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Level 2

Competence & Training in Traction Power Distribution

Endorsement and Authorisation

Endorsed by:



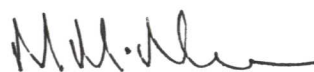
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Issue record

Issue	Date	Comments
1	Dec 2006	New Issue
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Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 05 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/SP/CTM/005	Quality Assurance in Training Delivery.
NR/L2/OHS/018	Supplier requirements for the approval of medical assessments and drug and alcohol and screening & certification.
NR/L2/OHS/00124	Competence Specific Medical Fitness Requirements
NR/L2/OHS/051	Drugs and alcohol.
NR/SP/ELP/21060	Issue of Safety Documentation for Work on 650/750V DC Apparatus
NR/WI/ELP/21067	Making out, Issuing and Cancelling High Voltage Permits-to-Work, Sanctions-for Test and Circuit State Certificates
NR/SP/ELP/29987	Working on or near 25kV AC Electrified Lines
NR/WI/ELP/3091	DC Electrified Lines Instructions
NR/WI/ELP/27051	Working Instructions for DC Electrified Lines in the Liverpool Area
NR/WI/ELP/27052	Working Instructions for DC Electrified Lines on the Northern City Line

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1 Purpose

This specification sets out the minimum requirements for the assessment of personnel who undertake Traction and/or Non Traction Power Distribution, and/or isolation activities on Network Rail managed infrastructure. It defines processes to be implemented and the standards to be achieved to confirm that personnel who undertake Traction and/or Non Traction Power Distribution and/or isolation activities are competent to perform the work.

2 Scope

The specification applies to all employers and people who undertake Traction Power Distribution, and/or isolation activities on Network Rail managed infrastructure.

The scope of this document also applies where activities extend to non traction locations and equipment where applicable.

3 Definitions

Access to

Relates to those persons who have access to Electrical Power Supply Equipment which is normally secured in buildings, rooms, equipment cases and enclosures, etc., to prevent danger to persons not trained in the avoidance of danger from such equipment.

Assessor

A person approved to undertake assessments of people against the requirements of specific Competence units.

Assessment

Gathering and judgement of evidence to 'prove' or 'determine' a person's Competence as required by a Competence unit.

Authority to work

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

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 shall include 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 confirm the safety of any person who might be affected by the work; and an appropriate level fitness.

Certificate

Certificate confirms that specific competence has been demonstrated by an individual against the requirements of a Competence unit. The certificate forms the basis for the competence to be added to the Authority to work.

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Competence Management System (CMS)

Competence Management System is 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 a impact on the:

- Safe operation and maintenance of Network rail managed infrastructure.
- Occupational health and safety of workers on or about the Network Rail or.
- Safety of other persons affected by their activities.
- Performance of Network Rail's business.

Competence Profile

Competence Profile is 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 Unit

Competence Unit is a statement of:

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

Electrical Control Operator (ECO)

The person working in an Electrical Control Room, having control of the power supply to the electric traction system and all operations of related electrical equipment thereon.

Electrical Power Supply Equipment

Equipment, over 1,000V A.C. and over 600V D.C., forming part of the traction and power supply systems owned or leased by Network Rail.

Employee/Person.

Employee/Person means a person in scope whose Competence is assessed by an Assessor.

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I&E Assessor

I&E Assessor is a person approved to undertake the assessments of people against the requirements of specific the Isolation and Earthing Competence Units; who has been trained in assessment techniques and methods and has occupational experience and current knowledge of Railway Group Standards and Network Rail Company Specifications applicable to the I&E activity and Competence unit. In addition they shall hold the equipment specific I&E competence. See also I&E Supported Assessor.

I&E Expert

A person who has thorough knowledge and understanding of a specific competence, equipment type and/or procedure, and who is certified to complete the duties in that competence, equipment type and/or procedure.

I&E Supported Assessor

An I&E Supported Assessor is a person who has been trained in assessment techniques and methods and has occupational experience and current knowledge of Railway Group Standards and Network Rail Company Specifications applicable to the activity and Competence unit. The I&E supported assessor shall use the expertise of an I&E expert who has the required equipment specific competence to support the required I&E Competence assessment.

Isolate

The process of electrical disconnection and separation.

Isolated

Electrical equipment is isolated when it is disconnected and separated from all sources of electricity supply in a secure way.

