gotrain industry

Registered Training Organisation

UEPOPL002 License to operate a reciprocating steam engine

Course Outline

NATIONALLY RECOGNISED TRAINING

USE OF THIS RESOURCE

The document is written for Students, to guide the Training and Assessment of the unit:

UEPOPL002 License to operate a reciprocating steam engine

Trainers/Assessors should also use this resource to assist with the delivery of their training and assessment in the unit.

UEPOPL002 is a High-Risk Work unit of training. The outcome of completion of this unit is the issue of a High-Risk Work Licence to operate a Reciprocating Steam Engine.

Safe Work Australia as the national regulator defines the assessment process. The current mechanism is the SWA 2015 V2 ES assessment instrument.

The WorkCover authorities approve the RTO and its assessors who can issue the HRW licences.

The WorkCover authorities & SWA are the industry review and therefore consultation authority that GTI uses in ensuring that the requirements of this unit meet the required standards on an ongoing basis

The theory and training of this unit is delivered in a face to face format, for training delivery with assessment being conducted in a one-on-one practical verbal manner including a written assessment supplementing the practical skills assessment to the Trainer/Assessor. This Course Outline contains details of the unit structure and content, and the Practical and Written Assessments and, links to support services as applicable.

Students should use the information in this resource in close combination with the Learner Guide. The Learner Guide is a print document extracted from the Training Resource, which for this unit is a PowerPoint presentation. Your Trainer may also provide additional learning materials and documentation to supplement these resources.

By using this Course Outline and the learning and assessment resources together, Students will more effectively:

- Comprehend the key concepts and theories
- Review topics covered
- Prepare for the assessments
- Undertake their assessments

UNIT OF COMPETENCY

UEPOPL002A License to operate a reciprocating steam engine

UNIT DESCRIPTOR

This unit specifies the outcomes required to operate a reciprocating steam engine for licensing purposes, which includes the operation of steam equipment where the steam acts upon a piston under pressure where this action of the steam forces the piston to move, including expanding (steam) reciprocating engines, with any piston diameter of greater than 250 millimetres.

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This program is designed for persons over 18 years of age, seeking to operate a Reciprocating steam engine. Aspiring persons may be from these vocations:

- Manufacturing industry
- Heritage
- Power generation.
- Unemployed
- Those wishing to gain entry to a different industry sector

The reciprocating steam engines covered by this unit would typically include engines with which are stationary, portable, pumping engines or locomotive engines.

This unit in its current form meets state and territory high risk work licensing requirements. Any alteration to the content or outcomes would not be acceptable to regulators for the purpose of licensing

LEGISLATION

This unit is based on the licensing requirements of Part 4.5 of the Model Work Health and Safety (WHS) Regulations, High Risk Work

PREREQUISITE UNITS

You are not required to have completed any other National Unit of Competency prior to attempting this Unit.

ENTRY REQUIREMENTS

It is important that you are physically fit and have sufficient visual and audio capacity prior to participation in work in and around the rail environment. You therefore must have no medical condition that would affect your ability to work in the rail corridor.

All students must be over 18 years of age and must possess English language skills equivalent to a Yr 10 high school education.

EQUIPMENT AND RESOURCE REQUIREMENTS

To undertake your training and assessment in this unit, and to satisfactorily demonstrate your competency you will need to provide the following resources and equipment:

- Blue or Black pen
- Closed-toe work shoes or boots
- Long sleeve shirt and long trousers
- Riggers gloves and safety glasses
- Appropriate clothing or uniform for training outside

Any additional PPE and equipment will be provided by Go Train.

DURATION.

The classroom/theoretical training session for this unit will take approximately 1 day (6 hours) for you to complete. This will include activities. A written and practical assessment is conducted on a second day and takes 3 hours in total. The practical component of the unit will take you approximately 1 hour to complete. This includes a practical demonstration of skills assessment.

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Overall, the total time it will take to complete the unit will be approximately 9 hours.

Where training and assessment is conducted in the Workplace, the time and speed at which you will complete this unit will depend on the level of access and flexibility you have to the required facilities and equipment.

