

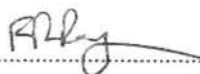
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Level 2

Competence and Training in Telecommunications Engineering

Endorsement and Authorisation

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Issue record

Issue	Date	Comments
01	June 2008	New Issue
02	September 2010	Updated to incorporate additional working activities

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 05th March 2011.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 4 to continue to comply with the Issue of any relevant Network Rail Standards current when GRIP Stage 4 was reached and not to comply with requirements contained herein, unless the designated Standard Owner has stipulated otherwise in the accompanying Briefing Note.

Reference documentation

NR/CS/CTM/001	Competence Management
NR/L2/CTM/021	Competence and Training in Track Safety
NR/L2/CTM/202	Quality Assurance in Training and Assessment
NR/L2/OHS/00124	Competence Specific Medical Fitness Requirements

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1 Purpose.

This document sets out the minimum requirements for the training and assessment of individuals who undertake Telecoms engineering activities on Network Rail managed infrastructure. It defines processes that are to be implemented and the standards that are to be achieved to confirm that individuals who undertake Telecoms engineering work are competent to perform the work.

2 Scope.

This specification applies to all employers and individuals who undertake maintenance, faulting, defect rectification, installation and testing and commissioning of Network Rail owned Telecoms infrastructure equipment on managed infrastructure, unless the employer can demonstrate fundamental equality in the assurance of employee competence by using an alternative system.

The requirements of this specification do not apply to individuals who undertake maintenance, faulting, defect rectification, installation and testing and commissioning of services or assets leased from Third Party suppliers, such as British Telecom.

3 Definitions.

Assessor.

An individual who has been trained in assessment techniques and methods and has occupational experience and current knowledge of Railway Group Standards and Network Rail and/or company specifications applicable to the activity and competence standard. See also supported assessor.

Assessment.

The gathering and judgement of evidence to 'prove' or 'determine' an individual's competence as required by a competence standard.

Authority to Work (AtW).

A document that details the work activities that an individual is authorised to undertake. It includes the details of the individual's competence and details of any restrictions that apply to the way the individual works e.g. the requirement for supervision.

Candidate.

An individual whose competence is being assessed.

Competence.

The ability to undertake responsibilities and to perform activities to a recognised standard on a regular basis. A combination of practical thinking skills, experience and knowledge and includes a willingness to undertake activities in accordance with agreed standards, rules and procedures.

In the context of this specification it also includes the consistent achievement of an identified standard of performance under defined normal, abnormal, and emergency situations; the ability to undertake activities to arrange for suitable measures to be put in place aimed at achieving the safety of any individual who might be affected by the work and an appropriate level of fitness.

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Competence Management System (CMS).

A suitably resourced, logical and integrated cycle of activities within an organisation used to assure competence of those who may, through lack of competence, have an adverse impact on the:

- a) safe operation and maintenance of Network Rail managed infrastructure;
- b) occupational health and safety of workers on or about the Network Rail managed infrastructure;
- c) safety of other persons affected by their actions or inactions;
- d) performance of Network Rail's business.

Competence profile.

A description of the competences that apply to a specific job role or post. The Competence profile is used to determine the training and assessment requirements for the person occupying the post.

Competence standard.

A statement of;

- what an individual is able to do and how well, in order to achieve the intended outcome of work;
- the range of circumstances in which the ability shall have to be demonstrated;
- the knowledge needed to complete the work;
- the types of evidence required to confirm that performance is consistent and can be sustained;
- how this would be assessed.

Mentoring period.

A period of time between the satisfactory completion of training where an individual undertakes the work under supervision of a mentor. This period is used to enable the individual to practice the activity, acquire the associated knowledge and collate the relevant evidence ready for assessment.

Person in scope.

Anyone whose role involves the actual completion of maintenance, inspection, installation or testing of Telecoms assets and their work can affect the operation of the asset.

Persons new to Railway Telecoms engineering.

An Individual who have not previously undertaken work involving railway Telecoms engineering maintenance, installation or testing tasks. It includes any individual that already works in, or has worked in, the rail industry before, but in another role, not related to Telecoms engineering. New to railway Telecoms engineering is not related to grade but to previous experience as described above.

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Supported Assessor.

An assessor who has been trained in assessment techniques and methods but does not have the technical knowledge of Railway Group Standards and Network Rail company specifications applicable to the activity and competence standard and therefore uses the expertise of another individual who has the required technical knowledge to support competence assessments.

Telecoms.

Short form of the word Telecommunications.

Trainer.

An individual who has demonstrated that they meet the trainer criteria described in NR/L2/CTM/202 Quality Assurance in Training and Assessment and who is approved by Network Rail (where applicable) to deliver one or more named training events.

Verification.

A process by which the quality of assessment decisions and the supporting process are independently assured.

Verifier.

An individual who is competent and authorised to review the assessment process and confirm assessment decisions.

4 Requirements.

4.1 Deployment.

Employers shall not deploy any individual new to Railway Telecoms engineering on any tasks associated with Telecoms engineering activities that can have a direct impact on the integrity of the Telecoms system, until that individual has demonstrated the relevant railway telecoms engineering competence for the activity, or who is under the direct supervision of a suitably competent person.

Additionally individuals who are not new to Railway Telecoms engineering shall only be deployed on tasks associated with Telecommunications engineering activities work provided that individual has attended and successfully completed appropriate training or has been assessed as competent to complete the work. Where the individual has been trained they are able undertake the activity but shall be subjected to an appropriate level of supervision.

4.2 Work on or near the line.

Where an individual is required to work on or near the line they shall hold the relevant track safety competence(s) as described in NR/L2/CTM/021 Competence & Training in Track Safety.

In addition, individuals shall be able to demonstrate medical fitness and be screened for alcohol and drugs in accordance with Network Rail Specification NR/SP/OHS/00124: Competence Specific Medical Fitness Requirements

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4.3 Training.

Subject to the minimum requirements in 4.1 and 4.2, employers shall have systems in place to identify specific training needs for each 'person in scope'. A guide to the requirements of training is summarised in Appendix A. Employers shall use this information to determine what training is appropriate for each 'person in scope'.

The following steps shall be used and documented to identify and satisfy specific training needs:

- identify deployment requirements for the individual concerned;
- take account of specific types of asset that the individual is required to work on and the type of activities the individual is required to undertake;
- establish the current competence of the individual in relation to deployment requirements;
- establish what development is required and therefore which training modules are appropriate to match the deployment needs;
- agree development plan with the individual and the order in which the training should take place;
- arrange training;
- individual completes relevant training.

4.4 Mentoring.

Following the successful completion of training, each individual shall undertake a period of workplace experience. The detailed mentoring requirements shall be provided in each training event. Employers shall appoint a mentor who shall be responsible for supporting the workplace experience. Employers shall demonstrate that appropriate supervision is maintained during the period of mentoring.

Network Rail or each contracting employer shall provide a work experience book to record what activities the individual has completed during the workplace experience.