Isolation

The action of causing an electrical section of specified equipment to be isolated.

Mentoring period

Mentoring period is a period of time between the satisfactory completion of training where the employee shall undertake the work under supervision of a mentor. This period is used to enable the employee to practice the competence and gather evidence ready for assessment.

Person in Scope

Anyone whose current or future role shall involve completing tasks associated Traction Power Distribution work.

Persons New to Traction Power Distribution

Those persons who have not previously undertaken activities involving Traction Power Distribution work. It includes persons that may already be working in, or have worked in, the rail industry before, but in another role, not related Traction Power Distribution work. New to Traction Power Distribution work is not related to grade but to previous experience as described above.

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Trainer

A person approved by Network Rail to deliver specific training courses.

Safety Critical Work

Activities carried out in the railway industry that may affect the health and safety of persons on the transport system and that may have a real time impact on the operational railway.

Supported Assessor

A person who has been trained in assessment techniques and methods but does not have current knowledge of Railway Group Standards and Network Rail Company Specifications applicable to the specific activity and Competence unit.

Verification

Verification is a process by which the quality of assessment decisions and the supporting process are independently assured.

Verifier

Verifier is a person who is competent and authorised to review the assessment process and assure the completed assessment decisions against specific competence units.

4 Requirements

4.1 Deployment

Employers shall not deploy any Person New to Traction Power Distribution work on any tasks associated with Traction Power Distribution work that shall have a direct impact on the integrity of the Traction Power Distribution system, until that person has attended and successfully completed the Network Rail Traction Power Distribution Induction Course.

Additionally people who are not New to Traction Power Distribution work shall only be deployed on tasks associated with Traction Power Distribution and/or isolation activities provided the person has attended and successfully completed appropriate training or has been assessed as competent to complete the work. Where a person has been trained they may undertake the activities but shall be subjected to an appropriate level of supervision.

4.2 Work on or near the line

Where a person is required to undertake activities on or near the line they shall be hold the relevant track safety competence(s).

In addition, persons shall be able to demonstrate medical fitness and be screened for alcohol and drugs in accordance with Network Rail Specification [NR/SP/OHS/018](#): Supplier requirements for the approval of medical assessments and drug and alcohol and screening & certification.

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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 training framework and specific training modules have been developed to address the common training needs of Persons in Scope. Details of this framework together with normal training progression are contained 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 person concerned.
- Take account of specific types of equipment that the person shall be required to work on and the type of activities the person shall be required to undertake.
- Establish the current competence of the person with 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 person and order in which the training should take place.
- Arrange training.
- Person completes relevant training.

4.4 Mentoring

Following the successful completion of training, each person shall undertake a period of workplace experience. The detailed mentoring requirements shall be provided in the requirements for each training course. The person's employer 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.

Each employer shall provide a work experience book to record what activities the person has completed during the workplace experience.

4.5 Assessment

Following successful completion of the relevant training and mentoring the person shall be assessed against the requirements of the relevant competence units contained in Appendix B of this specification.

4.6 Delivery of training

Persons delivering the training courses listed in Appendix A shall be approved by Network Rail in accordance with the requirements of NR/SP/CTM/005 - Quality Assurance in Training Delivery.

Trainers shall only use the Network Rail approved training plans and assessments to deliver the training event.

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4.7 Completion of assessment

Where competences are recorded on the NCCA database Assessors shall be approved by Network Rail or its agents. For all other competences Assessors shall be approved in accordance with the employing organisation's competence management system. In both cases Assessors shall be approved prior to undertaking assessments against the competence units detailed in this specification. Assessors shall plan and complete assessments.

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

4.8 Maintaining competence

Employers shall have systems in place to assure the continued competence of persons undertaking Traction Power Distribution and/or isolation activities. These systems shall consist as a minimum of:

- a) The use of a work experience book to record completed activities. All competences detailed in this specification should be practised at least 4 times in a 12 month period, unless otherwise stated and associated work experience book entries shall be made to confirm the completion of the activities.
- b) The implementation of a review or re-assessment regime as defined in **6.2**.

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 personnel who are undertaking Traction Power Distribution and/or isolation activities 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 teams undertaking maintenance, installation activities or working with the electrical power supply.

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 Traction Power Distribution activity competence requirements.

