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Level 2

Competence and Training for the Maintenance of Traction and Rolling Stock and On-track Machines

Endorsement and Authorisation

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Issue record

Issue	Date	Comments
1	June 2011	First Issue

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 02/06/2012 with the following exceptions.

1) Where an existing contract is in place and the supplier has demonstrated to the satisfaction of the Contract Manager that they have Competency Management System which is mature and of an equivalent level of equality to that specified in this standard.
2) For all projects that have formally completed GRIP Stage 3 to continue to comply with the issue of any relevant Network Rail Standards current when GRIP Stage 3 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/L2/CTM/001	Competence Management System
NR/L2/CTM/021	Competence and Training in Track Safety
NR/L2/CTM/202	Quality Assurance in Training and Assessment
NR/L2/CTM/025	Competence and Training in On Track Plant Operation
BS EN 287-1	Qualification test of welders. Fusion welding. Steels
BS 4872 -1	Specification for Approval testing of welders when welding procedure approval is not required - Part 1: Fusion welding of steel

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1 Purpose

The purpose of this document is to define the minimum requirements for the training and assessment of individuals required to undertake maintenance and/or overhaul work on Traction and Rolling Stock (T&RS) and On-track machine (Including modules on-track plant, which have been deemed to be T&RS assets in order to reduce ambiguity and complexity), which are owned, hired and/or leased by Network Rail, or where Network Rail has an engineering responsibility.

2 Scope

This standard applies to any individual who undertakes maintenance, fault finding, repair and overhaul activities of any assets for which Network Rail has engineering responsibility, unless the employer is able to demonstrate fundamental equality in the assurance of an individual's competence by using an alternative system.

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 company specifications applicable to the activity and competence standard.

An individual approved to undertake Assessments of people against the requirements set out in specific Competence Standards.

Assessment

A systematic process of gathering and judging evidence to 'prove' or 'determine' an individual's competence as defined in a competence standard. Assessment includes the re-assessment of individual's competence.

Asset

For the purposes of this document 'Asset' refers to Network Rail owned or leased rail vehicles; modules, on-track plant and/or on-track machines.

Authority to Work

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

Candidate

An individual whose competence is being assessed.

Certificate

A document that confirms that specific competence has been demonstrated by an individual against the requirements of a competence standard.

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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 can include a willingness to undertake work activities in accordance with agreed standards, rules and procedures. It can also include the consistent achievement of an identified standard of performance under defined normal, abnormal, and emergency situations; the ability to undertake work to confirm the safety of any individual who might be affected by the work; and an appropriate level of physical fitness.

Competence assessment
A systematic process of gathering and judging evidence to 'prove' or 'determine' an individual's competence as defined in a competence standard. Assessment includes the re-assessment of individual's competence.

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 a 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
c) Safety of other persons affected by their actions or inactions.
d) Performance of Network Rail's business.

Competence profile
A description of the range of competence requirements 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:

a) what a person must be able to do and how well, in order to achieve the intended outcome of work;
b) the range of circumstances in which the ability would have to be demonstrated
c) the knowledge required to complete the work;
d) the types of evidence needed to confirm that performance is consistent and can be sustained;
e) how this would be assessed.

Delegate
An individual who is undergoing a period of training

Design specification
A detailed statement of the outcomes and results of the Design Phase of Instructional System Design (ISD) identifying the necessary Development resources, costs and organisational needs and recording all the information obtained from various Analysis activities.

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Mentoring Period
In the workplace 'mentoring' describes a relationship and an activity by which a more experienced colleague uses their greater knowledge and understanding of the work, tasks or range of activities to support the development of a less experienced colleague.

Person in Scope
An individual whose current or future role involves completing activities associated with asset, maintenance, overhaul, inspection, or testing on assets.

Persons New to Asset Maintenance and Overhaul
Individuals who have not previously undertaken work activities involving maintenance, overhaul, inspection or testing tasks on the asset. It includes individuals that may already be working in, or have worked in, the rail industry before, but in another role, not related to asset maintenance and overhaul. New to asset maintenance and overhaul is not related to grade but to previous experience as described above.

Rail Vehicle
Any vehicle described as traction and rolling stock or rail plant (i.e. locomotives, multiple units, coaching stock or wagons) and on-track machines, rail mounted maintenance machines and road-rail vehicles.

Supported Assessor
Is 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 activity and Competence Standard.

