Station	Train Services	Infrastructure Managers[#]
Marylebone	Bakerloo Chiltern Railways	LUL Chiltern Railways Network Rail
Moorgate	Circle Metropolitan Hammersmith & City Northern Great Northern (GTR)	LUL Network Rail
North Wembley*	Bakerloo London Overground	LUL Network Rail
Old Street	Northern Great Northern (GTR)	LUL Network Rail
Paddington (Praed Street for Main Line)	Circle District Bakerloo First Great Western Heathrow Express Heathrow Connect	LUL Network Rail
Paddington (suburban)	Hammersmith & City Circle	LUL Network Rail
Queen's Park*	Bakerloo London Overground	LUL Network Rail
Richmond	District London Overground	LUL Network Rail
Seven Sisters	Victoria London Overground Rail for London	LUL Network Rail
South Kenton*	Bakerloo London Overground	LUL Network Rail
South Ruislip	Central Chiltern Railways	LUL Chiltern Railways Network Rail
Stonebridge Park*	Bakerloo London Overground	LUL Network Rail
Stratford (suburban)	Central Jubilee DLR London Overground c2c Great Anglia MTR Crossrail (TfL Rail)	LUL MTR Crossrail
Tottenham Hale	Victoria Greater Anglia	LUL Network Rail Great Anglia
Upminster	District c2c	LUL c2c Network Rail
Victoria	Circle District Victoria Southern (GTR) South Eastern Gatwick Express (GTR)	LUL Network Rail

Station	Train Services	Infrastructure Managers[#]
Walthamstow Central	Victoria London Overground	LUL Network Rail Rail for London
Waterloo	Northern Bakerloo Jubilee Waterloo & City	LUL Network Rail
Wembley Central*	Bakerloo London Overground London Midland Southern	LUL Network Rail
West Brompton*	District London Overground Southern	LUL Network Rail
West Ham	District Hammersmith & City DLR Jubilee c2c	LUL c2c Network Rail
West Ruislip	Central Chiltern Railways	LUL Chiltern Railways Network Rail
Whitechapel	Hammersmith & City District London Overground	LUL Rail for London
Willesden Junction	Bakerloo London Overground	Network Rail
Wimbledon	District Southern (GTR) Thameslink (GTR) Trams Operations Ltd	LUL Network Rail London Trams

* LU is the Station Facility Owner at the14 asterisked stations in a regulated agreement with Network Rail. Network Rail is the Infrastructure Manager for these stations. LU's responsibilities as Station Facility Owner involves operation and light maintenance at the following stations: Harrow & Wealdstone, Kenton, South Kenton, North Wembley, Wembley Central, Stonebridge Park, Harlesden, Kensal Green, Queens Park, Kew Gardens, Gunnersbury and the parts of the station served by Arrival Rail London at Highbury & Islington, Blackhorse Road and West Brompton. At these last 3 stations, LUL owns or has leases for the remainder of the station.

[#] Where there is more than one Infrastructure Manager (IM) at a station, the Infrastructure Manager accountabilities have been defined in documented agreements. All agreements are held by the LU National Rail Agreements team. The relevant IM is responsible for the relevant areas of the station concerned, in accordance with the documented agreements.

Section 14: Safe design of infrastructure

Contents

14.1 Introduction 75
14.2 Arrangements for meeting statutory requirements 75
14.3 Overview of design standards 75
14.4 Assurance 75
14.4.1 Application of the assurance regime 76
14.4.2 Assurance through the complete asset life cycle 76
14.5 Asset design pre-dating current standards 76

14.1 Introduction

LU aims, through the design of its assets, to keep operational and maintenance risks ALARP and to provide stations through which customers can transit easily and safely.

This section describes how LU complies with statutory requirements in relation to design, and how LU is assured that requirements are met and processes complied with in achieving deliverables.

14.2 Arrangements for meeting statutory requirements

The design of LU assets is compliant with the relevant statutory requirements, including the Health and Safety at Work Act 1974, ROGS and CDM 2015; these requirements are supplemented by LU's engineering standards. The Statutory Instruments Register (Section 3), which contains details of all applicable asset-related legislation, is part of the Asset Management System, which is described in Section 15. Design is controlled by technical and process standards which are published in the LU Management System standards library under the Stations, and Trains and Infrastructure headings (Table 5.1 in Section 5).

The related management process standards are contained under the Management heading in the LU Management System standards library.

14.3 Overview of design standards

LU's Category 1 standards mandate that systems are in place so that risks to safety associated with assets through all stages of the asset life cycle are effectively managed. Standards, procedures and working arrangements reflect the accountabilities and responsibilities for all safety and technical assurance activities for each stage of the asset design, maintenance and project delivery cycles and asset life cycles. Engineering design is subject to standards whether it is carried out by internal project delivery, external parties or LU maintenance teams. Where designs result in significant changes to infrastructure or rolling stock, the safety verification arrangements (Section 7) are applied.

Depending on the asset, standards may be internal standards or external (e.g. British or European) standards. The relevant Head of Profession is responsible for ensuring that appropriate design standards are in place.

As part of contractual arrangements, all suppliers are required to put appropriate safety management systems and controls in place to ensure compliance with regulations and LU's Category 1 standards. Where work is carried out by third parties, LU's role in design is as setter of requirements and associated standards, and seeker of assurance of compliance with such requirements and standards.

Assets are designed and built to the standards applicable at the time of construction. LU ensures that these assets are fit for purpose through the asset management regime described in Section 15. Non-compliance to standards is managed through the TANC and concessions processes (Section 5) and appropriate mitigations are implemented to ensure risk is ALARP.

14.4 Assurance

LU's arrangements for assurance of the design of infrastructure are set out in the Category 1 Standard: *S1538 Assurance*, which ensures safety is secured on an on-

going basis and that corrective action is taken when assurance activity identifies that it is required. The standard establishes requirements for:

- compliance with legislation, internal and external standards
- the accreditation to perform delivery and assurance activities
- verification activity - including audit, inspection, monitoring, review, observation and licensing
- the management of assurance evidence
- determining the level of assurance evidence and verification required.

The primary role for providing safety and technical assurance lies with both internal and external suppliers, who provide details of their proposed assurance activities and evidence to LU for approval in the form of an assurance plan. The receiver of this assurance is the Head of Technical Discipline or their agent.

14.4.1 Application of the assurance regime

All suppliers are obliged to deliver assets which are safe and fit for use, accompanied by assurances that those assets are safe and fit and that any potential impacts of work being undertaken on them are properly controlled. This applies to new or enhanced assets and assets subject to routine maintenance or repair.

The Engineering Director agrees, through the Head of Technical Assurance, roles, verification and surveillance plans on a risk basis with the respective Heads of Technical Discipline for their respective asset or system areas. The Heads of Technical Discipline provide assurance to the Engineering Director that these plans have been completed and that any non-compliance or safety issues have been addressed or an appropriate action is in place to address the issue. Where necessary, the Engineering Director escalates non-compliance or safety issues to the TfL Director of Health, Safety and Environment.

14.4.2 Assurance through the complete asset life cycle

LU has defined the roles and responsibilities for safety and technical assurance throughout the asset life cycle. These include what assurance activities are carried out and who performs them. Running through each phase of the life cycle are continuous assurance activities such as audit, inspection, review, observation, accreditation, licensing, validation and provision of assurance evidence. The position in the assurance chain of regulators, LU, LU's suppliers and their suppliers have all been identified. These positions are reflected in the assurance process operated and the supporting standards and procedures. LU's assurance role is to ensure that suppliers' assurance and self-assurance activities are adequate. LU also undertakes safety and technical audits on suppliers' design and maintenance arrangements.

14.5 Asset design pre-dating current standards

Compliance with current standards for LU assets is not applied retrospectively. Our obligation is to ensure that we remain ALARP at all times. When changes to standards take place, there is a consideration of any potential safety implications for pre-existing assets. If for any reason a safety shortcoming is identified, it will be addressed in order to ensure we remain ALARP, but this does not necessarily extend to achieving full compliance with the requirements of the new standard.

Section 15: Safe maintenance of infrastructure

Contents

15.1 Introduction 78
15.2 Asset Management System 78
15.2.1 Maintenance standards 78
15.2.2 Asset maintenance regime 78
15.3 Compliance with maintenance regimes 80

15.1 Introduction

LU provides a safe and reliable service for customers by maintaining assets in line with legislation and industry best practice and keeping risks as low as reasonably practicable.

15.2 Asset Management System

LU's Asset Management System is certified against ISO 55001: 2014 - Asset Management. LU has an effective management system in place linking LU's strategic objectives to delivery through a TfL Asset Management (AM) Policy, an Asset Management Strategy, and a Line, and Asset, Network Plan (LANP). LU's approach to AM is based on a whole life cost approach ensuring that expenditure is optimised throughout the life of an asset taking into consideration the balance between cost, performance, condition and risk.

