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| <b>Ref:</b>             | <b>NR/SMS/Part/A</b> |
| <b>Issue:</b>           | 16                   |
| <b>Date:</b>            | 04 March 2023        |
| <b>Compliance date:</b> | 03 June 2023         |

**NR/L3/SIG/10663**

**NR/SMS/Part/A**

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## General

- This Handbook gives information needed to maintain signalling equipment to the necessary standard.

- The manual is divided into separate parts as follows:

### Part A:

- Describes the general responsibilities and conditions for maintaining equipment.

### Part B:

- Contains the specified tests that are referred to in the signalling maintenance specifications. These are identified in sections A, C, E, & T of this document by means of a hyperlink.

- For Example: [NR/SMS/PartB/Test/001](#) (Facing Point Lock Tests (Machine))

- Specified tests on assets not owned by signalling are in their designated sections along with the maintenance specification.

### Part C:

- Contains the approved maintenance specifications for signalling assets. These are packaged as units of work; each unit being designed around a physical asset. If a part or all of that asset is owned by different function (e.g. SPTs on signals) the maintenance specification for that asset is in the relevant section.

### Part D:

- Contains the indexes and references to the level crossing annual tests (details of how to obtain the annual test documents are detailed here).

### Part E:

- Contains the approved maintenance specifications and specified tests for assets owned by functions other than Signalling or Telecoms that are maintained by signalling (e.g. HABD systems).

### Part R:

- Contains the standard NR/SMS record cards associated with the tests and tasks in part B & C.

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**Part T:**

- Contains the approved maintenance specifications and specified tests for Telecom assets that are maintained by Signalling.

**Part Z:**

- Contains listings of commonly used voltages and measurements on all assets as a ready reference guide.

**Part Appendix:**

- Contains information on equipment that is not direct preventative or corrective maintenance but provides background information which will assist in carrying out these tasks but is too large or detailed to fit in the generic '00' series of NR/SMS parts C, E, or T.

- Each maintenance specification is divided into services, tests, and tasks that relate to the frequency of the maintenance.

- The frequency for each NR/SMS service is stated in NR/L2/SIG/10661.

**DAILY SERVICES:**

- Services and/or tasks that are performed daily.

**REGULAR SERVICES:**

- Services, tests or checks that are performed at a frequency greater than daily but can be equal to or less than Service A.

**SERVICE A:**

- Relates to the routine inspection and testing of equipment (typically four times a year).

**SERVICE B:**

- Relates to the heavy maintenance or testing (typically once a year).

**SERVICE RA / RB / R1 / R2 / R3 / R4 or RE:**

- These relate to the Reliability - Centred Maintenance Tasks, the intervals on these tasks are in excess of the standard frequencies.

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## PERIODIC TASKS:

Relates to tasks that are carried out periodically (usually between two and five years) as opposed to cyclic. (e.g. periodic tasks might include memory battery replacement on PC boards or returning an item for re-servicing at an approved service centre).

## ROLE DESCRIPTIONS:

Role descriptions within NR/SMS refer to Network Rail post and titles. Companies other than Network Rail might use different posts and titles. It is the responsibility of the individual companies to map the Network Rail posts and titles within NR/SMS to the equivalent ones within their own company.

## MANDATING OF TASKS AND TESTS:

Some tasks and tests within NR/SMS have the following comments as part of their description:

- a) Local Policy Requirement:
- b) If provided:
- c) If fitted:

If the details of a task or test having this comment are applicable to you, it will be on your work order, or if not your SM(S) will tell you. If you are in any doubt, ask.

Any task that does not have these comments attached to them is mandatory.

## IMPERIAL AND METRIC MEASUREMENTS:

Some older signalling equipment (especially mechanical) was designed, built, and installed to imperial measurements.

This also applies to new equipment built in the United States of America (USA).

These do not always easily convert or make sense in metric units. If a piece of equipment is from the 'imperial' era, or from the USA, the equivalent imperial measurement is used.

If it is a new piece of equipment metric measurements are used. If you are unsure about any imperial or metric measurements stated in NR/SMS, ask your SM(S).

**END**

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| <b>NR/SMS/Part A/A02</b>                          |                      |                           |
| <b>Preventative and Corrective Maintenance</b>    |                      |                           |
| Issue No. 2                                       | Issue Date: 04/03/17 | Compliance Date: 31/05/17 |

**The safe passage of trains is the top priority, if you find any item than can or will affect this, immediate action shall be taken up to and including blocking the line.**

More details can be found in **GE/RT8000 (rule book)**.

## Preventative Maintenance

The scheduling of preventative maintenance is the responsibility of the maintenance function within Network Rail. This is performed by the Ellipse system which produces work orders.

For signalling, electronic handheld devices are used for scheduling and inputting in place of paper.

Completion or partial completion of any work should be recorded on the electronic "Work orders" or Work Arising Identification Forms (WAIFs) displayed on the handheld device.

Staff carrying out tests that have a related record card(s) should also check that card as all the appropriate details fully completed.

Any work undertaken other than that stated on your work order including any adjustments that have to be made as a result of carrying out a task/test shall be classed as corrective maintenance and dealt with as detailed in the next section.

Inform your SM(S) if you find any conflict between what is stated on your work order, such as:

- asset you have to maintain (e.g. work order states a WRSL 63 point machine but the asset is actually a HW point machine) or
- find an asset that should be maintained but is not on your work order (e.g. the point system has a supplementary drive but there is no job for it on the work order) or
- the work order states maintain an asset that has been removed or the work order states an incorrect job for the asset

If you have any problems or queries with the maintenance you are scheduled to undertake, inform your SM(S).

## Corrective Maintenance

Some of the tasks/test within NR/SMS asks you to rectify any defects you find or undertake adjustments, tightening etc. This shall be classed as corrective maintenance.

All corrective maintenance items shall be recorded in Ellipse using the WAIF process. This shall apply to:

- Work identified and completed
- Work identified but not completed
- Work identified that is undertaken by other functions (e.g. Track, E&P etc).

|                                                   |                      |                           |
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Corrective maintenance items that are causing a failure that will have an impact on the running of trains, shall also be reported to the Integrated Control Centre or Infrastructure Fault Control (both covered by the generic acronym ICC) of the details.

- This is so that it can be entered into the Fault Management System (acronym FMS) and appropriate action taken.

**End**

|                                                   |                      |                           |
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| NR/SMS/Part A/A03                                 |                      |                           |
| Signalling Definitions                            |                      |                           |
| Issue No. 7                                       | Issue Date: 04/03/17 | Compliance Date: 31/05/17 |

## General

- The following terms appear in this Handbook to describe particular actions that should be used when maintaining equipment.

| Term          | Definition                                                                                                                                                       |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Brush         | Brush all loose dirt from apparatus and foundations using a brush which has no exposed metallic surfaces                                                         |
| Check         | Visually inspect for alignment, obstructions, breakages, decay, obvious damage, and/or operation within its defined tolerances, and/or fulfilment of purpose.    |
| Clean         | Remove moisture, dirt, corrosion, or roughness (e.g. from contact faces).                                                                                        |
| Dust          | Dust lightly with a brush with no exposed metallic surfaces or duster                                                                                            |
| Examine       | Closely inspect apparatus and connections for wear, security, corrosion, deterioration, decay, and damage.                                                       |
| Isolate       | Electrically disconnect from working circuitry as detailed in <a href="#">NR/SMTH/Part-03/Check A05</a> .                                                        |
| Lubricate     | Oil or grease parts to reduce friction or provide protection and wipe off excess.                                                                                |
| Measure       | Apply an approved, calibrated measuring instrument/gauge, then read, and record the result.                                                                      |
| Note          | Make a physical record of the visible state, the position, or displayed indications of the equipment or item and its associated controls or operating system(s). |
| Observe       | Look at the equipment in use to make sure it is working correctly and is not faulty.                                                                             |
| Protect       | Apply an approved protecting agent.                                                                                                                              |
| Rectify       | Make good any faults discovered and/or adjustments required as a corrective maintenance item.                                                                    |
| Record        | Enter the obtained measurement readings or observations on a suitable record card or in a site log book.                                                         |
| Scrape        | Scrape all dirt and surplus grease off apparatus and foundations.                                                                                                |
| Test or Gauge | Examine apparatus and run it (or use the appropriate tool, gauge or instrument) to make sure it is working correctly and is adjusted within the specification.   |
| Wash          | Remove contaminated oils, greases, and dirt by applying an approved cleaning agent, or by using a detergent and water and then drying.                           |
| Wipe          | Rub apparatus with a cloth to remove dirt, grease etc.                                                                                                           |

**END**



|                                                   |                      |                           |
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| NR/L3/SIG/10663 Signal Maintenance Specifications |                      |                           |
| NR/SMS/Part A/A04                                 |                      |                           |
| Method Statement Summary                          |                      |                           |
| Issue No. 8                                       | Issue Date: 04/03/17 | Compliance Date: 31/05/17 |

## General

This single generic method statement covers preventative and corrective maintenance activities and is based on best practice.

It does not supersede any mandated documents you may currently be using (this includes local method statements or risk control sheets) or any local policies.

Your SM(S) shall explain the documents applicable to you. The points to be considered are as follows:

1. Scope of work
2. Competence of staff
3. Safety of staff and briefing arrangements
4. Communications and emergency plans
5. Protection arrangements and equipment
6. Railway and public 'interfaces'
7. Associated hazards and risks
8. Tools and plant
9. Personal protection equipment
10. Environmental issues
11. Working at height

The following sections explain these main points.

### 1. Scope of Work

Before starting any activity:

- a) Consider all the work involved
- b) Check that you are protected by a safe system of work
- c) Select the correct maintenance specification
- d) Obtain the signallers permission before starting any work that will interfere with signalling equipment.

When you communicate with the signaller, confirm that your and their messages are clearly understood. GE/RT8000 HB1 specifies the requirements for safe communication.

GE/RT8000 HB19 allows you to carry out certain maintenance activities without making an entry in the train register providing that:

- a) The work does not affect the safety of train working
- b) The work does not affect the normal passage of trains
- c) The work can be carried out between trains
- d) This generally equates to lubricating and cleaning equipment, taking non-intrusive meter readings.

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NR/L3/SIG/10064 (General Instructions to Staff Working on S&T Equipment) section [NR/GI/B002](#) clarifies the permissible work that can be carried out under these circumstances.

GE/RT8000 HB19 does not provide protection for staff. It is only concerned with the protection of trains

Consideration shall be given to systems affected by work on individual items of equipment. For instance, work on a piece of equipment that might affect an erroneous release on a system.

When resetting or restoring equipment back into service, consideration should be given to other systems that will be affected by this action.

## 2. Competence of Staff

Staff should be trained, and deemed competent work on the specific equipment that they will be undertaking preventative and corrective maintenance on, or have authorisation endorsed by their line manager. These will be recorded on your individual competency records.

Staff should have:

- a) A current or be working towards an IRSE licence, where appropriate;
- b) Certificates in safety activities, as appropriate (for example, PTS, SWL, COSS, Lookout, Working at Height etc);
- c) Training in manual handling;
- d) Knowledge of the Rule Book, particularly the Handbooks related to the Signalling activity they are undertaking.
- e) Knowledge of HASAW, the Electricity at Work Regulations and COSHH.

## 3. Safety of Staff and Briefing Arrangements

Always carry out preventative/corrective maintenance using a safe system of work set up by the SWL (Safe Work Leader) or COSS (Controller of Site Safety).