A Supported Assessor shall use the expertise of another person who has the required knowledge to support all Competence assessments.

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.

Training
Learning that is provided in order to improve performance on the present job.

A planned process to modify behaviour, knowledge and/or skill through learning experience to achieve effective performance in an activity or range of activities.

Its purpose is to develop the abilities of the individual and to satisfy the requirements of the organisation.

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 confirm Assessment decisions.

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4 Requirements

4.1 Deployment

Individuals new to asset maintenance and/or overhaul shall not undertake any activities associated with maintenance, overhaul inspection or testing, on any asset until they have undertaken the appropriate training approved by Network Rail.

Until proven competent that individual shall not undertake any activities unless they are suitably supervised by a competent and experienced person.

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 and Training in Track Safety*.

4.3 Medical fitness

Medical fitness of the individual shall be taken into account prior to any identification of training and/or competence requirements and shall be in line with NR NR/L2/OHS/00124: Competence specific medical fitness requirements

Any individual required to go on or near the line shall be able to demonstrate medical fitness in accordance with:

- NR/L2/OHS/00124 - Competence specific medical fitness requirements
- NR/L1/OHS/051 - Drugs and Alcohol

4.4 Asset repair/recovery on or near the line

Asset repair and/or recovery activities shall only be carried out on or near the line where taking into account disruption and risk, no other reasonable method of clearing the line is available.

4.5 Operation of assets

Where an individual is required to operate any asset in order to undertake any maintenance, overhaul, inspection and/or testing activities, they shall either;

a) hold sufficient and relevant On-track Plant Operators competence(s) as described in *NR/L2/CTM/025 - Competence and Training in On-track Plant Operators*; or

b) (where operation of assets is not covered by NR/L2/CTM/025), reference the relevant operational document for the specific asset to confirm the operational competence requirements are met.

4.6 Training

Subject to the minimum requirements in 4.1 - 4.4, managers 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. Managers 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;

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- establish the current competence of the individual in relation to deployment requirements and ascertain whether this meets the “pre-requisite” and “foundation discipline” knowledge;
- take account of specific types of assets and systems that the individual is required to work on and the type of activities the individual is required to undertake;
- establish what development is required and therefore which “core” competency 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 with an approved training supplier;
- individual completes relevant training.

4.7 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. Managers shall appoint a mentor who shall be responsible for supporting the workplace experience. Managers shall demonstrate that appropriate supervision is maintained during the period of mentoring.

Network Rail or each contracting employer shall provide a mechanism to their employees to enable them to record work experience including activities the individual has completed during the workplace experience.

4.8 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.

4.9 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.

4.10 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 A. Assessors shall plan and complete assessments, see the process detailed in Appendix B.

4.11 Verification

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

4.12 Maintaining competence

The implementation of a re-assessment regime as defined in section 6.3.

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5 Application

5.1 Competence units

Traction and Rolling Stock Competence Review Group (CRG) have developed a four tiered structure (see Figure 1) as follows:

- Pre-requisite (existing knowledge)
- Foundation (basic engineering knowledge and skills)
- Core (asset specific skills and knowledge)
- Expert (component specific skills and knowledge)