ACADEMIC AND CAREER PATHWAYS

From an academic perspective, upon receiving a Statement of Attainment for this unit you could use it towards any elective unit in any other nationally recognised training qualification, where appropriate.

From a career perspective, you could use the skills and knowledge learnt to enhance your likelihood of employability in the general industry or power generation sectors.

ACCESS AND EQUITY

You are encouraged to speak to or contact your Trainer/Assessor and seek support as required. As a rule, to seek assistance with any of the training and assessment materials, and/or if you have any questions or queries with your assessment tasks, you should first make direct contact with your Trainer/Assessor.

When enrolling in the unit, we will have asked you questions which would identify any issues you may have relating to your physical ability, cultural or educational background that could pose a hurdle for you to comfortably complete this unit within the anticipated timeframe.

If you feel that you are at a disadvantage to other students, your Trainer/Assessor may be able make reasonable adjustments to how some of your Assessment Tasks can be demonstrated and/or submitted. Such adjustments are considered 'reasonable' if they do not impose an unjustifiable hardship on Go Train, and as long as they do not change the core outcomes of this unit and still satisfy the Critical Contexts of Assessment requirements from this units Training Package.

Language, Literacy & Numeracy

Candidates with Language, Literacy and Numeracy (LLN) barriers or learning disabilities, are encouraged to pursue their vocational education and training goals through participation in the programs offered by Go Train.

Details of student support services available for our courses are outlined on the Go Train website http://rms.gotrainrto.com or in the Student Handbook. Should you wish to contact a Student Support Officer to discuss your LLN needs, please email students@gotrain.com.au, or call our NSW office on: (02)43554595.

RECOGNITION OF PRIOR LEARNING (RPL)

As a rule RPL is not allowed for this unit.

DEMONSTRATING YOUR COMPETENCY

Competence means that you have the required knowledge and skills to do your job. These are described as 'competency standards'. Your training in this unit will be based on these competency standards to make sure that it is relevant to the needs of your job and yourself.

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The classroom theoretical training of this unit is provided across 4 Sections that mirror the 4 Elements in the table below. After your training, your competence will be assessed against these criteria. You must achieve competency in these assessments to be deemed competent in the unit and gain your Statement of Attainment certificate. Details of your Assessments for this unit are outlined in the Assessments section of this Course Outline.

At the conclusion of your training and assessment you will receive either a Competent (C) or a Not Yet Competent (NYC) grade. If you are deemed Competent in the unit, you will be provided either in person or by post a Statement of Attainment (SOA) Certificate.

If your Certificate is to be posted, it will be sent to your address as indicated on your Enrolment Form. Certificates are as a rule, not posted to your Employer.

Not Yet Competent
If you receive a NYC grade, your Trainer/Assessor will indicate to you which questions or tasks from the Assessments will require re-submission. You will be provided with every reasonable opportunity to attempt each of the questions or tasks to demonstrate your Competency.

If you are unable to demonstrate your competency within a reasonable timeframe, your Trainer/Assessor will either: organise another time for you to undertake the Assessments again; or request that you re-enrol in the unit and undertake the Training session again.

Note: If you are asked to re-enrol in the unit you will have to pay the enrolment fee in full prior to undertaking the Training session again.

Elements and Performance Criteria
Elements describe the essential outcomes of the unit, whilst the Performance Criteria describe the required performance needed to demonstrate achievement of the element.