Use a Safeguarded system whenever possible but other systems can be used as conditions permit.

Trackside briefing shall be given by the SWL/COSS before the work can start.

Site briefings, the nature of the work, any possible dangers, Rule Book protection etc. shall be recorded on a Company Site Assessment Briefing Sheet at the time of the briefing.

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#### 4. Communications and Emergency Plans

- You should have a communication list for normal weekday working, weekend working, and on-call arrangements.
- The list should include contacts for Network Rail, emergency services, hospitals and other contractors, as appropriate.

#### 5. Protection Arrangements and Equipment

- When working in a non-safeguarded area, as well as normal protection arrangements, for certain activities equipment will need to be disconnected or an alternative protective measure used. This is to prevent the signaller from accidentally using the equipment being worked on.

##### Points

- When working on points, there are two risks that you need to protect against.
- The signaller could accidentally set a route involving (calling) the points and so cause a risk of injury to the person working on the points.
- The signaller may set a route with the points set in a particular position. If you then move the points to check or test them, you will disrupt the set route and this could cause a signal to revert to danger.

Before moving any points manually, request the Signaller to move them and then apply one of the protection options below and confirm the Signaller cannot obtain a proceed aspect over the affected points.

Protection options include the following:

- a) Disable signal routes by dropping the track circuit that locks the points. Always confirm the effectiveness of this with the signaller by requesting them to attempt to move the points \*

\*The EP&RR function can allow signallers to move a set of points even when the track circuit locking the points is occupied, thereby rendering the protection afforded in a) ineffective.

Therefore the protection method defined in paragraph a) above is prohibited in Emergency Point and Route Release (EP&RR) areas. Technicians shall use an alternative method of protection as defined in b) to f) below.

- b) For electronic interlockings, apply control(s) via the technicians' terminal to prevent the signaller from setting a route over the points. If the control(s) do not prevent the signaller from moving the points individually (e.g. SSI route bar) the points shall also additionally be switched to

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| Method Statement Summary                          |                      |                           |
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manual operation using the crank handle cut out or manual/auto switch.

- c) Disconnect the point detection (KR lines) by consulting the wiring diagrams and slipping the appropriate links in the equipment room or apparatus case. The points shall also be switched to manual operation using the crank handle cut out or manual/auto switch.
- d) Where all tail cables are connected to the point machine by plug coupler(s), disconnect all tail cable plug coupler(s) at the machine.
- e) Place a competent person (as a reminder) with the signaller to oversee the Rule Book arrangements and remind the signaller of the work whenever necessary.
- f) Apply a documented local operating arrangement that has been agreed with the Route Asset Manager (Signalling).

When working on points where bolt heads may need to be accessed or debris between the open switch rail and stock rail removed, it is good practice to scotch the open switch. This will prevent any unexpected movement that may be accidentally caused.

## 6. Railway and Public 'Interfaces'

Railway and public interfaces are areas where the public come into contact with signalling equipment

There are two main interfaces for preventative/corrective maintenance:

- a) Level crossings
- b) Equipment on platforms

No member of the public is to be put at risk.

## 7. Associated Hazards and Risks

These include:

- a) The risk to staff from trains
- b) Failure of signalling equipment.
- c) Electrical injury
- d) Accidents involving lifting, slipping, tripping, falling and trapping fingers.

Information is available in Hazard Directories, which will include red zone prohibited areas.

Information about dangers is also contained in local Health and Safety Policy Statements.

|                                                   |                      |                           |
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| NR/SMS/Part A/A04                                 |                      |                           |
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- Use official access points.

## 8. Tools and Plant

- See section [NR/SMS/Part/A05](#) 'Plant, tools and calibration' for details.

## 9. Personal Protective Equipment

Personal Protective Equipment (PPE) shall be used at all times.

- Additional PPE may be required depending to the task to be carried out.
- Your SM(S) will supply the correct PPE for the situation and the circumstances that you will be working in.

## 10. Environmental Issues

- Follow the relevant company standards to dispose of waste material or scrap.

## 11. Working at Height

- Follow the relevant company standards when working at height.

**End**

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| NR/L3/SIG/10663 Signal Maintenance Specifications |                      |                           |
| NR/SMS/Part A/A05                                 |                      |                           |
| Plant, Tools, and Calibration                     |                      |                           |
| Issue No. 4                                       | Issue Date: 04/03/17 | Compliance Date: 31/05/17 |

## General

Use the correct tools to carry out preventative and corrective maintenance.

When using a test or a measuring instrument (gauge, meter, insulation tester, and so on), it should be calibrated, within date and is fit for the purpose.

All calibrated instruments shall have a calibration label detailing the instruments unique ID and its next calibration date. If this label is not present, it is out of date, any seal is broken or the instrument is found to be faulty then the test will not be valid. You shall return faulty or un-calibrated equipment to your SM(S).

Details of test instruments and calibration requirements for S&T measuring equipment can be obtained via your SM(S).

If you are in any doubt about a gauge or test instrument, ask your SM(S) before use.

## List of Approved Tools, Gauges and Test Instruments

The listing of these items is constantly changing with the removal of certain items and new items gaining product approval.

Any listing of these items in this section would be out of date in a short time and could lead to an incorrect item seemingly being approved.

Your SM(S) will be able to give you details of the currently available and approved items.

## Plant

Typically includes:

- Bonding machine (powered)
- Drilling machine (powered)
- Disc cutters
- Angle grinders

This equipment shall be inspected and maintained and is identified by an inspection label.

Check before you use any the equipment that it is within the serviceable date.

**End**

|                                                   |                        |                             |
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| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A06                                  |                        |                             |
| Materials                                         |                        |                             |
| Issue No: 05                                      | Issue Date: 04/06/2022 | Compliance Date: 03/09/2022 |

## 1. General

- 1.1 Use the correct, approved materials when maintaining equipment.
- 1.2 Shelf life of materials should be considered, do not use items that are outside their service date or use before date. Inform your SM(S) if you come across any of these items.
- 1.3 If you are in any doubt about an item, ask your SM(S) before use.

## 2. Common Approved Materials

- 2.1 The listing of these items is constantly changing with the removal of certain items and new items gaining product approval.
- 2.2 Any listing of these items in this section would be out of date in a short time and could lead to an incorrect item seemingly being approved.
- 2.3 Your SM(S) will be able to give you details of the current available and approved items.

**END**

|                                                   |                        |                             |
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| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A07                                  |                        |                             |
| Security of Equipment                             |                        |                             |
| Issue No. 03                                      | Issue Date: 04/09/2021 | Compliance Date: 04/12/2021 |

## 1. Security

1.1 Always check that access points to the railway are closed and secured at all times when they are not in use.

1.2 Equipment shall be secured against unauthorised access.

1.3 Refit and secure all locking devices, access doors, covers and plates before leaving the site.

1.4 Replace missing or ineffective locks.

## 2. Padlocks

2.1 Leave the padlock hanging vertically to reduce rain ingress to the key mechanism.

2.2 Do not put a padlock down on the ground when removed. Hang it on the lock staple or place it somewhere it will not get dirty.

## 3. Door Locks

3.1 If door locks are stiff or badly fitting, arrange for them to be repaired.

3.2 Do not remove or file out striker plates as this weakens the lock.

3.3 Lock mechanisms are not to be oiled as this attracts dirt. They should be lubricated with the correct type of graphite powder.

3.4 If keyhole cover plates are provided, confirm they drop when the key is removed. This keeps out dirt and insects.

## 4. Keys

4.1 Keys should be securely kept and not be labelled with their purpose; this greatly reduces the chances of misuse if they are lost.

4.2 After locking, check that the lock is effective by gently testing the door or tugging the padlock.

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| NR/SMS/PartA/A07                                  |                        |                             |
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- 4.3 The following keys are in standard range:
- a) JW 442 Grand Master for YS and YW locks for S&T personnel only.
  - b) JW 442 Sub-master YS for YW locks.
  - c) RKB 221 For S&T personnel only.
  - d) RKB 222 For Operating Dept. personnel only.
  - e) BR No.1 For Trainmen's access.
  - f) Triangular For wooden cupboards.
- Many regional variations to the above list still exist. Special keys are required for some token and key release instruments and lifting barriers.

## 5. User Worked Crossings

- 5.1 Lower or close barriers or gates at user-worked crossings and report if you see any barriers or gates that have been left open or not lowered properly.

## 6. Lineside Fences

- 6.1 If you come across damaged or missing fencing, you should attempt to secure it if you can do this safely and report it to Control.

## 7. Extra Security

- 7.1 Your SM(S) will consider the need for extra security measures in the following circumstances:
- a) Areas, which are being vandalised.
  - b) Places which the public use (such as stations, level crossings etc.).

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- 7.2 Protection measures will be taken as appropriate. This could include:
- a) Mesh cages.
  - b) Poly-carbonate signal lenses.
  - c) Anti-vandal guards.
  - d) Fencing.
  - e) Using lid fixing systems on cable troughs (bands, glue, channel rodding and so on).
  - f) Alarm systems.
  - g) Re-routing or burying cables.
  - h) Ladder Guards.

**END**

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| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A08                                  |                        |                             |
| Items for Renewal                                 |                        |                             |
| Issue No: 04                                      | Issue Date: 04/06/2022 | Compliance Date: 03/09/2022 |

## GENERAL

### 1. Renewals

- 1.1 Maintenance of Signalling equipment shall be planned at the required intervals using Ellipse. These intervals are set so equipment is maintained in a safe condition and remains fit for purpose.
- 1.2 Equipment may be maintained at different intervals depending on the regime being applied and this may alter from time to time with the application of the RBM initiative.
- 1.3 Give enough attention to equipment during each visit so it meets the required standard of maintenance.
- 1.4 As equipment ages, normal maintenance activities might not be able to maintain it to the necessary standard.
- 1.5 Similarly, equipment might be damaged or fail due to vandalism or interference by others.
- 1.6 When making repairs of a temporary or permanent nature, it is your responsibility to confirm that the equipment remains safe and reliable.
- 1.7 If it is not possible to maintain equipment to the necessary standard, or a temporary repair has been made, you shall report this on a WAIF to your SM(S). Identify the failed equipment and the reason for your request.
  - Your SM(S) is responsible for assessing each request, and prioritizing any action needed. Examples of problems are:
    - a) Wire Degradation.
    - b) Corroded Supports or Structures.
    - c) Rotten Bases or Boards.
    - d) Damaged Cable Routes.
    - e) Illegible or Missing Labels and Equipment Number Plates.
    - f) Equipment Seals or Gaskets.
    - g) Relay Bases.
    - h) Equipment Needing re-servicing.
    - i) Overgrowth or Infestation.
    - j) Worn Fittings.
    - k) Vandalism.
    - l) Silver migration.

**END**

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A09                                  |                        |                             |
| Lubrication                                       |                        |                             |
| Issue No: 04                                      | Issue Date: 04/06/2022 | Compliance Date: 03/09/2022 |

## GENERAL

### 1. Approved Lubricants

- 1.1 Only use approved lubricants on signalling equipment.
- 1.2 Dry film lubrication is the preferred lubricant type and should be considered for reduction of contamination and ease of inspection.
- 1.3 Dry film lubrication should also be supplemented at the maintenance frequency and the use of degreaser removed.