LU's Asset Management System is supported through clear requirements embedded in the LU Management System including statutory requirements and asset standards, summarised in Section 5. The Statutory Instruments Register, which contains details of all applicable asset-related legislation, is part of the Asset Management System. The process to identify new and changing statutory requirements and to amend and update standards to reflect these requirements is described in Section 3. All changes to LU standards are controlled and made in accordance with the change management arrangements detailed in Section 7.

15.2.1 Maintenance standards

LU's Category 1 Standards mandate that systems are in place so that risks to safety are effectively managed through all stages of the asset life cycle. These requirements state that:

- assets are maintained in accordance with standards
- assets shall be entered into and withdrawn from service in a controlled manner
- assets are maintained by competent staff in accordance with safe systems of work.

These standards set the requirements for maintenance activities carried out by LU or by suppliers to LU. Details on how risk is controlled in LU are included in Section 4.

15.2.2 Asset maintenance regime

LU's maintenance regime is set out in the Management System, including the Maintenance Work Instructions, engineering standards, HSEMS and the assurance regime. It aims to ensure that all safety risks are effectively managed in line with the Asset Management system. Details on maintenance of Management System documents (including standards and procedures) are set out in Section 5. LU has defined maintenance standards for LU assets. Some of these standards are internal standards, others are external standards (e.g. British or European standards), where appropriate.

Lead Maintenance Assurance Engineers produce a Maintenance Assurance Plan (MAP) each year which describes the practices and arrangements for the assurance of the Track, Signals or Rolling Stock assets. The MAP also references the maintenance delivery schedule for the coming year, which describes specific and ongoing maintenance activities. The MAP supports the London Underground (LU) Assurance Regime and demonstrates how, for the Track, Signals and Rolling Stock assets,

compliance is met with LU Cat 1 Standard: *S1538 Assurance*. The MAP is required to describe the boundaries of the Track, Signals and Rolling Stock assets, delivery organisations, performance metrics, surveillance arrangements and improvement activities and forms the basis of a maintenance regime.

Verification Activity Plans (VAPs) are normally created at project level as described in Section 7. Within maintenance, verification arrangements are detailed within the MAP in the form of plans for surveillance activity on the maintainer; this enables the Lead Maintenance Assurance Engineer to be satisfied that the maintenance regime is being complied with and standards met.

Asset Condition Reports are prepared each year for each asset type in accordance with Category 1 Standard: *S1042 Asset Condition Reporting (ACR)*. Asset condition is assessed against set criteria, to prepare Asset Safety and Management Certificates. The Asset Condition Reports and Asset Safety & Management Certificates together:

- provide assurance to the London Underground Board and other stakeholders that the assets are of known condition and are fit for purpose
- allow asset condition trends to be monitored
- identify residual safety and performance risks and their associated mitigations and controls
- inform the asset investment planning process.

The Asset Safety and Management Certificates are signed by the appropriate Head of Technical Discipline.

The Asset Condition Reports also feed into the LANP which covers each asset area. The LANP reflects the strategies set out in the Asset Management Strategy (AMS) and are produced by the LU Strategy and Service Development Directorate. The LANP provides details of what work is planned for the next 9 years in order to deliver the AMS.

To improve asset maintenance performance and management, the responsible Heads of Asset Maintenance conduct regular reviews of performance indicators and failure history in order to prioritise remedial work based upon data maintained by LU Operations and/or provided by the HSE Directorate.

Where it is identified that an asset needs major improvement or replacement, Asset Managers in LU Asset Strategy and Investment (part of the Strategy directorate) determine the most cost effective asset management solution based on:

- the nominal life expectancy of the asset
- the asset condition and performance
- the asset environment and usage
- the asset technology strategy
- the best whole life cost.

Details of assets maintained by LU Operations are stored on the Ellipse and Maximo Asset Management Systems. A programme exists to fully populate all assets onto these systems and for those assets not yet populated, existing systems will continue to be used to manage assets. Some existing, specialised, legacy systems will continue to be used for managing a small number of assets until the systems are fully populated. Each Head of Asset Maintenance is responsible for providing assurance that details of their assets are kept up to date in accordance with LU standards.

All risks from the ACR are assessed against a standard matrix, which takes into account the likelihood of the risk occurring and its potential impact in accordance with Category

5 standard: *S5044 Asset Risk Standard*. Any risk assessed as greater than 8 will be assessed by the Asset Manager with appropriate risk plans developed and entered into the TfL risk register ARM.

For safety related risks the Head of Technical Discipline, liaising with the Health, Safety and Environmental team, will determine if the risk control measures, planned or existing, are sufficient to maintain safety risk at a tolerable level in accordance with Category 1 standard: *S1521 Safety Decision Making*.

15.3 Compliance with maintenance regimes

The mechanisms in place to manage non-compliance with maintenance / engineering standards, both within LU and by suppliers, is set out in Section 5. In addition compliance is ensured through:

- risk-based audit/surveillance of performance in accordance with the assurance regime
- regular LU-supplier contract meetings where health, safety and environmental issues are discussed
- delivery of the Verification Activity Plan
- direction which allows LU to instruct that a specific action be undertaken or works stopped
- Engineering Regulatory Notices (ERNs) which must be complied with, including removing the asset from service if necessary.

Requirements for the control of health and safety aspects of supplier management are established through the intranet-based Management System section: *Managing HS&E with contractors and suppliers*. This includes:

- supplier selection and tender evaluation
- the management of suppliers/contractors
- the application of the Construction (Design and Management) Regulations
- management of work interfaces.

Accountable managers responsible for managing contractors/suppliers working on LU sites provide data on supplier performance including health and safety data. This data is used in the management of contractors/suppliers. It is also considered during the procurement process. All LU suppliers must comply with LU Category 1 standards.

Contracts are managed through contractual regimes that ensure the supplier meets the required level of performance, quality, safety and security. The contracts also contain provisions for compliance with appropriate standards.

Audit is used to ensure processes are being adhered to by suppliers and safety and technical audits are programmed and co-ordinated by the Director of Internal Audit.

Regular contract meetings are held where safety, quality and environmental performance matters are reviewed. The LU contract teams are actively supported by an LU Health, Safety and Environment Manager.

Section 16: Safe operation of infrastructure

Contents

16.1 Safe delivery of operational aims 82
16.1.1 Train operations 82
16.1.2 Signal operations 83
16.1.3 Station operations 83
16.1.4 Service Control 84
16.1.5 Power Supply 84
16.2 Operational standards 84

16.1 Safe operation of railway

LU's organisational structure, operating in line with corporate governance and documented processes and standards, ensures the safe operation of the infrastructure – during normal operation and in degraded or emergency conditions. The processes and standards are set out in the HSE Management System (as outlined in Section 2) and Rule Books (Sections 9.2 and 16.2).

Specific details of safe operation of trains (including signalling), stations, service control and power are set out below. In each area, roles and responsibilities for operating the railway safely are clearly defined (in the HSE Management System and/or Rule Books), in particular where there are overlaps in infrastructure/asset management.

Where LU operates over Network Rail infrastructure LU complies with the relevant parts of Network Rail's safety arrangements. Where LU's activities interface with other railway operators, LU works with those organisations to ensure the safe operation of the infrastructure (during normal and degraded/emergency conditions) as set out in Section 13.

16.1.1 Train operations

LU holds overall responsibility for health and safety aspects of its train operations. Train operations includes all train movements (whether carrying customers or not) along permanent way over specific routes, usually to a timetable and normally under the control of a Service Controller and the signalling system. All train operations are managed to the standards set out in the LU Rule Books, Line Supplements and other appendices.

The speed of trains across the LU network varies from line to line. The highest speed is 60mph. At certain locations, emergency, temporary or permanent speed restrictions may be put in place to manage the train service, e.g. to mitigate the risk of derailment.

All LU passenger rolling stock is One Person Operated (OPO). Train Operators are responsible for operating trains in accordance with the timetable, signals and operational rules; they remain in radio contact with Service Control. The *Train Operations Competence Standards and Guidance* published on the Competence Management System sets out the mandatory principles, practices and instructions against which train operators are monitored and assessed for competence.

LU also operates a number of specialist engineering vehicles. Where these vehicles need to move in Traffic Hours under their own power, a Train Operator / competent pilot works the vehicle to its work site or competent resources will be brought in to operate these miscellaneous vehicles. The vehicles have valid certificates of technical conformance and operating approvals in accordance with LU standards.

LU employs Test Train Operators who undertake a range of activities such as:

- testing and commissioning of both current and replacement rolling stock
- stock transfers
- brake and ancillary equipment testing
- journey time metric proving
- ATO testing
- training of LU instructor/operators on new rolling stock
- rail adhesion activities
- excursion, tour and heritage trains
- gauging activities

- acting as a pilot for specialist self-propelled on-track engineering vehicles travelling in Traffic Hours where required.

These activities involve, typically, the operation of between 60 and 100 train paths per week. Whilst these activities may be carried out during traffic hours, they do not involve the carriage of customers, with the exception of the excursions, tours and heritage trains, where specific Operational Safety Plans are used.

All such operations are carried out under LU's Safety Certificate and in accordance with LU standards for operations safety and competence assurance. The effectiveness of the arrangements is subject to the assurance and approvals regimes described in Section 14.