Competence Units shall be selected on the basis of the person's job role and responsibility. A set of profiles for Traction Power Distribution activity competence requirements have been developed to aid this process.

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5.3 Training Needs

A training framework and specific training modules applicable to the activities associated with Traction Power Distribution and isolation activities have been developed and brief details of each module are contained in Appendix A. The training framework and specific training modules are directly linked to the competence units in Appendix B.

Persons in Scope who are new to Traction Power Distribution work shall as a minimum complete Traction Power Distribution Induction training regardless of what job role the person is undertaking.

5.4 Equipment Specific Endorsements

Where a person has been assessed as competent for one equipment type in a group of similar types and is required to demonstrate competence on other types certificate endorsements shall be added in the following way:

- a) Assessed as competent against "Dist 1: Undertake Corrective Maintenance of Traction Power Distribution Systems" on HV Switchgear. The certificate issued shall show competence to:
 - Undertake Corrective Maintenance of Traction Power Distribution Systems inc:
 - o H.V Switchgear
- b) The person attends a Traction Power Distribution Maintenance course for a different type of Traction Power Distribution Systems and successfully completes end of training assessments. A new certificate shall be issued showing competence to:
 - Undertake Corrective Maintenance of Traction Power Distribution Systems on
 - o H.V Switchgear
 - o L.V Switchgear

Assessment Strategy

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

- Whether or not the person is new to the job role.
- What training and experience a person has had.
- What different types of equipment the person is required to work on.
- The practicality of gathering observed evidence.
- The risks from incompetent performance.

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5.5 Initial Assessment

The following approach shall be used:

Case 1

Where the activity is new to the person's 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 records the details in their work experience book. During the mentoring period the Mentor shall confirm that both his/her own safety and the safety of the person is maintained at all times in accordance with the Rule Book.
- c) Be assessed against the requirements laid down in the relevant Competence unit.
 - If the employee is competent the person completing the assessment shall issue a certificate of competence (See equipment specific endorsements).
 - If the employee is not yet competent.
 - o The line manager shall agree and implement a development action plan.
 - o The employee may continue workplace experience under supervision.
 - o On completion of development action plan the employee shall be re-assessed for the specific competence.

Case 2

Where the employee has been previously trained and been completing the work for more than 1 year they shall be assessed for the specific competence using the following as the primary source of evidence:

- a) Detailed questioning/standard knowledge tests.
- b) Performance report from the line manager to confirm satisfactory and safe performance across the range of work detailed in the Competence unit.
- c) If the employee is competent the person completing the assessment shall issue certificate of competence.
- d) If the employee is not yet competent they shall be dealt with as described in Case 1.

5.6 Re-assessment Regime

Where an employee requires re-assessment of a competence the following minimum shall apply

- Review of a work experience book in which the completed activities have been recorded.
- Confirmation of knowledge through detailed questioning.
- Specific criteria for the requirement of Isolation competence are detailed in Appendix B

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Appendix A Traction Power Distribution Training Framework Summary

Where a person requires training to develop their competence they shall attend and successfully complete the Network Rail approved Traction Power Distribution training courses. This appendix contains a brief overview of the modules that form the Traction Power Distribution Training Framework.

A.1 Technical Training

Traction Power Distribution Induction

This module is designed to train persons who are new to Traction Power Distribution and whose activities may involve the maintenance of the Traction Power Distribution equipment or other duties that may affect the operation of Traction Power Distribution equipment. The aim of the module is to provide the basic underpinning knowledge of the Traction Power Distribution system components and working methods associated with maintenance of Traction Power Distribution assets.

Traction Power Distribution Maintenance

This module is designed to train persons whose activities involve the basic maintenance of the Traction Power Distribution engineering equipment. The person shall be likely to be in a team member role that needs to develop their competence in Dist 1 Undertake preventative & corrective maintenance of the Traction Power Distribution systems and Dist 5 Inspect the Traction Power Distribution Infrastructure. The aim of the module is to develop the delegate's understanding of:

- HV Switchgear Maintenance
- LV AC Switchgear Maintenance
- Transformer Maintenance
- Rectifier Maintenance
- Battery and Charger Maintenance
- DC Switchgear Maintenance (geographically dependant)
- Traction Derived Supplies (geographically dependant)
- Safe working Practices