### 2. Teflon Dry Film Lubrication

- 2.1 Interflon Lube TF and Lube EP is a dry film lubricant that can be used to replace mineral oil, PTFE grease and Rocol.
- 2.2 Lube TF should be treated as a preparation light use lubricant including locks and hinges.
- 2.3 Lube EP should be the main maintenance lubricant for heavier use (standard for clamplocks).
- 2.4 Lubricant is suitable to replace grease in certain applications.
- 2.5 It is important to follow the manufacturer's instructions, particularly those relating to preparing parts before applying the lubricant.

### 3. Mineral Oil

- 3.1 This is used for lubricating mechanical connections (unless grease points are provided) to reduce wear and make the connection work smoothly.
- 3.2 Apply oil sparingly and wipe away any excess or spillage.
- 3.3 Do not allow oil to come into contact with electrical equipment or wiring.

### 4. Lithium-Based Grease

- 4.1 This is generally used for greasing mechanical bearings (cranks, pivots, bushes, and so on) via grease nipples.
- 4.2 Remove excess grease to prevent the build-up of dirt. Teflon impregnated lithium grease (Grease MP1) is also available and is pumpable to very low temperature.

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A09                                  |                        |                             |
| Lubrication                                       |                        |                             |
| Issue No: 04                                      | Issue Date: 04/06/2022 | Compliance Date: 03/09/2022 |

## 5. Adhesive-Type Grease

- 5.1 This is used to protect exposed mechanical parts (for example lock and detector slides) from the environment. Interflon Grease MP1 is suitable as adhesive grease.

## 6. PTFE Grease

- 6.1 Nulon QH90 grease contains Teflon and is suitable for use on clamp locks instead of Rocol. It is also suitable for use on other mechanical parts including cranks and slide chairs.
- 6.2 It is important to follow the manufacturer's instructions, particularly those relating to preparing parts before applying the grease.

## 7. Automatic Lubrication System

- 7.1 The Simalube (sliver/grey) automatic lubrication system can be used in various applications. Yellow end cap units are for use with Interflon liquid lubricants. Green end cap units are for use with Interflon grease.
- 7.2 Cartridges should be set to 12 months for standard application.
- 7.3 Reference should be made to the manufacturer's instructions relating to application and fitting.

## 8. Graphite Powder

- 8.1 Only to be used on locks and padlocks.
- 8.2 Avoid mineral oil, as it can allow dust/dirt to adhere inside the lock.

**END**

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A10                                  |                        |                             |
| Painting and Surface Treatments                   |                        |                             |
| Issue No. 04                                      | Issue Date: 04/09/2021 | Compliance Date: 04/12/2021 |

## 1. General

- 1.1 The painting of signalling equipment is part of maintenance but is usually managed outside of the normal maintenance scheduled tasks.
- 1.2 During each maintenance visit, make a note of any paintwork or surface treatments (for example galvanizing) that has deteriorated and report to the SM(S). The SM(S) will arrange for equipment to be repainted as necessary.
- 1.3 The following are examples of surface treatment faults that you should report:
  - a) Coatings that are cracked, peeling or flaking.
  - b) Rust, rust staining and blistering.
  - c) Vandalism and graffiti.

## 2. Points and Fittings

- 2.1 Cracks are often initiated from corrosion found around bolts holes and deterioration of galvanising is indicative of deterioration that might be worse on hidden surfaces.
- 2.2 During each maintenance visit, make a note of any galvanizing that has deteriorated and report to the SM(S). The SM(S) will arrange for equipment to be replaced.
- 2.3 Painting is not desirable as it can mask crack identification.

**END**

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| <b>NR/SMS/PartA/A11</b>                           |                        |                             |
| <b>Maintenance Diagrams</b>                       |                        |                             |
| Issue No: 03                                      | Issue Date: 04/06/2022 | Compliance Date: 03/09/2022 |

## 1. Technicians' Copies

- 1.1 Technicians' Copy diagrams are issued as an 'as installed' record of signalling systems and to support the testing and maintenance of the equipment.
- 1.2 It is essential that the diagrams are available, complete, accurate, and in a condition that is fit for use.
- 1.3 Store diagrams carefully, using the container provided. If any storage container is inadequate, inform your SM(S) so that they can arrange an alternative.
- 1.4 Diagrams are stamped, signed, and dated by the issuer. If this is not the case, assume the drawings are uncontrolled and ask for replacements.

## 2. Incorrect Drawings

- 2.1 Inform your SM(S) of any diagrams which are incorrect so that they can be updated, or replacement copies ordered.

## 3. Maintenance Work - Changes to Diagram

- 3.1 Maintenance work can result in a change to a diagram. Examples are:
  - a) Equipment replacement.
  - b) Cables renewals.
- 3.2 In such cases, you should inform your SM(S) so National Records Group can be informed for replacement diagrams.
- 3.3 Any temporary diversion of circuits is to be shown on the diagrams.
- 3.4 This is not a permanent change to the diagram and does not need reporting to Network Records Group.
- 3.5 Any necessary amendments shall be made in red ink and be signed and dated by the Technician.

**END**

|                                                        |                        |                             |
|--------------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications      |                        |                             |
| <b>NR/SMS/PartA/A13</b>                                |                        |                             |
| <b>Reinstating Flooded or Water Affected Equipment</b> |                        |                             |
| Issue No: 05                                           | Issue Date: 04/06/2022 | Compliance Date: 03/09/2022 |

## 1. GENERAL

- 1.1 The tasks and tests stated in this section are to be carried out on equipment after incidents of flooding.
- 1.2 Floodwater or rainwater ingress into equipment can cause tracking on electrical equipment, corrosion on mechanical equipment and contaminate hydraulic oils and lubricants. This can pose a risk to the safe and reliable operation of the equipment.
- 1.3 Flooding or moisture contamination does not have to be widespread or dramatic to cause serious problems.
- 1.4 Water is a very good conductor of electricity, therefore a small amount of moisture between terminals or on a printed circuit board can be sufficient to enable current to flow. This can result in a false feed, the shorting out of a vital circuit or provide an earth path.
- 1.5 Water on or inside metal equipment can lead to rust, lubricants becoming ineffective and equipment becoming seized.
- 1.6 Water and oil do not mix; any hydraulic oil affected can be made ineffective and lead to rusting inside the hydraulic system.
- 1.7 During each maintenance visit, check for signs of flooding or moisture contamination (rust streaks, 'furring' of terminals, silt deposits, 'tide' marks, etc).
- 1.8 Check gaskets, seals and glands are fitted correctly and show no signs of cracking, bulging or distortion.
- 1.9 Serious contamination shall require action and be reported to the Signaller and your SM(S).
- 1.10 If equipment is renewed, follow the SMTH.
- 1.11 Once debris (silt, twigs, rubbish etc.) has been removed from the equipment, you shall carry out the requirements in [NR/SMS/PartB/Test 300](#) for each piece of affected equipment.

**END**



|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A14                                  |                        |                             |
| Environmental Issues                              |                        |                             |
| Issue No: 04                                      | Issue Date: 04/06/2022 | Compliance Date: 03/09/2022 |

## 1. Waste Disposal

- 1.1 Waste is classed either as special waste or as non-special waste.
- 1.2 Keep special waste separate from non-special waste.
- 1.3 Some contractors will allow different types of special waste to be mixed if full COSHH details are sent.
- 1.4 You are only licensed to transfer waste from the worksite to your depots.
- 1.5 Your SM(S) shall provide waste disposal points and also arrange for a licensed contractor to take it away.
- 1.6 All waste shall be disposed of in accordance with current environmental policy. If in doubt, ask your SM(S).
- 1.7 Table 1 shows a typical arrangement of waste segregation.

| Waste Type                | Class       | Disposal Point     |
|---------------------------|-------------|--------------------|
| Primary cells             | Special     | Depot battery box  |
| Lead acid cells           | Special     | Depot battery box  |
| Alkaline cells            | Special     | Depot battery box  |
| Hydraulic fluid tins      | Special     | Special waste skip |
| Grease lubricant tins     | Special     | Special waste skip |
| Oil lubricant tins        | Special     | Special waste skip |
| Metal scrap               | Non-special | Scrap metal skip   |
| Plastic scrap             | Non-special | Non-special skip   |
| Cable and wire            | Non-special | Designated area    |
| Glass                     | Non-special | Non-special skip   |
| Dirty cloth               | Special     | Special waste skip |
| Paper                     | Non-special | Recycling bin      |
| Concrete                  | Non-special | Non-special skip   |
| Asbestos cement           | Special     | Special waste skip |
| Treated wood              | Special     | Special waste skip |
| Wood                      | Non-special | Non-special skip   |
| Paint tins                | Special     | Special waste skip |
| Cleaning agents           | Special     | Special waste skip |
| Herbicides and fungicides | Special     | Special waste skip |

**Table 1 – Waste Disposal Classes**

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A14                                  |                        |                             |
| Environmental Issues                              |                        |                             |
| Issue No: 04                                      | Issue Date: 04/06/2022 | Compliance Date: 03/09/2022 |

## 2. Recovered Signalling Equipment

- 2.1 Some signalling equipment can be repaired. Attach a non-conforming product label to it and take it to the depot quarantine area.
- 2.2 Signalling equipment that cannot be repaired is classed as scrap. You should put it in the appropriate skip.

## 3. Polychlorinated bi-phenols (PCB)

- 3.1 Some signalling equipment may contain PCBs. If it does, clearly label it.
- 3.2 If you have to replace the equipment, your SM(S) shall arrange for an approved disposal company to take it away from your depot.
- 3.3 Always check that you are putting the waste into the right skip.

**END**

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| <b>NR/SMS/PartA/A15</b>                           |                        |                             |
| <b>Out of Use Assets</b>                          |                        |                             |
| Issue No: 04                                      | Issue Date: 04/09/2021 | Compliance Date: 04/12/2021 |

## 1. General

- 1.1 Signalling assets can be taken out of use temporary (e.g., in conjunction with signalling or track renewal and enhancement work), permanently pending recovery, or 'moth balled' (e.g., closure of a branch line but assets left in situation with a possible re-instatement of the branch for a different purpose).
- 1.2 The time an asset can remain in this state can vary from a few days to years or possibly never.
- 1.3 Due to the asset being in this situation it is sometimes impossible to carry out the full NR/SMS tasks and tests in parts C and B.
- 1.4 This NR/SMS details the disconnection methods and the reduced tasks and tests.
- 1.5 In all cases it shall be checked by means of the diagrams and/or control tables that taking a signalling asset out of use does not affect any other signalling equipment that is to remain operational.

## Out of Use Assets

- 1.6 All Out of Use Assets shall still be subject to Ellipse work orders which detail the maintenance requirement on the assets.
- 1.7 Your SM(S) will inform you of any additional signalling assets that require maintaining to this NR/SMS. If you are in any doubt if any asset is out of use or operational, ask your SM(S).
- 1.8 Signalling assets that are out of use shall be disconnected in such a way that it cannot be re-instated to service without a signalling Technician being involved in the process (e.g., physical disconnection of mechanical components or physical isolation of electrical circuits).

Assets controlled by electronic interlocking's such as SSI shall be disconnected at the Technicians terminal. Details of disconnections to assets can be found in section 1 to 10.

## 2. Form RT3187

A form RT3187 shall be issued for signalling assets that are taken out of use.

- 2.1 A copy of the form shall be kept in the controlling signal box of the asset. It shall be the responsibility of the signalling Technician to carry out the maintenance, to check that the RT3187 exists as authority to carry out this NR/SMS.

If the existence of the form cannot be verified, inform your SM(S).