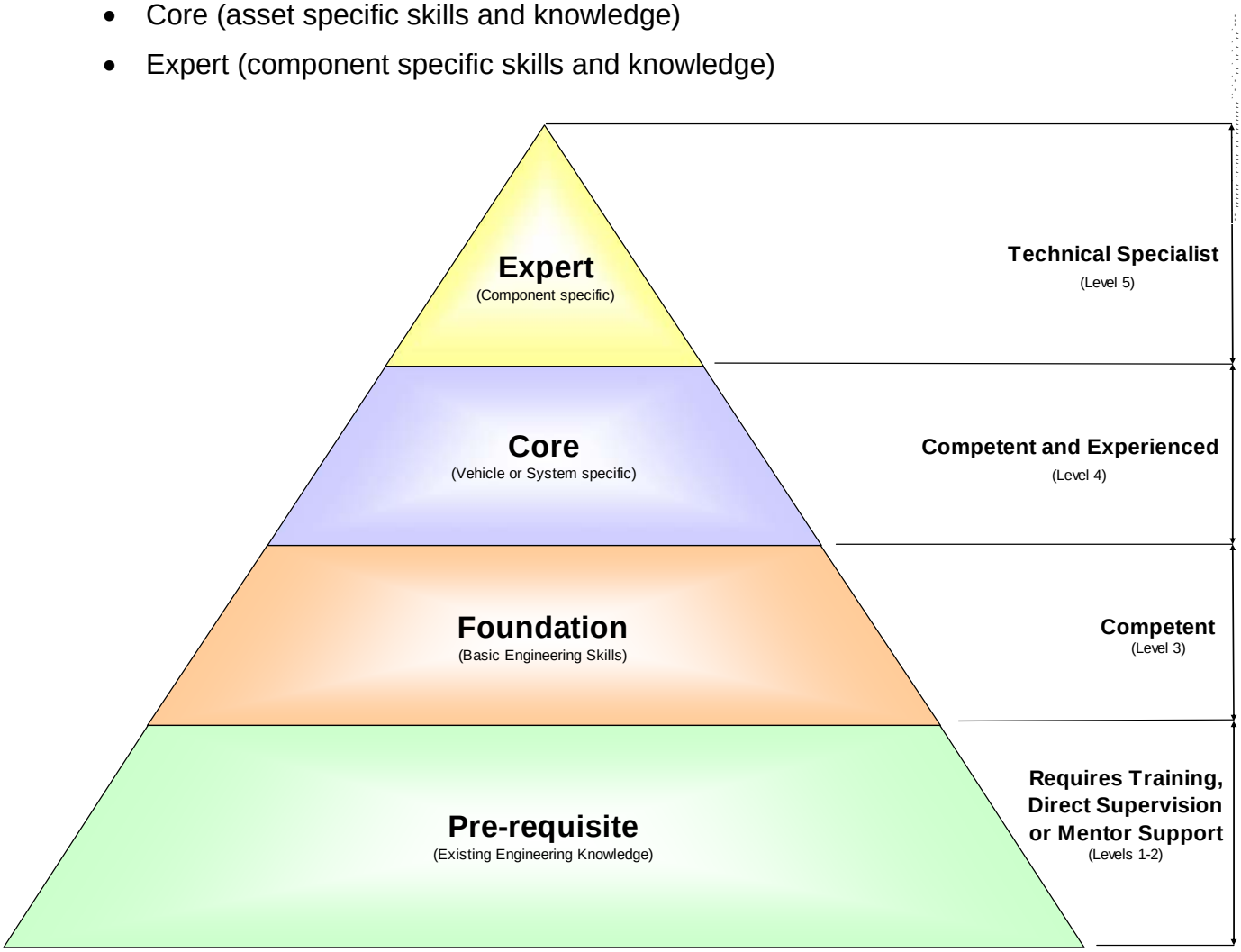

Figure 1 Traction and Rolling Stock competency knowledge structure

Competence units have been developed which shall be suitable to control the risks associated with incompetent performance of individuals who are undertaking asset maintenance, overhaul, inspection and/or testing activities. These competence units are detailed in Appendix A.

Specific competence profiles shall be developed for each role and shall take account of equipment specific needs. This can then be compared against the level of knowledge and skill of the individual and the assets that they shall be working on, to enable a personal training programme to be developed.

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

Each of the competence units in Appendix A defines the competence requirements for a particular area of knowledge such as structures and coachwork or axles and wheels. These units detail the knowledge and performance assessment criteria that the individual should be meeting for the specified subject.

5.2 Competence Levels

The individual will be assessed in each unit as required and shall be deemed competent at one of the following levels based on either the requirements of the task that they are required to perform, or where working as part of a team – their respective input to the execution of the intended task:

a) **Level 1 - Requires Training**

The person is not able to undertake the task

Applies where the employee requires this competence and:

- has little/no knowledge or experience in completing the work; or
- has been previously judged as competent but the work experience records and/or knowledge test results indicate that they have lost most of the required knowledge; or
- are performing significantly below the required standard; or
- the competence has expired and can only be recertified through training.

b) **Level 2 - Direct Supervision or Mentor Support**

The person is able to complete the task under direct supervision of a “competent and experienced” person (level 4).

- is normally applied following initial training.

Applies if the employee:

- meets the medical / physical capability requirements for the task; and
- has sufficient knowledge to complete the work but has little or no experience in completing the work; or
- has been previously judged as competent but the work experience and/or knowledge test results indicate that they have lost some required knowledge or are not performing to the required standard.