16.1.2 Signal operations

Signalling controls train movements and maintains safe separation between trains. Signalling is co-ordinated from line control centres. For the majority of London Underground lines, signallers are co-located with the line controllers, although some legacy signal cabins remain on the sub-surface network.

The Central, Jubilee, Northern and Victoria lines are provided with continuous Automatic Train Protection (ATP) and Automatic Train Operation (ATO). The ATP equipment will command an over-speeding train to reduce its speed to below the maximum safe speed and keep trains a safe distance apart. The remaining lines have a train protection system comprising trackside trainstops and train-borne tripcocks. When a signal is at danger its associated trainstop is in the "up" position, so if a train passes the signal, its tripcock will be mechanically operated, activating the train emergency brake. All other lines with the exception of the Chesham branch of the Metropolitan line (axle counters) are equipped with train detection in the form of jointed or non-jointed (except points and crossing areas) track circuits, with location accuracy supported by delta track circuits or position detectors.

In areas of points and crossings, interlocking systems are employed to ensure that trains are safely routed. These use either mechanical, relay or computer-based technology.

At terminal stations with limited over-run distances beyond the platform ends, there are special arrangements for monitoring the speed of trains entering the platforms, whereby emergency brake applications are initiated for over-speeding trains.

Signal control systems are logically separated from vital interlocking so that, under most failure conditions, signal control can be maintained by direct control of site interlocking.

16.1.3 Station operations

The LU stations structure is organised along a number of station areas. Each area has an Area Manager who is accountable for station operations. The Area Managers are landlord of the area and are the employing manager of the rostered staff in their area. The Area Manager reports to the Line's Head of Customer Service.

Each station is run by a Customer Service Manager or Customer Service Supervisors (CSS). The number of Customer Service Managers allocated to a particular station reflects the station's size, type (e.g. sub-surface) and operational risks. Customer Service Supervisors are responsible for stations operations at Gateway and Destination stations under the direction of the Customer Service Manager (CSM). Customer Service Supervisors (CSS) staff local stations supported by at Customer Service Manager.

Depending on the station type CSMs and CSSs may be responsible for deploying Customer Service Assistant.

Each station holds a Congestion Control and Emergency Plan (CCEP) which addresses foreseeable risks and response at the station. The plans cover congestion control, evacuations and summarise emergency response/incident management arrangements. The CCEPs are reviewed at intervals defined in the Manager's Handbook in respect of emergency plans and following changes or incidents.

16.1.4 Service Control

The Service Control Manager is accountable for the management of:

- the operation and monitoring of service control equipment in a designated area to optimise the safe and efficient operation of train services whilst providing train service information to customers and other operational management
- the monitoring, recording and signalling of trains through designated areas, operating multi-site signalling equipment including emergency back-up systems ensuring safe and efficient train services
- the competence management of relevant staff
- the proactive prevention of incidents, line performance reviews and the investigation of reasons for poor service performance and development of ways to improve performance.

16.1.5 Power Supply

LU operates to Category 1 Standard: *S1105 Power Service Contract - Performance Specification*. LU source power from the local Distribution Network Operators at high voltage and transform and distribute this for use across the railway. Power is derived from the national grid via Bulk Supply Points (BSPs) and a series of high voltage feeders. In addition, gas turbine alternator sets provided by LU's Central Emergency Power Supply (CEPS) are used from time to time to generate commercial income and very occasionally to provide power to support the distribution system. The LU distribution network generally has sufficient redundant capacity to permit failure or disconnection for maintenance of elements of the network without loss of power. Section 11 contains details of the alternative power supplies used in the event of a power failure.

The operational management of the distribution systems is undertaken by the LU Shift Supply Engineers (SSEs) in the main Power Control Centre. LU has operational control of traction current supplies to the operational railway and to rolling stock depots and low voltage power supplies for signalling, pumps, lighting and lifts and escalators.

The respective sections of the power distribution network are managed, controlled and constantly monitored by the power control room staff using computer-based supervisory control and data acquisition (SCADA) systems. Emergency control facilities are available for use in the event of equipment failure or the need to evacuate the main power control centre.

Traction current is switched on or off by LU's power control room staff using SCADA systems in consultation with the appropriate LU Line and Track Access Controllers and in compliance with the LU Rule Book. In tunnel and sub-surface areas, traction current can also be switched off in an emergency via the tunnel telephone system on some lines.

Variations to traction current switching on and off times to allow engineering works are published in line with the communication of operational information processes detailed in Section 9.

Clear processes are in place for ensuring safe access to the track environment whether during Traffic Hours or Engineering Hours. These rules are set out in the Rule Books or in a Code of Practice.

Where Network Rail supplies power to Network Rail infrastructure, or where LU infrastructure abuts that of Network Rail, the arrangements for traction power provision are set out in LU-Network Rail infrastructure agreements (which sit with the National Rail Agreements team, Section 13).

16.2 Operational standards

Operational risks are predominantly controlled via the LU Rule Book and Appendices, and the Managers Handbooks.

LU is responsible for maintaining these documents and reviewing to incorporate industry best practice and changes in British, European and International standards and legislation. The process for proposing a change to a standard, Rule Book or handbook is through DRACCT and is set out in Sections 2 and 7.

Integration between the Management System and operational arrangements are managed by ensuring staff are competent to carry out the prescribed tasks as documented in Section 8.

The relevant legislative requirements and the methods by which LU ensures compliance are set out in Section 3.

Section 17: Types of work and compliance with legislative requirements

Contents

17.1 Categories of work with a safety element 87
17.2 Competence management..... 87

17.1 Categories of work with a safety element

The activities detailed below are deemed to be safety critical when carried out on the LU network. These include practical training in the areas identified and the additional LU activities that are not designated safety critical by the Regulations but are considered to be equivalent in risk from activities within the scope of the Regulations. Individual detailed sets of requirements, including relevant practical elements, have been developed covering each safety critical activity. These requirements are maintained by the appropriate area of LU or supplier responsible for the activity. There are approximately 8,300 safety critical staff employed by LU. Precise staff numbers for LU are recorded on the LU HR systems. Suppliers' staff details are recorded on their local HR systems.

Railway operations:

- train operations
- signal operations
- station operations
- degraded and emergency operations

Engineering – installation, inspection, maintenance and repair:

- track and structures
- pumps and drainage
- fleet maintenance
- use of engineering vehicles/trains and on-track machines
- signalling
- telecommunications systems
- power supply, distribution and current collect system
- testing trains and use of test track.

Safety on the track:

- protection, train and possession duties
- activities that have safety implications in terms of decisions made; these are typically activities undertaken by operational managers and supervisors.

A comprehensive list of LU's safety critical activities is included in Category 1 Standard S1548: *Safety critical work*. The standard sets out requirements on employees and managers for providing assurance on competence, requirements on identification and working hours for safety critical staff in order to ensure compliance with Railway and Other Guided Transport Systems (Safety) Regulations 2006 (as amended) and ORR's Railway Safety Publication 4 (*Safety Critical Tasks - Clarification of ROGS Regulations Requirements*)

17.2 Competence management

LU complies with the Office of Rail and Road Safety Publication Developing and Maintaining Staff Competence via the LU Competence Management Systems (CMS). This sets out responsibilities for ensuring the training and maintenance of competence. The under-pinning objective is to ensure that any individual who controls safety risk is competent to do so and that this competence can be demonstrated. The CMS applies to those who undertake activities:

- that affect or have the potential to affect safe operation
- that affect occupational health and safety

- that are critical for controlling risk.

Access to the LU network is restricted to individuals carrying staff passes or Sentinel cards. Access arrangements are applied through the LU Rule Books which requires employees or suppliers carrying out safety critical work to be competent. The relevant Rule Books include:

- Rule Book 10: *Station Access*
- Rule Book 13: LU Staff responsibilities – Traffic Hour Protection
- Rule Book 14: Possessions planning and management
- Rule Book 16: Going on the Track in Engineering Hours,
- Rule Book 17: Managing access to the track in Engineering Hours
- Rule Book 18: Engineer's trains, vehicles and trolleys
- Rule Book 20: Engineering Staff – Traffic Hours Protection
- Rule Book 21: Personal Safety on the Track
- Rule Book 23: Incompatible train operations

Access to train cabs is restricted to authorised personnel in accordance with the LU Rule Book 6: *General Train Operations*. Access to potentially hazardous environments, such as equipment rooms or machine chambers, is restricted to individuals who are appropriately competent and who operate to a safe system of work.

The CMS outlines the high level requirements for LU employees and their suppliers when working on LU Infrastructure. Where a role involves operation over another Infrastructure Manager's infrastructure, the competence management process will include all of the necessary elements to operate on LU and third party infrastructure.

Those who undertake competence assessments are selected, assessed and accredited to allow the maintenance of competence as an assessor and competence in the skill being assessed.