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A15                                  |                        |                             |
| Out of Use Assets                                 |                        |                             |
| Issue No: 04                                      | Issue Date: 04/09/2021 | Compliance Date: 04/12/2021 |

### 3. Re-instatement

- 3.1 Signalling assets that are being maintained to this SMS, shall not be re-instated to full operational service without a method statement endorsed by the RAM(S).
- 3.2 The processes in SMTH shall be followed for the re-instatement of single or small numbers of simple assets.

For larger collections of assets where there is to be only a partial re-instated or there has been a change to the design of the layout, SWTH shall be followed.

If the asset has been out of use for more than three months, then a full annual service shall be carried out as part of the re-instatement process.

### 4. Maintenance

- 4.1 The reduced preventative maintenance for Out of Use Assets is detailed in sections 11 to 20. These tasks shall be carried out in place of the ones detailed in [NR/SMS/Part/C](#).

## DISCONNECTIONS REQUIRED TO RENDER AN ASSET OUT OF USE.

### 5. Points with No Trains Passing Over Them

|                  |                                                                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Includes:</b> | Points on lines that are completely out of use                                                                                                            |
| <b>Excludes:</b> | Points that are used as trap points to a line that is in use or as flank protection for a line that is in use, use 'Points with Trains Passing Over Them' |

⋮ If you are in any doubt about if the points fall into this category, ask your SM(S).

#### Power Operated Points:

- 5.1 Remove the motor and detection fuses; remove all links to the motor and detection circuits.
- 5.2 Check that reminder appliances are placed over the correct controls in the controlling signal box.
- ⋮ 5.3 Power to any heaters can be maintained.

#### Mechanically Operated Points:

- 5.4 Remove (if provided) detection fuses and links to the detection circuit.
- 5.5 Remove the cotter pin to the catch handle on the point operating lever or (if provided) the FPL lever in the controlling signal box.

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| <b>NR/SMS/PartA/A15</b>                           |                        |                             |
| <b>Out of Use Assets</b>                          |                        |                             |
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5.6 Check that reminder appliances are placed over the correct lever(s) in the controlling signal box.

## 6. Points with Trains Passing Over Them

6.1 The points shall be clamped, scotched and padlocked (or equivalent).

• This is usually an operating responsibility to carry out but can be undertaken by signalling Technicians.

6.2 The points shall remain powered (power operated points) or connected (mechanically operated points) with working detection still proved in the interlocking.

• More details on securing points out of use can be found in [NR/GI/E054](#) (Securing Points Out of Use).

### Power Operated Points:

#### **Electronic Interlocking areas:**

6.3 Apply the required controls via the Technicians' Terminal.

6.4 Check that reminder appliances are placed over the correct controls in the controlling signal box.

#### **Relay Interlocking areas:**

6.5 Remove the fuse/feed to the point NLR/RLR circuit (or point LR on E10k interlocking).

6.6 Check that reminder appliances are placed over the correct controls in the controlling signal box.

### Mechanically Operated Points:

6.7 Place a reminder collar on the point lever and (if provided) the FPL lever.

## 7. Colour Light Signals which are Not Visible to Drivers

7.1 Where the loss of power to the signal does not affect the indications or aspects of any other signal that is visible to drivers, the signal and indications shall be totally powered down.

• Where the loss of power to the signal does affect the indications or aspects of any other signal that might visible to drivers, remove the signal HR and DR links.

• Check that reminder appliances are placed over the correct controls in the controlling signal box.

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A15                                  |                        |                             |
| Out of Use Assets                                 |                        |                             |
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## 8. Colour Light Signals which are Visible to Drivers

### 8.1 Remove the signal HR and DR links.

Where it has been published in the weekly operating notice, a black cover with a white St. Andrews cross shall be placed over the signal aspects.

Check that reminder appliances are placed over the correct controls in the controlling signal box.

## 9. Semaphore Signals which are Not Visible to Drivers

### 9.1 Remove the signal arm and spectacle plate.

On electrically lit signals where the loss of power to signal does not affect any other signals that might be visible to drivers, the signal lamp, and indications shall be totally powered down.

On oil lit signals, remove the oil lamp. If the signal illumination is indicated in the controlling signal box, power down the indication.

Check that reminder appliances are placed over the correct controls in the controlling signal box.

## 10. Semaphore Signals which are Visible to Drivers

### 10.1 Where it has been published in the weekly operating notice, remove the signal arm and spectacle plate, if this is not practical a white St. Andrews cross shall be attached to the front of the arm.

On electrically lit signals where the loss of power to signal does not affect any other signals that might be visible to drivers, the signal lamp, and indications can be totally powered down.

On oil lit signals, remove the oil lamp. If the signal illumination is indicated in the controlling signal box, power down the indication.

Check that reminder appliances are placed over the correct controls in the controlling signal box.

• Lamp proving of semaphore signals is often grouped, so that removing one lamp results in the group indicator showing lamp out.

### 10.2 The lamp proving for the removed lamp might need to be strapped out, this shall only be done once diagrams and method statements have been prepared and approved in accordance with the SMTH.

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A15                                  |                        |                             |
| Out of Use Assets                                 |                        |                             |
| Issue No: 04                                      | Issue Date: 04/09/2021 | Compliance Date: 04/12/2021 |

## 11. Track Circuits

11.1 Track circuits shall be powered down by removal of the supply fuses or disconnection of the primary cells, providing this does not affect any other signalling equipment that is still operational.

If requested by the Signaller, the indications on the panel might be extinguished along with a legend stating the track circuit is out of use.

## 12. Level Crossings

### Level crossings with gates:

12.1 Gates shall be secured (by means of a chain and padlock or similar) in the closed to rail traffic position.

12.2 Electric gate lights shall be powered down and oil gate lights shall be removed. The road lights (wig-wags) if provided shall be powered down by removal of the supply fuses.

12.3 Check that reminder appliances are placed over the correct controls in the controlling signal box.

### Level crossings with booms:

12.4 The road lights (wig-wags) and boom lights shall be powered down by removal of the supply fuses.

12.5 Booms shall be secured in the raised position.

If this is not practical or possible, the booms shall be removed, and the side arm assemblies/counter weights secured or removed.

12.6 Check that reminder appliances are placed over the correct controls in the controlling signal box.

## 13. Ground Frames

### Electrical Ground Frames:

13.1 The points shall be dealt with as detailed in the points section of this SMS.

13.2 The switch panel shall be powered down by removal of the supply fuses.

13.3 Check that reminder appliances are placed over the correct controls in the controlling signal box.

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A15                                  |                        |                             |
| Out of Use Assets                                 |                        |                             |
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Mechanical Ground Frames:

- 13.4 The points shall be dealt with as detailed in the points section of this SMS.
- 13.5 The power supply to the release lever lock shall be isolated either at the ground frame or monitoring signal box.
- 13.6 Check that reminder appliances are placed over the correct controls in the controlling signal box.

**14. Trackside Apparatus Cases (Location) and Equipment Rooms**

- 14.1 Where the location or equipment room controls assets that are out of use, it can be powered down by removal of the incoming supply fuses.
- 14.2 The location or equipment room shall be suitably secured. In vandal prone areas the padlocks can be replaced with a bolt and self-locking nut.

**PREVENTATIVE MAINTENANCE TO OUT OF USE ASSETS**

**15. Points with No Trains Passing Over Them**

|                  |                                                                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Includes:</b> | Points on lines that are completely out of use.                                                                                                           |
| <b>Excludes:</b> | Points that are used as trap points to a line that is in use or as flank protection for a line that is in use, use 'Points with Trains Passing Over Them' |

**SERVICE A**

- 15.1 Check or verify that a RT/3187 form is available.
- 15.2 Visually check the points for security of fittings and evidence of vandalism.
  - Report any degradation to your SM(S).
- 15.3 Check or verify that the correct reminder appliances are in place in the controlling signal box.

**16. Points with Trains Passing Over Them**

**SERVICE A**

- 16.1 Check or verify that a RT/3187 form is available.
- 16.2 Report any degradation or evidence of vandalism to your SM(S).
- 16.3 Check that the points are suitably clamped and scotched.



|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A15                                  |                        |                             |
| Out of Use Assets                                 |                        |                             |
| Issue No: 04                                      | Issue Date: 04/09/2021 | Compliance Date: 04/12/2021 |

- 16.4 Visually check the points for security of the stretcher bars (including the lock stretcher where provided), and associated fittings.
- 16.5 Check that the FPL is still holding the lock blades or lock stretcher or that the drive lock slide on RCPLs is still fully through the Lock Body Unit. Rectify as necessary.
- 16.6 Check that the free wheel clearance and the residual switch opening are being correctly maintained. Details of values are in [NR/SMS/PartZ/Z02](#) (Point Reference Values).
- 16.7 If provided, check that the point machine is secure, and the lid is correctly fitted and padlocked.
- 16.8 If provided, check that the point rodding and cranks are secure.
- 16.9 Check or verify that the correct reminder appliances are in place in the controlling signal box.

## SERVICE B

These tests shall only be carried out if the points can be unclipped and un-scotched:

- 16.10 Identify and carry out the correct Facing Point Lock Test for the equipment being serviced [NR/SMS/PartB/Test 011 to 013](#).
- 16.11 Identify and carry out the correct Detection Test for the equipment being serviced [NR/SMS/PartB/Test 011 to 013](#).

### Power Operated Points:

- 16.12 If 12.10 is not possible, remove the cover/lid and break each detection contact in turn.
- 16.13 Check that the relevant detection relay de-energizes with each break.

⋮ This check is not be possible on clamp lock and HPSS systems.

### Mechanical Points with Electrical Detection:

- 16.14 If 12.10 is not possible, remove the cover/lid from the electrical detector and break the detection contact in turn.
- 16.15 Check that the relevant detection relay de-energises with each break.

⋮ This might not be possible on all types of electrical detector.

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| <b>NR/SMS/PartA/A15</b>                           |                        |                             |
| <b>Out of Use Assets</b>                          |                        |                             |
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Mechanical Points with Mechanical Detection:

16.16 If 12.10 is not possible, check that the signal reading over the points (if still operational) is mechanically held at danger by the detector.

**17. Colour Light Signals which are Not Visible to Drivers**

**SERVICE A**

17.1 Check or verify that a RT/3187 form is available.

17.2 Visually check the signal for security and evidence of vandalism. Report any degradation to your SM(S).

17.3 Cables suspended from the structures above overhead line equipment that are out of use shall be inspected.

17.4 Check or verify that the correct reminder appliances are in place in the controlling signal box.

**18. Colour Light Signals which are Visible to Drivers**

**SERVICE A**

18.1 Check or verify that a RT/3187 form is available.

18.2 Visually check the signal for security and evidence of vandalism. Report any degradation to your SM(S).

18.3 If the signal has not been powered down check that it is displaying a red aspect, or if a cover has been fitted over the lenses, it is in place and secure.

18.4 Cables suspended from the structures above overhead line equipment that are out of use shall be inspected.

18.5 Check or verify that the correct reminder appliances are in place in the controlling signal box.

**SERVICE B**

18.6 If requested by your SM(S) replace the red aspect lamp.

18.7 Carry out [NR/SMS/PartB/Test/021](#) (Filament Signal Lamp Tests) on the red aspect lamp.

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A15                                  |                        |                             |
| Out of Use Assets                                 |                        |                             |
| Issue No: 04                                      | Issue Date: 04/09/2021 | Compliance Date: 04/12/2021 |

## 19. Semaphore Signals which are Not Visible to Drivers

### SERVICE A

- 19.1 Check or verify that a RT/3187 form is available.
- 19.2 Visually check the signal for security and evidence of vandalism. Report any degradation to your SM(S).
- 19.3 Cables suspended from the structures above overhead line equipment that are out of use shall be inspected.
- 19.4 Check or verify that the correct reminder appliances are in place in the controlling signal box.

