

Mentor's Guide

(Generic Version)

Version 1

June, 2011

IMPORTANT NOTICE

This booklet is one of a series of generic training and assessment templates developed by the Association of Tourist & Heritage Rail Australia Inc (ATHRA) as guides for heritage railway and tramway operators seeking to develop or upgrade their local training and assessment resources.

This booklet and others in the series are not intended to be training resources in their own right but rather to be suitably customised, embellished and adapted by railway and tramway operators to match the specific context of their own railway or tramway, e.g. types of locomotives/trams, rollingstock and associated equipment, the track layout and infrastructure, the local standard procedures and rules, the safety management and safeworking systems, the railway or tramway organisational structure, and the roles and functions of personnel in the railway or tramway, etc.

Railway and tramway operators seeking to use this booklet and others in the series should initially refer to the *ATHRA Customisation Guidelines Booklet* which provides important information on how the generic templates should be used.

Disclaimer

The information contained herein is made available by the Association of Tourist & Heritage Rail Australia Inc (ATHRA) as part of a set of **generic training and assessment templates** for use by individual heritage railway and tramway operators.

It is intended that heritage railway and tramway operators will be able to create their own local training resources by suitably modifying, embellishing and customising the generic templates to meet their own requirements.

ATHRA does not assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information provided in these generic resources.

© Association of Tourist & Heritage Rail Australia Inc. 2011

CONTENTS

1 The training / learning approach

2 How to conduct the training a	nd assessment
---------------------------------	---------------

- 2.1 Overview
- 2.2 Mentoring the learner
- 2.3 Assisting learners to use their 'Lesson Plans and Workbooks'

3 Conducting assessments of knowledge and performance

- 3.1 Overview
- 3.2 Evidence of knowledge
- 3.3 Use of Multiple-choice Questions
- 3.4 Use of Open-ended Questions
- 3.5 Knowledge Checklists
- 3.6 Evidence of Performance
- 3.7 Performance Checklists

Separate Attachment 1: Applicable Knowledge Checklists

Separate Attachment 2: Applicable Mentor's Knowledge Question and

Answer (Q&A) Banks

Separate Attachment 3: Applicable Mentor's Knowledge Question and

Answer (Q&A) Banks

Attachment 4: Sample Training Diary Sheet

1 THE TRAINING / LEARNING APPROACH

The approach for the learning and lesson processes adopted in the lesson plans and workbooks and this mentor's guide is one that is already used as the basis of good practice by many Tourist and Heritage Railway and Tram Sector Operators in Australia.

This is the well-proven model outlined by Jerome Bruner in the 1960s¹ and which continues to be widely used both in vocational education and more recently in IT training and literacy training in schools across the world. The model is often called the scaffolding educational approach and is distinguished by the following features....

- It emphasises that knowledge <u>and</u> skill are two sides of the same coin (i.e. competence). Skill is in effect applied knowledge while knowledge development is specifically targeted on enabling the practice of skills in both normal and abnormal work contexts.
- Learning is a collaborative activity in which the learner interacts with experienced mentors and colleagues both in practical workplace settings and in convenient off-job locations such as staff rooms, training rooms, etc.
- Learning is best conducted in a variety of practical settings or contexts involving a range of learning activities in which the experienced colleague, mentor or trainer can show and demonstrate equipment, resources and processes in real work situations and where abnormal situations can be discussed and the reasons for precautions, recognition of problem situations and responses to perceived problems can be explained.
- 'Scaffolding' is now widely used as a metaphor for the temporary supporting structures that assist learners to develop new understandings, new concepts, and new abilities (Hammond 2001). Characteristically, 'scaffolding' provides high levels of initial support, and gradually reduces this as students move towards independent control of the learning task or text......DEST (2006)²

Mentor's Guide 4

Bruner, J. (1960). <u>The Process of Education</u>. Cambridge: Harvard University Press.