Also applies where no formal training exists and

- vocational competence has been gained via experiential learning; and
- knowledge gaps have been identified and a mentoring plan exists

c) **Level 3 - Competent**

The person is able to complete the task without supervision and directly supervise others.

Applies if the employee can provide evidence that he/she:

- meets the medical / physical capability requirements for the task; and

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- has been trained;

NOTE Includes where vocational competence has been gained via experiential learning

and

- has demonstrated the required underpinning knowledge; and
- has been performing the work to the required standard and frequency; and
- has consistently demonstrated proper and appropriate work safe behaviours;

and

- has consistently demonstrated behaviours in line with the company's values of *Respect, Teamwork, Determination and Pride*.

d) **Level 4 – Competent and Experienced**

The person is able to complete the task without supervision and can mentor others.

Applies if the employee can provide evidence that he/she:

- meets the medical / physical capability requirements for the task; and
- has been trained;

NOTE Includes where vocational competence has been gained via experiential learning

and

- has demonstrated the required underpinning knowledge; and
- has been performing competently (level 3) on a regular basis for a period exceeding 12 months and has thorough underpinning knowledge; and
- has demonstrated the confidence and willingness to improve the capability, safety and productiveness of others; and
- has consistently demonstrated proper and appropriate work safe behaviours;

and

- has consistently demonstrated behaviours in line with the company's values of *Respect, Teamwork, Determination and Pride*.

e) **Level 5 – Technical Specialist**

The person is able to provide technical advice for the task.

Only applies if the employee:

- does not, under normal circumstances, need to practice the competence. They shall demonstrate they have all the required knowledge for the competence;
- the application of level 5 shall be limited. Consideration shall be given to the competence type, grade and role of the employee;

5.2.1 Pre-requisite

(Levels 1 and 2 - Requires Training, Direct Supervision or Mentor Support)

Pre-requisites comprise the first and second levels of competencies and knowledge required to have a basic understanding of the skills, systems, processes which facilitate safe working practices on T&RS and OTM Assets whilst undertaking maintenance and repair activities.

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For example this includes topics as diverse as understanding bespoke maintenance equipment and the format/structure of typical maintenance documentation.

Pre-requisite knowledge base covered by at this level typically includes:

- Basic Workshop principles, Safety & Legislation.
- Basic Electrical principles & Safety.
- Basic Hydraulic principles & Safety.
- Basic Air Brake principles & Safety.
- Basic Railway Safety – working in sidings and yards.
- Rail Vehicle Safety Conditions for maintenance examinations.
- Basic Railway Safety – working on failed vehicles on running lines.

5.2.2 Foundation

(Level 3 – Competent)

Foundation enables the individual to understand the basic engineering principles and physics behind a given engineering discipline. This is of paramount importance to safe working with and gives an understanding of risk associated with given T&RS systems.

For example this includes understanding the basic principles and risks associated with the engineering relating systems as diverse as high pressure hydraulic systems and electronic train control systems. Disciplines which are covered by Foundation modules include:

- Electrical;
- Mechanical;
- Hydraulic;
- Pneumatic;
- Operations for Maintenance Staff.

5.2.3 Core

(Level 4 – Competent Experienced)

Core competences provide the individual with sufficient capability to understand given T&RS systems, major components with a view to completing the following activities;

- fault diagnosis;
- component exchange or where necessary fixed component repair;
- replacement of consumable items;
- dismantle;
- repair;
- re-assemble;
- calibrate/adjust.

This includes systems identified as safety critical. An example of this would be where a draw-hook is being replaced due to wear.

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Although Core is system based, individuals shall also have to complete (where applicable) a vehicle type endorsement to acquaint themselves with the asset specific knowledge required.

Core includes:

- Wheelsets;
- Speedometer;
- Fire systems;
- Vehicle heights;
- Transmissions;
- Engines;
- Bogies;
- Glazing;
- Painting;
- Safety Equipment;
- High Pressure jetting;
- OTMR
- TCA;
- Radio systems;
- Lasers and geometry systems;
- Lighting;
- TPWS/AWS;
- ERTMS;
- Doors;
- Inter-vehicle connections;
- Machine Testing;
- De-railment.

5.2.4 Expert

(Level 5 – Technical Specialist)

Expert that provides the individual with sufficient capability to undertake the following activities;

- dismantle;
- repair;
- re-assemble;
- calibrate/adjust.