## 20. Semaphore Signals which are Visible to Drivers

### SERVICE A

- 20.1 Check or verify that a RT/3187 form is available.
- 20.2 Visually check the signal for security and evidence of vandalism. Report any degradation to your SM(S).
- 20.3 Cables suspended from the structures above overhead line equipment that are out of use shall be inspected.
- 20.4 If the lamp has not been powered down or the oil lamp has not been removed check that it illuminated. If a St. Andrews cross has been fitted over the arm, check that it is correctly in place and secure.
- 20.5 Check or verify that the correct reminder appliances are in place in the controlling signal box.

### SERVICE B

- 20.6 If electrically lit and if requested to by your SM(S) replace the lamp.
- 20.7 If electrically lit, carry out [NR/SMS/PartB/Test/021](#) (Filament Signal Lamp Tests).

## 21. Track Circuits

### SERVICE A

- 21.1 Check or verify that a RT/3187 form is available.

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A15                                  |                        |                             |
| Out of Use Assets                                 |                        |                             |
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## 22. Level Crossings

### SERVICE A

#### Level crossings with gates

- 22.1 Check or verify that a RT/3187 form is available.
- 22.2 Visually check the gates and (if provided) road lights for security and evidence of vandalism. Report any degradation to your SM(S).
- 22.3 Check that the gates are securely locked closed to rail traffic.
- 22.4 Check or verify that the correct reminder appliances are in place in the controlling signal box.

#### Level crossings with booms

- 22.5 Check or verify that a RT/3187 form is available.
- 22.6 Visually check the crossing infrastructure for security and evidence of vandalism. Report any degradation to your SM(S).
- 22.7 If the booms are still fitted, check that they are secured in the raised position.
- 22.8 Check or verify that the correct reminder appliances are in place in the controlling signal box.

## 23. Ground Frames (Electrical and Mechanical)

### SERVICE A

The points shall be dealt with as detailed in the points section of this SMS.

- 23.1 Check or verify that a RT/3187 form is available.
- 23.2 Visually check the ground frame infrastructure for security and evidence of vandalism. Report any degradation to your SM(S).
- 23.3 Check or verify that the correct reminder appliances are in place in the controlling signal box.

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A15                                  |                        |                             |
| Out of Use Assets                                 |                        |                             |
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## 24. Trackside Apparatus Cases (Location) and Equipment Rooms

### SERVICE A

- 24.1 Visually check the location or equipment room for security and evidence of vandalism. Report any degradation to your SM(S).

**END**

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A16                                  |                        |                             |
| Reference Documents                               |                        |                             |
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## 1. General

- 1.1 There are many signal engineering documents that contain detailed and useful information about specific assets. Some of these are listed at the beginning of the relevant NR/SMS tasks and tests. This section lists the documents that may be useful for reference purposes.
- 1.2 They are available on Connect via the 'NR Standards' link and using the search function to call up the document number. Externally they are available through uk.ihs.com.
- 1.3 Once a document is downloaded or printed from its electronic source, it is to be considered as uncontrolled.
- 1.4 The status of these documents can change during the life of this SMS; always check the status of the document on the NR Standards site or uk.ihs.com before use.

| Document No.    | Title                                                           |
|-----------------|-----------------------------------------------------------------|
| NR/GN/SIG/19002 | Westinghouse Signals Style 63 Point Machine                     |
| NR/GN/SIG/19012 | Cables and Wiring used for Signalling Systems                   |
| NR/GN/SIG/19014 | Mechanical Handbook                                             |
| NR/GN/SIG/19015 | Relay Plugboard Problems                                        |
| NR/GN/SIG/19016 | Westinghouse M3 Point Machine                                   |
| NR/GN/SIG/19019 | Westinghouse Signal Machines                                    |
| NR/GN/SIG/19020 | Signalling Relay Problems                                       |
| NR/GN/SIG/19023 | Signal Post Replacement Switches                                |
| NR/GN/SIG/19024 | Signalling Control Panels                                       |
| NR/GN/SIG/19025 | Electric Lever Locks & Circuit Controllers                      |
| NR/GN/SIG/19026 | Track Circuit Equipment                                         |
| NR/GN/SIG/19030 | Earth Testing of Bus-bars                                       |
| NR/GN/SIG/19032 | Alignment of Colour Light Signals                               |
| NR/GN/SIG/19036 | Test and Measurement Meters                                     |
| NR/GN/SIG/19039 | Signals (General)                                               |
| NR/GN/SIG/19040 | Train Protection Systems                                        |
| NR/GN/SIG/19041 | Battery Cells                                                   |
| NR/GN/SIG/19045 | Power Supplies                                                  |
| NR/GN/SIG/19046 | Treadles                                                        |
| NR/GN/SIG/19048 | TPWS Trackside Equipment                                        |
| NR/GN/SIG/19051 | GEC FDM Reed Equipment                                          |
| RT/E/C/19052    | TPWS In Radio Electronic Token Block (RETB) – Faulting Guidance |
| NR/WI/SIG/00111 | Point General - Supplementary Drives – Mechanical               |

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| <b>NR/SMS/PartA/A16</b>                           |                        |                             |
| <b>Reference Documents</b>                        |                        |                             |
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| Document No.    | Title                                                                                |
|-----------------|--------------------------------------------------------------------------------------|
| NR/SP/SIG/10029 | O&M of Non-Intrusive Earth Test Adapter for Reed FDM system                          |
| NR/SP/SIG/10081 | Preventive and Corrective Maintenance of Lever Frames                                |
| NR/SP/SIG/10083 | Preventive and Corrective Maintenance of Mechanical Signalling Runs and Rodding      |
| NR/L2/SIG/10157 | Signal Sighting                                                                      |
| NR/SIG/10661    | Signal Maintenance Task Intervals                                                    |
| NR/L2/SIG/10662 | Process for Introduction of new or Revised Maintenance Regimes for Signalling Assets |
| NR/L2/SIG/11213 | Signalling Cable Equivalent Sizes                                                    |
| NR/L2/SIG/11400 | HPSS Equipment Handbook                                                              |
| NR/SP/SIG/11752 | Train Detection                                                                      |
| NR/GN/SIG/11772 | Supplementary Point Drives and Detection                                             |
| NR/L2/SIG/11774 | Clamp Lock Handbook                                                                  |
| NR/L2/SIG/11107 | Silver Migration                                                                     |
| NR/L2/SIG/11400 | HPSS Handbook                                                                        |
| NR/L2/SIG/11630 | BR930 Series pin Code Allocation and Contact Arrangement                             |
| NR/L2/SIG/11655 | Management of Signalling Wire and Cable Insulation Degradation                       |
| NR/SP/SIG/11752 | Train Detection                                                                      |
| NR/PS/SIG/11755 | DC Track Circuits                                                                    |
| NR/PS/SIG/11756 | HVI Track Circuits                                                                   |
| NR/PS/SIG/11757 | AC Phase-Sensitive Track Circuits                                                    |
| NR/PS/SIG/11762 | Track Circuit Assister Interference Detectors                                        |
| NR/PS/SIG/11763 | Reed Type RT Track Circuits                                                          |
| NR/PS/SIG/11764 | Track Circuit Interrupters                                                           |
| NR/PS/SIG/11765 | Impedance Bonds                                                                      |
| NR/GN/SIG/11772 | Supplementary Point Drives and Detection                                             |
| NR/GN/SIG/19053 | IECC Technicians Manual                                                              |
| NR/GN/SIG/19054 | SSI Technicians Manual                                                               |
| NR/GN/SIG/19101 | Good Practice Guide - ACIC Track Circuit Leaf Fall                                   |
| NR/GN/SIG/19800 | Bedford-Bletchley: Control and use of VHLC Local Panels                              |
| NR/GN/SIG/19801 | Sittingbourne - Sheerness: Control and use of VHLC Local Panels                      |
| NR/L2/SIG/19608 | Level Crossing Infrastructure (Inspection and Maintenance Handbook)                  |
| NR/L2/SIG/19807 | Prioritisation of Signal Engineering Equipment Defects                               |
| NR/L3/SIG/19810 | Signal Involvement in Civil Engineering Work                                         |
| NR/GN/SIG/19808 | Alstom SO Hydraulic Supplementary Point Drive System - Installation & Set-up         |
| NR/TRK/6100     | The installation and maintenance of stretcher bars                                   |

**END**

|                                                   |                        |                             |
|---------------------------------------------------|------------------------|-----------------------------|
| NR/L3/SIG/10663 Signal Maintenance Specifications |                        |                             |
| NR/SMS/PartA/A17                                  |                        |                             |
| Signalling Definitions                            |                        |                             |
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## General

A glossary of general Signalling terms is given in GK/GN0802. Those terms are not repeated here except where they have been given a more technical definition for use within this document.

Any reference to source indicates that the definition has been taken from an external document.

## Glossary of Signalling Terms

| Term                   | Meaning                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adequate sighting      | Check that the driver's view of a signal is not obstructed, e.g. by trees, bushes, buildings or other structures, and can be seen for the required reading time on approach (see NR/L2/SIG/10157). Alignment is detailed in <a href="#">NR/SMS/SG00</a> .                                                                                                                                                           |
| Affected lever/locking | Any locking affected by the removal or potential release of any part which could alter the setting or integrity of the locking.                                                                                                                                                                                                                                                                                     |
| Alterations            | Changes to existing installations (including the provision of new Signalling) which form part or all of a self-contained scheme. A single alteration is by definition one which is designed to be commissioned on a single occasion.                                                                                                                                                                                |
| Apparatus              | A product with an intrinsic function intended for the end-user and supplied or taken into service as a single commercial unit.<br>[source: EMC Regs - modified]                                                                                                                                                                                                                                                     |
| Apparatus case         | An apparatus housing which is intended for unprotected outdoor use, is smaller than a building or REB and is usually capable of being transported as a made-up unit. It is usually of metallic construction. The wooden equivalent is commonly known as an apparatus cupboard                                                                                                                                       |
| Apparatus housing      | This is provided to house relays and / or other equipment at lineside locations or interlocking's, and may consist of an apparatus case, apparatus cupboard disconnection box, equipment room, REB, signal box, control center, or other equipment building.                                                                                                                                                        |
| Application criteria   | Document(s) specifying the constraints applied to the installation and maintenance of a system or an item of equipment in order that it can be guaranteed to deliver the performance attributes stated in the system or equipment specification.                                                                                                                                                                    |
| Approval               | The status given by the requisite authority when the product or works complies in all respects with the specification and addresses all identified risks.                                                                                                                                                                                                                                                           |
| Aspect test            | See signal aspect test.                                                                                                                                                                                                                                                                                                                                                                                             |
| Assessment             | The undertaking of an investigation in order to arrive at a judgement based on evidence, of the suitability of a product, competence of a person or acceptability of a risk. (source: BS EN 50126 expanded)                                                                                                                                                                                                         |
| Authorisation          | The formal permission to use a product within specified application constraints. (source: BS EN 50126)                                                                                                                                                                                                                                                                                                              |
| Automatic function     | A Signalling function that, under ordinary operation, is operated automatically by the passage of trains and is not interlocked with any other Signalling function. The function is generally associated with a particular signal box from which its operation is supervised, unless some form of local monitoring is provided.<br>The state of the function when there are no trains present is designated normal. |
| Back (B) contact       | A contact of a relay which is made when the relay is released and broken when it is operated.                                                                                                                                                                                                                                                                                                                       |



