A wedge, normally wood, fitted on the rail between wheel and railhead, preformed to suit the diameter of the wheel to which it is to be applied. It has a handle on one side to facilitate fitment and also ensure the wheel-scotch falls from the rail once released.

# Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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## References

The Catalogue of Railway Group Standards and the Railway Group Standards CD-ROM give the current issue number and status of documents published by RSSB. This information is also available from [www.rgsonline.co.uk](http://www.rgsonline.co.uk).

### Documents referenced in the text

RGSC 01	The Railway Group Standards Code
<b>Rail Industry Standards</b>	
RIS-1530-PLT	Rail Industry Standard for Possession-Only Rail Vehicles and Associated Equipment
RIS-1701-PLT	Rail Industry Standard for Portable and Transportable Infrastructure Plant – expected to be published summer 2008
<b>Railway Group Standards</b>	
GE/RT8000/AC1	AC Electrified lines: Part A Dangers of the system, description of equipment and communications, Part B Emergency Procedures
GE/RT8000/AC2	AC Electrified lines: Working on or near to OLE
GE/RT8000/DC	DC Electrified lines
GE/RT8000/OTP	On-track plant
GE/RT8000/SS2	Shunting
GE/RT8000/T2	Protective engineering work or a hand trolley on a line not under possession
GE/RT8000/T3	Possession of the line for engineering work
GE/RT8000/T4	Possession of a siding for engineering work
GE/RT8000/T7	Safe system of work when walking or working on or near the line
GE/RT8000/T12	Protecting personnel when working on rail vehicles and sidings
GE/RT8067	Personal Track Safety
GE/RT8250	Safety Performance Monitoring and Defect Reporting of Rail Vehicles, Plant and Machinery (expected to be re-issued as issue two in June 2007 titled Reporting High Risk Defects)
GM/RT2000	Engineering Acceptance of Rail Vehicles
GM/RT2004	Requirements for Rail Vehicles
GM/RT2400	Engineering Acceptance and Design of On-Track Machines
GO/RT3056/K	Working Manual for Rail Staff – Freight Operations (White Pages) AC Electrified lines: Vehicles requiring special conditions of travel
GO/RT3251	Train Driving
GO/RT3260	Competence Management for Safety-Critical Work
GO/RT3437	Defective On-Train Equipment
<b>Other References</b>	
	Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)
	Provision and Use of Work Equipment Regulations 1998
	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR)
	The Control of Noise at Work Regulations 2005
	The Noise Emission in the Environment by Equipment for use Outdoors Regulations 2001
2006/66/EC	Technical Specification for Interoperability sub-system: rolling stock – noise
BS 7121	Code of Practice for Safe Use of Cranes

## Rail Industry Standard for Safe Use of Plant for Infrastructure Work

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COP 005	M&EE Code of Practice for Handling Serviceable Rail with Road-Rail Excavators in Rail Mode including Thimbling
COP 007	M&EE Code of Practice for On/off Tracking Road-Rail Machines
COP 008	M&EE Code of Practice for Tandem Lifting with Two Road-Rail Cranes
COP 011	M&EE Code of Practice for Planning and Executing Lifting Operations
COP 013	M&EE Code of Practice for Maintenance, Operation and Testing of Track Jacks
COP 014	M&EE Code of Practice for Trailers and Attachments with RRVs and RMMMs
COP 018	M&EE Code of Practice for Rail Mounted Manually Propelled Equipment
COP 019	M&EE Code of Practice for Action to be Taken in the Event of Accident or Incident with a Possession-Only Rail Vehicle
HSE COP26	HSE Approved Code of Practice: Rider-Operated Lift Trucks: Operator Training
HSE GS 6	HSE Guidance: Avoidance of danger from overhead electrical lines
NR/OLE F04	Overhead Line Work Instructions
NR/CS/OPS/071	Loading and securing of infrastructure traffic
NR/PRC/MPI/CP0026	The process for locating buried services prior to ground penetration
NR/WI/ELP/3091	DC electrified lines working instructions
RT/E/S/29987	Working on or about 25kV AC Electrified Lines