This includes items and equipment identified as safety critical. An example of this is where a brake distributor overhaul is being undertaken to a defined Component Overhaul Instruction (COI).

5.3 Competence profiles

The competence units and levels are applicable to the job roles associated with individuals undertaking asset maintenance, overhaul, and inspection and/or testing. Specific competence profiles shall be developed for each role and shall take account of asset specific needs. Competence units and levels to be achieved shall be selected on the basis of the individual's job role and responsibility.

5.4 Training needs

Specific training modules applicable to the work activities associated with asset maintenance, overhaul, inspection, and/or testing on assets are required.

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6 Assessment strategy

6.1 General

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;

d) the practicality of gathering observed evidence;

e) the risks from incompetent performance.

6.2 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 completing 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**.

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6.3 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.

e.g.: RVM 01 Undertake maintenance of mechanical components and systems

- Compressor Systems

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.

e.g.: RVM 01 Undertake maintenance of mechanical components and systems

- Compressor Systems
- Braking Systems

6.4 Maintaining competence

Employers shall have systems in place to assure the continued competence of individuals undertaking asset maintenance and overhaul work.

These systems shall consist as a minimum of:

- a record of work experience (this can be in the form of the following):
  - 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 maintenance, overhaul, inspection, and/or testing of assets or sub-systems.

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 can include retraining and/or further mentoring and re-assessment.

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Appendix A Traction and Rolling Stock and On-track Machines Engineering Competence Units

A.1 Competence unit summary

The table below summarises the scope of the traction and rolling stock, and on-track machines competence units.

RVM Unit No.	Unit Title	Scope
RVM 01	Undertake maintenance of mechanical components and systems.	• Fault finding methods and techniques • Intrusive and non-intrusive testing • Use of calibrated monitoring and measuring equipment • Use of tools • Knowledge of fixings. • Interpretation of mechanical drawings • Rectification of faults • Testing of systems
RVM 02	Undertake maintenance of hydraulic and pneumatic components and Systems	• Pumps and motors • Compressors • Pipework, hoses and fittings • Valves • Hydraulic/pneumatic Cylinders and actuators • Pressure vessels and accumulators • Reading hydraulic and pneumatic schematics • Testing of systems
RVM 03	Undertake maintenance inspection and repair of structures and coachwork	• Bodywork and Exterior and Painting • Underframes & Bogies • Door, Locks and external covers • Buffers, Couplings and Drawgear • NDT • Glazing units • Repair of welds • General fitting inc Grinding, drilling
RVM 04	Maintenance of axle bearings	• Bearing removal and re-fitting • Handling and storage • Cleaning and lubrication • Axle bearing inspection • Bearing fault diagnosis

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RVM Unit No.	Unit Title	Scope
RVM 05	Undertake inspection of axles and wheels	• Defect types and recognition • Causes of defects • Visual inspection for defects • Safety criteria • Quarantine and storage
RVM06	Undertake maintenance of safety and emergency equipment	• Fire Protection Systems • Fire Extinguishers • Conductor rail equipment • Track circuit clips • Emergency equipment, flags, signs and detonators • On-board emergency equipment
RVM 07	Undertake maintenance or replacement of gearboxes and cardan shafts	• Gearbox inspection and testing • Cardan shaft inspection • Transmission defects and repair • Lubrication and condition monitoring
RVM 08	Undertake maintenance repair or replacement of engines	• Engine types & fuel systems • Engine servicing • Engine adjustment and test • Rectification of faults • Major overhaul
RVM 09	Undertake maintenance of electrical equipment and systems	• Electrical systems • Earthing arrangements and safe isolation • Fault Finding • Use of instruments • Downloading fault logs • Interpreting electrical drawings
RVM 10	Undertake corrective and preventive maintenance on electrical components	• Batteries • Inter-vehicle connectors • Auxiliary equipment, radios etc. • Electronic Control Systems and Software/PLCs
RVM 11	Undertake corrective and preventative maintenance of TPWS equipment	• TPWS
RVM 12	Undertake corrective and preventative maintenance of AWS equipment	• AWS
RVM 13	Undertake corrective and preventative maintenance of OTMR equipment	• OTMR
RVM 14	Undertake corrective and preventative maintenance of Track Circuit Actuator equipment (TCA)	• TCA
RVM 15	Undertake Corrective and Preventative Maintenance of Radio Equipment Installed in Assets	• Radio Equipment

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RVM Unit No.	Unit Title	Scope
RVM 16	Undertake maintenance of brake systems	• Vehicle braking systems • Types of brake blocks, pads • Brake defect identification • Lubrication of linkages & screw threads etc. • Brake valves and reservoirs
RVM 17	Undertake maintenance of bogies	• Removal and re-fitting • Inspection for defects • Maintenance methods / procedures • Attachments and Testing
RVM 18	Undertake movement or shunting of rail vehicles or OTMs	• Carry out pre-movement and pre-start checks • Know the authorisation requirements prior to movement of a Rail Vehicle • Set route & operate hand points safely using approved methods • Carry out coupling and uncoupling of Rail vehicles following specified procedures • Move Rail Vehicle in response to approved signals and signalling procedures • Control vehicle using knowledge and experience of the depot/yards/test facility

A.2 Evidence requirements

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

A.3 Performance evidence

The units of competence in this standard specify the form and the performance evidence which is required 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 can be in the form of the product itself; records or photographs generated as part of the work.

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A.4 Knowledge evidence

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

For all units of competence the candidates shall have relevant knowledge and understanding of:

- health and safety legislation, regulations and safe working practices and procedures;
- what procedures need to be followed to confirm operational and personal safety is maintained during the work;
- engineering specifications associated with relevant asset components and systems for which competence is being assessed;
- how the maintenance activity may affect the safe operation of the railway;
- how the relevant components and systems are designed to function under normal operating conditions;
- how to identify asset components and systems;
- which tools and specialised equipment are required to complete the work and how to confirm they are suitable for the activity being undertaken;
- what maintenance authorisation procedures are and the limits of their responsibility and authority;
- maintenance reporting documentation and control procedures;
- relevant recording, reporting and escalation procedures.

Specific knowledge requirements are detailed in each competence unit.

A.5 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;

Asset specific endorsements shall be added as described in 6.2.

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A.6 RVM 01: Undertake maintenance on mechanical components and systems

A.6.1 Purpose

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

A.6.2 Scope

This competence unit applies to assess any candidate who is required to undertake basic maintenance (mechanical fitting), diagnose faults, functional test, repair or replacement mechanical components or systems.

A.6.3 Competence unit

This competence unit comprises of three elements.

Element 1: Undertake safely, basic preventative maintenance of mechanical components and systems in accordance with instructions

Element 2: Locate and diagnose faults and take appropriate corrective maintenance of mechanical components and systems in accordance with instructions.

Element 3: Safely repair mechanical components and systems in accordance with instructions.

To prove competence in this unit, the candidate shall demonstrate their ability to complete preventative and corrective maintenance on assets associated with mechanical components and systems as appropriate, in accordance with instructions. The candidate shall have to show they can follow recording and reporting procedures.

A.6.4 Assessment

A.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 asset.

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.

A.6.4.2 Re-assessment

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

A.6.4.3 Equipment specific endorsements

This competence unit shall be endorsed as detailed in 6.2

A.6.5 Knowledge Evidence that is specific to the whole unit

Candidates shall have knowledge and understanding of how the:

a) mechanical components and systems are designed to function under normal operating conditions;

b) how the maintenance adjustment, fault finding, repair and testing activity affects the safe operation of the railway.

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RVM 01: Undertake maintenance of mechanical components and systems

Element 1: Undertake basic preventive maintenance of mechanical components and systems in accordance with instruction

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) understand and follow the relevant maintenance schedules, applicable drawings/diagrams and working instructions to undertake the required work;

c) undertake adjustments within the limits of your personal authority using the correct tools and equipment;

d) undertake the maintenance activities in the specified sequence and in an agreed time scale;

e) confirm that the maintained equipment meets the required operating specification;

f) report any instances where the equipment fails to meet the required performance after adjustments or where there are identified defects outside the required adjustments;

g) complete relevant maintenance records accurately and pass them on to the appropriate person;

h) dispose of waste materials in accordance with safe working practices and approved procedures.

Knowledge statements

Candidates shall have knowledge and understanding of:

1) how to undertake adjustments related to the functions detailed in scope statement 1;

2) how to recognise basic failures of asset mechanical components and systems;

3) rectification of faults and failures discovered as part of knowledge statement 2;

4) the requirements for cleanliness when undertaking removal and fitting of certain components;

5) safe handling of equipment;

6) maintenance methods and procedures relating to asset mechanical components and systems.