Protection Relay Maintenance

This module is designed to train persons whose activities involve the maintenance of the Protection Relays equipment on the Traction Power Distribution Infrastructure. The person shall be likely to be in a team leader role that needs to develop their competence in Dist 2 Undertake preventative & corrective maintenance of protection relays

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SCADA Systems Maintenance

This module is designed to train persons whose activities involve the maintenance of SCADA system equipment on the Traction Power Distribution infrastructure. The person shall be likely to be in a team leader role who needs to develop their competence in Dist 3 Undertake preventative & corrective maintenance of SCADA. The aim of the module is to develop the delegate's understanding of:

- Electro Mechanical SCADA
- Solid State SCADA (Outstation & Masterstation)

HV Distribution Cable (inc. Pilot cables) Maintenance

This module is designed to train persons whose activities involve the maintenance of the HV Distribution Cables (inc. Pilot cables) equipment. The person shall be likely to be in a Cable Technician role who needs to develop their competence in Dist 4 Undertake preventative & corrective maintenance of HV Distribution Cables (including Pilot Cables).

Supervision of Traction Power Distribution Work & Assets

This module is designed to train persons whose activities involve the supervision of any work or assets on the Traction Power Distribution Infrastructure. The person shall be likely to be in a team leader role that needs to develop their competence in Dist 6 Confirm effective progression of Traction Power Distribution activities and Dist 7 Confirm Traction Power Distribution assets are fit for operational purposes following work

A.2 Isolation Training

Level D: Receive Safety Documentation

This module is designed to train persons whose duties require them to undertake activities on the isolated Traction Power Distribution Infrastructure and who are required to receive safety documentation associated and in line with isolation procedures. In addition, it is designed to train persons on their personal and organisational responsibilities when receiving safety documentation and to allow competent personnel to work/test electrical power supply equipment. The person shall be likely to be in a team leader role and whose duties require them to complete their work without interfering with the electrical Infrastructure.

Level C: Access & Egress Traction and/or non traction locations

This module is designed to train persons whose duties require them to Access & Egress Traction and/or non traction locations on the Traction Power Distribution Infrastructure. The person shall be likely to be in a team member role and whose duties require them to have access to Traction and/or non traction locations to complete activities without interfering with the electrical equipment.

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Level B: AC Isolation Procedures

This module is designed to train persons whose duties involve the completion of isolating, earthing and/or switching procedures under direction for AC Traction Power Distribution Equipment. This module includes the procedures for working under authorising personnel in order to complete instructions in line with rules and regulations, and how to complete the duties safely and satisfactorily with regard to HV AC (66kV/33kV/25kV/22kV/11kV) current equipment. The person shall be likely to be an experienced team member with adequate knowledge of the distribution infrastructure or in a team leader role who needs to develop their competence in electrical power supplies.

Level B: DC Isolation Procedures

This module is designed to train persons whose duties involve the completion of isolating, earthing and/or switching procedures under direction for DC Traction Power Distribution Equipment and is an additional module to the AC Isolation Procedures training. It includes the procedures for working under authorising personnel in order to complete instructions in line with rules and regulations, and how to complete the duties safely and satisfactorily with regard to DC (750V) current equipment. The person shall be likely to be an experienced team member with adequate knowledge of the distribution infrastructure or in a team leader role who needs to develop their competence in electrical power supplies.

Level A: Isolation Procedures

This module is designed to train persons whose activities involve setting up safe systems of work and completion of safety documentation to allow competent personnel to work/test electrical power supply equipment. This module is designed to train persons whose duties involve the completion of isolating, earthing and/or switching procedures, authorising and directing isolation, earthing and/or switching procedure and issuing Safety documentation for the isolation, earthing and switching process to allow competent personnel to work/test electrical power supply equipment for Traction and/or Non Tract Power Distribution Equipment. This module includes the procedures for working in order to complete duties in line with rules and regulations, and how to complete the duties safely and satisfactorily with regard to HV AC (66kV/33kV/25kV/22kV/11kV) and DC (750V) current equipment. The person is most likely to be an experienced team member with adequate knowledge of the distribution infrastructure or in a team leader role who needs to develop their competence in electrical power supplies.

