END POINT ASSESSMENT PLAN

FOR

RAIL AND RAIL SYSTEMS PRINCIPAL ENGINEER

INTEGRATED DEGREE APPRENTICESHIP

LEVEL 7

Contents:

Summary of End Point Assessment

This document sets out the requirements for end-point assessment (EPA) for the **Level 7 Rail and Rail Systems Principal Engineer integrated degree apprenticeship standard**. It is written for end-point assessment organisations (EPAOs) that need to know how EPA for this apprenticeship must operate. It will also be of interest to Rail and Rail Systems Engineer apprentices, their employers, awarding universities and training providers.

In an integrated degree apprenticeship, the degree incorporates on-programme academic and workplace learning and assessment with an independent EPA to test the standard's KSBs. The Master's degree must consist of 180 credits, 120 delivered on-programme and 60 through the EPA. It will typically take four to five years to complete, with the EPA taken in the last eight months.

The EPA should only start once the employer is satisfied that the apprentice is consistently working at, or above, the level set out in the standard, the pre-requisite gateway requirements for EPA have been met and that they can be evidenced to an EPAO. As a gateway requirement, apprentices must successfully pass 120 on-programme credits, have compiled a portfolio of evidence and have had a technical work-based project outline agreed with their employer and academic supervisor. In addition, apprentices without English and mathematics at level 2 must achieve level 2 prior to taking their EPA.

The EPA must be completed within a maximum 6-month period, after the apprentice has met the EPA gateway requirements.

Awarding Universities will be responsible for the on-programme and EPA requirements. They must be on the Education & Skills Funding Agency (ESFA) Register of Apprenticeship Training Providers (RoATP). In addition, they must be approved to offer the EPA for this standard and be on the ESFA Register of End Point Assessment Organisations (RoEPAOs).

The EPA consists of 2 distinct assessment methods:

- A specialist area, technical work-based project, with presentation to a panel based on the technical work-based project, followed by questioning
- An occupational competence interview, conducted by the same panel as the work-based project presentation, based on the work-based evidence

Performance in the EPA will count towards the overall degree classification. Apprentices cannot successfully complete the degree apprenticeship without successfully passing the EPA.

Performance in the EPA will be separately graded and determine the apprenticeship grade of pass, merit, distinction or fail.

On-programme (typically, 48 – 60 months)	End-Point Assessment Gateway	End-Point Assessment (6 months)	Professional recognition (optional)
Training to develop the occupation standard's knowledge, skills and behaviours. Working towards and completing 120 credits of a Master's degree aligned with the content of the standards. Working towards English/maths Level 2 or alternative for those with an education, health and care plan or a legacy statement. Preparing a portfolio of evidence.	120 Master's degree credits for the 180 needed. English/maths Level 2. Submit the portfolio of evidence. Employer satisfied apprentice is consistently working at or above the level of the standard. Technical work-based project outline agreed.	Specialist area, Technical work-based project with presentation and questioning Occupational competence interview (supported by a portfolio of evidence). Both leading to Master's degree achievement. Graded fail, pass, merit or distinction.	The experience gained, and responsibility held by the apprentice on completion of the apprenticeship partially contributes to the requirements for CEng.

Rail and Rail Systems Principal Engineer Integrated Degree apprenticeship standard

Diagram 1. Typical Rail and Rail Systems Principal Engineer Integrated Degree apprenticeship summary

End Point Assessment Overview

Assessment Method	Area Assessed	Assessed by	Grading
Specialist, technical work-based project and Presentation	Knowledge, skills and behaviours (as indicated in Annex A)	End-Point Assessment Organisation	Fail/Pass/Merit/Distinction
Occupational competence interview (with Portfolio)	Knowledge, skills and behaviours (as indicated in Annex A)	End-Point Assessment Organisation	Fail/Pass/Merit/Distinction

Please note that on-programme assessment does not count toward the EPA/Apprenticeship grade but the EPA will contribute to the final degree classification.

Performance in the two end-point assessment methods is combined to determine the EPA and Apprenticeship grade of fail, pass, merit or distinction.

The rules of combination for the final grade are straightforward:

- the apprentice will be assigned the lowest grade awarded for any individual assessment component as the final grade.

End Point Assessment Gateway

Gateway requirements:

- An apprentice's employer must confirm that the apprentice is working at, or above, the level set out in the standard; employers may wish to take advice from the apprentice's University
- An apprentice must hold a portfolio of evidence demonstrating competence against the standard. The portfolio will be used to underpin the EPA occupational competence interview. It may also be used to support the evidence requirements for professional recognition, should the apprentice wish to apply. It must therefore be presented in line with the relevant professional body's guidance. It will be mapped to the knowledge, skills and behaviours relating to the assessment method that it supports and typically

contain performance review documentation, witness statements, training records/certificates and work products such as risk assessments, reports, meeting records, plans and costings. The portfolio cannot include self-assessment other than records of learning activities targeting their own performance (to support demonstration of Behaviour B7).

- An apprentice must have completed 120 on-programme credits and have passed all on programme modules.
- English and mathematics at level 2
- An apprentice must have a technical work-based project outline agreed with their employer and academic supervisor, based on their option specialism within the standard. The outline must detail the project title, scope, key activities/milestones and expected outputs/measures of success. The 24-week period will start at gateway sign off.

Portfolio requirements:

On commencement of the apprenticeship the apprentice must begin to retain a portfolio of evidence which must be finalised before passing through the gateway. A completed portfolio of evidence is a **compulsory** EPA gateway requirement that underpins the EPA Occupational competence interview component.