ELEMENT	PERFORMANCE CRITERIA
1. Plan Work	
1.1	Types of operations to be conducted for a reciprocating steam engine are assessed and prepared
1.2	Personal protective equipment (PPE) is selected for use, ensuring statutory requirements and procedures are followed
1.3	Hazards and potential hazards in work area are identified and assessed for risk, and controls recommended consistent with appropriate standards
1.4	Pre-operational safety checks of reciprocating steam engine and equipment are conducted according to statutory requirements and procedures
1.5	Maintenance requirements and equipment faults are identified and reported according to procedures
1.6	Appropriate communication methods are identified according to procedures
2 Start the Reciprocating Engine	
2.1	Controls are implemented for identified hazards and potential hazards in work area consistent with appropriate standards
2.2	Start-up checks are performed and the reciprocating steam engine is brought on line safely, according to statutory requirements and procedures

2.3	Maintenance requirements are identified and reported according to procedures
3. Monitor Reciprocating Steam Engine operation	
3.1	Reciprocating steam engine is monitored according to statutory requirements and workplace procedures, including undertaking operational checks
3.2	Operating log is maintained clearly and accurately, according to statutory requirements and procedures
3.3	Information regarding reciprocating steam engine, its status and operation is communicated clearly according to procedures
4. Shut down reciprocating steam engine	
4.1	Engine is shut down according to statutory requirements and procedures, including shut down checks and shut down checks for maintenance
4.2	Reciprocating steam engine is isolated according to procedures
4.3	Maintenance requirements are identified, recorded and reported according to procedures

The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria in the table above, and also include demonstration of applying:

- The Required Knowledge and Skills
- Relevant legislation and workplace procedures
- Relevant aspects of the range statement

Note: your Trainer/Assessor may also request additional Assessment tasks be performed; customise the assessment tools where access and equity issues are present or where your employer requests the practical tasks be tailored to your workplace needs.

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

The required skills include:

1. Accurate recording and maintenance of information relating to operation of a reciprocating steam engine
2. Compliance with legislation, regulations, standards, codes of practice and established safe practices and procedures for starting, operating, shutting down and maintaining a reciprocating steam engine
3. Diagnostic and testing techniques for reciprocating steam engines
4. Efficient and safe conduct when starting, operating, shutting down and maintaining a reciprocating steam engine
5. Use of appropriate communication techniques with colleagues and others
6. Use of relevant tools and equipment
7. Verification of problems and equipment faults and demonstrate appropriate response procedures

Required knowledge includes:

1. Basic principles of heat transfer and thermodynamics
2. Commonwealth, state or territory WHS legislation, regulations, standards and codes of practice relevant to the full range of techniques for operating reciprocating steam engines
3. Confined space awareness and the limits for entry into a confined space.

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4. Engine speed control equipment
5. Environmental protection requirements relating to the disposal of waste material and storage of environmentally hazardous materials
6. Established communication channels and protocols in the workplace
7. Safety data sheets and material handling methods
8. Organisational and workplace standards, requirements, policies and procedures for starting, operating, shutting down and maintaining a reciprocating steam engine
9. Procedures for the recording, reporting and maintenance of workplace records and information
10. Understanding of the hierarchy of hazard identification and control
11. Reciprocating steam engine capabilities and components
12. Reciprocating steam engine fault finding and problem solving techniques
13. Reciprocating steam engine operations and operating techniques
14. Reciprocating steam engine safety devices and testing techniques
15. System components and their interaction with other plant and equipment
16. Types of tools and equipment and procedures for their use, operation and maintenance
17. Typical routine problems encountered in the process and with equipment and adjustments required for correction

ASSESSMENTS

To achieve competency in this unit you must satisfactorily complete the following 2 assessment tasks.

Your Trainer/Assessor will determine your competency on an overall basis – their role is to decide whether you have 'satisfactorily' demonstrated the Elements and Performance Criteria, Required Skills, and an understanding of the Knowledge to apply fatigue management strategies correctly in a workplace.

If your Assessor grades you as Not Yet Satisfactory in any or all of the tasks, they will provide you with either verbal or written feedback regarding where you did not meet the assessment criteria, and will instruct you to re-submit that part of the assessment again. This may include all or only some of the questions and tasks.

Note: the assessment has an 'Assessment Cover Sheet' which you must fill-in and sign before being permitted to undertake the Assessments.

1. Written Assessment

You must complete the National Assessment Instrument for this unit as defined by SafeWork Australia for High Risk Licences.

2. Practical Assessment

You must complete the National Assessment Instrument for this unit as defined by SafeWork Australia for High Risk Licences.