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Equipment Specific Endorsements

In addition to the procedural Level A and Level B modules, requirements for specific equipment type training are detailed below. Before allowing persons to isolate, earth and/or switch specific Traction Power Distribution equipment types they shall be trained in the modules below suitable to their requirements

The category modules below have been identified and detail the definitive equipment type required for training on the infrastructure

AC Equipment Types			
<u>Category 1</u> (Separate Earthing Accessory/Reconfigurable) GEC - KC Switchgear - KA Switchgear Reyrolle - L800T Switchgear BTH/AEI - MF36 Switchgear Hawkgas - Hawkgas 36 Switchgear - Hawkgas 12 Switchgear	<u>Category 2</u> (Air Insulated Vacuum) Whipp and Bourne - W&B CV Switchgear - Euston/Watford - W&B CV Switchgear - South Eastern GEC - GEC XE2 Switchgear	<u>Category 3</u> (Gas Insulated Switchgear) Siemens 8DA10 Switchgear 8DA11 Switchgear 8DA12 Switchgear ABB - ZX1.2 Switchgear - ZX0 Switchgear - ZV2 Switchgear Areva Switchgear - WI Switchgear - WS Switchgear	<u>Category 4</u> (SMOS) GEC - OX36 (FSK11) Switchgear - Areva CBR Switchgear ABB Switchgear - Sace Switchgear Hawkgas Switchgear - Hawkgas 25 Switchgear Hawker Sidley - HSS Switchgear
<u>Category 5</u> (Air Insulated Gas Breakers) - ABB Switchgear - Safe Six Switchgear	<u>Category 6</u> (Flexible Portable Earthing) Single Phase GEC/South Wales Switchgear/Hawkvac - XE2/XE2/X82S/H25 /HawkVac25 Switchgear Three Phase GEC - JB424 Switchgear - OX36 Switchgear	<u>Category 7</u> (Individual/Other) Switchgear & Cowans - K4 Switchgear - K11 Switchgear ASEA Switchgear - HKSJ	<u>Category 8</u> (Non Traction) ** Equipment Specific External Training Event

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DC Equipment Types

<u>Category A</u> (Withdrawable)			<u>Category B</u> (Fixed)
- A1 = Open Busbar - A2 = Semi Enclosed Busbar, - A3 = Enclosed Busbar For Guidance Equipment includes:			For Guidance Equipment includes: AEI - RJR526 Switchgear GEC - RJR 526 Switchgear Holec - Soule Switchgear - Ferraz Switchgear - Le Carbone Switchgear ABB - ACB Switchgear CTS/CTI
Associated Electrical Industries - RJR 721 E Switchgear (A1) - RLR 151 Switchgear (A1) - RJR530 Switchgear (A1) - RJR531 Switchgear (A1) - RJR831 Switchgear (A1) Bertram Thomas - HSE Switchgear (A1) - HSL Switchgear (A2) - MR Switchgear (A2) - T & N Switchgear (A2)	British Thompson-Houston - RJR 721 A Switchgear (A1) GEC - RJR 530 Switchgear (A1) - RJR 831 Switchgear (A1) Siemens 8MF94 Switchgear (A3) - DSG Switchgear (A3) Balfour Beatty - BBRPS Switchgear (A3)	Whipp & Bourne - MM74 Switchgear (A3) - NDC(Lightning) Switchgear (A3) Secheron - UR 36 Switchgear (A3) - UR 40 Switchgear (A3) - HPB (Main Circuit) Switchgear (A3)	

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Appendix B - Competence Units

Competence units applicable to the working activities associated with the Traction Power Distribution Infrastructure have been developed and are contained within this Appendix. The Appendix contains the competence units that shall be used to assess the competence of personnel who are responsible for the maintenance, faulting repairing and/or testing of the Traction Power Distribution equipment.

B.1 Competence Units

Based on a functional analysis the following competence units have been identified as suitable to control the risks associated with competent performance of personnel who are undertaking the maintenance, faulting, repair and/or testing of Traction Power Distribution equipment on Network Rail Managed infrastructure.

- Dist. 1: Undertake Preventative & Corrective Maintenance of the Traction Power Distribution Systems.
- Dist. 2: Undertake Preventative & Corrective Maintenance of Protection Relays.
- Dist. 3: Undertake Preventative & Corrective Maintenance of SCADA Systems.
- Dist. 4: Undertake Preventative & Corrective Maintenance of the HV Distribution Cable Systems (including Pilot Cables).
- Dist. 5: Inspect the Traction Power Distribution Infrastructure.
- Dist. 6: Effective Progression of Traction Power Distribution Activities.
- Dist. 7: Confirm Traction Power Distribution Assets are fit for Operational Purposes following work.