7) Correct use of tools and equipment

8) How to read and interpret mechanical drawings

Scope of competence

1) Preventative maintenance procedures are to be completed on:
   - mechanical components and systems.
2) Activities are to:
   - perform non-intrusive maintenance on asset mechanical components and systems;
   - check integrity of all mechanical components;
   - undertake basic visual inspection of mechanical components;
   - check fastenings;
   - mechanical fitting of components - remove and refit in accordance with instructions.
3) quality standards to be achieved are as defined in the maintenance specifications.

Performance Evidence Requirements

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 book entries;*
- *performance reports;*
- *observation;*
- *relevant activity records.*

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RVM 01: Undertake maintenance of mechanical components and systems

Element 2: Locate and diagnose faults and take appropriate corrective maintenance of mechanical components and systems in accordance with instructions

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) review and use all relevant information on the symptoms and problems associated with asset mechanical and/or electrical components and systems;

c) select, use and apply diagnostic techniques, tools and aids to locate faults;

d) complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved;

e) investigate and determine the implications of the fault for other work and for safety considerations;

f) use the evidence gained to draw valid conclusions about the nature and probable cause of the fault;

g) record details on the extent and location of the faults in an appropriate format.

Knowledge statements

Candidates shall have knowledge and understanding of:

1) fault diagnostic aids including:
   - gauges, meters, measuring and monitoring equipment

2) fault finding methods and techniques.

3) analytical methods and techniques including:
   - comparison with specification;
   - comparison with operational requirements;
   - comparison with previous data.

4) assessing risks arising from faults.

5) Use of correct fixings and security of fixings obtaining correct torque figure where appropriate.

Scope of Competence

1) Type of fault finding techniques or procedures, diagnostic aids and equipment including:
   - techniques appropriate to the fault symptoms;
   - intrusive and non–intrusive testing;
   - observation.
   - taking measurements and readings using appropriate calibrated equipment.

2) Type and range of problems and faults including:
   - component damage or failure;
   - component security;
   - missing or loose fixings.

3) Level and complexity of diagnosis including:
   - replacement of failed or damaged components;
   - renewal of loose or missing fixings;
   - rectification of faults found;
   - testing the system as appropriate in accordance with specifications or instructions.

4) Quality standards to be achieved are as defined in the maintenance specifications.

Performance Evidence Requirements

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 book entries;*
- *performance reports;*
- *observation;*
- *relevant activity records.*

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RVM 01: Undertake maintenance of mechanical components and systems

Element 3: Safely repair mechanical components and systems in accordance with instructions

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) understand and follow the relevant maintenance schedules, applicable drawings/diagrams and working instructions to undertake the required work;

c) prepare the component or system for repair;

d) undertake the repairs within agreed timescale using approved materials and components and methods and procedures;

e) confirm that the repaired component or system meets the specified operating conditions;

f) produce accurate and complete records of all repair work carried out.

Knowledge statements

Candidates shall have knowledge and understanding of:

1) component repair methods, techniques and procedures associated with mechanical components or systems for which competence is being assessed;

2) what maintenance testing procedures need to be completed after undertaking a repair

3) importance of obtaining correct torque figures for fastenings from drawings/specifications/manufacturing information.

Scope of competence

1. Type of repairs or repair techniques to be used including:
   - adjust;
   - replace;
   - renew.
2. Complexity or nature of repairs to be carried out including repairs relating to:
   - system function failures;
   - components not operating to specification;
   - failure to meet the test specification;
   - replacement or re-fixing of loose or missing fasteners.
3. Quality standards to be achieved are as defined in the maintenance specifications.

Performance evidence requirements

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 book entries;*
- *performance reports;*
- *observation;*
- *relevant activity records.*

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A.7 RVM 02: Undertake maintenance of hydraulic and pneumatic components and systems

A.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 asset hydraulic and pneumatic systems fitted to assets.

A.7.2 Scope

This competence unit is used to assess any candidate who is required to maintain, diagnose faults or test hydraulic or pneumatic systems.

A.7.3 Competence unit

This competence unit comprises of three elements.

Element 1: Undertake preventive maintenance of hydraulic and/or pneumatic systems and pipework (including couplings, hoses and valves).

Element 2: Detect and diagnose faults on hydraulic and/or pneumatic components and systems.