LU suppliers must establish arrangements to meet the legal requirements for Competence Management and the LU Category 1 Standard: *S1548 Safety Critical Work*, and are subject to TfL audits for compliance with the arrangements put in place. This includes providing assurance to LU, where required, of their compliance with limits spent at work. The LU Category 1 Standard: *S1548 Safety Critical Work* sets out working hour limits which are designed to manage the risk of fatigue.

Further details on competence management are set out in Section 8.

Section 18: Types of rolling stock and compliance with legislative requirements

Contents

18.1 Types of rolling stock 90
18.2 Engineering vehicles operated by TransPlant..... 92
18.3 Statutory requirements..... 93
18.4 Maintenance plans..... 95
18.5 Approval to operate..... 95
18.6 Rolling stock modifications..... 97
18.7 Engineering trains supplementary information.....97

18.1 Types of rolling stock

LU's passenger trains are either tube stock or sub-surface stock. Tube stock is designed to operate on lines with the restricted structure gauge of tube tunnels. Surface stock is built to a gauge that is similar to main line stock.

All trains are one person operated (OPO). On the Central, Jubilee, Northern and Victoria lines, trains are driven by an automatic driving system. Safety on these lines is assured using Automatic Train Protection (ATP) systems that set the maximum safe speed at which the train may proceed and the limit of its movement authority. In the absence of such data, the trains will stop.

If the maximum safe speed is exceeded when operating in Automatic Train Operation (ATO) mode on the Central, Jubilee, Northern or Victoria lines, the train will be automatically braked using the emergency brake until the speed is below the maximum safe speed. If the ATO is defective or the train is being driven by the Train Operator in protected manual and the maximum safe speed set by the signalling system is exceeded, an emergency brake application will be made until the train is brought under the maximum safe speed. If the train exceeds its limit of movement authority, in either ATO or protected manual modes, the train will be automatically braked to a standstill using the emergency brake.

In the event of a manually operated train passing a signal at danger the train will be immediately brought to a standstill by the emergency brake. A Speed Control After Tripping (SCAT) system ensures that the Train Operator cannot exceed 16 km/h for a defined time after the tripcock is reset. On the Victoria, Jubilee, Northern and Central lines, if the trackside or train borne signalling system fails and it is necessary to move the train, a Restricted Manual mode may be used. The train's control system prevents the train exceeding 16 km/h at all times whilst restricted manual is in use by making an emergency brake application if 16km/h is exceeded for any reason. The brake is released by the train's control system once the speed is below the 16 km/h limit.

All trains are fitted with service and emergency braking systems that provide redundancy. All trains, including the automatic trains when being driven manually, are provided with Dead Man's Handles. These apply the emergency brakes if released by the Train Operator. Emergency brake rates are compatible with signal overlaps.

All trains have been designed and are maintained to:

- operate within a defined swept envelope that is within the structure gauge
- control the risk of parts falling from trains to minimise the risk of derailment
- minimise the risk of collision through train protection/signalling/braking systems
- minimise the consequences of collisions through structural design.

Stock which travels on Network Rail tracks also carry Network Rail track circuit operating clips to maintain the signal in the rear at danger in the event of Network Rail lines being obstructed.

A summary of the passenger fleet is given in Tables 18.1 – 18.2 below [Note: The dates referred to are the first date of build. The process of building and commissioning the required trains took several years.]. LU also operates specialist and heritage rolling stock on its network (as outlined in Section 16.1.1).

Stock	Lines	Composition	Fleet size	Nominal Build date	Built by
S7	Circle, District and Hammersmith & City (already replaced C Stock and started replacing D Stock from 2015)	1 x 7 car	133 (this will be the final total when the D Stock replacement is complete)	2012	Bombardier Transportation Ltd
S8 Stock	Metropolitan	1 x 8 car	58	2010	Bombardier Transportation Ltd

Table 18.1 Surface stock

Stock	Lines	Composition	Fleet size	Nominal Build date	Built by
1972 Mark 1&2	Bakerloo	1 x 3 car + 1 x 4 car	36	1972	Metro Cammell
1992	Central	4 x 2 car	85	1993	Adtranz
1992	Waterloo & City	2 x 2 car	5	1993	Adtranz
2009	Victoria	2 X 4 car	47	2009	Bombardier Transportation Ltd
1996	Jubilee	1 x 4 car + 1 x 3 car	63	1997/2005	Alstom
1995	Northern	2 x 3 car	106	1998	Alstom
1973	Piccadilly	2 x 3 car	86	1974	Metro Cammell

Table 18.2 Tube stock - the 1995 Tube Stock is maintained by Alstom

LU operates heritage trains and engineering vehicles on the network (listed below). These trains must have approval to operate in order to operate on the network (as described in Section 18.4). Not all the vehicles listed below currently hold a Certificate of Technical Conformance.

Heritage vehicles

- 1923 Metropolitan Electric Loco - Met 12 "Sarah Siddons" (Bo-Bo electric)
- Coach driving trailer set Ex BR class 483 DTS76297, TF71163, TBS70823, DTS76324
- A stock 5110, 6110, 6111, 5111
- 1938 Tube stock driving motor car, A-end, No. 10012, 1938
- 1938 Tube stock driving motor car, D-end, No. 11012, 1939
- 1938 Tube stock non-driving motor car No. 12048, 1939
- 1938 Tube stock trailer car No. 012256, 1939
- Metropolitan Railway 'Jubilee' carriage No. 353, 1892
- 9466 – ex BR(W) 94xx class steam locomotive
- Ex - BR class 20 locomotives – 20227, 20142, 20189, 20205
- Ex - BR class 20 locomotives – 20227, 20142, 20189, 20205

- Ex-LT 1960TS 3 car unit 3906, 4927, 3907 (Craven Heritage)
- L150 (5521) – ex GWR 4575 class steam locomotive
- Metropolitan Ashbury Coaches – 4 car "Chesham Set"
- Metropolitan No1 – ex Metropolitan E class steam locomotive
- Ex-BR Mk1 BSK Coach brake std compartment

Engineering vehicles

- A Stock Rail Adhesion Train 5110, 6110, 6036, 6111, 5111
- 1962 Tube Stock 8 car rail adhesion train 1407, 9459, 9577, 1682, 1681, 9125, 2406, 1406
- 1962 Tube Stock 5 car rail adhesion train 1570, 9691, 2440, 9441, 1441
- Ex-BR class 20 Diesel electric locomotives
- GBRf Class 73 Diesel electric locomotives
- Class 960 3 car diesel multiple unit - Sandite laying and water jetting train
- Class 66, 3 FEA wagons, class 66 - Rail head treatment train
- MLA wagon Falcon box
- Bogie tank KBA wagon

18.2 Engineering vehicles operated by TransPlant.

LU's fleet of engineering vehicles including wagon mounted plant and on track machines is given in the table below.

Types of Rolling Stock	Build Year	Quantity
Battery Locomotive	1964	13
Battery Locomotive	1969	5
Battery Locomotive	1973	11
Schoma Diesel Locomotive	1995	4
Schoma Battery Locomotive	1964	10
Track Recording Vehicle (pilot car)	1960	2
Track Recording Vehicle (Recording)	1973	1
Wagons		
General Purpose Wagon	1985	41
Rail Wagon (FW)	1966	3
General Purpose Wagon (JLE)	1995	15
Rail Wagons	1986	26
Deep Well Cable Drum Wagon	1985	3
Deep Well Wagon (JLE)	1995	4
Low Loader (JLE)	1995	4

High Deck Wagons	1987	6
Hopper Wagons	1981	22
Mixer Match Wagons	1987	12
Spoil & Ballast Wagons (Turbot)	1996	60
FEA's Wagon 60ft Flat Wagon	2006	13

Wagon Mounted Plant

LWRT	2005	1
Atlas Roll Loader	1987	1
DISAB	2007	2
Weed Killing Unit Wagon	2013	1
Cable Turntable	1984	4
ELK	1986	4
End Loading Unit	1986	4
Short Chute	1965	1
De-Icing Equipment	1986	5
VCM	2016	1
RSDT	2006	13

On Track Machines

Diesel Hydraulic Crane (7.5 tonne)	1983 & 1985	4
Diesel Hydraulic Crane (Twin Jib)	1986 & 1989	2
Tamping Machine (Plain Line)	1980	3
Tamping Machine (Points & Crossing)	2007	1
Tamping Machine (Matisa B45 UE)	2015	2

Table 18.3 TransPlant Fleet of Engineering Vehicles, On Track Machines, Plant and Wagon Mounted Plant

18.3 Statutory requirements

As LU is not part of the interoperable railway, legislative requirements which apply include those arising from the Health and Safety at Work etc. Act 1974, Regulations enabled under this Act and other regulations such as the Rail Vehicle Accessibility (Non-Interoperable Rail System) Regulations 2010 and the Railways and Other Guided Transport Systems (Safety) Regulations 2006. The way that LU responds to new or amended legislation is described in Section 3.