|                                                   |                        |                             |
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| Term                          | Meaning                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Back feed                     | An inadvertent feed which has arisen at an intermediate point within a circuit due to the uncontrolled combination of positions of several pieces of control equipment.                                                                                                                                                                                                       |
| Balise                        | A track mounted spot transmission unit that uses magnetic transponder technology. Its function is to transmit/receive messages to/from the train passing overhead. A TASS balise is passive with no interface to a Lineside Electronic Unit (LEU) and will therefore only transmit the fixed telegram stored in its memory. This data can only be changed by reconfiguration. |
| Balise Positioning Form (BPF) | Provides all the necessary information to the installer to allow the accurate trackside positioning and installation of the balise.                                                                                                                                                                                                                                           |
| Balise Testing Form (BTF)     | Provided to allow appropriate checks and tests associated with the balise to be recorded and a record retained.                                                                                                                                                                                                                                                               |
| Block tests (various)         | A test to ensure correct operation of specified block equipment.                                                                                                                                                                                                                                                                                                              |
| Bonding plan                  | A detailed plan of the track layout showing individual rails and position of IRJs, together with track circuit feed and relay connections with polarities, cross bonds, structure bonds, impedance bonds, etc., as applicable. This term may also include track plans and negative Bonding Plans in D.C. electrified areas.                                                   |
| Cable function test           | A test to ensure that each circuit in a cable functions correctly after work on that cable.                                                                                                                                                                                                                                                                                   |
| Change-over contact           | See dependent contact                                                                                                                                                                                                                                                                                                                                                         |
| Circuit diagrams              | A collection of individual drawings showing the equipment layout and circuit arrangement associated with a location, an interlocking or signal box.                                                                                                                                                                                                                           |
| Circuit function test         | A test of each individual circuit to verify the presence of the necessary controls.                                                                                                                                                                                                                                                                                           |
| Class I equipment             | Electrical equipment that requires the connection of the exposed- conductive-parts to a protective conductor connected to earth, to ensure personal safety. See BS 2754.                                                                                                                                                                                                      |
| Class II equipment            | Electrical equipment with double or reinforced insulation, either to prevent contact with exposed-conductive-parts, or to ensure no contact between such parts and live parts. The insulation is not therefore to be pierced by screws. Such equipment is never connected to earth. See BS 2754.                                                                              |
| Closure list                  | Final Index of design details issued to the tester in charge.                                                                                                                                                                                                                                                                                                                 |
| Common cause failure (CCF)    | A failure which is the result of an event(s) which, because of dependencies, causes a coincidence of failure states of components in two or more separate channels of a redundancy system, leading to the defined system failing to perform its intended function. (source: BS EN 61508)                                                                                      |
| Competent person              | A person who has the appropriate competence, authority to work, experience and ability to perform a particular task.                                                                                                                                                                                                                                                          |
| Concentrator                  | A facility to connect several telephone circuits to one terminal and thus avoid the need for a telephone instrument for each circuit.                                                                                                                                                                                                                                         |
| Configuration control         | A procedure to ensure that the functional and physical characteristics of a design or product are adequately identified and that changes to these characteristics are controlled and traceable throughout the life-cycle of the design or product, by recording its version or modification state.<br>Also known as version control.                                          |

|                                                   |                        |                             |
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| Term                        | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configuration (system)      | The structuring and interconnection of the hardware and software of a system.                                                                                                                                                                                                                                                                                                                                                                   |
| Construction                | The carrying out of any building, civil engineering or other engineering work, particularly that which falls within the scope of the Construction (Design and Management) Regulations 1994. Also known as installation.                                                                                                                                                                                                                         |
| Continuity test             | A test to ensure the continuity and correspondence of each individual wire or cable core shown on the wiring diagrams.                                                                                                                                                                                                                                                                                                                          |
| Control point               | A signal box (including control center), gate box or ground frame (including ground switch panel or shunting frame).                                                                                                                                                                                                                                                                                                                            |
| Control table test          | A test to ensure that each Signalling function conforms to all the requirements specified in the approved Control Tables. This test applies to Signalling works testing.                                                                                                                                                                                                                                                                        |
| Controlled function         | A Signalling function that, under ordinary operation, is controlled from the signal box (or other control point) to which the function is allocated and may be interlocked with other Signalling functions.                                                                                                                                                                                                                                     |
| Correlation                 | The comparison of the configuration and version status of a system with the design records to ensure that the two are in agreement.                                                                                                                                                                                                                                                                                                             |
| Correspondence              | Ensuring that the following all agree:<br>1 The controlling device, e.g. relay or SSI telegram, AND<br>The operated function, AND<br>3 The associated signal box indication(s), e.g. repeat relay or SSI telegram.                                                                                                                                                                                                                              |
| Custodian (of records)      | The organization appointed by the infrastructure owner to take care of master records. Also known as records custodian.                                                                                                                                                                                                                                                                                                                         |
| Cut-section (track circuit) | A method of reducing the continuous length of a track circuit by the use of individual track circuits, each one controlling a common final track repeat relay, or equivalent. These are indicated as one track circuit on the Signaller's panel. This is also known as a multi-section track circuit.                                                                                                                                           |
| Data (Signalling)           | Site specific geographical and control information in an electronic form, which may be of a safety-critical nature or otherwise. In order to be used in an electronic system or sub-system, data from master data files is usually permanently stored in an EPROM (erasable programmable read only memory).                                                                                                                                     |
| Data link                   | A serial data transmission system.<br>In SSI systems, this refers to the link between the interlocking and the lineside location and may take the form of a baseband unmodulated trackside data link cable, or a long line link using standard telecommunications PCM equipment.<br>Internal data link cables are also provided between the modules in an SSI cubicle and, where applicable, between modules in adjacent interlocking cubicles. |
| De-energised (relay)        | See released.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Degraded conditions         | The state of the part of the railway system when it continues to operate in a restricted manner due to the failure of one or more components.                                                                                                                                                                                                                                                                                                   |
| Dependent contact           | A contact set which consists of a front contact, a back contact and one arm shared between them, with not more than one contact path made at any one time. Also referred to as change-over contact.                                                                                                                                                                                                                                             |
| Design                      | A wide term including specification and the production of drawings, design details and bills of quantity (including specification of systems or equipment).<br>(source: CDM Regulations - modified)                                                                                                                                                                                                                                             |

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| Term                             | Meaning                                                                                                                                                                                                               |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Design authority                 | Network Rail or such other organization as is contracted by Network Rail to undertake specified design work on a system or on the infrastructure.                                                                     |
| Design details (Signalling)      | Any plans, control tables, engineering details and data, which are required to sufficiently define Signalling systems and equipment for production or record purposes.                                                |
| Design records                   | Design details defining the current state of the infrastructure.                                                                                                                                                      |
| Destructive test                 | A test which may alter the electrical, mechanical or physical state of the equipment.                                                                                                                                 |
| Difference list                  | A computer / data processor generated print out (produced by a validated software program) which details the data differences between two versions of a software program or data.                                     |
| Disarrangement of interlocking   | The interlocking can no longer be relied on to operate safely because of the removal or disturbance of component parts.                                                                                               |
| Disconnection box                | An apparatus housing for unprotected outdoor use, which is intended to contain mainly terminations and is commonly smaller than an apparatus case.                                                                    |
| Dog chart comparison test        | A test to ensure that the mechanical locking agrees with the site drawings.                                                                                                                                           |
| Double-cut (circuit)             | The inclusion of controls in both feed and return legs in order to mitigate the risk associated with a false feed or earth fault.                                                                                     |
| Drop away (DA) voltage (relay)   | The maximum voltage applied to an operated relay coil at which the last front contact breaks.                                                                                                                         |
| Drop shunt                       | The maximum value of non-inductive resistance which, when placed across the rails, causes the track relay to fully open its front contact.                                                                            |
| Drop-away time (track circuit)   | The time between the application of a shunt to the rails and the front contacts of track relay (TR) fully opening.<br>The converse is pick-up time.                                                                   |
| Earth fault                      | Unintentional contact between a circuit conductor and a conductive part at earth potential, by which an earth fault current may flow.                                                                                 |
| Earth fault detector             | A permanent device, wired to the busbars, that will detect an earth fault on the power supply and give an alarm that will alert the maintainer.<br>Also known as earth leakage detector.                              |
| Earth fault loop impedance       | The impedance of the earth fault current loop starting and ending at the point of earth fault. (source: BS 7671 extract)                                                                                              |
| Earth leakage detector           | See earth fault detector.                                                                                                                                                                                             |
| Earth test                       | A test to ensure that leakage current to earth is below specified limits.                                                                                                                                             |
| Emergency situation              | A current unforeseen or unplanned event which has life threatening or extreme loss implications and requires immediate attention (e.g. a fire).                                                                       |
| Energised                        | See operated.                                                                                                                                                                                                         |
| Engineering details (Signalling) | Design details from which a Signalling system is constructed.                                                                                                                                                         |
| Engineers Line Reference (ELR)   | A unique alphanumeric code used by Network Rail to define each route segment of the network.                                                                                                                          |
| Equipotential bonding            | Electrical connection maintaining various exposed-conductive-parts and extraneous-conductive-parts at substantially the same potential. It need not include a direct connection to earth. (source: BS 7671 augmented) |

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| Term                               | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| External (circuit or power supply) | Failing to wholly meet the internal criteria.                                                                                                                                                                                                                                                                                                                                                                          |
| Extraneous lighting                | An external light source affecting a signal aspect, e.g. from an open signal head door or nearby streetlamps.                                                                                                                                                                                                                                                                                                          |
| Fail-safe                          | A concept which is incorporated into the design of a product such that in the event of failure, it enters or remains in a safe state.<br>(source: BS EN 50129)                                                                                                                                                                                                                                                         |
| Final functional test              | A test carried out immediately prior to "signing-in" for operational use to ensure all equipment is fully connected and operates correctly.                                                                                                                                                                                                                                                                            |
| FREDDY                             | Flange Reading Electronic Detector Designed at York.<br>FREDDY treadles are not approved for use on Network Rail Infrastructure and will be removed in due course.                                                                                                                                                                                                                                                     |
| Free-wired interlocking            | A relay interlocking that comprises individually wired relays rather than pre-wired sets of relays.                                                                                                                                                                                                                                                                                                                    |
| Frequency division multiplex (FDM) | A data transmission system that uses unique frequencies to separate channels over a single pair of conductors. See <a href="#">NR/SMS/SB00</a>                                                                                                                                                                                                                                                                         |
| Front (F) contact                  | A contact which is made when the relay is operated and broken when it is released.                                                                                                                                                                                                                                                                                                                                     |
| Functional earthing                | The connection to earth necessary for the proper functioning of electrical equipment, i.e. an earth return. This may be used for telecommunications purposes but is no longer permitted for new Signalling circuits. Conductors for functional earthing are identified by the colour cream. (source: BS 7671 augmented)                                                                                                |
| Global Positioning System (GPS)    | A non-railway system used to determine geographical vicinity.                                                                                                                                                                                                                                                                                                                                                          |
| Graceful degradation               | A means by which a more complex control sub-system has the facility to switch into some other (more restricted) mode of operation if a particular input fails, or if availability is otherwise reduced by some means.                                                                                                                                                                                                  |
| Guaranteed power supply            | See secure power supply.                                                                                                                                                                                                                                                                                                                                                                                               |
| Independent checking               | Independent checking means that one person undertakes the work and another person checks it. In some cases, testing may be started before the work is completed. In other cases, the work may allow two staff to work on two tasks and then change over to test each other's work (as long as both are Maintenance Testers). Maintenance Testing may often be quite interactive within the guidelines of independence. |
| Inspection                         | A visual check to ensure that the specified equipment has been installed securely, undamaged and in accordance with the design details.                                                                                                                                                                                                                                                                                |
| Installation (infrastructure)      | That part of the Signalling system associated with the infrastructure at a particular place.                                                                                                                                                                                                                                                                                                                           |
| Insulated rail joint (IRJ)         | A method of joining rail ends together whilst maintaining electrical insulation between them.<br>An alternative non-preferred term is insulated block joint (IBJ).                                                                                                                                                                                                                                                     |
| Insulation test                    | A test to ensure that a cable, wire, spare core or other equipment meets the required insulation criteria.                                                                                                                                                                                                                                                                                                             |
| Interlocking (building)            | The (generally dedicated) building housing the interlocking system, where separate from the signal box (or other control point).                                                                                                                                                                                                                                                                                       |