4.5 Assessment.

Following successful completion of the relevant training and mentoring the individual shall be assessed against the requirements of the relevant competence unit contained in this standard.

4.6 Delivery of training.

Any individual delivering the training shall be approved by Network Rail in accordance with the requirements of NR/L2/CTM/202: Quality Assurance in Training and Assessment.

Where available, trainers shall use training plans and assessments approved by Network Rail to deliver the training event. Where these are not available, the line manager shall assure that the training delivered is to the required standard for the delegate to meet the requirements of the relevant competence unit.

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4.7 Completion of assessment.

Assessors shall be approved in accordance with the Network Rail standard NR/L2/CTM/202 Quality Assurance in Training and Assessment, prior to undertaking assessments against the competence units detailed in Appendix B. Assessors shall plan and complete assessments.

4.8 Verification.

Employers shall have in place verification procedures to confirm that at least 10% of completed assessments are verified.

4.9 Maintaining competence.

Employers shall have systems in place to assure the continued competence of persons undertaking Telecoms engineering work. These systems shall consist as a minimum of:

- The use of a log book to record work experience; **and**
- The implementation of a review/re-assessment regime as defined in section 6.3.

5 Application.

5.1 Competence units.

Based on a functional analysis competence units have been developed that are suitable to control the risks associated with competent performance of individuals who are undertaking the maintenance, testing and installation of Telecoms equipment on Network Rail managed infrastructure. These competence units are contained in the Appendix B of this specification.

5.2 Competence profiles.

The competence units are applicable to the job roles associated with those that undertake maintenance, testing and/or installation. Specific competence profiles shall be developed for each role and shall take account of equipment specific needs in a particular geographic location and other non Telecoms engineering competence requirements. Competence units shall be selected on the basis of the individual's job role and responsibility.

5.3 Training needs.

Specific training modules applicable to the work activities associated with Telecoms maintenance testing and installation shall be developed. Specific training modules shall be directly linked to the competence units in Appendix B.

6 Assessment Strategy.

The strategy to be applied to assessment takes account of a number of factors:

- a) whether or not the individual is new to the job role;
- b) what training and experience the individual has had;
- c) what different types of asset or sub systems the individual is required to work on;

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- d) the practicality of gathering observed evidence;
- e) the risks from incompetent performance.

6.1 Initial Assessment.

The following approach shall be used:

Case 1

Where the activity is new to the individuals area of responsibility they shall:

- a) attend the relevant training and complete end of training assessments;
- b) complete a period of work experience under supervision, against objectives set at the end of the training, and record the details. During the mentoring period the mentor shall demonstrate that both their own safety and the safety of others are maintained at all times in accordance with current legislation;
- c) be assessed against the requirements laid down in the relevant competence unit.

If the individual is competent the person completing the assessment shall issue a certificate of competence.

If the individual is not yet competent:

- the line manager shall agree and implement a development action plan;
- the individual is able to continue workplace experience under supervision;
- on completion of the development action plan the individual shall be re-assessed for the specific competence.

Case 2

Where the individual has been previously trained and has been undertaking the work for more than one year they shall be assessed for the specific competence using the following as the primary source of evidence:

- detailed questioning/standard knowledge tests;
- performance reports from the line manager to confirm satisfactory and safe performance across the range of work detailed in the competence unit.

If the individual is competent the person completing the assessment shall issue a certificate of competence.

However, if the individual is not yet or no longer competent they shall be dealt with as described in **Case 1**.

6.2 Asset specific endorsements.

Equipment specific endorsements shall be used to specify the type of asset or sub-system the individual is competent to work on.

Where an individual is required to work on additional assets or sub-systems additional endorsements shall be added to the certificate once competence has been confirmed.

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6.3 Maintaining competence.

Employers shall have systems in place to assure the continued competence of individuals undertaking Telecommunications engineering work. These systems shall consist as a minimum of:

- a record of work experience:
this may be in the form of the following:
 - copies of work records;
 - check sheets;
 - work experience book entries.
- the implementation of a re-assessment regime shall confirm that:
 - the work completed by the individual meets the requirements of the performance statements in the relevant competence unit;
 - the individual has the knowledge defined in the relevant competence unit;
 - there have been no incidents, accidents or near misses as a result of the individuals completing the work.
- the implementation of a process in accordance with the site specific safety management system that confirms that the individual has the knowledge necessary to continue undertaking the work.

Where continued competence cannot be confirmed through the review/re-assessment, arrangements shall be made for the competence to be withdrawn.

The responsible manager shall develop a plan to restore the individual's competence, dependent upon business needs, which may include retraining and/or further mentoring and re-assessment.

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Appendix A Telecommunications Engineering Training Framework Summary.

A.1 General.

Training shall be a mix of, formalised training events, on-site development activities and knowledge enhancement exercises, where necessary to meet the minimum criteria of each competence.

Employers shall have systems in place to provide training to individuals who are required to undertake the activities as described in Appendix B

This appendix contains a brief overview of the suggested Telecommunications Engineering modules that can be applied where required.

A.2 Training Modules.

Telecommunications Engineering Induction.

For individuals who are new to Telecommunications engineering and whose work involve the maintenance, installation or testing of the Telecommunications engineering equipment or other duties that can affect the operation of Telecommunications equipment. The aim of the module is to provide the basic underpinning knowledge of the Telecommunications system components and working methods associated with maintenance and installation of Telecommunications assets.

Telecommunications Engineering Maintenance 1.

For individuals whose work involves the maintenance of the Telecommunications Engineering equipment.

The aim of the module is to develop the delegate's understanding of:

- Telecommunications maintenance;
- cables maintenance;
- power supplies maintenance;
- working on operational Telecommunications equipment;
- safe working practices;
- fault finding techniques;
- Telecommunications maintenance testing.

Working on Operational Telecommunications Equipment.

For individuals who are responsible for handover and hand-back of Telecommunications equipment in accordance with Section T1A of the Network Rail Rule Book.

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Telecommunications Engineering Installation.

For individuals who are responsible for the installation of the Telecommunications Engineering equipment. The module includes installation techniques, methods and safe working practices when constructing equipment cases/rooms and installing:

- cables, wiring and power supply equipment;
- racking and cable trunking;
- fuses and terminals.

Failure and Incident Testing.

For individuals who are responsible investigating in safety related Telecoms failures.

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Appendix B Competence units.

B.1 Competence unit summary.

This appendix contains the detailed units of competence that shall be used to assess the competence of candidates who are responsible for the installation, maintenance, faulting, defect rectification or testing of the Telecommunications Engineering equipment.