The regulations which apply in respect of the design and maintenance of LU's rolling stock and OnTrack Plant include:

Regulations	Design	Maintenance	Rolling Stock
Locomotives and Waggons : Use of on Lines and Sidings Regulations	Y	Y	All
Railways Consolidated Clauses Act 1845	Y	N	All
Railway Safety (Miscellaneous Provisions) Regulations 1997	Y	Y	All
Railway Safety (Miscellaneous Amendments) Regulations 2001	Y	Y	All
Rail Vehicle Accessibility (Non-Interoperable Rail Systems) Regulations 2010	Y	N	All
Railways and Other Guided Transport Systems (Safety) Regulations 2006	Y	Y	All
Railways and Other Guided Transport Systems (Safety) (Amendment) Regulations 2006	Y	Y	All
Railways and Other Guided Transport Systems (Safety) (Amendment) Regulations 2011	Y	Y	All
Railway Safety Regulations 1999.	Y	Y	All
Supply of Machinery (Safety) Regulations 2008	Y	Y	Y
Provision and Use of Work equipment regulations 1998	Y	Y	Y

Other relevant railway legislation which affects the operation of the railway include:

- Railways Act 1993
- Railways and Transport Safety Act 2003
- Rail Vehicle Accessibility (Networks) Exemption Order 2010
- Rail Vehicle Accessibility (London Underground Victoria Line 09TS Vehicles) Exemption Order 2008
- Rail Vehicle Accessibility (London Underground Metropolitan Line S8 Vehicles) Exemption Order 2010
- Rail Vehicle Accessibility (London Underground Metropolitan Line S8 Vehicles) Exemption Order 2011
- Rail Vehicle Accessibility (Non-Interoperable Rail System) (London Underground Circle, District and Hammersmith & City Lines S7 Vehicles) Exemption Order 2012

Other National standards applicable to On Track Plant include:

- GM/RT2004 Rail Vehicle Maintenance
- BS 7121-1:2006 Code of Practice for Safe Use of Cranes – General
- RIS-1530-PLT Rail Industry standard for Engineering Acceptance of Om Track Plant and associated equipment
- RIS-1700-PLT Rail Industry standard for safe use of Plant for Infrastructure work

The requirements of these regulations are integrated into LU's Management System through standards.

18.4 Maintenance plans

All rolling stock operated by LU is maintained by LU's Asset Maintenance teams or the train manufacturer under contract. Maintenance requirements are mandated via the maintenance provisions within LU Category 1 Standard: *S1180 Standard for Rolling Stock*. The standard mandates for each type of rolling stock:

- acceptance of the maintenance regime by LU, including changes to the regime
- periodic review of the maintenance regime
- documentation requirements
- train maintenance plans covering all systems and sub-systems to be produced
- record keeping
- Minimum Acceptable Condition Standards (MACS)
- dealing with faults in service
- post-maintenance testing
- monitoring and review of train performance and condition.

The maintenance requirements differ for different rolling stock.

Compliance with requirements is assured through the assurance arrangements described in Section 14 and the audit arrangements described in Section 12. An overview of maintenance plans is maintained by the relevant manager.

18.5 Approval to operate

The arrangements for trains to run over the LU network are governed by:

- certificates of technical conformance which confirm that the rolling stock complies with standards, is compatible with the route and there are appropriate maintenance regimes in place
- the company's Safety Certification and Safety Authorisation
- safety assurance of operational arrangements.

Approval for LU rolling stock to operate on Network Rail infrastructure is achieved in accordance with Railway Group Standards. Where LU rolling stock operates in proximity to other transport undertakings' infrastructure, comments are sought from the relevant parties and considered as part of the LU approvals process, as described in LU's Category 1 standard: *S1538 Assurance*.

Other train operating companies are also governed by track agreements that dictate how often a train operating company is allowed to operate.

All rolling stock that is new or reintroduced to the LU network, or modifications to existing stock, is formally approved before it can be operated in accordance with S1538. This standard requires the production and approval of appropriate engineering certificates and production and approval of operating procedures.

Certificates of Technical Conformance certify that vehicles, when operated in planned mode will comply with all appropriate legislation and engineering standards. The relevant legislation is identified through the mechanisms described in Sections 3.1 and 3.2. The Head of Technical Discipline for Rolling Stock, or his authorised deputy, issues

these certificates and may at any time withdraw, suspend or modify them. The scope of the certificates includes compliance, where relevant, with standards for:

- train protection
- crash worthiness and structural strength
- performance of power and parking brakes
- performance of traction system
- type of materials employed
- fire performance
- provision of fixed and portable safety equipment.

These certificates also certify that the rolling stock is compatible with the route and include:

- kinematic envelope within the structure gauge
- weight distribution compatible with the infrastructure
- ability to operate track circuits correctly
- interaction of the vehicle with the track and power supply
- compatibility with other vehicles using the route
- compatibility of doors and step-plates with platforms.

The certificates also certify there is an appropriate maintenance policy in place.

Plant Approval Certificates, issued on behalf of the Head of Technical Discipline - Permanent Way, are required for track maintenance plant or equipment.

These certificates cover the following:

- identification number
- type of operation
- area of operation
- operational limitations or conditions
- type of approval granted
- period of certification.

All, but the first bullet point, are only relevant in relation to rail mounted plant.

The Plant Approval Certificates certify that the equipment complies with statutory regulations, company requirements and track engineering standards. Where the plant is defined as a rail vehicle, a Certificate of Technical Conformance is also required.

Where the operational arrangements proposed for rail vehicles differ from the LU Rule Books, LU requires that, prior to the commencement of operations, a concession against the relevant standard is in place, in accordance with the arrangements described in Section 5. This applies:

- when a new piece of rolling stock or on-track plant is introduced to the Underground
- when a maintenance contractor wants to use on-track plant for a specific job, the vehicle will usually be removed from the Infrastructure once the job/project has been completed
- when test train movements are required where the stock being used is not regular passenger stock formations, or cannot be operated in the usual way.

The Network Services Director, or his authorised deputy, reviews the proposed arrangements to ensure that they comply with legislation and do not compromise the safety of LU's operations. Operation of the rail vehicles is permitted once the following assurances have been provided:

- that the risk associated with the operation of the rail vehicle is as low as reasonably practicable
- all responsibilities have been identified and assigned, and training has been provided.

The frequency and timings of any train operation are agreed between LU Timetables and the train operator. Trains will only come on to the LU network under the control of the Service Controller.

Where other rolling stock, e.g. historic rolling stock, is operated on LU's infrastructure, appropriate assurance arrangements (as set out in Section 7) ensure that this stock is operated safely.

18.6 Rolling stock modifications

Rolling stock modifications are managed by LU's Asset Maintenance teams. Details of all rolling stock modifications and supporting information are maintained on databases that record details of the changes/modifications, drawing numbers, programme information and any special instructions. All changes are reviewed and signed off by the Head of Technical Discipline for Rolling Stock or delegated authority.

Details of changes/modifications that have been sufficiently significant to require approval by LU and the ORR are also maintained by LU's Asset Maintenance teams or the Train Supplier, as appropriate to the arrangements in place.

Section 14 describes LU's assurance process through which LU is assured that the safety and technical requirements of bringing modified, upgraded or renewed rolling stock into service are met.

18.7 Engineering vehicles supplementary information

TransPlant operates a non-passenger fleet of engineers' trains used to transport engineering materials, plant and equipment in support of the maintenance, improvement, renewal and enhancements on LU. The majority of the fleet is made up of electric battery and diesel locomotives and their associated wagons, and other specialist "on-track machines" such as tamping machines, rail mounted cranes, a weed control train, vacuum machines (DISAB) and a track recording vehicle.

Maximum tonnages are dictated by the capability of the individual wagons used in each train. These can vary typically between 20 tonnes for a rail wagon to 35 tonnes for wagons capable of carrying track panels.

TransPlant does not carry any dangerous goods, as defined by *The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment (Amendment) Regulations 2011*. TransPlant does remove waste from site and, while doing so, fully complies with the Hazardous Waste Regulations.

LU hires third party vehicles for activities such as rail grinding; these are controlled in accordance with *PR 0723 Assurance arrangements for 3rd party vehicles*.

Where TransPlant's engineering trains operate adjacent or over NR infrastructure TransPlant comply with the relevant *Railway Group Standards (RGS)* and the *RSSB Rule Book GE/RT 8000.* Where TransPlant is unable to comply with an RGS, TransPlant seeks derogations from these standards in accordance with *Railway Group Standards Code (the Code) – RGSC01.*

TransPlant has been granted an exemption certificate by the ORR against the prohibition in *Regulation 3(1) of the Railway Safety Regulations 1999,* (prohibition on operating a train on a railway unless a train protection system is in service). This exemption applies to engineering trains with incompatible systems operating on the LU infrastructure under an ITMP (as per Rule Book 23).

TransPlant's staff check that an engineers' train is safely loaded by using the following:

- gauging – envelope of train and load
- gauging – weight
- even distribution of load
- load security.

Load capacities are marked on the side of each vehicle. The engineering train operator carries out loading checks and acceptance is recorded in the train journal.

TransPlant's train operators are competent to sign off trains as safely loaded for the operational railway and carry a safety critical licence for this activity.