Element 3: Repair of hydraulic and/or pneumatic components or systems after faults have been diagnosed, in order to return the component or system to the required specification.

To prove competence in this unit, the candidate shall be able to demonstrate their ability to complete maintenance in accordance with instructions; locate, diagnose and repair faults associated with asset hydraulic and/or pneumatic systems. The candidate shall have to show they can follow recording and reporting procedures.

A.7.4 Assessment

A.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 individual working on the asset.

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.

A.7.4.2 Re-Assessment

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

A.7.4.3 Equipment Specific Endorsements

This competence unit shall be endorsed as detailed in 6.2.

A.7.4.4 Knowledge Evidence that is common to the whole unit

Candidates shall have knowledge and understanding of:

a) how the asset hydraulic and pneumatic systems are designed to function under normal operating conditions;

b) what each of the component parts contributes to the overall operation of the hydraulic or pneumatic system.

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RVM 02: Undertake maintenance of hydraulic and pneumatic components and systems

Element 1: Undertake basic preventive maintenance of hydraulic, pneumatic systems and pipework

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) understand and follow the relevant maintenance schedules, applicable drawings/diagrams and working instructions to undertake the required work;

c) undertake the maintenance activities within the limits of your personal authority;

d) undertake the maintenance activities in the specified sequence and in an agreed time scale;

e) confirm that the maintained equipment meets the required operating specification;

f) report any instances where the equipment fails to meet the required performance after adjustments or where there are identified defects outside the required adjustments;

g) complete relevant maintenance records accurately and pass them on to the appropriate person;

h) dispose of waste materials in accordance with safe working practices and approved procedures.

Knowledge statements

Candidates shall have knowledge and understanding of:

1) how to undertake adjustments related to the functions detailed in scope statement 1;

2) rectification of faults and failures discovered during routine maintenance;

3) how to diagnose basic failures within:

- hydraulic systems;
- pneumatic system;
- pipework components or system.

4) maintenance methods and procedures relating to:

- hydraulic systems;
- pneumatic systems;
- pipework systems to include bending and brazing.

Scope of Competence

1) Preventative maintenance procedures are to be completed on:

- hydraulic systems;
- pneumatic systems;
- pipework systems.

2) Activities are to:

- perform non-intrusive maintenance on hydraulic systems;
- perform non-intrusive maintenance on pneumatic systems;
- perform non-intrusive maintenance on pipework systems.

3) Quality standards to be achieved are as defined in the maintenance specification.

Performance Evidence Requirements

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 book entries;*
- *performance reports;*
- *observation;*
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RVM 02: Undertake maintenance of hydraulic and pneumatic components and systems

Element 2: Detect and diagnose faults on hydraulic and/or pneumatic systems or components

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) review and use all relevant information on the symptoms and problems associated with the hydraulic and/or pneumatic systems;

c) select, use and apply diagnostic techniques, tools and aids to locate faults;

d) complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved;

e) investigate and determine the implications of the fault for other work and for safety considerations;

f) use the evidence gained to draw valid conclusions about the nature and probable cause of the fault;

g) record details on the extent and location of the faults in an appropriate format;

Knowledge statements

Candidates shall have knowledge and understanding of:

1) fault diagnostic aids including:
   - gauges, meters, monitoring or measuring devices.

2) fault finding methods and techniques;

3) analytical methods and techniques including:
   - comparison with specification/drawings;
   - comparison with operational requirements;
   - comparison with previous data.

4) identifying risks arising from faults;

5) identifying the risks arising from testing the systems.

Scope of Competence

1) Type of fault finding techniques or procedures, diagnostic aids and equipment including:
   - techniques appropriate to the fault symptoms;
   - functional testing;
   - intrusive testing;
   - observation;
   - taking measurements and readings using appropriate hydraulic/pneumatic test equipment.

2) Type and range of problems and faults including:
   - leaking pipe work, seals and joints;
   - failure of components to operate within specification.

3) Level and complexity of diagnosis including:
   - pipework, cylinder, hose or fitting security;
   - replacement or repair criteria;
   - rectification of any fault found;
   - full commissioning of asset hydraulic/pneumatic systems.

4. Quality standards to be achieved are as defined in the maintenance specifications.

Performance Evidence Requirements

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 book entries;*
- *performance reports;*
- *observation;*
- *relevant activity records*

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