|                                                   |                        |                             |
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| Term                                    | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interlocking (equipment)                | The equipment that performs the role required of the interlocking system.                                                                                                                                                                                                                                                                                                                                                                                               |
| Interlocking (system)                   | The safety-critical locking provided between Signalling functions in accordance with control tables.                                                                                                                                                                                                                                                                                                                                                                    |
| Interlocking area                       | The area of railway controlled by a particular interlocking, extended up to a boundary with each other adjacent interlocking controlled by the same or another signal box.                                                                                                                                                                                                                                                                                              |
| Internal (circuit)                      | A circuit that does not leave the apparatus housing in which it originates, and which is fed from a busbar which feeds only internal circuits. This includes the feed to an isolated transformer supplying an external circuit. Circuits that extend between adjacent apparatus housings may be considered to be internal if they are run in a protective non-conducting duct and are judged to be away from any environment that might be susceptible to earth faults. |
| Internal (power supply)                 | A power supply feeding only internal circuits. Also known as local power supply                                                                                                                                                                                                                                                                                                                                                                                         |
| Joint hopping                           | Where fast moving short vehicles pass from one track circuit to the next, the difference between the pick-up and drop-away times can cause the vehicle to momentarily be undetected.                                                                                                                                                                                                                                                                                    |
| Jumper                                  | An interconnecting cable (commonly single core) between two termination points within an apparatus housing.                                                                                                                                                                                                                                                                                                                                                             |
| Jumper cable (track circuit / traction) | An interconnecting cable (commonly single core) between two pieces of rail that are not adjacent, for track circuit or traction purposes. This includes midpoint connections to impedance bonds.                                                                                                                                                                                                                                                                        |
| Lamp proving relay                      | A neutral DC. relay designed to operate from the current supplied to signal lamps and to release when lamp or lamps burn out. Some relays incorporate a bridge rectifier to operate from a.c. lamp currents.                                                                                                                                                                                                                                                            |
| Left hand relay                         | The left-hand half of a twin relay as viewed from the front. In a 930 series twin relay this controls the contacts in banks C and D.                                                                                                                                                                                                                                                                                                                                    |
| Like-for-like replacement               | The removal and restoration of an item of equipment, including a cable, in a previously working and commissioned system where the work does not change the design. This may involve restoring the original item of equipment or replacing it with an operationally equivalent new item.                                                                                                                                                                                 |
| Line circuit                            | An external relay circuit, which is not a trackside circuit.                                                                                                                                                                                                                                                                                                                                                                                                            |
| Local panel                             | A panel (sometimes simplified) provided at the interlocking and capable of being used to take over control from the main panel at the signal box. It may also be used as a maintainer's monitoring panel, when the operating function is not in use.                                                                                                                                                                                                                    |
| Local power supply                      | See internal power supply.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Main cable                              | A twin or multicore lineside cable carrying Signalling functions or power supplies between apparatus housings.                                                                                                                                                                                                                                                                                                                                                          |
| Main earthing terminal (MET)            | The terminal or bar provided for the connection of protective conductors, including equipotential bonding conductors, and conductors for functional earthing if any, to the means of earthing.<br>(source: BS 7671)                                                                                                                                                                                                                                                     |
| Maintainer's monitoring panel           | An indication panel situated at the interlocking that repeats the indications sent to the Signaller and allows the maintainer to observe the state of the interlocking. It also indicates various fault conditions. This may be combined with a test panel.                                                                                                                                                                                                             |

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| Term                             | Meaning                                                                                                                                                                                                                                                                                                                                 |
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| Maintainer's terminal            | This consists of a VDU, keyboard and printer connected to a solid state interlocking, or an IECC system monitor sub-system. It is used to obtain essential fault diagnostic information and also acts as an interface with the system to enable restrictive controls on the equipment to be set. Also known as a Technician's Terminal. |
| Maintenance                      | The combination of all technical and administrative actions, including supervision actions, intended to retain a product in, or restore it to, a state in which it can perform a required function. (source: BS EN 50126)                                                                                                               |
| Maintenance records              | Design records kept on site for maintenance purposes.                                                                                                                                                                                                                                                                                   |
| Maintenance tester               | A person certificated as competent in the application of Maintenance Testing.                                                                                                                                                                                                                                                           |
| Master record                    | The certified Signalling design record from which duplicates are obtained for issue. See also source record.                                                                                                                                                                                                                            |
| Mechanical locking function test | A test to ensure that each mechanical lever is locked in its correct position.                                                                                                                                                                                                                                                          |
| Mentor                           | A person appointed as guide and council to a Trainee in a specific competence. The Mentor retains responsibility for the Trainee's actions in the Mentored Competence, but the Trainee is able to gain the necessary experience under field conditions. The Mentor ensures the safety and integrity of the Signalling system.           |
| Meshed circuit                   | Complex circuitry feeding more than one relay, where the same could be achieved by independent circuits, thereby requiring duplication of contacts. Not all paths in a meshed circuit are applicable to all relays.                                                                                                                     |
| Method statement                 | A comprehensive step-by-step plan of how the work is to be safely carried out in order to ensure that all hazards are considered and risks minimised.                                                                                                                                                                                   |
| Missing equipment                | Equipment which was previously working, and which is physically missing or separated from its normal position.                                                                                                                                                                                                                          |
| Mod state                        | See modification status.                                                                                                                                                                                                                                                                                                                |
| Modification status              | The detail that defines the particular version of the design or specification, appropriate to the functional and physical characteristics of an item of equipment or system, and is recorded under configuration control procedures. Colloquially known as mod state.                                                                   |
| Modifications                    | Changes to the design details which are required to be carried out after they have been officially issued, usually as a result of installation, testing and commissioning activities.                                                                                                                                                   |
| Monitored (level crossing)       | Checked by the observation of indications which provide the Signaller with the status of equipment.                                                                                                                                                                                                                                     |
| Non-conceptual work              | Work which is based directly on an applicable existing proven design and does not introduce new design features to a system. This includes work items that facilitate maintenance, or performance improvements, whilst maintaining similar functionality. Testing of this shall be undertaken to NR/L2/SIG/30014/G110                   |
| Non-destructive test             | A test which may involve: visually examining Signalling equipment, taking measurements or readings without disconnecting the equipment or disturbing the electrical characteristics of the system.                                                                                                                                      |

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| Non-safety- contact                   | A relay contact that is not a safety contact. This includes metal to metal contacts for medium duty use, where both elements are made of silver, silver cadmium oxide, or 60/40 silver palladium.                                                                                               |
| Non-safety- related                   | A Signalling function or sub-system where operational safety and the integrity of the interlocking are not directly affected. Manual intervention, where a failure would be noticed, may be part of the process. Formerly known also as non-vital.                                              |
| Non-vital                             | See non-safety-related.                                                                                                                                                                                                                                                                         |
| Normal (function)                     | Position of a lever when it is fully back in the lever frame (away from the operator). The non-operated or quiescent state of a two-state system. The converse is reverse.                                                                                                                      |
| Note (failure investigation records)  | Clearly record the facts when they are reported or discovered. Notes shall be readable and retained for future reference.                                                                                                                                                                       |
| Operate time (relay)                  | The time interval between the energisation of the relay coil and the first front contact making. The converse is release time.                                                                                                                                                                  |
| Operate voltage (relay)               | The minimum voltage applied to a released relay coil at which the last front contact makes. Also known as pick-up (pu) voltage.                                                                                                                                                                 |
| Operated (relay)                      | The state of a relay when the armature is energised, picked up (PU), or latched, all front contacts are made, and all back contacts are broken. Also known as energised, and colloquially as 'picked' or 'up'. The converse is Released.                                                        |
| Operationally equivalent              | The replacement item of equipment is functionally identical to the item it replaces.                                                                                                                                                                                                            |
| Out of use                            | Non-operational equipment that is still connected to the infrastructure. See also spare.                                                                                                                                                                                                        |
| Output                                | This includes all relevant indications, displays, communications links, power drives, etc.                                                                                                                                                                                                      |
| Pick-up (PU) shunt                    | The minimum value of resistance between the two running rails at which the track relay just closes its front contacts.                                                                                                                                                                          |
| Pick-up (PU) voltage (relay)          | See operate voltage.                                                                                                                                                                                                                                                                            |
| Pick-up time (track circuit)          | The time between the removal of a shunt to the rails and the first front contact of the track relay (TR) making. The converse is drop-away time.                                                                                                                                                |
| Pin-code                              | See registration pin-code.                                                                                                                                                                                                                                                                      |
| Plugboard                             | The permanent mounting block and termination for external wiring, for use with plug-in equipment.                                                                                                                                                                                               |
| Plug-in                               | The attribute of an item of electrical equipment which can be replaced without disconnecting any wiring.                                                                                                                                                                                        |
| Point detection & correspondence test | A test to ensure the required correspondence between points and their controls and indications is achieved and ensure detection contacts are effective.                                                                                                                                         |
| Polarised circuit                     | A circuit where the resulting operation is dependent on the polarity or phase angle of the feed.                                                                                                                                                                                                |
| Primary function relay                | The relay by which the logic required to control a Signalling function is brought together. It is the first relay in a chain that directly controls all safety critical Signalling functions. It is the only function relay which has back contacts valid for use in safety-critical functions. |