These assessments will take place in your workplace or in an actual environment. Your Trainer/Assessor will either ask you to perform each task or activity individually and will record their observations of your performance on the Observation Sheet. At the conclusion of the assessment you will be asked to sign the Observation Sheet, which will be used as evidence of your performance.

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STUDENT SURVEY & FEEDBACK

After you complete your training and before we issue your Certificate we will invite you to take part in a feedback survey to seek your views on the quality of our education and training. The survey is conducted to collect feedback from our students on their views about their learning and training experiences. The outcomes of the feedback process play an important role in developing and delivering future training at Go Train.

Your feedback counts. We use the feedback part of our continuous improvement processes. Also we must provide a summary report of feedback from Students to our Registering Body (the Australian Skills Quality Authority) to provide an indication of our performance and the satisfaction of our students. This is a condition of our registration as an RTO.

Participation in this survey is highly valued, but voluntary. You are free to withdraw consent at any time. We will protect your anonymity and the confidentiality of your response to the fullest possible extent within the limits of the law. The survey should take no longer than 10 minutes to complete.

GLOSSARY / RANGE STATEMENTS

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below.

- **Appropriate standards** may include, but not be limited to: codes of Practice; legislation; Australian standards and manufacturers' specifications.
- **Communicated/Communication** may include, but not be limited to: verbal; written; telephone; two-way radio; log records and computer record systems.
- **Emergencies** may include, but not be limited to: fire; bomb threat; terrorism; personal accidents; chemical spills; major steam leaks; major water leaks and flooding and natural disasters.
- **Equipment** may include, but not be limited to: engine and auxiliary plant; engine lubrication and power or control oil systems; hydraulic oil system; pump; compressed air system; steam supply system; cylinder exhaust system; computers with equipment control functions; supervisory, alarm, protection and control equipment and Relevant maintenance equipment. Also to include equipment for: lock out for protecting operators and co-workers from accidental injury; emergency shutdown stopping; extinguishing fires; organisational first aid requirements and evacuation.
- **Equipment faults** may include, but not be limited to: abnormal operating conditions; loss of a major auxiliary; excessively high engine and engine valves heating rates or differentials; high engine bearing temperatures or vibration; high pressure heaters malfunctions; mechanical or electrical faults or failure and failed field devices and engine protection.
- **Hazards** may include, but not be limited to: chemical hazards; thermal hazards; manual handling hazards; guarding of machinery requirements; illumination of work area; rubbish and combustibles in area; leakage of steam; leakage of fuel; obstructions in the work area; fire; noise; vibration; water and working at heights.
- **Operational checks** may include, but not be limited to: supply and quality of steam and line pressure; exhaust system; safety devices; speed governor; vibration level; lubrication system; operation and function of valves and fittings; cylinder drainage system and operation of control/safety devices.

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- **Personal Protective Equipment (PPE)** may include, but not be limited to: prescribed under legislation, regulation, codes of practice, and workplace policies and practices; hard hat; safety boots; gloves; high visibility clothing; breathing, hearing, sight, skin and sun protection; fall-arrest equipment such as harnesses and lanyards, horizontal life lines and inertia reel.
- **Pre-operational safety checks** may include, but not be limited to: supply steam system; position and operation of engine valves; lubrication system; cylinder drainage system; exhaust system; auxiliary equipment; safety devices; over speed shut down; pressure relief devices and speed governor.
- P**rocedures** may include, but not be limited to: manufacturer's guidelines (instructions, specifications or checklists); industry operating procedures and workplace procedures (work instructions, operating procedures, checklists).

The operation of steam equipment where the steam acts upon a piston under pressure where this action of the steam forces the piston to move. The definition includes all expanding (steam) reciprocating engines, with any piston diameter of greater than 250 millimetres.