In addition to the above those persons required to work on or have access to electrical power supply equipment shall have sufficient competence to carry out activities without risk of danger to themselves or other persons. The competence units shown below have been identified as meeting the requirements for persons who undertake the duties for this work

- Dist. 8: Level D: Receive Safety Documentation
- Dist. 9: Level C: Access & Egress Traction and/or non traction locations
- Dist. 10: Level B: Isolate, Earth and/or Switch Traction Distribution Equipments under direction
- Dist. 11: Level A: Isolate Earth and/or Switch & Issue Safety Documentation for Traction Distribution Equipment

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B.1.1 Sentinel Applicable Codes:

Units 8 – 10 are subject to sentinel certification. Below is the list of Sentinel applicable codes that relate to these units of competence

Sentinel Applicable Code	Associated Unit of Competence
LD DIST	Dist. 8: Level D: Receive Safety Documentation
LC DIST	Dist. 9: Level C: Access & Egress Traction and/or non traction locations
LB DIST AC -i (a.c equipment only)	Dist 10: Level B: Isolate, Earth and/or Switch Traction Distribution Equipments under direction (a.c equipment)
LB DIST AC + DC -i (a.c & a.c equipment)	Dist 10: Level B: Isolate, Earth and/or Switch Traction Distribution Equipments under direction (a.c & d.c equipment)
LA DIST (equipment only)	Dist 11: Level A: Isolate Earth and/or Switch & Issue Safety Documentation for Traction Distribution Equipment)

The equipment specific types shall be detailed as the category groups in Appendix A

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 employee is capable of consistent competent performance.

B.3 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 employee 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 employee's work – items that the employee produces or works on or documents produced as part of the activity. The evidence may be in the form of the product itself, or may be a records or photographs generated as part of the work.

B.4 Knowledge Evidence

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

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B.5 Knowledge requirements that is common to all competence units.

Candidates shall have knowledge and understanding of:

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

- Relevant sections of the Health and Safety at Work Act.
- Safety Critical Work Regulations.
- Electricity at Work Regulations.
- COSHH.
- Transport and Works Act (Alcohol and drugs).
- Track access restrictions.
- Current rule book.

B.6 Assessment Decisions

Initial assessment decisions shall only be made following the generation of evidence from the person's normal workplace.

Assessment decisions of "competent" shall only be made when:

- All the required performance and knowledge evidence, as defined in the competence unit, has been provided.
- The evidence has been confirmed as accurate, current and attributable to the person concerned.
- Equipment endorsements may be added to a competence certificates following successful completion of training.

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B.7 Monitoring Process

The table below provides guidance on how often a competence shall be practiced to demonstrate the competence is maintained.

Competence Units		Minimum Work experience entries in 12 months
Dist. 1	Undertake Preventative & Corrective Maintenance of the Traction Power Distribution Systems.	4
Dist. 2	Undertake Preventative & Corrective Maintenance of Protection Relays.	4
Dist. 3	Undertake Preventative & Corrective Maintenance of SCADA .	4
Dist. 4	Undertake Preventative & Corrective Maintenance of the HV Distribution Cables Systems (including Pilot Cables).	4
Dist. 5	Inspect the Traction Power Distribution Infrastructure.	4
Dist. 6	Confirm the Effective Progression of Traction Power Distribution Activities.	4
Dist. 7	Confirm the Traction Power Distribution Assets are fit for Operational Purposes following work.	4
Dist. 8	Level D: Receive Safety Documentation	0
Dist. 9	Level C: Access & Egress Traction and/or non traction locations	0
Dist. 10	Level B: Isolate, Earth & Switch Traction Distribution Equipments under direction	2
Dist. 11	Level A: Isolate, Earth and/or Switch & Issue Safety Documentation for Traction Distribution Equipment	2

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B.8 Dist. 1: Undertake Preventative & Corrective Maintenance of the Traction Power Distribution Systems.

B.8.1 Purpose

The purpose of this competence unit is to define the competence requirements for persons required to undertake preventative and corrective maintenance of the Traction Power Distribution Systems.

B.8.2 Scope

This competence unit applies in all circumstances where any person is required to maintain the Traction Power Distribution systems and components on Network Rail managed infrastructure.