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| Term                                     | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| Principles test                          | A test to ensure that the Signalling system provided conforms to Railway Group Standards and Statutory Requirements and is fit for purpose. This test applies to Signalling works testing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Product acceptance                       | Authorisation for the use of a product type. undertaken by the product acceptance team                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Public emergency telephone system (PETS) | A special telephone system for use at level crossings, which includes provision for proving that handset connections are intact and also for the transmission of level crossing status indications. The speech path has priority over other facilities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Pulse code modulation (PCM)              | A serial data transmission system by which many channels of information are passed over a data link, by use of a multiplexer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Random hardware failure                  | Failures occurring at random times, which result from a variety of degraded mechanism in the hardware.<br>Note 1) There are many degradation mechanisms occurring at different rates in different components and since manufacturing tolerances cause components to fail due to these mechanisms after different times in operation, failures of a total equipment comprising many components occur at predictable rates but at unpredictable (i.e. random) times.<br>Note 2) A major distinguishing feature between random hardware failures and systematic failures is that system failure rates (or other appropriate measure), arising from random hardware failures, can be predicted with reasonable accuracy but systematic failures, by their very nature cannot be accurately predicted. That is, system failure rates arising from random hardware failures can be quantified with reasonable accuracy but those arising from systematic failures cannot be accurately quantified. (source: BS EN 61508) |
| Record                                   | Information bearing media, irrespective of date or physical format, created or received in the course of carrying out the duties and functions of an undertaking, and subsequently retained by the undertaking or its successors as evidence, as a reference source, or to meet legal or regulatory obligations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Records custodian                        | See custodian (of records).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Registration pin-code                    | A series of locating pins assembled in a unique pattern to prevent equipment being incorrectly used. The unique pattern also acts as a means of identification for a specific style and variant of a relay.<br>The term registration pin-code is commonly abbreviated to pin-code.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Release time (relay)                     | The time interval between the removal of the supply (at rated voltage) to the relay coil and the last front contact breaking.<br>The converse is operate time.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Released (relay)                         | The state of a relay when the armature is de-energised, dropped away (DA), or unlatched, all back contacts are made and all front contacts are broken.<br>Also known as de-energised and colloquially as 'dropped' or 'down'. The converse is operated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Relocatable equipment building (REB)     | Apparatus housing to specification BR 1615 or equivalent. Also known as PER (portable equipment room)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



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| Term                             | Meaning                                                                                                                                                                                                                                                                                                                    |
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| Reset                            | Placing a system into a state which corresponds with the actual state of the railway prior to restoration into service, fault finding or testing.<br>For an axle counter, this is the action of setting the number of axles registered in a track section to zero.                                                         |
| Residual voltage                 | The voltage remaining across the rails or relay of a track circuit after the feed has been disconnected.<br>It may be caused by mutual interference between adjacent single rail track circuits, the battery effect of the track formation, cathodic protection measures, or d.c. traction return or other stray currents. |
| Restoration                      | Accepting reset systems back into service by the Signaller after maintenance, failure or (for axle counters) miscount.                                                                                                                                                                                                     |
| Reverse (function)               | Position of a lever when it is fully out of the lever frame (towards the operator). The operated state of a two-state system.<br>The converse is normal.                                                                                                                                                                   |
| Right hand relay                 | The right-hand half of a twin relay as viewed from the front. In a 930 series twin relay this controls the contacts in banks A and B.                                                                                                                                                                                      |
| Risk Based maintenance           | A maintenance system developed failure mode studies, deterioration analysis, and consequence assessments, to allow differing maintenance intervals depending on the risk classification of the asset.<br>This maintenance system shall <b>not</b> now be used on Network Rail                                              |
| Reliability Centered Maintenance | Also known as RoSE (Reliability Centered Maintenance on Signalling Equipment).<br>A maintenance system using an analysis of the equipment location, use, and failure modes to provide a full maintenance regime<br>Shall only be used when authorized                                                                      |
| Safe state                       | Any one of the following:<br>the state of the last valid request at the interlocking; or correspondence with the state of the trackside equipment; or the most restrictive state.                                                                                                                                          |
| Safety contact                   | A relay contact that is specified for safety purposes in the 930 series specifications. These are non-weld contacts, generally silver to carbon for ordinary use. For medium duty use, the contact elements may be of silver impregnated graphite (SIG) and silver.                                                        |
| Safety-critical                  | Carries direct responsibility for safety. (source: BS EN 50129)                                                                                                                                                                                                                                                            |
| Safety-related                   | Carries responsibility for safety (direct or indirect). (source: BS EN 50129)                                                                                                                                                                                                                                              |
| Secure power supply              | A power supply system that can be relied upon to keep certain safety- critical Signalling functions operating for a predetermined minimum time, in the event of a total failure of the main incoming supply.<br>Also known as guaranteed power supply.                                                                     |
| Signal aspect test               | A test to ensure that only the correct aspects and indications as specified in the approved control tables and signal aspect sequence charts are displayed to the driver.                                                                                                                                                  |
| Signal sighting form             | A form that depicts the profile, location and other details of each signal as agreed by the signal sighting committee.                                                                                                                                                                                                     |

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| Term                             | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| Signalling function              | Final discrete component of a Signalling system listed on control tables with a unique identity (such as signals, points, train detection devices, releases and level crossing barriers) and the circuitry or logic by which it is controlled an/or proved.<br>Signalling functions are allocated (as defined by the control tables) to a specific interlocking controlled by a particular signal box (or other control point) and are given a unique identity within a particular Signaller's area.                                                                                                                                                                                                                                                                                                                                                                      |
| Signalling system                | Equipment, circuitry and software associated with:<br>Lineside signals;<br>Point operation;<br>Level crossings;<br>Train detection;<br>Trainborne equipment conveying information about the state of the line; operational telecommunications (excluding electrification control systems and electrification telephones); and fixed trackside safety systems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Single cut (circuit)             | The inclusion of controls in either the feed or return leg, but not both. (See double cut.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Slow acting relay                | A relay in which both operation and release are intentionally delayed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Slow to operate relay            | A relay in which the operation is intentionally delayed and the operate time is significantly longer than the release time.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Slow to release relay            | A relay in which the release is intentionally delayed, and the release time is significantly longer than the operate time.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Software controlled system (SCS) | Any item of electronic equipment which is controlled by software to enable it to perform the required activities. Examples include general purpose microprocessor systems (e.g. proprietary Personal Computers), dedicated systems using microprocessors or Digital Signal Processors.<br>Note that a SCS may be composed of separate items, which are referred to in this document as "the parts of the SCS". Note: Application Specific Integrated Circuits (ASICs) have similar characteristics to software; for example, they are not readily visible to the tester, they may be created by software-controlled machines, and they may themselves require configuration by data. Therefore, the term SCS shall be taken to include ASICs, and consideration shall be given to applying these requirements to machines which contain no software but do contain ASICs. |
| SPAD                             | Signal Passed at Danger. The term used to describe an incident when a train has passed a stop signal at danger without authority. SPADs are categorised and detailed in GO/RT3119                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Spare                            | Equipment not connected to any part of the infrastructure. See also out of use.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Specialist investigation         | Examination or monitoring by a competent, independent Signalling and telecommunications specialist capable of undertaking comprehensive technical investigation of equipment and systems, where necessary using complex instrumentation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Stagger (electrical)             | The phase or polarity difference between one track circuit and the next, or between the rails on either side of an IRJ within one track circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Stagger (physical)               | Occurs where two IRJs in a pair of rails are not exactly opposite each other, thus creating a dead section between track circuits or within a track circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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| Term                            | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| State (of a function)           | Position or action of the equipment. Examples of complementary states are: operated / released, normal / reverse, on / off, raised / lowered, locked / free, enabled / inhibited, energised / de-energised.<br>In data driven systems this is stored as variable data.                                                                                                                                                                                                                                                                                                                                                                       |
| State (of the infrastructure)   | Configuration of an installation defined by the current design records.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| State (of the railway)          | The functional position of trackside equipment which should correspond to the state of the controlling device and the signal box indication.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Strap and function test         | A circuit function test where the presence and operation of each individual contact is verified by the application of a test strap.<br>This test applies to Signalling works testing.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Stub Ends                       | A parallel spur in track circuit configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Supervised (level crossing)     | Checked by visual observation, either directly or by use of CCTV.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Supervisory (circuit)           | Control or indication circuit, particularly in respect of electric traction power supplies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Systematic failures             | Failures due to errors (including mistakes or acts of omission) in any safety life-cycle activity which cause it to fail under some particular combination of inputs or under some particular environmental condition. Systematic failures could arise in any safety life-cycle phase.<br>Examples of systematic failure include:<br>Systematic failures due to errors in the safety requirements specification;<br>Systematic failures due to errors in the design, manufacture, installation, operation of the hardware;<br>Systematic failures due to errors in the design, implementation etc. of the software.<br>(source: BS EN 61508) |
| Tail cable                      | A cable between trackside or on-track Signalling equipment and other such equipment or a lineside apparatus housing.<br>For track circuits, see also track cable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Technician's Terminal           | See maintainer's terminal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Temporary diversion of circuits | The short-term reallocation of cores/contacts or emergency repositioning of an item of equipment which has been operating correctly.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Temporary work                  | Alterations which remain in use for a limited period of time.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Terminated                      | A wire that is finally connected in its allotted position. See also top-nutting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Test                            | See <a href="#">NR/SMS/Part/A03</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Test panel                      | A control panel provided at the interlocking for testing or maintenance purposes. It may be provided temporarily for a commissioning or the function may be performed by the local panel.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Through circuit                 | An external circuit drawn in entirety from supply to destination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Through test                    | A test to ensure that each individual circuit between the supply source and the final control function operates and is installed throughout as shown in the approved design details.<br>This test applies to Signalling works testing.                                                                                                                                                                                                                                                                                                                                                                                                       |

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| Tilt Activation and Speed Supervision System (TASS) | The TASS trackside sub system uses a Eurobalise Balise to store infrastructure data that describes the route ahead and transmit this data to a passing TASS capable train. This data is in turn used by the trainborne equipment to supervise the speed and give authority to the trains tilt system to allow tilting where permitted.   |
| Time division multiplex (TDM)                       | A non-safety-critical serial data transmission system that addresses each channel in turn and converts it into a unique digital code. It is generally used to transmit operating controls and indications between a signal box and interlocking's. See <a href="#">NR/SMS/SB00</a>                                                       |
| Top-nutting                                         | Top-nutting is the connection of temporary or stage work cables or wires to the top of one side of a terminal strip with the links between the terminal columns removed, so as to interlink with existing circuitry beneath.                                                                                                             |
| Train operations processing system (TOPS)           | The national computer data system for management of train operations. This is a real-time network that tracks train movements and formations, vehicle identities and goods commodities. It provides input to the national train running system operating on TOPS (TRUST). Also known as total operating and processing system.           |
| Track cable                                         | A track circuit tail cable which connects directly to the rails.                                                                                                                                                                                                                                                                         |
| Track jumping                                       | Occurs when a fast moving vehicle passes over a very short track circuit (or a short arm of a longer track circuit) and fails to de-energise the track relay.                                                                                                                                                                            |
| Trackside circuit                                   | An external circuit. Run to, or via, an item of trackside or on-track Signalling equipment in a tail cable.                                                                                                                                                                                                                              |
| Trackside Apparatus Case                            | A single or group of apparatus housings at a particular site and the equipment contained therein. (This excludes apparatus housings that perform a main interlocking function, although some interlocking local to ground frames or level crossings may be included.) Alternatively known as lineside locations or colloquial as 'locs'. |
| Type approval                                       | Approval granted to an individual product.                                                                                                                                                                                                                                                                                               |
| Uninterruptible power supply (UPS)                  | A power supply with a secondary source which is capable of providing an uninterrupted changeover in the event of a failure of the incoming supply. It generally consists of low maintenance cells, a charger, voltage regulator, and monitoring, changeover and bypass devices.                                                          |
| Verification                                        | Confirmation by examination and provision of objective evidence that the specified requirements have been fulfilled.<br>(source: BS EN 61508)                                                                                                                                                                                            |
| Wire count                                          | A visual examination to ensure that the specified number of conductors is securely connected to each terminating point as shown on the wiring diagram and contact analysis, and that the conductors are correctly labelled.                                                                                                              |
| Wrong side failure                                  | A failure which reduces the protection normally provided by the Signalling system and increases the risk of an incident.<br>Also known as safety-critical failure.                                                                                                                                                                       |

**END**