Where necessary, a competent person will assess and authorise the movement of unusual or out of gauge loads over the route to be traversed. A Certificate of Route Availability is issued stating vehicle gauge, route approval and any restrictions for a load over a permitted running route. Details on infrastructure and vehicle gauges are detailed in Category 1 Standard: *S1156 – Gauging and clearances.*

All loading and unloading activities comply with the requirements of *R0904 – Loading and conveyance of materials plant and equipment* which cover:

- depot loading
- work site loading
- unloading.

Glossary

a. Abbreviations

A	
ABRA	Asset Based Risk Assessment
ACR	Asset Condition Reports
ALARP	As Low As Reasonably Practicable
AMS	Asset Management Strategy
ATO	Automatic Train Operation
ATP	Automatic Train Protection (Signalling)
B	
BCV	Bakerloo, Central, Waterloo & City and Victoria lines
BSP	Bulk Supply Point
C	
c2c	c2c Rail Limited
CAP	Change Assurance Plan
CCEP	Congestion Control and Emergency Plan
CCTV	Closed Circuit Television
CDM	Construction (Design and Management) Regulations 2015
CEPS	Central Emergency Power Supply
CIRAS	Confidential Incident Reporting and Analysis System
CMS	Competence Management System
COSHH	Control of Substances Hazardous to Health
CRA	Customer Risk Assessment
CRCL	Chiltern Railway Company Limited
D	
DLR	Docklands Light Railway
DRACCT	Director's Risk, Assurance and Change Control Team
E	
ERN	Engineering Regulatory Notice
F	
FIR	Formal Investigation Report
G	
None	
H	
HR	Human Resources
HSE	Health, Safety & Environment
HSEMS	Health, Safety and Environmental Management System
I	
IAF	Integrated Assurance Framework
IAP	Internal Audit Plan
ICP	Independent Competent Person
ITMP	Incompatible Train Movement Plan
J	
JNP	Jubilee, Northern and Piccadilly lines
K	
None	
L	
LANP	Line and Asset Network Plan

LFEPA	London Fire and Emergency Planning Authority
LU	London Underground
LUCC	London Underground Control Centre
M	
MACS	Minimum Acceptable Condition Standards
N	
None	
O	
OLBI	Off Line Battery Invertor
OPO	One Person Operated
ORR	Office of Rail and Road
P	
None	
Q	
QRA	Quantitative Risk Assessment
QUENSH	Quality, Environmental, Safety and Health Conditions
R	
RAIB	Rail Accident Investigation Branch
RGS	Railway Group Standards
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013
ROGS	Railways and Other Guided Transport Systems (Safety) Regulations
RSSB	Rail Safety and Standards Board
S	
SABRE	Site Access Booking Railway Engineering
SAP	An enterprise management information system which manages procurement, HR functions, Duty Allocation, payrolls etc.
SCADA	Supervisory Control and Data Acquisition (computer-based system)
SCAT	Speed Control After Tripping
SOO	Senior Operating Officer
SPAD	Signal Passed At Danger
SSE	Shift Supply Engineer
SSL	Sub-Surface Lines (Circle, District, Hammersmith & City and Metropolitan lines)
T	
TANC	Temporary Approved Non Compliance
TOC	Train Operating Company
TfL	Transport for London
U	
UPS	Uninterruptible Power Supply
V	
VAP	Verification Activity Plan
W	
WRA	Workplace Risk Assessment
X, Y, Z	
None	

b. Terms and definitions

A

Accountability - Assigned to the person who has the ultimate responsibility for completion of the activity to the required standard and has the authority to veto. Within LU, this authority resides with the appropriate Executive Director.

ALARP - Under UK legislation, LU is required to do whatever is reasonably practicable to reduce the health and safety risks to its employees and others affected by its operations; in other words, risks must be reduced to a level which is as low as reasonably practicable (ALARP). The term reasonably practicable means that safety measures should be undertaken unless the cost, in terms of money, time and trouble, is grossly disproportionate to the safety benefit, which is expressed in terms of the value of the risk averted by the safety measure.

Asset - An item of property owned or leased by LU.

Asset Life Cycle - The life of an asset can be represented by a series of stages commencing with identification of need through specification, design, manufacture or construct, install, commissioning (sometimes included with installation), operate and maintain (the service life) and ending with withdrawal and disposal. This is one cycle of the asset life cycle. Assuming continued requirement for an asset the commissioning stage of a second life cycle will coincide with withdrawal of the asset used in the first life cycle.

Asset Management - Asset Management is the way assets (such as trains, signals, stations and tunnels) are managed throughout their life to achieve the right balance of cost, performance and risk for the organisation. Asset Management covers demand analysis, asset acquisition, operation, maintenance and renewal/disposal and follows a plan, do, check, act process.

Automatic Train Operation - The subsystem of automatic train control, responsible for the automatic driving of trains.

B

None

C

Centurion - Senior operational manager.

Competence – A combination of practical and thinking skills, knowledge, experience, fitness and behaviour.

Contractor - A company, firm, person, supplier, consultant, sub-contractor, agent or stockist, providing goods, materials or services. Contractors may be company employees.

D

None.

E

Emergency - An undesired event which has life threatening and/or extreme loss implication and requires immediate action.

Engineering Hours - The period of time between the published time or actual time, if later, traction current is switched off **and** the published time or amended time, if earlier, traction current is switched on. Note therefore that Engineering Hours cannot be extended.

Environment - Surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation.

F

Formal Investigation - A Formal Investigation aims to identify underlying causes of an incident and to make recommendations to address these causes, any contributory factors, and any issues relating to managing incidents and business recovery. The recommendations are included in a report which is circulated widely and formally held within the Company and is reviewed by DRACCT.

G

None.

H

None.

I

Incident - An undesired event that results in, or under slightly different circumstances could have resulted in, harm to people, damage to property, damage to the environment, or loss of process.

Infrastructure Manager – Has the meaning ascribed to it by the Railways and Other Guided Transport Systems (Safety) Regulations.

Interlocking Machine Rooms - A large signalling equipment room which houses the equipment associated with the signalling interlocking system.

J

None.

K

None.

L

LU network - The geographic extent of the services provided by London Underground.

M

None.

N

None.

O

None.

P

Performance Management - The means by which performance measures are defined and set, and against which a comparison of actual vs. planned/targeted performance can be continuously monitored.

Points - A mechanical installation enabling vehicles to be guided from one track to another at a junction. Points can be either mechanically powered or hand-worked.

Possession - A designated section of track where a Possession Master has control. Unauthorised train movements into the section are prevented by the arrangements shown in the Possession Standards.

Possession Master - A person certificated by LU to take control and give up a possession in order to carry out engineering and similar work.

Q

None.

R

Railway Group - Organisations that are bound to comply with Railway Group Standards.

Railway Group Standards - Standards mandated by Railway Safety and Standards Board (RSSB) for use by organisations that operate on or support the operations of Network Rails' infrastructure.

Responsibility - Normally assigned to the person who undertakes the activity, the 'doer'. The person may delegate the task or a part thereof to another or contract the work to a third party, but retains responsibility for the outcome.

Risk Profile - A graphical representation of LU's 'Top Events'.

S

Safe System of Work - A set of controls which result from a risk assessment on a task. It defines safe methods to ensure that risks are reduced to as low as reasonably practicable.

Sentinel - The membership and Smartcard scheme for Engineering and Construction workers on London Underground.

Special Event - An event which is known about in advance, including those organised and managed by an outside party or parties, which requires LU to plan for any alteration to operational arrangements; for example the Notting Hill Carnival, or a Royal Wedding.

Speed Control After Tripping (SCAT) - A system ensuring that a train can only proceed at slow speed for a defined period of time after tripping past a signal at danger and resetting the tripcock.

Standards - Standards articulate minimum constraints on internal and external designers, suppliers and contractors to LU and third parties.

Station Control Room - Room on a station from which the station is controlled on a minute by minute basis.

Sub-surface Station – A station where the ceiling above the station platform is below the adjacent surface level and where the ceiling encloses more than half the length of the platform. These stations are regulated by the Fire Precautions (Sub-surface Railway Stations) Regulations 2009.

Surface Station – A station which is not in scope of the Fire Precautions (Sub-surface Railway Stations) Regulations 2009.

Surface Stock - Rolling Stock, which through the structure gauge employed in its design, cannot operate through tube tunnels.

System Risk - The totality of all safety risks to customers, employees, suppliers, other railway operators and other third parties that arise due to LU operations. This includes risks imported by customers and other third parties.

T

Technical Specification - Documents defining requirements to be satisfied by equipment, systems or services, and the methods by which compliance with the requirements shall be verified. They are used to purchase goods and services.

Top Event - LU's major hazards as identified by the LU Quantified Risk Assessment.

Traction Current - Electrical supply to third and fourth conductor rail system.

Trade Union Health and Safety Representative - An individual elected by a Trade Union to represent their members, or non-union members they have agreed to represent, on health, safety and welfare matters. Their responsibilities are governed by the Safety Representatives and Safety Committee Regulation 1977 (as amended by the Management of Health & Safety at Work Regulations 1992).