- R**ecorded** may include, but not be limited to: operations and maintenance of reciprocating steam engine equipment; difficulties or issues; environmental issues; recommendations for future work; results; costs; hazards; incidents or injuries; dangerous occurrences or equipment; malfunctions using log books; proformas; production reports and maintenance records
- **Shut down checks** may include, but not be limited to: steam supply; cooling process; load on engine; cylinder drains and auxiliary equipment.
- **Shut down checks for maintenance** may include, but not be limited to: checks of cooling down process; isolation of steam; isolation from any common connection and opening of all access points required for inspection.

- **Start-up checks** May include, but not be limited to: heat input; steam supply system; steam traps and steam line purge systems operation; engine warmed up; lubrication system; drainage system; operation and position of engine valves and fittings; operation of auxiliary equipment; freedom of rotation of engine; warm up of reticulation system and reticulation line pressure.
- **Testing** May include, but not be limited to: loss of a major auxiliary controls response checks; stand-by plant "cut-in" tests; valves operating checks; on-load engine valve and emergency governor operation test; performance tests; valve operation tests and alarm and protection tests.

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements, performance criteria and range of conditions on at least one occasion and includes:

- communicating effectively and working safely with others in the work area
- completing verification of problems and equipment faults and demonstrate appropriate response procedures
- compliance with Commonwealth, state or territory regulations for the acquisition of a high risk work licence for reciprocating steam engine operation
- compliance with legislation, regulations, standards, codes of practice and established safe practices and procedures for starting, operating, shutting down and maintaining a reciprocating steam engine

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- compliance with organisational and site policies and procedures including quality requirements and state or territory legislation applicable to workplace operations
- compliance with WHS and environmental regulations, policies and procedures
- identifying hazards associated with the operation of the reciprocating steam engine and put in place effective hazard controls for those hazards identified
- performing efficiently and safely when starting, operating, shutting down and maintaining a reciprocating steam engine
- recording accurately and maintaining information relating to operation of a reciprocating steam engine
- starting up, monitoring and shutting down a reciprocating steam engine effectively that meets the definition of this licence class
- undertaking diagnostic and testing techniques for reciprocating steam engines
- using appropriate communication techniques with colleagues and others
- utilising relevant tools and equipment

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements, performance criteria and range of conditions and includes knowledge of:

- basic principles of heat transfer and thermodynamics
- Commonwealth, state or territory WHS legislation, regulations, standards and codes of practice relevant to the full range of techniques for operating reciprocating steam engines
- confined space awareness and the limits for entry into a confined space
- engine speed control equipment
- environmental protection requirements relating to the disposal of waste material and storage of environmentally hazardous materials
- established communication channels and protocols in the workplace
- hierarchy of hazard identification and control
- organisational and workplace standards, requirements, policies and procedures for starting, operating, shutting down and maintaining a reciprocating steam engine
- procedures for the recording, reporting and maintenance of workplace records and information
- reciprocating steam engine capabilities and components
- reciprocating steam engine fault finding and problem-solving techniques
- reciprocating steam engine operations and operating techniques
- reciprocating steam engine safety devices and testing techniques
- routine problems encountered in the process and with equipment and adjustments required for correction
- safety data sheets and material handling methods
- system components and their interaction with other plant and equipment
- types of tools and equipment and procedures for use, operation and maintenance

Assessment Conditions

Assessments must be conducted by an assessor accredited for this High-Risk Work (HRW) licence class in the Commonwealth, state or territory where the licence will be obtained (i.e. an assessor authorised by a Commonwealth, state or territory WHS/OHS regulator).

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As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment of performance must be undertaken in the workplace and/or under realistic workplace conditions which typically reflect:

performing tasks and activities within timelines that would be expected in a workplace standard and authorised work practices, safety requirements and environmental constraints using full scale equipment

The use of simulators in the assessment of this unit of competency is not acceptable.

Resources for assessment must include access to:

a range of relevant exercises, case studies and/or other simulations

relevant and appropriate materials, tools and equipment and currently used in industry including:

- Personal Protective Equipment (PPE) for performance assessment
- appropriate safety equipment in safe condition
- appropriate reciprocating steam engine and associated equipment in safe condition

communication equipment, as required applicable documentation including workplace procedures, industry standards, equipment specifications, regulations, codes of practice and operation manuals.