Tel Unit No.	Unit Title	Applicable Endorsements
TEL 01	Undertake immunisation testing on the Telecoms cable system	
TEL 02	Undertake corrective and preventative maintenance of Telecoms cable systems	• Cable Distribution Frames/Location Cases • Telecoms Earth and Screening Systems • Telecoms Copper Cables (Jointing) • Telecoms Copper Cables (Fault Location & Routine Maintenance Testing) • Telecoms Optical Fibre Cables (Jointing) • Telecoms Optical Fibre Cables (Fault Location and Routine Maintenance Testing) • Pressurisation Units
TEL 03	Undertake corrective and preventative maintenance of Telecommunication Power supplies	• Rectifiers • Batteries • Invertors • UPS
TEL 04	Undertake corrective and preventative maintenance of telephone systems	• Operational Telephones and Tail cables • PETS System • Tunnel Emergency Communication Systems
TEL 05	Undertake corrective and preventative maintenance of Concentrators	• Electro-Mechanical Concentrators • Electronic PABX based Concentrators • Processor Controlled Concentrators
TEL 06	Undertake corrective and preventative maintenance of DOO systems	• DOO - CCTV • DOO Mirror systems
TEL 07	Undertake corrective and preventative maintenance of Radio systems	• National Radio Network (ORN/NRN) • Antenna Systems and Feeders • UHF Spot Scheme / Marine Radio Systems • Driver-to-Signal box Radio Systems (CSR and SMA). • Leaky Feeder Systems • Radio Electronic Token Block Telecoms Equipment
TEL 08	Undertake corrective and preventative maintenance of transmission systems.	• Analogue transmission Systems • Telecoms Digital Transmission Systems
TEL 09	Undertake initial diagnosis of failures to determine the necessary course of action	

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Tel Unit No.	Unit Title	Applicable Endorsements
TEL 10	Manage the effective progression of work and use of resources during Telecom testing, maintenance or installation activities.	Resource planning & analysis, contingency management
TEL 11:	Take and relinquish responsibility for Telecoms equipment.	Equipment disconnection, possession & isolation management, handover of responsibilities and service continuity, SINS
TEL 12	Undertake telecoms installation works of non safety related equipment	• S.I.S.S
TEL 13	Undertake telecoms installation works on un-commissioned / isolated equipment.	• Copper Cable • Data Equipment • Electrical/Electronic Equipment and racks • Cables/Terminations
TEL 14	Undertake telecoms Installation work on, or connecting to, Working safety related equipment.	• Transmission • Concentrators • Circuit on Transmission • Circuit on Cable • GSM-R
TEL 15	Testing and Commissioning	• Optical Fibre Cable • Copper Cable • Line only over copper cable • Line only over transmission • Line side Phone / Additional line on a concentrator • PETS • Transmission • GSM-R • Concentrator
TEL 16	Undertake Network Management and Fault analysis	• Management • Monitoring and Analysis
TEL 17	Undertake Corrective & preventative Mtce of Voice Recorders	• Voice Recorders
TEL 18	Undertake Corrective & preventative Mtce of S.I.S.S	• C.I.S • Security CCTV • P.A. • P.A.V.A • Help points • Station management systems
TEL 19	Undertake Corrective & preventative Mtce and Minor Changes on Business Switches	• Business Switches

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Tel Unit No.	Unit Title	Applicable Endorsements
TEL 20	Undertake Corrective & preventative Mtce of GSMR	- GSM-R network - Network Switching Subsystems (Didcot/Stoke) - GSM-R network - Base Station Subsystems
TEL 21	Undertake installation and corrective maintenance of Remote Monitoring Systems	Network Monitoring Systems
TEL 22	Undertake corrective and preventative maintenance of Network Control Processor Systems	Control Processors

B.2 Evidence requirements.

Sufficient evidence shall be collected to enable competence to be assessed against all the performance statements and knowledge and understanding requirements for each element. Evidence shall be sufficient to confirm that the candidate is capable of consistent competent performance.

B.2.1 Performance evidence.

The units of competence in the appendices specify what forms and the quantity of performance evidence which shall be presented for each element.

There are two types of performance evidence:

- evidence of the way the individual carried out activities - evidence of the process involved in demonstrating competence. This takes the form of observation, authenticated work experience book entries, or performance reports;
- products of the individual's work - items that the individual produces or works on or documents produced as part of the activity. The evidence may be in the form of the product itself; records or photographs generated as part of the work.

B.2.2 Knowledge evidence.

The knowledge evidence section of the element specifies the knowledge and understanding necessary for competent performance.

B.3 Knowledge requirements that are common to all competence units.

Candidates shall have knowledge and understanding of:

Health and safety legislation, regulations and safe working practices and procedures that include:

- relevant sections of the Health and Safety at Work Act;
- Electricity at Work Regulations;
- Transport and Works Act (Alcohol and drugs);
- current Rule Book;
- Working at Height;
- Confined Spaces.

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B.4 Assessment decisions.

Initial assessment decisions shall only be made following the generation of evidence from the individual's normal workplace. Assessment decisions of "competent" shall only be made when:

- all the required performance and knowledge evidence, as defined in the competence standard, has been provided;
- the evidence has been confirmed as accurate, current and attributable to the person concerned;
- equipments specific endorsements shall be added as described in **6.2**.

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B.5 TEL 01: Test the effectiveness of the immunisation system on copper cables in electrified areas (VLVT Testing).

B.5.1 Purpose.

The purpose of this competence unit is to define the requirements for individuals required to undertake VLVT testing activities.

B.5.2 Scope.

This competence unit applies in all circumstances where any individual is required to undertake VLVT testing activities on Network Rail managed infrastructure.

The level and extent of responsibility includes their own safety and that of others who might be affected by their work. The candidate shall be expected to refer to others for authorisation when required, shall be responsible for the implementation of the instructions and shall work within set procedures and specifications. The candidate is responsible for the quality of their completed work.

B.5.3 Competence Unit.

This competence unit comprises 1 element:

Element 1: Undertake VLVT testing activities

To prove competence in this unit, the candidate shall demonstrate their ability to confirm that VLVT testing activities are carried out in accordance with instructions. The candidate shall have to show they can follow checking, testing, recording, reporting and escalation procedures.

B.5.4 Assessment.

B.5.4.1 Initial assessment.

Where the equipment is new to the candidates area of responsibility evidence shall be used from satisfactory completion of training and mentoring and shall be gathered in relation to the individual undertaking immunisation testing activities.

Where the candidate has been previously trained and has been completing the work for more than one year the primary source of the evidence shall be from detailed questioning relevant to the particular type of asset, component or system supported by a performance report from the candidates supervisor.

B.5.5 Re-assessment.

Re-assessment shall be completed in accordance with the requirements in 6.3.

B.5.6 Knowledge evidence this is common to the whole unit.

Candidates shall have knowledge and understanding of:

- a) what the protection arrangements are required when completing VIVt activities;
- b) frequency of testing;
- c) testing procedures;
- d) limits of your own authority;
- e) safe working practices when testing;
- f) recording and reporting procedure;

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TEL 01: Undertake VLVT Testing	
Element 1: Undertake VLVT Testing	
Performance statements Candidate shall be able to: - work safely at all times, complying with health and safety and other relevant regulations and guidelines; - follow the appropriate procedures for use of tools and equipment to carry out the required tests; - set up and carry out the tests using the correct procedures and within agreed timescales; - record the results of the tests in the appropriate format and forward to the relevant people; - identify unsafe or faulty equipment; - identify where the test has been undertaken satisfactorily and when there is a requirement to retest; - set up basic test circuits including circuit provisioning, earth testing; - be able to initial analysis test results and know pass/failure limits, and escalate issues where necessary	Knowledge statements Candidates shall have knowledge and understanding of: - health and safety legislation, regulations and safe working practices and procedures; - VLVT test requirements; - VLVT test frequency & length of test period - types of test equipment and their application; - calibration of equipment and authorisation procedures; - testing methods and procedures - Initial analysis methods and techniques; - test reporting documentation and procedures; - recording, reporting and escalation procedures.
Scope of competence - The candidate must be aware of their own level and extent of responsibility - Type of products or assets to be tested include: - copper cables using allocated test pairs - Type of tools and test equipment to be used include: - Multimeter; - laptop computer with appropriate software; - test pairs; - Psophometer; - chart recorders. - Type and complexity of tests to be carried out include: - visual inspection; - pre-test check of test pairs; - full VLVT test over specified period of time. - Quality standards and accuracy to be achieved	Performance evidence Performance evidence shall be collected through differing types of evidence, of the employee completing all relevant tasks associated with the performance statements. <i>NOTE: Performance evidence methodology may include the use of:</i> <i>authenticated work experience records;</i> <i>performance reports;</i> <i>observation;</i> <i>relevant activity records.</i>

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B.6 TEL 02: Undertake corrective and preventative maintenance of Telecoms cable systems.

B.6.1 Purpose.

The purpose of this competence unit is to define the competence requirements for candidates required to undertake corrective and preventative maintenance of Telecoms cable systems.

B.6.2 Scope.

This competence unit applies in all circumstances where any individual is required to maintain, fault or test Telecoms cable systems on Network Rail managed infrastructure. The competence applies to candidates undertaking activities on any of the following:

- Cable Distribution Frames/Location Cases;
- Telecoms Earth and Screening Systems;
- Telecoms Copper Cables: - Jointing;
- Telecoms Copper Cables: - Fault Location and Routine Maintenance Testing;
- Telecoms Optical Fibre Cables: - Jointing;
- Telecoms Optical Fibre Cables: - Fault Location and Routine Maintenance Testing;
- Pressurisation Units;
- Hot Wire Working.

The level and extent of responsibility includes their own safety and that of others who might be affected by their work. The candidate shall be expected to refer to others for authorisation when required, shall be responsible for the implementation of the instructions and shall work within set procedures and specifications. The candidate is responsible for the quality of their completed work.

B.6.3 Competence unit.

This competence Unit comprises four elements.

Element 1: Carry out planned maintenance of Telecoms cable systems.

Element 2: Diagnose faults in Telecoms cable systems.

Element 3: Rectify defects in Telecoms cable systems.

Element 4: Confirm Telecoms cable systems comply with specifications.

The first element is concerned with the safe completion of planned maintenance in accordance with instructions. The second and third elements are concerned with the safe completion of locating, diagnosing and rectifying faults. The final element deals with testing of the equipment and analysing and interpreting the results to make sure that the equipment meets its operating requirements.

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To prove competence in this unit, the candidate shall demonstrate their ability to complete maintenance in accordance with instructions, locate, diagnose and rectify faults and complete the appropriate testing. The candidate shall have to show they can follow recording, reporting and escalation procedures.

B.6.4 Assessment.

B.6.4.1 Initial assessment.

Where the equipment is new to the candidate's area of responsibility evidence shall be used from satisfactory completion of training and mentoring and shall be gathered in relation to the individual working on the appropriate telecoms system.

Where the candidate has been previously trained and has been completing the work for more than one year the primary source of the evidence shall be from detailed questioning relevant to the particular type of asset, component or system supported by a performance report from the candidate's supervisor.

B.6.4.2 Re-assessment.

Re-assessment shall be completed in accordance with the requirements in **6.3**.

B.6.5 Knowledge evidence that is common to the whole unit.

Candidates shall have knowledge and understanding of:

- a) engineering specifications associated with Telecoms cable systems;
- b) how the maintenance adjustment, faulting, defect rectification and testing activity may affect the safe operation of the railway;
- c) what procedures need to be followed to confirm operational and personal safety is maintained during the work;
- d) how to avoid personal injury during the work;
- e) how the Telecoms cable systems are designed to function under normal operating conditions;
- f) what each of the component parts contributes to the overall operation of the system;
- g) what terminology and methods are used to identify Telecoms cable systems;
- h) what tools are required to complete the work and what equipment calibration is required;
- i) what maintenance authorisation procedures are and limits of your responsibility and authority;
- j) what equipment operating and care and control procedures are applicable to Telecoms cable systems;
- k) what procedures apply to taking the equipment out of operational service and what procedures apply to handing back the equipment to operational service;
- l) maintenance reporting documentation and control procedures;
- m) reporting lines and escalation procedures;
- n) industry protocols relating to communication important safety information.

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TEL 02: Undertake corrective and preventative maintenance of Telecoms cable systems.	
Element 1: Carry out planned maintenance of Telecoms cable systems.	
Performance statements. Candidates shall to be able to: - work safely at all times, complying with health and safety and other relevant regulations and guidelines; - follow the relevant maintenance schedules and instructions to carry out the required work; - carry out the maintenance activities within the limits of your personal authority; - carry out the maintenance activities in the specified sequence and in an agreed time scale; - confirm that the maintained equipment is operating within appropriate tolerances; - report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule; - complete relevant maintenance records accurately and pass them on to the appropriate person; - dispose of waste materials in accordance with safe working practices and approved procedures.	Knowledge statements. Candidates shall have knowledge and understanding of: - what types of defect can occur in Telecoms cable systems and how to check for these defects; - what maintenance schedules and related specifications apply to Telecoms cable systems; - what maintenance methods and procedures apply to which of the Telecoms cable systems including: - hot wire working. - what tests/checks need to be undertaken for a complete maintenance activity; - how to recognise when the work required to restore performance to specification exceeds the limits of the maintenance activity; - what the procedures are for dealing with an inability to complete maintenance activity within agreed timescales.
Scope of competence. - Activities include (equipment specific dependant): - clean; - examine; - visual check; - lubricate; - test and measure; - adjust; - replace. - Quality standards to be achieved are as defined in the maintenance specifications.	Performance evidence Performance evidence shall be collected through differing types of evidence, of the candidate completing all relevant tasks associated with the performance statements. <i>NOTE: Performance evidence methodology may include the use of:</i> <i>authenticated work experience records;</i> <i>performance reports;</i> <i>observation;</i> <i>relevant activity records;</i>

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TEL 02: Undertake corrective and preventative maintenance of Telecoms cable systems.

Element 2: Diagnose faults in Telecoms cable systems.

Performance statements.

Candidates shall be able to:

- work safely at all times, complying with health and safety and other relevant regulations and guidelines;
- review and use all relevant information on the symptoms and problems associated with the products or assets;
- investigate and establish the most likely causes of the faults;
- select, use and apply diagnostic techniques, tools and aids to locate faults;
- complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved;
- determine the implications of the fault for other work and for safety considerations;
- use the evidence gained to draw valid conclusions about the nature and probable cause of the fault;
- record details on the extent and location of the faults in an appropriate format.

Scope of Competence.

- Type of fault finding techniques or procedures, diagnostic aids and equipment including:
 - techniques appropriate to the fault symptoms;
 - destructive testing;
 - non-destructive testing;
 - observation;
 - taking measurements and readings.
- Type and range of problems and faults that affect specific assets including (but not limited to):
 - broken/disconnected fibre/wire;
 - short circuit;
 - open circuit;
 - earth conditions/connections;
 - sheath bonding/continuity;
 - induced voltages;
 - crosstalk;
 - attenuation problems;
 - air pressurisation.
- Level and complexity of diagnosis affecting the specific assets and issues including (But not limited to):
 - visual inspection;
 - electrical testing;
 - optical testing.

Knowledge statements.

Candidates shall have knowledge and understanding of:

- fault diagnostic aids including:
 - Multimeter;
 - level meter;
 - Insulation Resistance Meter;
 - OTDR;
 - Telecoms Maintenance Testing and Failure Investigation Handbook processes.
- fault finding methods and techniques including.
 - destructive;
 - non-destructive;
 - observation;
 - taking measurements and readings.
- analysis methods and techniques including:
 - comparison with specification;
 - comparison with operational requirements;
 - comparison with previous data;
- test equipment operating and care and control procedures including:
 - calibration;
 - authorisation;
 - controlled issue and return.
- assessing likely risks arising from faults

Performance evidence

Performance evidence shall be collected through differing types of evidence, of the candidate completing all relevant tasks associated with the performance statements.

NOTE: Performance evidence methodology may include the use of:

- authenticated work experience records;*
- performance reports;*
- observation;*
- relevant activity records.*

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TEL 02: Undertake corrective and preventative maintenance of Telecoms cable systems.

Element 3: Rectify defects in Telecoms cable systems.

Performance statements.

Candidates shall be able to:

- work safely at all times, complying with health and safety and other relevant regulations and guidelines;
- obtain all the required components and confirm that they are in a suitable condition for replacement and fit for purpose;
- confirm that any replacement components used meet the required specification;
- take adequate precautions to prevent damage to components, tools and equipment during replacement;
- replace the components in the correct sequence using appropriate tools and techniques;
- make any necessary settings or adjustments to the components so that they will function correctly;
- deal promptly and effectively with problems within your control and report those that cannot be solved;
- maintain documentation in accordance with organisational requirements.

Knowledge statements.

Candidates shall have knowledge and understanding of:

- component replacement methods, techniques and procedures associated with Telecoms cable systems;
- any local arrangements that may be in place at any given time e.g. hot wire working;
- what Telecommunications Maintenance Testing plans and procedures need to be followed prior to, and during the defect rectification (including need for independent testing of work).

Scope of competence

- Rectification techniques to be used including:
 - joint;
 - terminate;
 - replace parts;
 - test in relation to (FL&RMT).
- Complexity or nature of rectification to be carried out including:
 - fibre splicing;
 - fibre tail replacement;
 - joint copper wires;
 - sheath closure;
 - component replacement;
 - mechanical part replacement
 - earthing and bonding repairs;

Performance evidence

Performance evidence shall be collected of the candidate rectifying failures associated with:

- cable jointing;
- cable terminating;
- cable sheath closure;
- air pressurisation unit;

NOTE: Performance evidence methodology may include the use of:

- authenticated work experience records;*
- performance reports;*
- observation;*
- relevant activity records;*

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TEL 02: Undertake corrective and preventative maintenance of Telecoms cable systems.

Element 4: Confirm Telecoms cable systems comply with specifications

Performance statements.

Candidates shall be able to:

- work safely at all times, complying with health and safety and other relevant regulations and guidelines;
- follow and make appropriate use of the specifications for the product or asset being checked;
- use all the correct tools and inspection equipment and check that they are in a useable condition;
- carry out the checks in an appropriate sequence using approved methods and procedures;
- identify and assess any defects or variations from the specification and take appropriate action;
- report completion of compliance activities in line with organisational procedures.

Knowledge statements.

Candidates shall have knowledge and understanding of:

- what engineering test specifications are associated with Telecoms cable systems;
- what types of test equipment is used on Telecoms cable systems and how to use the test equipment;
- what Telecommunications Maintenance testing procedures and methods apply to Telecoms cable systems and how to select and conduct the appropriate Telecommunications Maintenance tests (including need for independent testing of work);
- what analysis methods and techniques are associated with Telecoms cable systems;
- what the test reporting documentation and procedures are;
- how to determine whether the equipment is operating within specification and what to do if adjustment or alteration is required.

Scope of competence.

- Tests to be carried out include:
 - functional;
 - continuity;
 - insulation;
 - signal level;
 - OTDR.
- Data to be used includes:
 - test results;
 - cable route drawings;
 - OTDR traces.
- Analytical techniques or procedures to be used including:
 - comparison with specification;
 - comparison with previous data.

Performance evidence

Performance evidence shall be collected through differing types of evidence, of the candidate completing all relevant tasks associated with the performance statements.

NOTE: Performance evidence methodology may include the use of:

- authenticated work experience records;*
- performance reports;*
- observation;*
- relevant activity records;*

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B.7 TEL 03: Undertake corrective and preventative maintenance of Telecommunication Power supplies.

B.7.1 Purpose.

The purpose of this competence unit is to define the competence requirements for candidates required to undertake corrective and preventative maintenance of Telecommunication Power supplies.

B.7.2 Scope.

This competence unit applies in all circumstances where any individual is required to maintain, fault or test Telecommunication Power supplies on Network Rail managed infrastructure. The competence applies to candidates working on:

- rectifiers;
- batteries;
- invertors;
- UPS.

The level and extent of responsibility includes their own safety and that of others who might be affected by their work. The candidate shall be expected to refer to others for authorisation when required, shall be responsible for the implementation of the instructions and shall work within set procedures and specifications. The candidate is responsible for the quality of their completed work.

B.7.3 Competence unit.

This competence unit comprises four elements.

Element 1: Carry out planned maintenance of Telecommunication Power supplies.

Element 2: Diagnose faults in Telecommunication Power supplies.

Element 3: Rectify defects in Telecommunication Power supplies.

Element 4: Confirm Telecommunication Power supplies systems comply with specifications.

The first element is concerned with the safe completion of planned maintenance in accordance with instructions. The second and third elements are concerned with the safe completion of locating, diagnosing and rectifying faults. The final element deals with testing of the equipment and analysing and interpreting the results to make sure that the equipment meets its operating requirements.

To prove competence in this unit, the candidate shall demonstrate their ability to complete maintenance in accordance with instructions, locate, diagnose and rectify faults and complete the appropriate testing. The candidate shall have to show they can follow recording, reporting and escalation procedures.

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B.7.4 Assessment.

B.7.4.1 Initial assessment.

Where the equipment is new to the candidate's area of responsibility evidence shall be used from satisfactory completion of training and mentoring and shall be gathered in relation to the candidate working on Telecommunication Power supplies.

Where the candidate has been previously trained and has been completing the work for more than one year the primary source of the evidence shall be from detailed questioning relevant to the particular type of Telecommunication Power supplies supported by a performance report from the candidate's supervisor.

B.7.4.2 Re-assessment.

Re-assessment shall be completed in accordance with the requirements in **6.3**.

B.7.5 Knowledge Evidence that is common to the whole unit.

Candidates shall have knowledge and understanding of:

- a) engineering specifications associated with Telecommunication power supplies;
- b) how the maintenance adjustment, faulting, defect rectification and testing activity affects the safe operation of the railway;
- c) what procedures need to be followed to confirm operational and personal safety is maintained during the work;
- d) how to avoid personal injury during the work;
- e) how the Telecommunication Power supplies are designed to function under normal operating conditions;
- f) what each of the component parts contributes to the overall operation of the system;
- g) what terminology and methods are used to identify Telecommunication power supplies;
- h) what tools are required to complete the work and what equipment calibration is required;
- i) what electrostatic precautions need to be taken when working on power supplies and how to use the appropriate protection method;
- j) what maintenance authorisation procedures are and limits of your responsibility and authority;
- k) what equipment operating and care and control procedures are applicable to Telecommunication power supplies;
- l) what procedures apply to taking the equipment out of operational service and what procedures apply to handing back the equipment to operational service;
- m) maintenance reporting documentation and control procedures;
- n) reporting lines and escalation procedures;
- o) industry protocols relating to communication important safety information.

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TEL 03: Undertake corrective and preventative maintenance of Telecommunication Power supplies.

Element 1: Carry out planned maintenance of Telecommunication Power supplies.

Performance statements.

Candidates shall be able to:

- work safely at all times, complying with health and safety and other relevant regulations and guidelines;
- follow the relevant maintenance schedules and instructions to carry out the required work;
- carry out the maintenance activities within the limits of your personal authority;
- carry out the maintenance activities in the specified sequence and in an agreed time scale;
- confirm that the maintained equipment is operating within appropriate tolerances;
- report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule;
- complete relevant maintenance records accurately and pass them on to the appropriate person;
- dispose of waste materials in accordance with safe working practices and approved procedures.

Scope of competence.

- Preventative maintenance procedures are to be completed on:
 - rectifiers;
 - batteries;
 - invertors;
 - UPS;
- Activities are to:
 - clean;
 - examine;
 - electrical test;
 - check;
 - adjust;
 - replenish;
 - replace;
 - report defects.
- Quality standards to be achieved are as defined in the maintenance specifications.

Knowledge statements.

Candidates shall have knowledge and understanding of:

- what types of defect can occur in Telecommunication Power supplies and how to check for these defects;
- what maintenance schedules and related specifications apply to Telecommunication Power supplies;
- what maintenance methods and procedures apply to the Telecommunication Power supplies;
- what tests/checks need to be undertaken for a complete maintenance activity;
- the safety precautions required when working with potential high voltages and currents present in the systems and which can still be present when systems are isolated
- what the safety precautions are to avoid contact with corrosive materials;
- how to protect against the potential hazardous environment due to cells gassing;
- how to recognise when the work required to restore performance to specification exceeds the limits of the maintenance activity;
- what the procedures are for dealing with an inability to complete maintenance activity within agreed timescales.

Performance evidence

Performance evidence shall be collected through differing types of evidence, of the candidate completing all relevant tasks associated with the performance statements.

NOTE: Performance evidence methodology may include the use of:

- authenticated work experience records;*
- performance reports;*
- observation;*
- relevant activity records;*

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TEL 03: Undertake corrective and preventative maintenance of Telecommunication Power supplies.

Element 2: Diagnose faults in Telecommunication Power supplies.

Performance statements.

Candidates shall be able to:

- work safely at all times, complying with health and safety and other relevant regulations and guidelines;
- review and use all relevant information on the symptoms and problems associated with the products or assets;
- investigate and establish the most likely causes of the faults;
- select, use and apply diagnostic techniques, tools and aids to locate faults;
- complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved;
- determine the implications of the fault for other work and for safety considerations;
- use the evidence gained to draw valid conclusions about the nature and probable cause of the fault;
- record details on the extent and location of the faults in an appropriate format.

Knowledge statements.

Candidates shall have knowledge and understanding of:

- fault diagnostic aids including:
 - Multimeter;
 - Battery Impedance Tester;
 - Telecoms Maintenance Testing and Failure Investigation Handbook;
 - manufacturers documentation;
 - site documentation;
 - supply analyser;
- fault finding methods and techniques including.
 - intrusive;
 - non-intrusive;
 - observation;
 - taking measurements and readings.
- analysis methods and techniques including:
 - comparison with specification;
 - comparison with operational requirements;
 - comparison with previous data;
- test equipment operating and care and control procedures including:
 - calibration;
 - authorisation;
 - controlled issue and return.
- Assessing likely risks arising from faults

Scope of competence.

- Type of fault finding techniques or procedures, diagnostic aids and equipment including:
 - techniques appropriate to the fault symptoms;
 - intrusive testing;
 - non-intrusive testing;
 - observation;
 - taking measurements and readings.
- Type and range of problems and faults including:
 - low output;
 - high output;
 - no output;
 - unstable output.
- Level and complexity of diagnosis including:
 - cell failure;
 - charger failure;
 - UPS failure;
 - inverter failure.

Performance evidence

Performance evidence shall be collected through differing types of evidence, of the candidate completing all relevant tasks associated with the performance statements.

NOTE: Performance evidence methodology may include the use of:

- authenticated work experience records;*
- performance reports;*
- observation;*
- relevant activity records;*

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TEL 03: Undertake corrective and preventative maintenance of Telecommunication Power supplies.

Element 3: Rectify defects in Telecommunication Power supplies.

Performance statements.

Candidates shall be able to:

- a. work safely at all times, complying with health and safety and other relevant regulations and guidelines;
- b. obtain all the required components and confirm that they are in a suitable condition for replacement and fit for purpose;
- c. confirm that any replacement components used meet the required specification;
- d. take adequate precautions to prevent damage to components, tools and equipment during replacement;
- e. replace the components in the correct sequence using appropriate tools and techniques;
- f. make any necessary settings or adjustments to the components so that they will function correctly;
- g. deal promptly and effectively with problems within your control and report those that cannot be solved;
- h. maintain documentation in accordance with organisational requirements.

Knowledge statements.

Candidates shall have knowledge and understanding of:

1. component defect rectification methods, techniques and procedures associated with Telecommunication Power supplies;
2. what Telecommunications maintenance testing procedures need to be completed prior to defect rectification;
3. escalation of non-compliances.

Scope of competence

1. Type of defect rectification techniques to be used include:
 - adjust;
 - replace.
2. Complexity or nature of defect rectification to be carried out including:
 - replacing fuses;
 - replacing cells;
 - replace components of chargers and UPSs;
 - adjust outputs;
 - reinstatement of supply;
 - isolation of supply.

Performance evidence.

Performance evidence shall be collected of the candidate undertaking defect rectification after failures associated with:

- adjustment;
- replacement;
- use of Telecoms Maintenance Testing; and Failure Investigation Handbook;
- recording of changes.

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TEL 03: Undertake corrective and preventative maintenance of Telecommunication Power supplies.

Element 4: Confirm Telecommunication Power supplies comply with specifications

Performance statements.

Candidates shall be able to:

- work safely at all times, complying with health and safety and other relevant regulations and guidelines;
- follow and make appropriate use of the specifications for the product or asset being checked;
- use all the correct tools and inspection equipment and check that they are in a useable condition;
- carry out the checks in an appropriate sequence using approved methods and procedures;
- identify and assess any defects or variations from the specification and take appropriate action;
- report completion of compliance activities in line with organisational procedures.

Knowledge statements.

Candidates shall have knowledge and understanding of:

- what engineering test specifications are associated with Telecommunication Power supplies;
- what types of test equipment are used on Telecommunication Power supplies and how use the test equipment;
- what Telecommunications Maintenance testing procedures and methods apply to Telecommunication Power supplies;
- how to select and conduct the appropriate Telecommunications Maintenance tests;
- what analysis methods and techniques are associated with Telecommunication Power supplies;
- what the test reporting documentation and procedures are;
- how to determine whether the equipment is operating within specification and what to do if adjustment or alteration is required.

Scope of competence.

- Tests to be carried out include:
 - functional;
 - voltage;
 - polarity;
 - earth;
 - battery cell impedance.
- Data to be used includes:
 - test results;
 - system drawings;
 - system manuals.
- Analytical techniques or procedures to be used including:
 - comparison with specification;
 - comparison with previous data.

Performance evidence

Performance evidence shall be collected through differing types of evidence, of the candidate completing all relevant tasks associated with the performance statements.

NOTE: Performance evidence methodology may include the use of:

- authenticated work experience records;*
- performance reports;*
- observation;*
- relevant activity records;*

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B.8 TEL 04: Undertake corrective and preventative maintenance of telephone systems.

B.8.1 Purpose.

The purpose of this competence unit is to define the competence requirements for candidates required to undertake corrective and preventative maintenance of telephone systems.

B.8.2 Scope.

This competence unit applies in all circumstances where any individual is required to maintain, fault or test telephone systems on Network Rail managed infrastructure.

The competence applies to candidates working on:

- Operational Telephones and Tail Cables;
- PETS System;
- Tunnel Emergency Communication Systems.

The level and extent of responsibility includes their own safety and that of others who might be affected by their work. The candidate shall be expected to refer to others for authorisation when required, shall be responsible for the implementation of the instructions and shall work within set procedures and specifications. The candidate is responsible for the quality of their completed work.

B.8.3 Competence Standard.

This competence unit comprises four elements.

Element 1: Carry out planned maintenance of telephone systems.

Element 2: Diagnose faults in telephone systems.

Element 3: Rectify defects in telephone systems.

Element 4: Confirm telephone systems comply with specifications.

The first element is concerned with the safe completion of planned maintenance in accordance with instructions. The second and third elements are concerned with the safe completion of locating, diagnosing and rectifying faults. The final element deals with testing of the equipment and analysing and interpreting the results to make sure that the equipment meets its operating requirements.

To prove competence in this unit, the candidate shall demonstrate their ability to complete maintenance in accordance with instructions, locate, diagnose and rectify faults and complete the appropriate testing. The candidate shall have to show they can follow recording, reporting and escalation procedures.

B.8.4 Assessment.

B.8.4.1 Initial assessment.

Where the equipment is new to the candidate's area of responsibility evidence shall be used from satisfactory completion of training and mentoring and shall be gathered in relation to the individual working on the appropriate telecoms systems.

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Where the candidate has been previously trained and has been completing the work for more than one year the primary source of the evidence shall be from detailed questioning relevant to the particular type of telecoms system supported by a performance report from the candidate's supervisor.

B.8.4.2 Re-assessment.

Re-assessment shall be completed in accordance with the requirements in **6.3**.

B.8.5 Knowledge evidence that is common to the whole unit.

Candidates shall have knowledge and understanding of:

- a) engineering specifications associated with telephone systems;
- b) how the maintenance adjustment, faulting, defect rectification and testing activity affects the safe operation of the railway;
- c) what procedures need to be followed to confirm operational and personal safety is maintained during the work;
- d) how to avoid personal injury during the work;
- e) how the telephone systems are designed to function under normal operating conditions;
- f) what each of the component parts contributes to the overall operation of the system;
- g) what the labelling requirements are for telephone systems;
- h) what terminology and methods are used to identify telephone systems;
- i) what electrostatic precautions need to be taken when working on telephone systems and how to use the appropriate protection method;
- j) what tools are required to complete the work and what equipment calibration is required;
- k) what maintenance authorisation procedures are and limits of your responsibility and authority;
- l) what equipment operating and care and control procedures are applicable to Telephone systems;
- m) what procedures apply to taking the equipment out of operational service and what procedures apply to handing back the equipment to operational service;
- n) maintenance reporting documentation and control procedures;
- o) reporting lines and escalation procedures;
- p) industry protocols relating to communication important safety information.

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TEL 04: Undertake corrective and preventative maintenance of telephone systems.

Element 1: Carry out planned maintenance of telephone systems.

Performance statements. Candidates shall be able to: - work safely at all times, complying with health and safety and other relevant regulations and guidelines; - follow the relevant maintenance schedules and instructions to carry out the required work; - carry out the maintenance activities within the limits of your personal authority; - carry out the maintenance activities in the specified sequence and in an agreed time scale; - confirm that the maintained equipment is operating within appropriate tolerances; - report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule; - complete relevant maintenance records accurately and pass them on to the appropriate person; - dispose of waste materials in accordance with safe working practices and approved procedures;	Knowledge statements. Candidates shall have knowledge and understanding of: - what types of defect can occur in telephone systems and how to check for these defects; - what maintenance schedules and related specifications apply to telephone systems; - what maintenance methods and procedures apply to the telephone systems; - what tests/checks need to be undertaken for a complete maintenance activity; - how to recognise when the work required to restore performance to specification exceeds the limits of the maintenance activity; - what the procedures are for dealing with an inability to complete maintenance activity within agreed timescales.
Scope of competence. - Preventative maintenance procedures are to be completed on: - Operational Telephones and Tail Cables; - PETS System; - Tunnel Emergency Communication Systems. - Activities are to: - clean; - examine; - check; - test; - lubricate; - replace; - adjust; - report defects. - Quality standards to be achieved are as defined in the maintenance specifications.	Performance evidence Performance evidence shall be collected through differing types of evidence, of the candidate completing all relevant tasks associated with the performance statements. <i>NOTE: Performance evidence methodology may include the use of:</i> <i>authenticated work experience records;</i> <i>performance reports;</i> <i>observation;</i> <i>relevant activity records;</i>

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TEL 04: Undertake corrective and preventative maintenance of telephone systems.

Element 2: Diagnose faults in telephone systems.

Performance statements. Candidates shall be able to: - work safely at all times, complying with health and safety and other relevant regulations and guidelines; - review and use all relevant information on the symptoms and problems associated with the products or assets; - investigate and establish the most likely causes of the faults; - select, use and apply diagnostic techniques, tools and aids to locate faults; - complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved; - determine the implications of the fault for other work and for safety considerations; - use the evidence gained to draw valid conclusions about the nature and probable cause of the fault; - record details on the extent and location of the faults in an appropriate format.	Knowledge statements. Candidates shall have knowledge and understanding of: - fault diagnostic aids including: - Multimeter. - Telecoms Maintenance Testing & Failure Investigation Handbook - Linesman telephone - fault finding methods and techniques including: - intrusive; - non-intrusive; - observation; - taking measurements and readings. - analysis methods and techniques including: - comparison with specification; - comparison with operational requirements; - comparison with previous data. - test equipment operating and care and control procedures including: - calibration; - authorisation; - controlled issue and return. - assessing likely risks arising from faults
Scope of competence. - Type of fault finding techniques or procedures, diagnostic aids and equipment including: - techniques appropriate to the fault symptoms; - intrusive testing; - non-intrusive testing; - observation; - taking measurements and readings. - Level and complexity of diagnosis including: - circuit failure; - instrument failure.	Performance evidence Performance evidence shall be collected through differing types of evidence, of the candidate completing all relevant tasks associated with the performance statements. <i>NOTE: Performance evidence methodology may include the use of:</i> <i>authenticated work experience records;</i> <i>performance reports;</i> <i>observation;</i> <i>relevant activity records;</i>

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TEL 04: Undertake corrective and preventative maintenance of telephone systems.

Element 3: Rectify defects in telephone systems.

Performance statements. Candidates shall be able to: - work safely at all times, complying with health and safety and other relevant regulations and guidelines; - obtain all the required components and confirm that they are in a suitable condition for replacement and fit for purpose; - confirm that any replacement components used meet the required specification; - take adequate precautions to prevent damage to components, tools and equipment during replacement; - replace the components in the correct sequence using appropriate tools and techniques; - make any necessary settings or adjustments to the components so that they will function correctly; - deal promptly and effectively with problems within your control and report those that cannot be solved; - maintain documentation in accordance with organisational requirements.	Knowledge statements. Candidates shall have knowledge and understanding of: - component defect rectification methods, techniques and procedures associated with telephone systems (including the requirements for escalation); - what Telecommunications maintenance testing procedures need to be completed prior to defect rectification; - recording of actions and defect rectification undertaken.
Scope of Competence requirements. - Type of defect rectification techniques to be used including: - adjust; - replace; - reconnect cables. - Complexity or nature of defect rectification to be carried out including: - replace handset; - replace telephone; - re-terminate wires; - replace PCBs.	Performance evidence Performance evidence shall be collected through differing types of evidence, of the candidate completing all relevant tasks associated with the performance statements. <i>NOTE: Performance evidence methodology may include the use of:</i> <i>authenticated work experience records;</i> <i>performance reports;</i> <i>observation;</i> <i>relevant activity records;</i>

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TEL 04: Undertake corrective and preventative maintenance of telephone systems.

Element 4; Confirm telephone systems comply with specifications

Performance statements. Candidates shall be able to: - work safely at all times, complying with health and safety and other relevant regulations and guidelines; - follow and make appropriate use of the specifications for the product or asset being checked; - use all the correct tools and inspection equipment and check that they are in a useable condition; - carry out the checks in an appropriate sequence using approved methods and procedures; - identify and assess any defects or variations from the specification and take appropriate action; - report completion of compliance activities in line with organisational procedures.	Knowledge statements. Candidates shall have knowledge and understanding of: - what engineering test specifications are associated with telephone systems; - what types of test equipment is used on telephone systems and how to use the test equipment; - what Telecommunications Maintenance testing procedures and methods apply to telephone systems; - how to select and conduct the appropriate Telecommunications Maintenance tests; - what analysis methods and techniques are associated with telephone systems; - what the test reporting documentation and procedures are; - how to determine whether the equipment is operating within specification and what to do if adjustment or alteration is required.
Scope of competence. - Tests to be carried out include: - functional; - non-intrusive; - intrusive. - Data to be used includes: - equipment specifications; - equipment manuals; - site diagrams. - Analytical techniques or procedures to be used including: - comparison with specification; - comparison with previous data.	Performance evidence Performance evidence shall be collected by observation in the workplace or during training, completing the following tests: - functional; - non-intrusive; - intrusive. <i>NOTE: Performance evidence methodology may include the use of:</i> <i>authenticated work experience records;</i> <i>performance reports;</i> <i>observation;</i> <i>relevant activity records</i>

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B.9 TEL 5: Undertake corrective and preventative maintenance of Concentrators

B.9.1 Purpose.

The purpose of this competence unit is to define the competence requirements for candidates required to undertake corrective and preventative maintenance of Concentrators.

B.9.2 Scope.

This competence unit applies in all circumstances where any individual is required to maintain, fault or test Concentrators on Network Rail managed infrastructure. The competence applies to candidates working on:

- Electro-Mechanical Concentrators
- Electronic PABX/Concentrators
- Processor Controlled Concentrators

The level and extent of responsibility includes their own safety and that of others who might be affected by their work. The candidate shall be expected to refer to others for authorisation when required, shall be responsible for the implementation of the instructions and shall work within set procedures and specifications. The candidate is responsible for the quality of their completed work.

B.9.3 Competence unit.

This competence unit comprises four elements.

Element 1: Carry out planned maintenance of Concentrators.

Element 2: Diagnose faults in Concentrators.

Element 3: Rectify defects in Concentrators.

Element 4: Confirm Concentrators comply with specifications.

The first element is concerned with the safe completion of planned maintenance in accordance with instructions. The second and third elements are concerned with the safe completion of locating, diagnosing and rectifying faults. The final element deals with testing of the equipment and analysing and interpreting the results to make sure that the equipment meets its operating requirements.

To prove competence in this unit, the candidate shall demonstrate their ability to complete maintenance in accordance with instructions, locate, diagnose and rectify faults and complete the appropriate testing. The candidate shall have to show they can follow recording, reporting and escalation procedures.

B.9.4 Assessment.

B.9.4.1 Initial assessment

Where the equipment is new to the candidate's area of responsibility evidence shall be used from satisfactory completion of training and mentoring and shall be gathered in relation to the individual working on Concentrators.

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