Employers/training providers are free to devise their own version of the portfolio of evidence, but the portfolio of evidence should typically contain the following information:

- the name of the apprentice
- details of the apprentice's workplace
- a minimum of 8 and a maximum of 10 pieces of evidence to support the knowledge, skills and behaviours of the apprenticeship standard. (Evidence can be provided through a range of sources, for example work reviews, manager's feedback and customer feedback)
- Records of learning activities targeting their own performance (to support demonstration of Behaviour B7
- confirmation from the line manager that the tasks were completed to the required standard of the organisation
- document the off-the-job training that has taken place during the on-programme phase, with at least 20% of their employed time off-the-job (i.e. a training log)

It is recommended that the employer signs off the portfolio of evidence, thereby confirming the demonstration of competence against the knowledge, skills and behaviours (KSBs) across the standard and that the apprentice is ready to take the EPA.

The apprentice must submit their portfolio of evidence to their EPAO when applying for the EPA. An independent assessor will review the portfolio to glean personalised information that will assist the Occupational competence interview component of the EPA. The portfolio is not assessed, it is used to inform the questioning for the Occupational competence interview.

Summary of Roles and Responsibilities

Universities, in their role of EPAO, must appoint:

- Independent assessors to mark an apprentice's technical work-based project and technical interview
- A panel to advise independent assessors

Independent assessors must meet the following requirements:

- Be independent of the on-programme delivery, the apprentice and their employer i.e. there must be no conflict of interest
- Hold an engineering degree and have engineering experience in the rail industry or operated as a discipline-specific engineer at or above the level of the standard; both must be within the specialist area selected by the apprentice
- Have completed an induction covering the requirements of the standard and assessment practice and attend at least one standardisation meeting per year

It is anticipated that the same independent assessor will mark an apprentice's technical work-based project and occupational competence interview to aide efficiency, however this is not a requirement and Universities may schedule independent assessors to ensure cost effective allocation of resources.

Independent assessors should be sourced from another University, industry or a professional body; or if none of the above options are available the independent assessor can be from the same University but must be independent of the apprentice's on-programme learning and assessment.

Independent assessors will be advised by two panel members, who will be present during the technical work-based project presentation and occupational competence interview. Their advisory role is outlined below.

The panel members must be:

- A representative from the apprentice's employer; they may provide the end-point assessor with any relevant technical support, advice and guidance such as confirming company policies, procedures, processes and providing context on technical information; they may for example be the work-based project sponsor, programme sponsor, the apprentice's line manager, site engineer, head of engineering or operations manager

- A University academic; their role is to provide specialist technical advice on the apprentice's project. In order to maintain independence, they cannot be an academic that was involved during the on-programme element of the apprenticeship.

Optional:

- An assessor from an engineering professional body; their role is to undertake assessment against Chartered Engineer professional standard, if the apprentice wishes their EPA to serve the dual purpose of application for professional recognition

The panel members must not have any role in the grading decision-making process. They must not provide information on behalf of the apprentice or influence the apprentice in any way. Their role is advisory and to provide information to the independent assessor on request due to the technical nature of the occupation. Independent assessors will solely determine the grade for the technical work-based project and occupational competence interview.

The independent assessor and panel will collectively provide an audience for the presentation, which is reflective of conditions an engineer would face when presenting a project in the workplace.

The employer representative and University academic are expected to provide their services free of charge. Any payment for professional body representation to assess the apprentice in relation to professional body registration lies outside the requirements of the apprenticeship.

The End Point Assessment

The end-point assessment consists of two distinct assessment methods:

1. Specialist area, Technical work-based project (including a presentation and questioning)
2. Occupational competence interview (supported by a portfolio of evidence)

The end-point assessment must be completed over a maximum period of 32 weeks after the apprentice has met the EPA gateway requirements.

The EPA period commences at gateway sign off and will last no longer than 32 weeks in total. This will mean there is 24 weeks for work-based project completion and 8 weeks allocated to the conducting of the work-based project presentation and the Occupational competence interview (1 hour) within this window. The work based project presentation should usually be carried out first as the same panel members will also form the audience for the occupational competence interview, in order to mirror a real-world presentation and discussion.

EPAOs must ensure that the Occupational competence interview (supported by a portfolio of evidence) is conducted in a suitable controlled environment. This must be a quiet room free from distraction and influence. It is anticipated that EPAOs will use the apprentice's employer's premises wherever possible to minimise costs. They may be conducted face-to-face or via an online platform e.g. video-conferencing. EPAOs must ensure appropriate methods to prevent misrepresentation are in place should an online option be used. For example, screen share and 360-degree camera.

Requirements for each assessment method are detailed below.

Assessment Method 1 – Specialist area, Technical work-based project (incl. a presentation and questioning)

Key Considerations:

- Synoptic assessment of the apprentice's knowledge, skills and behaviours within the chosen specialist pathway that identifies, explores and suggests an improvement issue or opportunity that will bring benefit to the business.
- Undertaken over a 24-week period, post-gateway.
- Apprentices must submit a project report to their EPAO a minimum of 4 weeks prior to their project presentation date, and within the 24-week period.
- The 24-week work window cannot officially start until the work-based project topic has been approved as part of the gateway process.
- Must be 10,000 words with a 10% +/- tolerance, conforming to the awarding university's work-based project requirements.
- The work-based project can contain an annex of data, diagrams, pictures, tables, appendices and other forms of appropriate evidence and information to support the report, and these do not form part of the word count.
- The work-based project should be submitted in accordance with the awarding university's procedural requirements.
- Graded as a fail/pass/merit/distinction.

Apprentices will produce a technical work-based project in their specialist area. The work-based project proposal and objectives must relate to their own work environment, be set within the context of one of the specialist pathways and be agreed formally by the employer and academic supervisor. Typically, the technical work-based project will be in relation to business improvements, innovation and/or sustainability.

The academic supervisor will be expected to log the title and scope of the work-based project with the end-point assessors, detailing the nature of the relationship with the standards and demonstrating how it addresses the intended coverage (as identified in Annex A). This will then be approved as suitable as a topic for the work-based project. Should the topic be seen to be insufficient or unsuitable in its relationship to the apprenticeship standard the apprentice will be asked to amend, develop further or change the focus to provide an appropriate coverage of the standard. Approval will signify the start of the EPA period.