Bruner, J. (1974). Toward a Theory of Instruction

Bruner, J. (1996). The Culture of Education. Cambridge: Harvard University Press

Department of Education, Science and Training (2006) <u>Scaffolding Literacy in the Middle Years</u> Report of a project completed by . the Consultancy and Development Unit (CDU) at Deakin University http://www.dest.gov.au/literacynumeracy/innovativeprojects/pdf/oakley_scaffolding.pdf

- In a vocational setting³, the sequence in the 'scaffolding' approach is typically....
 - 1. The learner is initially provided with important background information by their experienced colleague or mentor This will often include overviews and explanations, guided observations and walk throughs, as well as the provision of important documents such as manuals, rules, procedures etc. Typical would be an opportunity for an accompanied ride on a footplate of a locomotive, or the opportunity to watch the departure of a train or tram, or to observe the pre-operational preparation and checking of a locomotive or tram. (This is often called the *modelling* phase)
 - 2. The experienced colleague or mentor will then usually demonstrate the tasks and functions to be learned, providing explanations and drawing attention to critical issues during the course of the demonstration and linking the practical tasks to the explanations and information provided earlier. Knowledge continues to be developed throughout the demonstration and the learner is encouraged both to ask questions and to respond to questions on what is being observed. Discussion covers both normal and abnormal situations that may occur. (This is often called the coaching phase)
 - 3. The experienced colleague or mentor then encourages the learner to begin closely guided initial practice of the task or function one small step at a time. Careful direction and feedback is given as the learner tentatively begins the activity the feedback focused on giving encouragement and adjusting inappropriate procedures and correcting misconceptions and misunderstandings. (This is often called the scaffolding phase)
 - 4. As the learner becomes more confident and adept, the **degree of guidance is gradually reduced** (i.e. the scaffolding is gradually removed -- a bit like the training wheels on a bicycle).

The experienced colleague or mentor continues to monitor the activities and provide encouragement and feedback on performance during the guided practice. In this interaction with the learner, the

Billett, S. (1993) <u>Learning is working when working is learning – a guide to learning in the workplace</u>, Griffith University,

Billett, S. (1994) 'Authenticity in workplace settings' in J. Stevenson (ed.) The development of vocational expertise, NCVER, Adelaide.

experienced colleague or mentor will continue to build and check the learner's knowledge and understanding related to the task concerned. (This is often called the *fading* phase).

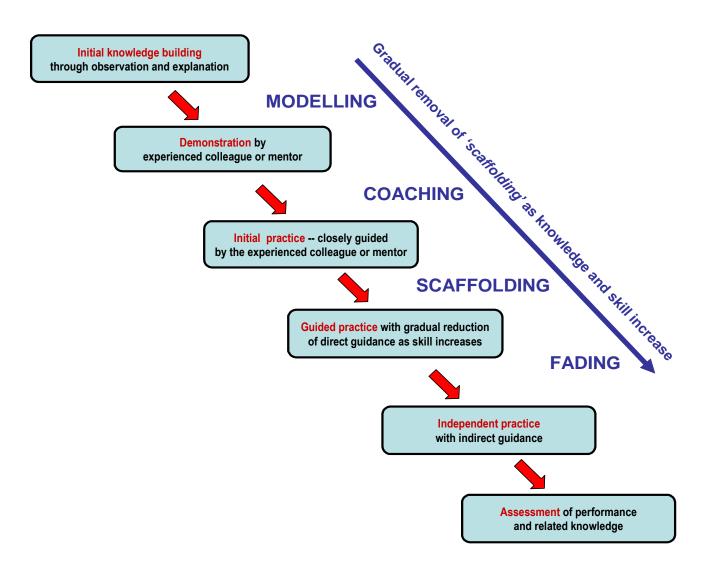
- 5. Eventually, once the experienced colleague or mentor is satisfied that the learner has a sufficient level of skill and related knowledge, the learner is allowed to independently **practice the task or function** without specific guidance.
- 6. When the learner and experienced colleague or mentor agree that sufficient practice has been undertaken, the learner's knowledge and skills on the task are **assessed** usually through a combination of observation of performance of the task, as well as written and/or oral questioning on the related knowledge.

This includes pre-set assessment activities with a checklist of observation points able to be ticked off once the experienced colleague or mentor is satisfied that sufficient evidence of competence has been demonstrated.

Questions used in written or oral questioning are usually be drawn from a database or list of questions covering such topics as the features of the equipment, standard operating and servicing procedures, regulatory requirements and rules, risk management processes, emergency procedures and action to be taken in a range of both normal and abnormal situations.