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Assessment Plan: UEPOPL002 Operate a Reciprocating Steam Engine

The following assessment plan applies to the following assessments conducted by SteamTraining and Go-Train Industry Pty Ltd relevant to pressure vessel High Risk Work assessment and licencing.

Definitions

Pressure equipment operation
Reciprocating steam engine means equipment that is driven by steam acting on a piston causing the piston to move, and includes an expanding (steam) reciprocating engine. **29. Reciprocating steam engine** - Operation of a reciprocating steam engine where the diameter of any piston exceeds 250 mm.

Assessment Plan

Method of Assessment	**Date and time of Assessment**	**Location of assessment**	**Candidate must provide**	**Standard expected for competent performance**
Paperwork associated with Assessment and HRW licencing process	0800 - 0900	Normally your worksite training room or alternative TBA	• USI • RTO Enrolment Form • Pre-Assessment Questionnaire • ID &/or HRW licence • Practical Assignment • Logbook • Printed Certificate from online learning	Assessment cannot proceed without all documented information
Knowledge assessment	0900 - 1100	Candidates workplace	Pen & PPE	58 written questions – closed book – 2 hours All critical questions must be answered correctly for the candidate to be deemed competent. The designated pass mark for non- critical questions of 75% must be achieved.
Performance assessment	After 1130 45 minutes duration	Candidates workplace	Personal protective equipment (steel cap boots, helmet, high visibility clothing, eye and ear protection, etc)	Performance must be in accordance with the standard outlined in the unit of competency and by the assessor. If candidates act in a manner that endangers themselves, others, or equipment and property, during the observation of performance the assessment will cease immediately.

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Assessment Checklist

Performance Evidence

Evidence required to demonstrate competence in this unit includes:

- Communicating effectively and working safely with others in the work area
- Completing verification of problems and equipment faults and demonstrate appropriate response procedures
- Compliance with commonwealth, state or territory regulations for the acquisition of a high risk work licence for reciprocating steam engine operation
- Compliance with legislation, regulations, standards, codes of practice and established safe practices and procedures for starting, operating, shutting down and maintaining a reciprocating steam engine
- Compliance with organisational and site policies and procedures including quality requirements and state or territory legislation applicable to workplace operations
- Compliance with WHS and environmental regulations, policies, and procedures
- Identifying hazards associated with the operation of the reciprocating steam engine and put in place effective hazard controls for those hazards identified
- Performing efficiently and safely when starting, operating, shutting down and maintaining a reciprocating steam engine
- Recording accurately and maintaining information relating to operation of a reciprocating steam engine
- Starting up, monitoring, and shutting down a reciprocating steam engine effectively that meets the definition of this licence class
- Undertaking diagnostic and testing techniques for reciprocating steam engines
- Using appropriate communication techniques with colleagues and others
- Utilising relevant tools and equipment

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Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements, performance criteria and range of conditions and includes knowledge of:

- Basic principles of heat transfer and thermodynamics
- Commonwealth, state, or territory WHS legislation, regulations, standards and codes of practice relevant to the full range of techniques for operating reciprocating steam engines
- Confined space awareness and the limits for entry into a confined space
- Engine speed control equipment
- Environmental protection requirements relating to the disposal of waste material and storage of environmentally hazardous materials
- Established communication channels and protocols in the workplace
- Hierarchy of hazard identification and control
- Organisational and workplace standards, requirements, policies, and procedures for starting, operating, shutting down and maintaining a reciprocating steam engine
- Procedures for the recording, reporting and maintenance of workplace records and information
- Reciprocating steam engine capabilities and components
- Reciprocating steam engine fault finding and problem-solving techniques
- Reciprocating steam engine operations and operating techniques
- Reciprocating steam engine safety devices and testing techniques
- Routine problems encountered in the process and with equipment and adjustments required for correction
- Safety data sheets and material handling methods
- System components and their interaction with other plant and equipment
- Types of tools and equipment and procedures for use, operation, and maintenance