The work-based project must be completed within the 24-week period and must be 10,000 words with a 10% +/- tolerance. All work must be appropriately referenced using the agreed referencing system specified by the Awarding University.

An independent assessor will mark the work-based project. Criteria for marking the work-based project are shown in Annex B. The same assessor will Chair the Presentation panel (see below and page 5).

All technical work-based projects must demonstrate competence against the application of the technical knowledge and skills of the specialist area, as well as the application of the following core areas of the standard:

- safe and professional working practices and keeping themselves and others safe
- contribute effectively to the delivery of engineering solutions, and delivering engineering solutions effectively
- working knowledge of problem solving, and use creative thinking and problem-solving techniques
- how teams work effectively, and collaborative working practice

The following behavioural aspects will also be covered as core:

- effective communicating and influencing
- act professionally
- promote and exhibit a self-disciplined, self-motivated and motivational approach to work

- works safely, collaboratively
- quality focused

The work-based project will involve the apprentice identifying and addressing an improvement issue or opportunity, which could relate to products, processes, quality assurance or the business, that once addressed will bring benefit back to the organisation and/or industry. This will ensure the work-based project has a practical element which reflects the day to day work of a Rail & Rail Systems Principal Engineer. The selected topic must be comprehensive, providing scope for the apprentice to show the full range of their knowledge, skills and behaviours as outlined in Annex A. It must demonstrate the apprentice has applied what they have learnt, has understood and is able to connect their learning to the organisation's objectives.

The technical work-based project can focus on an immediate or strategic long-term issue or opportunity and will contain the following (as a minimum):

1. Executive summary
2. Introduction and background
3. Outline of the issue or opportunity
4. Justification for the change
5. Evidence of effective research
6. Analysis of benefits and drawbacks including commercial, contractual and organisational etc.
7. Analysis of risks
8. Summary of the recommendations
9. Consideration of legislation, regulation, industry and organisational policies, procedures and requirements
10. Proposed plan for implementation and stakeholder engagement

The work-based project is expected to draw together the learning from across the standard, including the ability to select and apply knowledge as well as identifying and interpreting complex sets of data, and presenting the proposed solution in an appropriate format, (e.g. demonstrating knowledge requirement 2 "the scientific, technical, engineering, mathematical and design principles". The written report will be submitted to the EPAO for marking upon completion.

Assessment tools must be developed by the End Point Assessment Organisation to support reliable and consistent delivery of assessments, such as, marking criteria/checklists and reporting/feedback template/s.

The work-based project will be graded using the criteria and guidance shown in Annex B.

Technical work-based project presentation

Apprentices will complete a presentation based on their work-based project (as detailed above – Stage 1) to the panel. The presentation will last 40 minutes (+/- 10%). This will be followed by questions from the independent assessor (who may take advice from the panel) to further probe knowledge, skills and behaviours. There will be 8 questions and this will take an additional 40 minutes (+/- 10%). The end-point assessment organisation will provide the questions framework and content in conjunction with the assessor.

The work-based project presentation and answers to questions will be assessed against the core and specific knowledge, skills and behaviours as detailed in Annex A, aligned to the grading criteria in Annex B.

The panel will consist of up to four members (see page 5): one independent assessor, a representative from the apprentice's employer, a university academic and a possible fourth member from an appropriate Professional Institution. The independent assessor will have been responsible for assessing the work-based project and will be the panel Chair. Although they may seek technical advice from the panel members, they will make the ultimate decision on grading as other members are there in the advisory capacity outlined on page 5.

The presentation must cover: the technical work-based project scope, outcomes/ achievements, any difficulties faced/lessons learned and recommendations and will be expected to last 40 minutes (+/- 10%). There are no restrictions on how apprentices deliver the presentation or support resources/materials used. However, any equipment requirements, (for example, PowerPoint, whiteboard, flip chart etc) must be agreed with the university – in their role of EPAO, at least two weeks in advance of the presentation. Generally, presentations will consist of 5-8 presentation slides, supported by a handout or A1 poster.

Following the presentation, the independent assessor will ask 8 questions based on the work-based project, and the independent assessor may ask follow-up open questions to probe or seek further clarification. Questions and responses must be recorded by the independent assessor. Presentation questions will also look to confirm the work-based project grade.

Awarding Universities in their role as EPAO must develop a bank of sample questions, although independent assessors will need to tailor questions according to the work seen in the work-based project. The awarding universities must develop 'question banks' for the sample

questions of sufficient size to prevent predictability and be reviewed regularly (at least once a year) to ensure the questions are fit for purpose.

Assessment Method 2 - Occupational Competence Interview (supported by a portfolio of evidence)

Key considerations:
- The Occupational Competence Interview will assess the apprentice's knowledge, skills and behaviour as outlined in Annex A
- The assessment criteria and grading criteria applied are shown in Annex B

About the event -
- Lasts for 60 minutes with a 10%+/- tolerance
- The apprentice should be given at least one weeks' notice of the assessment date.
- The interview must take place on a one-to-one basis between an independent assessor and the apprentice.
- The independent assessor must ask the apprentice 10 open questions; follow up questions are allowed to seek clarification.
- Apprentices may refer to their portfolio when answering the questions.
- Apprentices must be given the opportunity to evaluate their portfolio during the interview i.e. what went well, lessons learnt and recommendations for the future.
- The apprentice may bring a copy of the portfolio with them.
- Must be carried out in a quiet room free from distractions.
- The Occupational competence interview should be recorded electronically, subject to the apprentice's agreement; where permission is not given it is permissible for another independent assessor to be present to document evidence presented.

Prior to the Occupational competence interview -
- The Portfolio of Evidence (and other Gateway evidence requirements) must be received by the EPAO during the Gateway process period. The Occupational competence interview will be based on the portfolio.
- Successful completion of the Gateway requirements will trigger confirmation of the EPA process and the start date for the 24-week technical work-based project work window and 32-week time limit for the entire EPA.
- The End-Point Assessment Organisation assessor must have reviewed the apprentice's portfolio and prepared questions to form the basis of the interview.
- EPAOs must develop 'question-set banks' of sufficient size to prevent predictability and review them regularly to ensure they, and the questions they contain, are fit for purpose.
- EPAO will develop an assessment specification and guidance, and provide training to standardise approaches to occupational competence interviews across their assessors, ensuring reliable and consistent delivery of the occupational competence interview. This will include recording documentation.

Occupational competence interview (Stage 3 – concurrent with Stage 2)

As the final stage of the EPA process, the panel will conduct an Occupational Competence Interview. The interview will synoptically assess knowledge, skills and behaviours across the apprenticeship standard. Apprentices must draw on their work-based evidence (see above) and portfolio of evidence in answering the questions.

The apprentice will be required to prepare a portfolio of evidence which will be mapped to the knowledge, skills and behaviours outlined in Annex A and detail the key information and work done as evidenced and collated during the on-programme period. It provides a structure to the work-based learning and how it has been applied and serves as a framework for how the work-based evidence is organised and where specific evidence can be found. The portfolio must contain at least one piece of evidence relating to each of the knowledge, skills and behaviours mapped to this assessment method. The portfolio must contain concise descriptions, analysis, evaluation, conclusions of the major evidence within the work-based evidence of performance and application of the standards. These must be included with in the evidence which supports the Occupational competence interview.

The interview will last one hour (+/- 10%). The independent assessor will use standardised questions from an agreed set of questions developed by the Awarding University as EPAO. Follow-up questions may be used to probe further into the detail to satisfy the panel of the depth of knowledge, skills and behaviour. This interview will be conducted under controlled conditions.

The Occupational Competence Interview independent assessor will be accompanied by the panel members from assessment method one, and this interview will take place on the same day as that assessment method to minimise cost. The independent assessor will be responsible for questioning the apprentice and assessing the interview, they will make the ultimate decision on grading.

The interview will be assessed against the core and specific knowledge, skills and behaviours as detailed in Annex A, aligned to their chosen specialism.

The set of criteria for marking the technical interview is shown in Annex B. The specification for the Occupational competence interview briefings to be produced by EPAOs is shown in Annex C.

End Point Assessment – Grading

Performance in the EPA will count towards the overall degree classification. Apprentices cannot successfully complete the degree apprenticeship without successfully passing the EPA.

Performance in the EPA will be separately graded and determine the apprenticeship grade of pass, merit, distinction or fail. If the apprentice has not evidenced the required knowledge, skills and behaviours outlined in the apprenticeship standard, then the standard has not been met and the apprentice has failed.

EPAOs should focus on assessing the apprentice against the higher order descriptors outlined in the Pass and Distinction columns in Annex B, rather than the lower order knowledge, skills and behaviours referenced in the left hand column. By showing competence against the higher order descriptors, it can be assumed that the apprentice is working at or above the level outlined in the standard.

Independent assessors will be responsible for grading each assessment method, in accordance with the requirements detailed in this plan. The grading criteria for each EPA method is detailed in Annex B. Independent assessor decisions must be subject to moderation (External Examiner review). Grades must not be confirmed until after moderation.

The University – in its role as EPAO must combine the grades for both assessment methods to determine the apprenticeship grade.

Apprentices must pass both assessment methods to gain an EPA/apprenticeship pass, merit or distinction. The table below shows how the grades must be combined to determine the EPA/apprenticeship grade. A pass will demonstrate that the apprentice has met all the requirements of the standard. Apprentices achieving a merit or distinction will be demonstrating performance above the minimum requirements of the standard.

Workplace Project	Technical Interview	EPA grade
Fail	Fail	Fail
Fail	Pass	Fail
Pass	Fail	Fail
Pass	Pass	Pass
Pass	Merit	Pass
Fail	Merit	Fail
Merit	Fail	Fail
Merit	Pass	Pass
Merit	Merit	Merit
Merit	Distinction	Merit

Fail	Distinction	Fail
Pass	Distinction	Pass
Distinction	Fail	Fail
Distinction	Pass	Pass
Distinction	Merit	Merit
Distinction	Distinction	Distinction

Grading for each method:

Grading for the specialist, technical work-based project:

- To achieve a PASS – all pass criteria must be met.
- A successful contribution at MERIT will meet the Pass Criteria in all 9 areas of assessment and meet at least 5 of the 8 Merit/Distinction criteria.
- A successful contribution at DISTINCTION will meet the Pass Criteria in all 9 areas of assessment and meet all 8 of the Merit/Distinction criteria.

Grading for the Occupational competence interview:

- To achieve a PASS – all pass criteria must be met.
- A successful contribution at MERIT will meet the Pass Criteria in all 9 areas of assessment and meet at least 4 of the 6 Merit/Distinction criteria.
- A successful contribution at DISTINCTION will meet the Pass Criteria in all 9 areas of assessment and meet all 6 of the Merit/Distinction criteria.

Re-sit and Re-take information

Apprentices who fail one or more EPA method will be offered the opportunity to take a re-sit/re-take. A re-sit does not require further learning, whereas a re-take does.

An individual EPA assessment re-sit/re-take (e.g. Occupational Competence Interview and/or work-based project must be completed satisfactorily within a period agreed with the employer and EPAO (typically six months of the EPA outcome notification for a resit and a longer period of time for a retake to accommodate the additional learning required).

Apprentices will be offered the opportunity to take a re-sit/retake in line with university academic regulations. Both the university and the employer must agree that a re-sit/re-take is an appropriate course of action.

Resits are not available to apprentices wishing to move from pass to merit or distinction. Re-sits/re-takes will not be awarded a grade higher than pass unless exceptional circumstances originate. Apprentices should have a supportive action plan to prepare for the re-sit/re-take.

Professional Body Recognition

This Apprenticeship Standard aligns with the current edition of the UK Standard for Professional Engineering Competence (UK SPEC). The experience gained and responsibility held by the apprentice on completion of the apprenticeship will allow them to work towards professional registration at Chartered Engineer (CEng) level. For more details on the requirements and application process go to the Engineering Council website at www.engc.org.uk

End-point Assessment Organisations Internal Quality Assurance

Internal quality assurance refers to the requirements that a University in their role as EPAO must have in place to ensure consistent, reliable, accurate and valid assessment decisions.

EPAOs for this standard must undertake the following:

- Appoint independent assessors and panel members that meet the requirements as detailed in this plan – see page 4
- Produce assessment tools and supporting materials for the EPA that follow best assessment practice, including a sample bank of projects, sample presentation question bank, technical interview question bank and assessment outcome recording documentation. Universities must develop of project and question banks of sufficient size to mitigate predictability and review them regularly to ensure they are fit for purpose. It is recommended that representative employers contribute to the development of project/question banks; where they do this they must put measures in place to ensure question security.

- Provide induction training for independent assessors in terms of good assessment practice, operating the assessment tools and grading
- Operate regular standardisation events that enable assessors to attend a minimum of one event per year
- Operate moderation (external examiner review) of assessment activity and decisions, through examination of documentation and/or observation of activity, with a minimum of 10% percent of each independent assessors' assessments moderated

External Quality Assurance

The Institute for Apprenticeships is exploring whether QAA can undertake external quality assurance for this standard, arrangements will be confirmed by August 2018.

Implementation

Affordability: The following factors should ensure the EPA is affordable:
- Employers premises should be used for EPA venues where possible
- Remote assessment is permissible, reducing travel costs, e.g. video conferencing
- The practical skills test is based on real work completed for the apprentice's employer, adding value to the employer

Volumes: It is anticipated that there will be 30-40 starts in the first year on this apprenticeship and 30 per year once established.

Annex A: Knowledge, Skills and Behaviours assessed by each assessment method

Assessment method	Key
Specialist, Technical Work-Based Project (and presentation)	**TWBP**
Occupational Competence Interview (supported by a portfolio of evidence)	**OCI**
NB: Where a KSB is shown as being assessed in more than one assessment method, this must be assessed in each method separately. EPAOs should not assume that because it has been met in one method, it no longer needs to be assessed in the other.	

Knowledge statement: Core

	Assessment method
C/K1. Safe and Professional working practices	TWBP/OCI
C/K2. The scientific, technical, engineering, mathematical and design principles	TWBP
C/K3. Rail and Rail Systems Engineering innovation and solutions	OCI
C/K4. Business planning	TWBP
C/K5. Research and development methodologies	TWBP
C/K6. Leading teams to work effectively	TWBP
C/K7. Approaches to partner, stakeholder and supplier relationship management	OCI

Knowledge statement: Specialist

Rail Civil Engineering (RC)	Assessment method
RC/K1. The requirements, methods and techniques for the installation and maintenance of the track support and track foundation.	TWBP/OCI
RC/K2. The impact of the railway environment e.g. geotechnics, structures, bridges, tunnels, embankments, cuttings, vegetation and drainage.	TWBP/OCI
RC/K3. The integrated system approach required e.g. interfaces between the physical rail structures and assets to ensure trains remain within the swept and kinematic envelope.	TWBP/OCI
Track Engineering (T)	**Assessment method**
T/K1. The application of track standards e.g. Eurocodes, TSIs and industry norms.	TWBP/OCI TWBP/OCI

T/K2. Rail materials and componentry e.g. construction material strengths and grades, components and proprietary elements (e.g. bearings, sleepers, rail etc.)	TWBP/OCI
T/K3. Rail track geometry requirements and influences of track layouts from particular aspects of the railway environment, e.g. geotechnical, structures, bridges, tunnels, embankments, cuttings, vegetation and drainage including relevant techniques (e.g. rail milling, grinding and stone blowing)	
Signalling and control systems (SC)	**Assessment method**
SC/K1. Fail-safe concepts and risk management and how that impacts and shapes rail signalling and control systems e.g. risk, designer, fault tree analysis, hazard logs etc. Interface with track assets and bonding/connections	TWBP/OCI
SC/K2. Operational rules for the railways and how signalling and control systems operate within these parameters e.g. how systems are initiated, implemented, delivered, upgraded and decommissioned.	TWBP/OCI
Rail Systems Integration (RSI)	**Assessment method**
RSI/K1. How to lead the end to end process for Rail Systems Integration e.g. requirements management, project interface management, safety in the railway system, verification, validation and assurance processes, and project migration (i.e. into other aspects of the system).	TWBP/OCI
Traction and Rolling Stock (TRS)	**Assessment method**
TRS/K1. The design principles used in Rail Traction & Rolling Stock (T&RS) engineering systems and the various generic types of legacy or modern rolling stock in a railway environment across the whole rolling stock lifecycle.	TWBP/OCI
Telecoms, Networks and Digital (TND)	**Assessment method**
TND/K1. Railway specific telecommunication engineering systems e.g. mobile networks, fixed networks and other services delivered over networks (e.g. CCTV, customer train time information systems) and the potential impacts of security breaches e.g. cyber security and the integrity of systems and data.	TWBP/OCI
TND/K2. The operating principles in legacy or modern rail telecommunication technologies including power supplies and electrical systems.	TWBP/OCI
TND/K3. The physical interfaces between railway assets and optimisation processes e.g. reliability.	TWBP/OCI
TND/K4. Immunisation e.g. that associated with preventing electrical interference.	TWBP/OCI
Electrical, Mechanical or Building Services (EMB)	**Assessment method**

EMB/K1. The physical and systems interfaces between electrical, electronic and mechanical assets and systems and other aspects of the railway and operating requirements, implications and constraints of these. Interface with track assets and bonding/connections.	TWBP/OCI
EMB/K2. Asset reliability, availability, maintainability within defined safety parameters.	TWBP/OCI
EMB/K3. Key accountabilities associated with regulations and standards e.g. electricity at work, building regulations, pressure systems safety directive, F-gas regulations etc.	TWBP/OCI

Skills statements: Core

	Assessment method
C/S1. Keep themselves and others safe	TWBP/OCI
C/S2. Lead value engineering and whole life costing	OCI
C/S3. Deliver rail and rail systems engineering solutions	TWBP/OCI
C/S4. Lead Senior Management/ Executive meetings	OCI
C/S5. Strategically contribute to long-term rail business planning within and beyond the organisation	OCI
C/S6. Engage in the creative and innovative development of railway engineering technology	TWBP
C/S7. Lead multiple, multi-disciplinary, high performing teams	OCI
C/S8. Work collaboratively	OCI

Skills Statements: Specialist

Rail Civil Engineering (RC)	Assessment method
RC/S1. Lead the definition of project, business and technical needs, considering the complete problem and associated risks to deliver from concept through to successful operation.	TWBP/OCI

RC/S2. Provide expert rail specific civil engineering judgement to ensure all engineering projects are assured and integrated, within financial targets, safe, risk assessed and delivered to targeted deadlines and requirements.	TWBP/OCI
RC/S3. Lead the provision of expert technical advice and input, including development of rail Civil Engineering policies, standards, specifications and means of compliance and assurance.	TWBP/OCI
RC/S4. Sponsor research; undertake design/development of innovative rail engineering solutions.	OCI
Track Engineering (T)	**Assessment method**
T/S1. Apply track engineering skill-sets in a wide range of environments/settings e.g. railway tunnelling, to support the effective performance and operation of the business, including understanding and application of appropriate techniques for maintenance, construction, and temporary works communicating findings to affected parties.	TWBP/OCI
T/S2. Lead the provision of expert technical advice and input, including development of rail track policies, standards, specifications and means of compliance and assurance.	TWBP/OCI
T/S3. Lead the definition of project, business and technical needs, considering the complete problem and its associated risks for track engineering.	TWBP/OCI
T/S4. Provide expert rail engineering judgement to ensure projects are assured and integrated, within budget, safe, risk assessed and delivered to deadlines and requirements.	OCI
Signalling and control systems (SC)	**Assessment method**
SC/S1. Lead implementation of standards, procedures or requirements within a project or for defined tasks including within a broader field e.g. national or global.	TWBP/OCI
SC/S2. Produce rail signalling and control solutions for the railway industry based on known and defined concepts and principles and new and novel approaches including leading interdisciplinary reviews and identifying better way of working e.g. automation / tooling.	TWBP/OCI
Rail Systems Integration (RSI)	**Assessment method**
RSI/S1. Take responsibility for leading the development of integrated designs that shall maintain or improve on the existing safety, reliability, capability (capacity), performance, efficiency and maintainability of the railway.	TWBP/OCI
RSI/S2. Deliver national rail projects within specified time scales and programme budgets, to specified quality and contractual requirements, identifying and addressing any associated risks with adherence to government requirements.	TWBP/OCI

RSI/S3. Provide strategic oversight of the practical application of systems integration across a range of sponsored programmes to avoid conflicts between multiple stakeholders/worksite.	OCI
Traction and Rolling Stock (TRS)	**Assessment method**
TRS/S1. Lead teams to develop, produce, alter, review and approve detailed specifications relevant to new or altered rail traction and rolling stock assets.	TWBP/OCI
TRS/S2. Obtain and retain relevant rail industry specific technical accreditation/ licences applicable to role.	OCI
TRS/S3. Providing rail engineering leadership and strategic thinking in the context of rail design, application, alteration, configuration, operation, maintenance and disposal of traction and rolling stock.	TWBP/OCI
Telecoms, Networks and Digital (TND)	**Assessment method**
TND/S1. Support railway telecommunication, network and digital engineering design, application, configuration, operation, maintenance or decommissioning and disposal.	TWBP/OCI
TND/S2. Undertake company standards review and development as a designated subject matter expert within the discipline.	TWBP/OCI
TND/S3. Obtain / retain rail industry specific technical accreditation/ licences applicable to role.	OCI
Electrical, Mechanical or Building Services (EMB)	**Assessment method**
EMB/S1. Lead teams to undertake rail standards review, operational practice, approvals and assessment of relevant asset types in line with technical knowledge.	TWBP/OCI
EMB/S2. Undertake systems reliability engineering and monitoring relevant to railway asset types.	TWBP/OCI
EMB/S3. Approve and certify electrical and mechanical and building services assets, as appropriate within the defined safety legislation e.g. building regulations.	TWBP/OCI

Behaviour statements

	Assessment method
B1. Communication and influencing skills	TWBP
B2. Professionalism	TWBP/OCI
B3. A proactive self-disciplined, self-motivated and motivational approach to work	TWBP
B4. Safe working practice	TWBP/OCI
B5. Collaborative working	OCI
B6. Continuous Professional Development	OCI

Annex B: Grading Criteria for each assessment component

Key for Specialist area coverage

Specialist Areas	Code
Rail Civils	RC
Track	T
Signals and control systems	SC
Rail System Integration	RSI
Traction and Rolling Stock	TRS
Telecoms, Network and Digital	TND
Electrical, Mechanical or Building Services	EMB

EPAOs should focus on assessing the apprentice against the higher order descriptors outlined in the Pass and Distinction columns rather than the lower order knowledge, skills and behaviours referenced in the left hand column. By showing competence against the higher order descriptors, it can be assumed that the apprentice is working at or above the level outlined in the standard.