The scaffolding model for the learning and lesson processes described above can be summarised in the diagram on the following page:

The scaffolding approach for the learning of vocational skills and knowledge



2 HOW TO CONDUCT MENTORING

2.1 Overview

There are two key processes in the development and confirmation of the skills and knowledge of personnel in a heritage or tourist railway:

1. Mentoring the learner

This involves assisting and supporting trainee personnel to gradually <u>develop and learn the required knowledge and skills</u>, and gain the confidence to apply them safely and reliably in the performance of a specified role in the railway concerned. A key person in this process is a mentor (an experienced and appropriately qualified colleague or trainer) who can guide and assist the learner in the progressive acquisition and building of the required knowledge and skills, and

2. Conducting assessments of knowledge and performance

This involves <u>checking or assessing</u> that the trainee is ultimately able to demonstrate the skills to the required level of competence for the role concerned, and that they have the knowledge required to support and exercise these skills in both normal and a range of abnormal situations that could be experienced in that role. This is usually undertaken by a <u>different</u> mentor or assessor to the mentor who has assisted and guided the trainee during the learning process.

2.2 Mentoring the learner

The role of the mentor in assisting and supporting the learner involves a range of tasks....

- Organising opportunities for the learner to progressively develop the knowledge and skills detailed in their lesson plan and workbook. Their lesson plan and workbook has been sequenced to allow the learning to progress steadily -- following the 'Scaffolding' training/learning approach detailed in the previous section, i.e.....
 - Observation and explanation (initial knowledge building) –
 (e.g. a guided ride on a locomotive or tram, or shadowing a
 guard on a train journey).

- <u>Demonstration</u> by the mentor to give the learner an understanding of how tasks are performed, (e.g. the mentor demonstrates how the fireman lights fire on a steam locomotive, or the role of a guard in the departure of a train from a station).
- Initial practice -- closely instructed and guided by the mentor,-- (e.g. the learner fireman assists the mentor to manage the firebox on a train with the mentor giving the learner opportunities to perform various tasks under close supervision).
- Guided practice -- with gradual reduction of direct instruction and guidance from the mentor as skill increases,-- (e.g. the trainee tram driver drives the tram on a full journey, initially the mentor provides close guidance and suggestions but as the trainee becomes more confident and obviously skilful, the mentor becomes more of an observer).
- Independent practice -- with indirect guidance and feedback from the mentor (e.g. the trainee train driver performs the full functions of a train driver with the mentor acting as an observer and being ready to assist in any situations which the trainee driver might not be able to manage or control).
- Assessment of evidence of performance and related knowledge (usually by a different mentor or assessor to the mentor who has guided the learning) (e.g. the person conducting the assessment reviews the evidence of performance and knowledge using the performance and knowledge checklists).
- Making sure that the learner has or has access to key applicable
 reference documents of the rail operator concerned, such as standard
 operating procedures, safeworking rules, pre-operational or postoperational checklists, operating and service manuals, timetables, route
 maps, etc.
- Assisting the learner to read, interpret and apply the railway's key reference documents and manuals, as well as applicable regulatory requirements.

- Discussing the contents of the Lesson Plan and Workbook with the
 learner and discussing how, where and when the various learning
 activities will take place. Every topic in the Lesson Plan / Workbook has a
 series of sub topics each of which requires the learner to learn some
 theory, partly from the workbook; partly from the reference documents
 they have been given access to and partly from discussions with their
 mentor, or other experienced railway personnel.
- Demonstrating how to perform the various tasks and duties detailed in the lesson plan and workbook.
- **Showing** the learner key equipment and components, pointing out the key features and concurrently explaining features, purpose, potential problems or defects and related action that would need to be taken.
- **Drawing attention** to critical equipment and activities, or situations that may arise, when observing or practising the functions the trainees are learning.
- **Explaining** how to do tasks, how to respond to abnormal situations, why things are done in a particular way, and what the consequences are if an important task is not done correctly or is not done at all.....

Always explain the reasons and benefits of doing things safely and correctly, as well as the dangers, problems and consequences of <u>NOT</u> doing them safely and correctly!

 Answering questions that the learner may pose about the duties and responsibilities of the job role they are learning, and the related equipment, procedures, safeworking rules, applicable regulations, potential problems and solutions.

- **Guiding** the gradual development of the learner's ability to perform the various tasks and duties safely and correctly in the sequence detailed in the learner's Lesson Plan / Workbook.
- Giving feedback to the learner, -- reinforcing achievements and successes and providing advice and support in situations where learners are unsure of what to do, or where they have made an error or incorrect response.
- Giving encouragement in situations where learners have made a
 mistake, are unsure of what to do next, or have forgotten an important
 aspect of standard procedure, or critical knowledge of a piece of
 equipment or component.