TransPlant – Department in LU responsible for operating and maintaining engineers trains and miscellaneous vehicles.

Transport Undertaking – Has the meaning ascribed to it by the Railways and Other Guided Transport Systems (Safety) Regulations.

Traffic Hours - The period between the published time or amended time, if earlier, traction current is switched on and published time or actual time, if later traction current is switched off. On non-electrified tracks and tracks within depots or sidings where traction current is normally on at all times, trains could move at any time and in any directions.

Train Arrestors - A device designed to decelerate a slow moving train so as to minimise the risk of damage to the train and injury to staff and customers should it overrun the correct stopping position at a terminal location.

Trainstops - A track side device adjacent to a signal which interacts with the tripcock arm to stop the train, should the train attempt to pass a signal at danger.

Tripcocks - A device attached to the leading right hand side of the leading bogie of a train, operated by an arm which when pushed back by a train stop in the up position, causes the automatic operation of the train's emergency brakes by the loss of train line air or round the train circuit.

Tube Stock - Rolling stock, which through the structure gauge employed in its design, is capable of operating through tube tunnels.

U

None.

V

None.

W

None

X

None.

Y

None.

Z

None.

References

Reference	Title
P002	London Underground Health, Safety and Environment Policy
P020	Asset Management Policy
5-539	Verification of Assurance
S1023	Infrastructure Protection
S1042	Asset Condition Reporting (ACR)
S1085	Fire Safety Performance of Materials.
S1088	Managing Changes to Stations Fire Precautions
S1105	Power Service Contract - Performance Specification
S1156	Gauging and clearances
S1157	Track - Performance, Design And Configuration
S1180	Standard For Rolling Stock
S1311	Customer information - stations
S1521	Safety Decision Making
S1526	The Assessment and Management of Health, Safety and Environmental Risk
S1538	Assurance
S1548	Safety Critical Work
S1556	Incident Reporting and Investigation
S1566	Monitoring Health, Safety And Environmental Performance
S1641	Concessions To Standards
S1642	The Management Of Temporary Authorised For Use Non-Compliance (TANC)
S1646	Queries To Standards
S5044	Asset Risk Standard
S5540	Safety Verification
S5557	Incident Reporting and Local Investigation
S5631	Railway Group Standards Reconciliation
Rule Book 01	Communications
Rule Book 02	Managing Incidents
Rule Book 03	Traction current and high voltage supply
Rule Book 04	Moving a stalled train and authorised detrainments
Rule Book 05	Movement of trains due to exceptional circumstances
Rule Book 06	General train operations
Rule Book 07	Train incidents and safety equipment
Rule Book 08	Managing the platform train interface
Rule Book 09	Lifts, escalators and moving walkways
Rule Book 10	Station access
Rule Book 11	Station management
Rule Book 12	Station emergency response
Rule Book 13	LU staff responsibilities - traffic hours protection
Rule Book 14	Possessions planning and management
Rule Book 15	Protection possession methods
Rule Book 16	Going on the track in engineering hours
Rule Book 17	Managing access to the track in engineering hours
Rule Book 18	Engineer's trains, vehicles and trolleys

Reference	Title
Rule Book 20	Engineering staff - traffic hours protection
Rule Book 21	Personal safety on the track
Rule Book 22	LU operational staff - track access
Rule Book 23	Incompatible train operations
	Train Operations Competence Standards & Guidance
Intranet-based Management System	Assessing and managing our HS&E risks
	Changes to HS&E law
	Communicating and consulting on HS&E
	Managing formal incident investigations and their outcomes
	Managing HS&E with contractors and suppliers
	Managing the way we work
	Performance and development conversations
	Recruitment
	Reviewing HS&E arrangements
H-027	Providing legal support, governance and audit
H-038	Providing emergency, contingency and business continuity and security support
H-045	Business and Resource Planning
Asset Performance Managers Handbook	Materials and Stores
Managers Handbook	Change Control
	Safety Security and Environment
	Monitoring Operational Communication
	Performance & Competence Management
PR0603	Incident Reporting and Local Investigation (JNP)
PR0723	Assurance arrangements for 3rd party vehicles operating under LUs safety certificate
R0010	Content framework for TfL's management system
R0904	Loading and conveyance of materials plant and equipment
W0085	HSE & Technical Audit Process

All documents are available on the TfL intranet.

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EVERY JOURNEY MATTERS

Transport for London
London Underground

Category 1 Standard

S1602 Corporate Medical Standard for Personnel Requiring Safety on the Track Certification

Issue No.: A10

Issue date: April 2014
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MAYOR OF LONDON

Contents

1 Purpose 3
2 Scope 3
3 Requirements 3
3.1 General 3
3.2 Medical Standards 3
3.3 Procedure for LU, and TfL employee's 3
3.4 Continuous Review 4
3.5 Arrangements for Contractors and any other LU suppliers who have Contractors staff who hold Safety on the Track Certificates or carry out Safety Critical work 5
3.6 Requirements for All (LU, TfL , external Contractors and other suppliers to LU) 6
3.7 Pre-Training Medical Examinations 6
3.8 Practical Tests during Training Courses 6
3.9 Medical Records 7
4 Responsibilities 7
4.1 Personal Responsibility 7
4.2 Manager's Responsibilities 7
5 Supporting information 7
5.1 Other information 7
6 References 8
6.1 References 8
6.2 Abbreviations 8
6.3 Definitions 8
6.4 Person accountable for the document 9
6.5 Document history 9
7 Appendix 11
London Underground Ltd REFRESHER TRAINING FOR TRACK RECERTIFICATION (TSW 024) 11
Medical and Competence Declaration Form TSW 029 12

1 Purpose

1.1 The purpose of this Standard is to specify the Medical Standards for personnel requiring track certification and for those staff requiring retraining and validation for track certification.

2 Scope

2.1 This Standard applies to all personnel whose duties require them to obtain certification as defined by the London Underground (LU) Rule Book for the operation and maintenance of the Railway.

3 Requirements

SECTIONS 3.3 AND 3.4 PROVIDE REQUIREMENTS FOR LU AND TFL EMPLOYEE'S.

SECTION 3.5 PROVIDES REQUIREMENTS FOR CONTRACTORS AND OTHER SUPPLIERS.

REQUIREMENTS THAT APPLY TO ALL ARE CONTAINED IN SECTIONS 3.1, 3.2, 3.6, 3.7, 3.8, 3.9 AND 4

3.1 General

3.1.1 It is the responsibility of the employing manager of staff requiring track certification that staff are able to speak and understand oral and written English and understand safety instructions. If in the course of medical assessment doubts arise regarding compliance, Transport for London Occupational Health (TfL OH) or an approved provider of medical assessments will immediately contact the appropriate employing manager.

3.2 Medical Standards

3.2.1 All personnel requiring track certification training must be medically assessed before referral for initial training. The medical assessment and training certification process shall form part of a continuing programme to ensure that staff continue to meet LU track medical standards.

3.2.2 Staff must not suffer from any condition or disability or take treatment which may affect their own safety, or that of others, when on or about the track. This includes medical conditions or treatment which may cause

a) sudden incapacity or loss of consciousness

b) impaired vision or hearing

c) impairment of awareness, concentration, balance or co-ordination

d) significant limitation of mobility

3.2.3 The purpose of medical assessment is to establish that the person is medically fit for being on or about the track.

3.3 Procedure for LU, and TfL employee's

3.3.1 Medical assessment prior to initial training

3.3.1.1 Required for all prospective new LU, and TfL employees, and existing staff [including agency and short term contract staff] not previously assessed, where track working is required to be part of the duties.

3.3.1.2 Employing managers or a member of Resourcing Services shall notify TfL OH or an approved provider of medical assessments as applicable and request a medical assessment by completing form **TfL, and LU only- London Underground Safety on the Track (Medical Component) Medical Assessment for London Underground Certification (TSW 027)**. Details to be notified will include frequency of such work and the type of certification required.

3.3.2 Initial training

3.3.2.1 Prior to commencement of initial training for Operational Procedures Training (OPT) and Track Certification course trainers will ensure that staff reporting for training have been medically assessed by TfL OH or an approved provider of medical assessments as fit to be on or about the track.

3.3.2.2 The **TfL and LU only - London Underground Safety on the Track (Medical Component) Medical Assessment for London Underground Certification (TSW 027)** form stamped by the medical assessor, must be retained by the employing manager on the employee's staff file, this does not need to be presented at training

3.3.2.3 The staff member presenting themselves for training must produce the completed **Medical and Competence Declaration** Form (TSW 029) (signed by themselves and their manager (a copy is acceptable). A copy must be retained in the employees staff file

3.3.2.4 Where trainers have any doubts about the medical fitness of any trainee during the course, particularly during the practical tests outlined at paragraph 3.8, they must immediately contact the appropriate employing manager who should refer the trainee to TfL OH h or an approved provider of medical assessments for advice.