The level and extent of responsibility shall include their own safety and that of others who might be affected by their work. The employee 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 employee is responsible for the quality of their completed work. This competence unit shall be used to assess the competence of people maintaining any of the following:

- HV Switchgear (and associated equipment)
- Transformers
- Rectifiers
- LV AC Distribution Boards
- Batteries
- Battery Chargers
- DC Switchgear (and associated equipment) (geographically dependant)
- Traction Derived Supplies (geographically dependant)
- CTI/CTS

B.8.3 Competence Unit

This competence unit comprises four elements:

- Element 1 Undertake routine preventative & corrective maintenance of the Traction Power Distribution system.
- Element 2 Adjust the Traction Power Distribution systems to meet operating requirements
- Element 3 Locate and diagnose defects in the Traction Power Distribution systems.
- Element 4 Restore the Traction Power Distribution systems to meet operational specification

The first element is concerned with the safe completion of planned maintenance in accordance with instructions. The second element deals with adjusting the

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equipment to make sure that it meets its operating requirements. The third element is concerned with the safe completion of locating and diagnosing defects.

The fourth and final element deals with the restoration work undertaken during maintenance activities.

To prove competence in this unit, the employee shall demonstrate their ability to complete maintenance in accordance with current working instructions. The employee shall have to show they can follow recording, reporting and escalation procedures.

B.8.4 Assessment

B.8.4.1 Initial Assessment

Where the activity is new to the employee's area of responsibility evidence shall be used from satisfactory completion of training and mentoring and shall be gathered of the employee working on the Traction Power Distribution.

Where the employee has been previously trained and has been completing the work for more than one year, performance evidence requirements defined in the element do not apply. The primary source of the evidence shall be from detailed questioning supported by performance reports from the employee's Supervisor.

B.8.4.2 Re-Assessment

Re-assessment shall be completed at least every 3 years in accordance with the requirements set out in 6.2.

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

You shall have knowledge and understanding of:

- a) How the maintenance and testing activity may affect the safe operation of the railway.
- b) Which procedures need to be followed, to confirm operational and personal safety, are maintained during the work.
- c) How to avoid personal injury during the work.
- d) How the Traction Power Distribution system is designed to function under normal operating conditions.
- e) What each of the component parts contributes to the overall operation of the Traction Power Distribution system.
- f) What terminology and methods are used to identify Traction Power Distribution and describe operational status of the equipment.
- g) What tools are required to complete the work and what equipment calibration is required.
- h) What the limits of your responsibility and authority are.
- i) Who is responsible for taking the equipment out of operational service and handing the equipment back to operational service.
- j) Maintenance reporting documentation
- k) Reporting lines and escalation procedures

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l) Industry protocols relating to communication important safety information

Dist. 1: Undertake Preventative & Corrective Maintenance of the Traction Power Distribution System

Element 1: Undertake routine preventative & corrective maintenance of the Traction Power Distribution System.

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Performance Statements

You 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 activities.
- Carry out the maintenance activities within the limits of 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

- The type of maintenance activity includes:
 - Inspect Traction Power Distribution equipment and components
 - Measure & Test Traction Power Distribution equipment and components including:
 - Electrical/Mechanical Clearances
 - Alignment/Available Movement
 - Electrical Continuity
 - Clean equipment and components where applicable
 - Lubricate where necessary
 - Replenish fluids where required
- The equipment to be maintained includes but not limited to:
 - HV Switchgear and associated equipment including:
 - Circuit Breakers
 - Busbar and support insulators
 - Bushings
 - Insulators
 - Isolators
 - DC Switchgear and associated equipment including
 - Relays
 - Contacts
 - Arc Chutes
 - Transformers
 - Rectifiers
 - CTI/STS
 - L.V AC Distribution Boards
 - Batteries inc:
 - Wet Cells
 - Sealed Lead Acid
 - Battery Chargers
 - Traction Derived Supplies
- Quality standards to be achieved are as defined in the maintenance specifications.