2.3 Assisting learners to use their 'Lesson Plans and Workbooks'

'Learners' Lesson Plans and Workbooks' have been developed by ATHRA as an aid for trainees (i.e. learners) to help them develop the required skills and knowledge to competently perform the functions of their intended job role on a heritage railway managed by a heritage rail operator. When using a 'Lesson Plan and Workbook', trainees will work closely with a learning mentor who will guide them through the learning activities contained in the Lesson/Plan Workbook to achieve the knowledge and levels of performance required to carry out the functions of the heritage railway job role concerned.

As at 31 December, 2010, 'ATHRA generic versions of Lesson Plans and Workbooks and associated Knowledge Checklists, Mentor's Q&A Booklets and Performance Checklists have been developed in the following topic areas:

- Safeworking and General Safety
- Heritage Steam Locomotive Driver
- Heritage Diesel Locomotive Driver
- Fireman on a Heritage Steam Locomotive
- Second Person on a Heritage Diesel Locomotive

- Guard on a Heritage Train
- Heritage Tram Driver
- Train Examination Addendum

Each Lesson Plan/Workbook is self-contained and is structured to have the following sections:

Section 1 - How to use the lesson plan / workbook

Section 2 - List of reference material

Section 3 - Objectives of the lesson plan

<u>Sections 4, 5, 6, etc. - A number of topics covering the tasks</u> that need to be performed by persons carrying out the job role covered by the Lesson Plan / Workbook concerned.

<u>Separate Attachment 1 Knowledge checklist</u> (for the Lesson Plan / Workbook concerned)

<u>Separate Attachment 2 Performance checklist</u> (for the Lesson Plan / Workbook concerned)

Mentors should familiarise themselves with the contents of the Lesson Plan / Workbook(s) being used by the trainee(s) they are mentoring.

In particular, Sections 4, 5, 6, etc. require the trainee or learner to interact with their mentor, as they develop their required knowledge (theory) and undertake a series of practical learning tasks (a defined practical activity listed in a shaded box) for each sub-topic of the task topics concerned). Mentors should prepare themselves in advance to be able to counsel and assist the trainees / learners in the conduct and satisfactory achievement of the practical learning tasks detailed. Mentors must have a good understanding of the job, the equipment and the Railway or Tramway Operator's Standard Operating Procedures and Safety Requirements.

3 CONDUCTING ASSESSMENTS OF KNOWLEDGE AND PERFORMANCE

3.1 Overview

Assessment of trainees is conducted when the assigned 'learning' mentor believes they have developed their skills and knowledge to the point where they are ready to demonstrate their competence.

In practice, it is desirable that the assessment is carried out by a suitably competent person other than the learning mentor. This could be another mentor or trainer or another suitable person with the expertise required to conduct the assessment.

The processes used for assessment of the knowledge and performance of learners involves collection and consideration of evidence that the learners can perform the required tasks in accordance with all procedural and safety requirements and can demonstrate the knowledge and understanding needed to complete the tasks in the required range of defined normal and abnormal situations they are likely to experience when carrying out their operational functions.

3.2 Evidence of knowledge

Evidence of required knowledge is obtained through an appropriate combination of written and/or verbal questioning. Banks of sample questions have been developed for each topic area as part of this resource kit for use by mentors/trainers during theory (i.e. knowledge) assessment (see separate attachments 1 and 2). It is planned that this bank of questions will be suitably supplemented and edited from time to time on an ongoing basis as required. Rail Operators should add their own questions to suit their specific equipment and procedures.

Assessment of knowledge may take place in

 a training room environment involving written tests and/or interactive verbal questioning, or

 a suitable work environment (where knowledge assessment and performance assessment can be suitably integrated).

Correct responses should be judged against the reference material used by the trainee and mentor / trainer in lessons. This may include reference documents such as standard operating procedures, operating and manuals, safeworking rules and related documents, safety management system documents, OH&S policies and procedures, emergency procedures manual, timetables, etc.

Of course, in practice, the questions in the database will need to be customised to circumstances of the particular heritage railway or tramway concerned.