Fail- The apprentice will be deemed to have failed if they do not meet the criteria outlined in the pass descriptor.

The Specialist, Technical Work-Based Project

Area of Assessment	Pass Criteria - The apprentice's project must demonstrate that they:	Merit/Distinction Criteria A successful contribution at MERIT will meet the Pass Criteria in all 9 areas of assessment and meet at least 5 of the 8 Merit/Distinction criteria below.

		A successful contribution at DISTINCTION will meet the Pass Criteria in all 9 areas of assessment and all of the 8 Merit/Distinction criteria below.
Show safe and professional working practices **Core:** C/K1 and C/S1 B2 and B4	Evidence of consistent safe and professional working practices, keeping themselves and others safe, including clear examples of leadership and followership. Approach demonstrates professionalism, respecting others and acts ethically.	
Use scientific, technical, engineering, mathematical and design principles **Core:** C/K2 **Specialism:** RC/K1 and RC/S1 T/K1 and T/S1 TND/K1 and TND/S1 SC/K1 and SC/S1 RSI/K1, RSI/S1 and RSI/S2 TRS/K1 and TRS/S1 EMB/K1 and EMB/S1	Correct selection and interpretation of principles and, as appropriate, the application of requirements (e.g. Standards), methods and techniques , leading to the successful delivery of a project or task, cognisant of relevant risk controls pertaining to the discipline (e.g. system security breaches). Understanding how technological developments influence future operation.	Compares a range of principles and techniques to enhance the robustness of decisions, leading discussions and supporting the interpretation of information, justifying and defending preferred option. Demonstrates insight and precision in the way principles and techniques are selected and applied to enhance the robustness of decisions and improve the reliability of results.
Manage the delivery of engineering solutions within a railway/regulated sector **Core:** C/S3, C/S6 **Specialism:**	Management of delivery shows correct levels of planning, implementation and monitoring, as well as evaluation of delivery and appropriate consideration of risk controls etc. Clear evidence of compliance with standards and regulations, and appropriate contribution to their	Compares a range of techniques, theory and practice, explaining benefits and risks, identifying most appropriate method to deliver practical solutions, cognisant of standards, regulations etc. Explains why regulations are important and the implications of failing to follow them.

RC/K1, RC/K2, RC/K3, RC/S1, RC/S2, RC/S3 T/K1, T/K2, T/K3, T/S1, T/S2, and T/S3 SC/K1, SC/K2 and SC/S1 and SC/S2 RSI/K1, RSI/S1 and RSI/S2 TRS/K1, TRS/S1 and TRS/S3 TND/K1, TND/K2, TND/K3, TND/K4, TND/S1 and TND/S2 EMB/K1, EMB/K2, EMB/K3, EMB/S1, EMB/S2 and EMB/S3	development, review etc. Describes and interprets regulations that must be followed when delivering specific engineering solutions.	Demonstrates strategic leadership, as well as project management techniques, theory and practice to deliver engineering solutions to required standards / regulations, making critical judgements informed by change and risk management priorities.
Undertake business planning **Core:** C/K4	Correct application of business planning tools and techniques meaning the engineering solution is well managed and successfully implemented.	Interprets financial data and assesses cost benefits to justify, develop and commission new process(es) or equipment, including making a strategic contribution to long-term business planning to affect business performance shaping factors, e.g. contract award.
Use research methodologies, data analytics, problem solving and continuous improvement **Core:** C/K5 and C/S6	Clear definition of scope and problems. Well-structured data analysis using at least one appropriate statistical tool or analytical technique to test engineering information, data and design using calculations pertinent to the work-based project topic such as probability distributions, significance testing and confidence limits, regression and correlation.	Appraises scope, boundaries and problems, assessing risk to allow for predicted and unforeseen benefits of the design solution to be realised. Compares outputs from a range of problem solving and continuous improvement techniques to interpret information and analyse their benefits, defending their decision(s) to improve change processes.
Use team and role theory to develop high performing teams and individuals	Demonstrates understanding of team and role theory, and evidence of application of theory to produce intended outcomes.	Applies theory with insight and awareness of risks and rewards, describing how theory was applied, with clear analysis of the impact and risks.

Core: C/K6		Demonstrates clear examples of leadership in complex situations, and across a range of disciplines / tasks.
Manage value engineering and whole life costing **Core:** None **Specialism:** RC/K1 and RC/S1 T/K1 and T/S1 TND/K1 and TND/S1 SC/K1 and SC/S1 RSI/K1 and RSI/S1 TRS/K1 and TRS/S1 EMB/K1 and EMB/S1	Evidence of analysis, synthesis, evaluation and critical appraisal is accurately presented.	Compares and contrasts evidence of analysis, synthesis, evaluation and critical appraisal. Presents this clearly and supported by a detailed appraisal of evidence and insight. Clear examples provided of the considerations given to resource implications and cost options, and how these impact on specifications, concepts and/or design solutions.
Deliver rail and rail systems engineering solutions effectively **Core:** C/S3 and B3 **Specialism:** RC/K1, RC/K2, RC/K3, RC/S1, RC/S2, RC/S3 T/K1, T/K2, T/K3, T/S1, T/S2, and T/S3 SC/K1, SC/K2, SC/S1 and SC/S2 RSI/K1, RSI/S1, and RSI/S2 TRS/K1, TRS/S1 and TRS/S3 TND/K1, TND/K2, TND/K3, TNDK4, and TND/S1	Applied appropriate theoretical and practical methods to design, develop and commission engineering solutions. Evidence of resilience and overcoming challenges despite set-backs.	Appraises solution and explains how this was carefully planned for, implemented, monitored and evaluated; showing an honest appraisal of performance of the solution. Solution exceeds expectations in relation to key impact measures and this is clearly demonstrated by supporting evidence.