3.4 Continuous Review

3.4.1 Personal Responsibility

3.4.1.1 To ensure that they remain medically fit to be on or about the track, holders of track certification must immediately inform their Employing Manager of any change in circumstances which may affect their fitness.

3.4.1.2 A guide to this is outlined in the **Safety on the Track re-certification - Medical Fitness Self-Assessment Questionnaire (TSW 024).**

3.4.1.3 The following conditions apply when track-certificated staff are on or about the track:

LU Individual Working Alone / Depot Track Access / Protection Master / Protecting Workers on the Track – Engineering Hours / Basic Track Awareness/ Track Access Qualified (LU only) / Depot track safety for LU Operational learning trainers

a) vision conditions as defined in **Vision standard for personnel requiring safety on the track certification**, section 4.0.2

b) hearing conditions as defined in **Audiology standard for personnel requiring safety on the track certification**, section 3.2.1 & 3.2.2

c) mobility is required as defined in section 3.8.3.1 below

3.4.2 Re-certification

3.4.2.1 Where staff require periodic re-training, the employing manager shall review suitability before referral for training.. The **Safety on the Track re-certification - Medical Fitness Self-Assessment Questionnaire** (TSW 024) form shall be completed satisfactorily and the declaration (**Medical and Competence Declaration Form** TSW 029) completed by both the employing manager and employee.

3.4.2.2 The staff member presenting themselves for training must produce the completed **Medical and Competence Declaration Form** (TSW 029) signed by their employing manager and themselves, (a copy is acceptable). A copy of the whole form and the TSW 024 must be retained on the employees' staff file.

3.4.2.3 Where doubt on medical fitness exists, advice shall be sought from TfL OH or the applicable authority responsible for medical assessment of staff.

3.4.3 Medical fitness examinations

3.4.3.1 LU, and TfL safety critical employees or holders of track certification who reach the ages 20, 25, 35 shall complete a confidential questionnaire screened by TfL OH or an approved provider of medical assessments and undergo medical examination if the screening indicates this is necessary.

3.4.3.2 LU, and TfL safety critical employees or holders of track certification reaching ages 30, 40, 45, 50, 55, 60 and 63 and annually over 65 years will complete a confidential questionnaire (PAA1) and must undergo medical examination.

3.4.4 Continuous Development Programme (CDP)

3.4.4.1 LU requires that a CDP assessment for operating staff is undertaken. Employing managers must review medical fitness for safety on the track before referral for CDP.

3.4.4.2 The **Safety on the Track re-certification - Medical Fitness Self-Assessment Questionnaire** (TSW 024) and **Medical and Competence Declaration** (TSW 029) shall be completed every two years.

3.4.4.3 Where doubt on medical fitness exists, advice shall be sought from TfL OH or an approved provider of medical assessments.

3.5 Arrangements for Contractors and any other LU suppliers who have Contractors staff who hold Safety on the Track Certificates or carry out Safety Critical work

3.5.1 Medical fitness must be maintained in people who have safety on the track certification and safety critical licences.

3.5.2 Contract QUENSH conditions require arrangements to be made to maintain this as part of a health and safety management system.

3.5.3 Contractors must ensure that they conform in every respect to the Standard especially with regard to the requirements stated in 3.1, 3.2 and 3.3.

3.5.4 External contractors' staff who hold safety on the track certification will undergo medical examinations before a person is issued a safety on the track certificate for the first time and thereafter at five yearly intervals and annually over 65 years of ages.

3.5.5 Medical assessments must be conducted by TfL OH or an approved provider of medical assessments. Signed confirmation that the medical standard has been met must be provided on the form **Contractors & Suppliers only - London Underground Safety on the Track (Medical Component) Medical Assessment for London Underground Certification (TSW 028)**., this does not need to be presented at training

3.5.6 The contractors' medical assessor must ensure that the current LU Medical Standards are applied for these medical assessments.

3.5.7 The staff member presenting themselves for training must produce the completed **Medical and Competence Declaration** Form (TSW 029) (signed by themselves and their manager (a copy is acceptable). A copy must be retained in the employees staff file

3.5.8 If training takes place more than 3 months from the date of signature by the medical assessor then the The **Safety on the Track re-certification - Medical Fitness Self-Assessment Questionnaire** (TSW 024) form shall be completed and the employing manager shall review suitability before referral for training..

3.5.9 Certification of medical fitness for safety on the track certification is valid for 5 years from the date of issue for all levels of track certification (unless a shorter validity time is applied by the assessing authority), after which time a medical examination is required.

3.5.10 Where contracting staff require periodic re-training, the employing manager shall review suitability before referral for training.. The **Safety on the Track re-certification - Medical Fitness Self-Assessment Questionnaire** (TSW 024) form shall be completed satisfactorily and the declaration (TSW 029) completed by both the employing manager and employee.

3.5.11 The contractor presenting themselves for training must then produce the completed **Medical and Competence Declaration Form** (TSW 029) signed by their employing manager and themselves, (a copy is acceptable). A copy of the whole form and the TSW 024 must be retained on the employees' staff file.

3.6 Requirements for All (LU, TfL , external Contractors and other suppliers to LU)

3.6.1 Employing/Project Manager's Responsibility

3.6.1.1 To ensure that track certificated staff remain medically fit to be on or about the track the employing/project manager shall regularly monitor the behaviour, work performance and attendance in particular with attention to reasons for absence.

3.6.1.2 Where any track certificated personnel develops any medical condition which may affect their own or others safety while on or about the track, whether this causes sickness absence or not, the employing/project manager shall contact TfL OH or the applicable authority responsible for medical assessment of staff for advice.

3.6.1.3 Employing/project managers must ensure that track certificated staff comply with paragraph 3.4.1.3.

3.7 Pre-Training Medical Examinations

3.7.1 Medical Assessment

3.7.1.1 An appropriate medical examination shall be carried out by TfL OH or an approved provider of medical assessments.

3.7.2 Vision Assessment

3.7.2.1 Vision assessment must be to the clinical standards specified by LU for aided, unaided, and colour vision.

3.7.3 Hearing Assessment

3.7.3.1 Hearing assessment must be to the clinical standards specified by LU for unaided hearing.

3.7.4 Mobility

3.7.4.1 Mobility shall be assessed as part of the general medical assessment with reference to the requirements specified at 3.8.3 below.

3.8 Practical Tests during Training Courses

3.8.1 In addition to the medical assessment, trainers will carry out practical tests as part of the training course. This does NOT include CDP and no practical tests will be carried out as part of that LU process. The outcome of this assessment is recorded on the Track Safety (Re)-Certification (Medical Component) - Practical Testing - TSW026. If a candidate fails any element of these tests, they should be referred to **TfL OH** or an approved provider of medical assessments and should not be issued with the relevant track certificate (any existing certificates should be suspended) pending medical advice re fitness assessed against LU standards.

3.8.2 Vision Test

3.8.2.1 The following shall be established under trackside conditions in simulated and actual situations.

d) the ability to see obstructions in daylight and artificial light and move safely about the track

e) the experience of seeing trains approaching at certain speeds and distances, against the standard warning time of 25 seconds.

3.8.2.2 **LU Individual Working Alone / Operating procedures training**, the ability to distinguish red and green signals and red and white tail/head lamps.

3.8.3 Mobility

3.8.3.1 The ability to leave the track and reach an adjacent place of safety in ten (10) seconds shall be established under trackside conditions in simulated situations. This includes crossing running rails, conductor rails, ballast shoulders and other track obstructions in plain line and junction work.

3.9 Medical Records

3.9.1 Personal medical records relating to assessment for track safety purposes will be kept by TfL OH or the authority responsible for the assessment of staff.

4 Responsibilities

4.1 Personal Responsibility

4.1.1 Track-certificated staff are responsible to ensure that they are medically fit to be on or about the track, and to immediately inform their employing manager of any change in circumstances which may affect their fitness.

4.2 Manager's Responsibilities

4.2.1 Local managers shall be responsible for ensuring all staff are able to speak and understand oral and written English and understand safety instructions.

4.2.2 Employing managers shall be responsible for maintaining correct procedures to ensure adequate medical surveillance [ongoing monitoring and referral] as identified in this document and in Management arrangements to assure medical fitness (1-601).

4.2.3 Where appropriate, employing/project managers shall agree respective responsibilities to ensure that track certificated staff whether permanent, agency or contractor remain medically fit to be on or about the track.

4.2.4 Project managers/employing managers/contract managers shall be responsible for suitable arrangements for ongoing medical surveillance of contractors staff and recall for periodic medical assessment.

5 Supporting information

5.1 Other information

5.1.1 The following pages contain examples of the medical forms referenced in this document.

Form no.	Title
TSW 024	**TfL, LUL, contractors and suppliers Safety on the track re-certification** London Underground Ltd Refresher Training for Track Re-certification Medical Fitness Self Assessment Questionnaire
TSW 026	**London Underground Safety on the track.** **Track Safety (re-) certification (Medical Component) –Practical Testing**
TSW 027	**TfL and LUL only** London Underground Safety on the Track (Medical Component) Medical Assessment for London Underground Certification