The table below summarises various types of questions. The list of question types is not exhaustive but provides a sample of the types of questions that can be included in the database.

Type of question	Example of lead-in to question
Questions on procedures to be followed for normal operations, during maintenance checks, during various abnormal situations and emergencies, safeworking and OH&S requirements, etc.	 How would you? or What is the procedure for? What action is necessary to? (e.g. shut down the tram or loco, respond to a derailment, depart from a station, manually lift a load, pass another train on a bi-directional track, etc.)
Questions on reasons for a particular action.	Why do you? (e.g. check on train movements when on track, need to wear personal protective equipment, regularly check water levels, etc.)

Type of question	Example of lead-in to question
Questions on action to be taken in a potential abnormal or contingency situation or in an operational situation that occurs irregularly.	 What would you do if? What action is necessary if? (e.g. there is a fire, a component fails, there is a total fire ban during the bushfire season, a safety incident occurs, you detect an air leak in the brake system, etc.)
Questions on identifying features and purposes of equipment, equipment components and controls, key documents, etc.	Identify and describe the purpose of ? (e.g. hood components, engine components, transmission controls, etc.)
Questions on functions of equipment and equipment components and controls.	Explain or describe the function of? (e.g. control, equipment components, staff, tools, infrastructure components, etc.)
Questions on the consequences (i.e. of a bad decision, a component failure, failure to follow safeworking requirements.	What could happen if? (e.g. you use a CO ₂ fire extinguisher on an electric fire, you do not follow correct procedures when approaching a crossing, enter a section without the correct staff or ticket, etc.)
Questions on facts which need to be known.	 State the? or What are the? (e.g. speed limits for various listed situations and sections of track, preoperational checks required, action that must be taken when approaching a crossing, etc.)

Type of question	Example of lead-in to question
Questions on service and safety checks which need to be completed.	What checks must be made? (e.g. during preparations for service, before departing a station, during the shutting down and stowing of a tram or loco, etc.)

3.3 Use of Multiple-choice Questions

It is noted that multiple choice questions are often included in the assessment processes. These can be very useful tools for training and assessment – if they are well designed. However, even if well designed, they should not be the <u>sole or principle source of evidence</u> for knowledge assessment, particularly where they relate to safety-critical functions and activities.

The reason for this is that it is statistically possible for a person with no formal knowledge of the topics concerned to randomly complete a multiple choice test and still possibly get 100% of the questions correct. This is even if the questions are well designed.

In practice, many multiple choice questions can also suffer from being poorly designed or having easily identifiable distracters or ambiguity in the correctness of the various alternatives. The words used in questions can also provide clues and cues as to the correct response. Care needs to be taken in the use of multiple choice questions. Where possible, it is better to use open-ended questions or at least a suitable combination of open-ended and multiple choice questions.

3.4 Use of Open-ended Questions

Open ended questions are more likely to reliably reveal the learner's knowledge and understanding. Questions can be in written form or be asked verbally. If people have difficulty expressing themselves in writing they may find it easier to respond verbally. Verbal questioning also enables the mentor/trainer to probe further with supplementary questions if the learner's initial response seems doubtful.

3.5 Knowledge Checklists

Knowledge Checklists are provided as separate attachments to the Learner's Lesson Plans and Workbooks. They are a series of open ended questions organised around the topics in the Lesson Plan / Workbook concerned. The intent of these checklists is to provide the learner with advanced knowledge of the possible types of questions that could be asked during their knowledge assessment.

The checklist also provides a tool for the assessor to mark which questions on the checklist candidates give satisfactory answers to during their assessments. The Knowledge Checklists for each applicable Lesson Plan / Workbook are provided as a separate attachment 1 to this Mentor's Guide.

The mentor also has, as a separate attachment 2 to this Mentor's Guide, question and answer banks (Q&A banks) containing the same questions as in the knowledge checklists in the Lesson Plans / Workbooks but with sample answers as a guide for the mentor in checking the candidate's responses. In practice, these answers will need to be customised to the circumstances of the particular rail operator and heritage railway concerned.

In practice, a <u>different</u> mentor to the one who has mentored the candidate during their learning activities would carry out a candidate's assessment. However, mentors guiding trainees learning activities will also find the Q&A banks useful as a reference resource when assisting learners during their learning activities and preparing them for their eventual assessment.