Knowledge statements

You shall have knowledge and understanding of:

- What types of defect can occur, how to check and how to deal with each defect.
- What maintenance schedules and related specifications apply to Traction Power Distribution equipment.
- What maintenance methods and procedures apply to Traction Power Distribution equipment.
- What tests/checks shall be undertaken for a complete maintenance activity.
- How to recognise when the activity required, restoring performance to specification, exceeds personal limits of competence.
- ~~Reporting lines and procedures as specified by the company~~

Performance Evidence Requirements

Performance evidence shall be collected through differing types of workplace evidence, of the employee completing all relevant maintenance procedures in respect of performance statements: a, b, c, d, e and g for all items applicable in scope statement 1, and shall include:

- Inspection
- Measure and Test
- Clean
- Lubricate and Replenish
- Record and Report

The remaining performance statements may be assessed using witness testimony, documented questioning or evidence from training.

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Element 2: Adjust the Traction Power Distribution system to meet operating requirements.

Performance statements

You shall be able to:

- Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- Follow the appropriate operating specifications for the equipment being maintained.
- Carry out adjustments within the limits of personal authority.
- Make the required adjustments in the specified sequence and in an agreed time scale.
- Confirm that the adjusted equipment meets the required operating specification.
- Report any instances where the equipment fails to meet the required performance after adjustments or where there are identified defects outside the required adjustments.
- Maintain documentation in accordance with organisational requirements.

Knowledge statements

You shall have knowledge and understanding of:

- How to carry out adjustments related to the functions detailed in scope statement 1.
- Maintenance schedules and related specifications relating to Traction Power Distribution equipment.
- Maintenance methods and procedures relating to Traction Power Distribution equipment.

Scope of Competence

- Type of adjustments to be made include:
 - Adjust appropriate equipment within specification and/or tolerances as required by manufacturers manual.
 - Security and position of all component parts
 - Mechanical clearances
 - Electrical clearances
 - Tightening
- Quality standards to be achieved are as defined in the maintenance specifications

Performance Evidence Requirements

Performance evidence shall be collected through differing types of workplace evidence, of the employee adjusting:

- Mechanical equipment
- Electrical equipment

in respect of performance statements: a, b, c, d, e, and g.

and shall include

- Security and positioning of all component parts
- Tightening
- Recording of actions performed

The remaining performance statements may be assessed using witness testimony, documented questioning or evidence from training.

Dist. 1: Undertake Preventative & Corrective Maintenance of the Traction Power Distribution System

Element 3: Locate & diagnose defects in the Traction Power Distribution system

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Performance statements

You shall be able to:

- Work safely at all times, complying with health and safety and other relevant regulations and guidelines
- Take prompt action to diagnose and rectify the problems and keep all relevant people informed of progress.
- Obtain all relevant information relating to the problems
- Identify correctly the nature and extent of the problems
- Identify the most effective solutions to rectify the problems
- Confirm that solutions are implemented correctly and promptly
- Confirm that the rectification complies with all relevant regulations and guidelines

Scope of Competence

- Type of fault finding techniques or procedures, diagnostic aids and equipment including but not limited to:
 - Techniques appropriate to the fault symptoms
 - Intrusive testing
 - Non-intrusive testing
 - Observation
 - Taking measurements and readings using approved equipment
- Type and range of problems and faults affecting:
 - HV Switchgear (and associated components)
 - DC Switchgear (and associated components)
 - Transformers
 - Rectifiers
 - CTI/CTS
 - LV AC Switchgear
 - Batteries
 - Chargers
 - Traction Derived Supplies
- Level and complexity of diagnosis including but not limited to:
 - Incorrect indications
 - Illegible signage/labelling
 - Complete System Failure/Loss of power supply
- Causes of defect include but not limited to:

- Loose/defective fastenings - High electrical resistivity or broken continuity of current carrying components - Excessive mechanical wear - Misalignment of components	- Foreign object encroachment - Corrosion/erosion of components - Inadequate mechanical/electrical clearances - Accumulation of dirt/pollution on insulation - Mechanical damage to components
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Knowledge statements

You shall have knowledge and understanding of:

- Fault diagnostic aids including:
 - Meters
- Fault finding methods and techniques including:
 - Intrusive
 - Non-intrusive
 - 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 Requirements

Performance evidence shall be collected of the employee locating failures associated with the equipment caused by:

- Electrical failure
- Mechanical failure
- Damage
- Foreign bodies

in respect of all performance statements.

This evidence shall normally be supplied by copies of relevant fault reports to confirm that the work has been completed.

Dist. 1: Undertake Preventative & Corrective Maintenance of Traction Power Distribution System

Element 4: Restore the Traction Power Distribution to meet operational specification.