EMB/K1, EMB/K2, EMB/K3, EMB/S1, EMB/S2 and EMB/S3		
Use communication and influencing skills **Core:** B1	Overall approach to presentation demonstrates consideration of how best to present and communicate the key content and messages, bounded by quality data / information.	Able to respond to technical questioning during presentation, with ability to argue and defend their view while showing respect for the opinions of others.

Annex C: The Occupational Competence Interview

EPAOs should focus on assessing the apprentice against the higher order descriptors outlined in the Pass and Distinction columns rather than the lower order knowledge, skills and behaviours referenced in the left hand column. By showing competence against the higher order descriptors, it can be assumed that the apprentice is working at or above the level outlined in the standard.

Fail- The apprentice will be deemed to have failed if they do not meet the criteria outlined in the pass descriptor.

Area of Assessment	Pass Criteria - The apprentice's Occupational competence Interview must demonstrate that they:	Merit/Distinction Criteria A successful contribution at MERIT will meet the Pass Criteria in all 9 areas of assessment and meet at least 4 of the 6 Merit/Distinction criteria below. A successful contribution at DISTINCTION will meet the Pass Criteria in all 9 areas of assessment and meet all of the 6 Merit/Distinction criteria below.
Safe and Professional working practices **Core:** C/K1 and C/S1 B2 and B4	Clearly able to discuss / evidence safe and professional working practices as being central to work, including protecting the safety of self and others, and their ethical approach to work.	
Effectively manage the delivery of engineering solutions within a railway/regulated sector	Discusses how delivery is managed and shows understanding of the correct levels of planning, implementation and monitoring necessary, as well as	Evaluates different management techniques, theory and practice to explain how to deliver practical solutions.

Core: C/K3 and C/S3 **Specialism:** RC/K1, RC/K2, RC/K3, RC/S1, RC/S2, RC/S3 and RC/S4 T/K1, T/K2, T/K3, T/S1, T/S2, T/S3 and T/S4 SC/K1, SC/K2, SC/S1 and SC/S2 RSI/K1, RSI/S1 and RSI/S2 TRS/K1, TRS/S1 and TRS/S3 TND/K1, TND/K2, TND/K3, TND/K4, TND/S1, TND/S2 and TND/S3 EMB/K1, EMB/K2, EMB/K3, EMB/S1, EMS/S2 and EMB/S3	how they evaluate delivery, in the context of their discipline and project / task, including standards review and development where applicable to the role.	Demonstrates a clear understanding of strategic leadership, project management techniques, theory and practice and their application in delivering (often innovative) engineering solutions within a regulated sector.
Demonstrate collaborative working techniques **Core:** C/K7 and C/S8 B5	Discusses collaborative working techniques, their understanding of these and how they are able to be selected, applied and critiqued.	Collaborative working techniques are compared, contrasted and illustrated with examples given of both providing and receiving advice and support from technical staff and non-technical staff in other parts of the organisation, explaining the different approach needed and reasons. Describes examples where collaborative working has included a range of influencers, internally and externally, and the development of multi-company and/or multi-disciplinary teams associated with effective task delivery.

Support the technical input to the development of rail standards, specifications and means of compliance **Core:** C/S2 **Specialism:** RC/K1 and RC/S1 T/K1 and T/S1 TND/K1 and TND/S2 SC/K1 and SC/S1 RSI/K1 and RSI/S1 TRS/K1 and TRS/S1 EMB/K1 and EMB/S1	Analysis, synthesis, evaluation and critical appraisal evident in the level of understanding and application of skills shown by the apprentice, pertinent to their discipline.	
Manage value engineering and whole life costing **Core:** C/S2 **Specialism:** RC/K1 and RC/S1 T/K1 and T/S1 TND/K1 and TND/S1 SC/K1 and SC/S1 RSI/K1 and RSI/S1 and RSI/S3 TRS/K1 and TRS/S1 EMB/K1 and EMB/S1	Demonstrates understanding of some major ideas related to value engineering and whole life costing, including risk management and control.	Demonstrates an appreciation of value engineering and whole life costing in their specialist sector showing knowledge and experience of active involvement in both areas by explaining the process and options available to make decisions. Able to discuss how to manage and evaluate value engineering and whole life costing as applying to their discipline, and within a complex systems of systems, whilst demonstrating critical appraisal, insight and reflection.

Contribute to and attend Senior Management and Executive meetings **Core:** C/K7 and C/S4	Active and purposeful contributions at senior management and executive meetings.	
Manage financial systems, forecasts and budgets **Core:** C/S5	Demonstrates application of financial systems, forecasts and budgets, working examples of financial management are articulated.	Estimates costs using a range of appropriate financial considerations which are evaluated and compared to justify, develop and commission new process(es) or equipment, on time and within budget. Includes explanation of the appropriate financial and business techniques used to justify, develop and commission new process(es) or equipment, on time, under budget and/or exceeding predicted performance.
Lead/manage multi-disciplinary teams **Core:** C/S7	Demonstrable experience of leading or managing multi-disciplinary teams, with appropriate mentorship / coaching for individuals within the team(s).	Explains the benefits and challenges of working with staff within a management matrix; explaining how they have addressed these issues and their understanding of the organisational purpose and values to support a high performance work culture. Demonstrates the ability to lead, motivate and influence people within a management matrix; articulating and explaining organisational purpose and values to create an inclusive, high performance work culture, where challenging tasks are effectively delegated and managed.

| Demonstrate continuous professional development
Core:
B6
Specialism:
TRS/S2
TND/S3 | Understanding of the importance of CPD backed up by planning and/or demonstrating intent, including relevant accreditations /licenses applicable to role. | Demonstrates a positive mind-set and willingness to learn, displaying proactive approach and the ability to take the initiative when it comes to personal CPD.

Acts as an ambassador for the profession / discipline. |