3.6 Evidence of Performance

Evidence of required performance is obtained through observation of the learner carrying out tasks as per standard operating procedures and other documentation of the rail operator concerned and the applicable safeworking and regulatory requirements. This evidence should comprise training records, diaries, mentor's comments, a record of the formal assessment and its outcome.

3.7 Performance Checklists

Performance Checklists are provided as a separate attachment to the Learner's Lesson Plans and Workbooks. They list a series of assessment tasks organised around the topics in the Lesson Plan / Workbook concerned.

The intent of these checklists is to provide learners with advanced knowledge of the types of tasks in which they will need to demonstrate competence during their knowledge assessment.

The checklists also provide a tool for the assessor to mark the assessment tasks on the checklist in which the candidates have demonstrated competent performance during their assessments. The Performance Checklists for each applicable Lesson Plan / Workbook are also provided as a separate attachment 3 to this Mentor's Guide.

The key criteria in the performance assessment are the standard operating procedures and operating / maintenance checklists of the rail operator concerned, applicable safeworking and regulatory requirements and the other key reference documents of the rail operator applicable to the duties of the heritage rail occupation concerned.

Questions should include a suitable number of 'What if's...?' – as the trainee may not have experienced equipment failures, hazards or other specific occurrences during the actual training.

SEPARATE ATTACHMENT 1

APPLICABLE

KNOWLEDGE

CHECKLISTS

SEPARATE ATTACHMENT 2

APPLICABLE

MENTOR'S

QUESTION AND ANSWER

(Q&A)

BANKS

SEPARATE ATTACHMENT 3

APPLICABLE
PERFORMANCE
CHECKLISTS

ATTACHMENT 4

SAMPLE TRAINING DIARY SHEET

SAMPLE TRAINING DIARY SHEET FOR A TRAINEE FIREMAN

TOPIC AREA		Date Completed	Mentor's Initials
Role and responsibilities of a fireman on a steam locomotive Duties of a fireman Statutory responsibilities including rail safety and safeworking requirements and regulations related to the operation of boilers Standard procedures of the rail operator applicable to a fireman, including record keeping and the reporting of defects and incidents			
Conducting pre-operational checks on a steam locomotive boiler • Identifying and describing the components of the boiler of a steam locomotive and its associated equipment (purpose, principal parts, functions and operation, and potential defects and related action) Theology is a steam locomotive boiler			
 Conducting a visual inspection and other pre-operational checks of boiler and associated equipment Checking the level of water in the boiler Lubricating the locomotive Carrying out other required pre-operational checks that are the responsibility of a fireman 	Practical		
Lighting fire and raising steam Ensuring adequate ventilation within a confined environment such as a locomotive shed Testing and operation of the water gauge glass fittings Conducting pre-light up procedures	Theory		
 Lighting the fire Raising steam Using a blower when raising steam and taking required precautions Minimising smoke generation while raising steam Testing the injectors 	Practical		
 Operating the boiler during a train journey Responding to the driver's instructions Checking and maintaining the water level in the boiler throughout the journey Firing and managing the boiler throughout a train journey Monitoring and testing equipment and instruments regularly to ensure an adequate supply of fuel and water to the boiler 	Theory		
 Optimising the burning of the fire and the level of steam throughout a train journey Ensuring adequate vacuum in firebox Checking and cleaning ash pan as required Taking on water and fuel Assisting the driver in the observance of signals and level crossings Remaining vigilant including looking back to train Responding to abnormal situations that may arise during a train journey Stopping and securing a train in the event of an emergency, including the safe management of the boiler 	Practical		

TOPIC AREA		Date Completed	Mentor's Initials
 Cleaning and checking the boiler after operations Confirming locomotive is secured prior to post-operational cleaning and checking operations Cleaning of smokebox Conducting cleaning operations including fire cleaning, dumping of ash and other cleaning duties Conducting a visual inspection and other post-operational checks of boiler 	Theory		
 and associated equipment Completing all required post-operational lubrication and greasing tasks Topping up water level in boiler as per standard procedures Checking that tool kit, fire extinguisher, first aid kit and other locomotive equipment is in operational condition and is correctly stowed Checking and confirming that boiler and associated equipment have been restored to required post operational condition Completing required post-operational documents and reporting any faults or defects for appropriate action 	Practical		

Mentor's and/or Assessor's Comments
Trainee's Details:
Railway's Details: