Training Package | Conservation and Land Management (RTD02), Amenity Horticulture (RTF03) and Rural Production (RTE03) | HSC Requirements and Advice
---|---|---
Title | Undertake operational maintenance of machinery |  
Unit code | RTC2301A | HSC Indicative Hours | 10

Evidence Guide

What evidence is required to demonstrate competence for this standard as a whole?

Competence in performing operational maintenance of machinery requires evidence of the ability to select and match the correct tools and supplies to carry out scheduled servicing and minor repairs to a range of plant and equipment. It also requires the ability to apply operational safety procedures, access and interpret maintenance plans, apply basic diagnostic techniques, recognise and rectify minor mechanical faults, and maintain maintenance records. The skills and knowledge to undertake operational maintenance of machinery must be transferable to a different work environment. For example, this could include different machinery and equipment, and workplaces.

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<tr>
<th>What specific knowledge is needed to achieve the performance criteria?</th>
<th>What specific skills are needed to achieve the performance criteria?</th>
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| Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts and to deal with unplanned events. The knowledge requirements for this competency standard are listed below:  
  - types and uses of lubricants and other commonly used servicing materials  
  - operational principles of machinery including mechanical and auto-electrical systems  
  - servicing characteristics of plant and equipment  
  - types, characteristics, uses and limitations of hand and power tools | To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complimentary skills are required. These include the ability to:  
  - select and match tools with work requirements  
  - apply hand-eye coordination  
  - apply basic diagnostic techniques  
  - recognise and rectify common mechanical faults  
  - perform scheduled maintenance including basic servicing and minor mechanical repairs  
  - read and interpret maintenance plans, manufacturers specifications, safety decals and | This competency standard could be assessed on its own or in combination with other competencies relevant to the job function. | There is essential information about assessing this competency standard for consistent performance and where and how it may be assessed, in the Assessment Guidelines for this Training Package. All users of these competency standards must have access to both the Assessment Guidelines and the relevant Sector Booklet. |
| | | | Key Terms and Concepts  
  - 2-stroke engine  
  - 4-stroke engine  
  - basic diagnostic processes and techniques  
  - calibration  
  - consumables  
  - diesel engine  
  - enterprise requirements  
  - hazard  
  - lubricants  
  - maintenance plans  
  - occupational health and safety (OHS)  
  - operational principles of machinery  
  - personal protective equipment (PPE)  
  - positive environmental practices  
  - pre-start and safety checks |
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<td>• functions of components of common mechanical and hydraulic systems</td>
<td>• MSDS</td>
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<td>• risk assessment</td>
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<td>• working principles of 2-stroke, 4-stroke, petrol and diesel engines</td>
<td>• effectively communicate with work team and supervisor, report faults, and maintain records</td>
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<td>• safe work practices</td>
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<tr>
<td>• set-up requirements of plant and equipment, and principles of calibration</td>
<td>• measure and calculate volumes, consumption and lubrication requirements.</td>
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<td>• scheduled servicing</td>
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<td>• basic diagnostic processes and techniques</td>
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<td>• signs of common mechanical faults</td>
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<td>• environmental codes of practice with regard to maintenance activities</td>
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<td>• Standard Operating Procedures (SOP)</td>
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<td>• OHS legislative requirements and codes of practice</td>
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<td>• supplies</td>
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<td>• hazard identification and assessment</td>
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<td>• OHS procedures.</td>
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<td>• workplace records and documentation.</td>
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<tr>
<td>1 Prepare for maintenance</td>
<td>1.1 Maintenance plans are accessed and understood prior to undertaking maintenance work.</td>
<td>The Range of Variables explains the context within which the performance and knowledge requirements of this standard may be assessed. The scope of variables chosen in training and assessment may depend on the work situations available. For more information on contexts, environment and variables for training and assessment refer to the Sector Booklet. What information may be included in a maintenance plan? This may include details of scheduled maintenance and servicing requirements and procedures, tools and supplies required to undertake maintenance tasks, pre-start and safety checks for tools and machinery, mechanical diagnostic procedures, common mechanical faults and adjustment or repair procedures, current operational details, supervisors instructions and reporting requirements.</td>
<td>Learning experiences for the HSC must address: An awareness of information provided in maintenance plans for machinery including: • scheduled servicing • tools and equipment required • pre-start and safety checks for tools and equipment • mechanical diagnostic procedures • common mechanical faults, adjustments and repair procedures • current operational details • supervisor’s instructions • reporting requirements. Communication processes including: • receiving instructions from supervisor • providing feedback to supervisor • reading machinery compliance plates, part numbers and service decals • user information on faults and symptoms • feedback to users on diagnosis and repairs required • instructions to spare parts suppliers • instructions to mechanical repair specialists.</td>
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<td>1.2 Tools and supplies are selected appropriate to job requirements and confirmed against maintenance plan.</td>
<td>What tools and supplies may be required? This may include hand tools, hand held power tools, grease guns, safety equipment, cleaning and maintenance supplies including grease, fuel, oil, chemicals, water steam, power and air. What may be involved in the preparation of tools? Preparation may include routine safety and pre-start checks, and procedures involving cleaning, lubricating, hand sharpening, priming pumps, clearing filters, basic repairs, tightening and adjustments.</td>
<td>Learning experiences for the HSC must address: Knowledge of hand and other tools required for operational maintenance: • hand tools including – sockets – spanners – screwdrivers – filter clamps – feeler gauges – spark plug sockets – Allen keys – pliers – scrapers – hacksaws – wire strippers.</td>
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### Element

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| What information may be included in a **maintenance plan**? | | • lubrication tools including  
  − grease gun  
  − oil pot  
  − oil jug  
  − sump oil pan  
  − oil syringe  
 | | • pneumatic tools including  
  − air compressor  
  − tyre gauge  
  − pneumatic wrench  
 | | • electric tools including  
  − lead light  
  − drill  
  − multimeter  
  − soldering iron  
 | | • hydraulic tools  
  − trolley jack  
 | | • consumables including  
  − degreaser  
  − hand cleaner  
  − solder  
  − soldering flux  
  − gasket sealer  
  − wheel bearing grease  
  − oil  
  − engine coolant  
 | | • spare parts including  
  − oil filters  
  − air filters  
  − fuel filters  
  − spark plugs  
  − drive belts  
  − bearings  
  − hoses  
  − gaskets  
  − seals  
  − switches.  
 | | Lubricant types and uses including:  
  • oils  
  • transmission  
  • engine  
 |
### Performance Criteria

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</table>
| 1.3     | Tools are inspected for serviceability and **prepared** for use according to manufacturers specifications and **enterprise requirements.** | • petrol  
• diesel  
• grease types  
• high pressure  
• high temperature  
• water proof  
• transmission fluid. | Learning experiences for the HSC must address:  
Inspection of tools for servicing including:  
• electrical tools  
  − condition of leads and plugs  
  − up-to-date test tag  
• hydraulic tools  
  − oil leaks  
  − operation  
  − oil level  
  − safe working loads  
• pneumatic tools  
  − lubrication  
  − clean air filter  
  − compressor oil level  
  − drain water from air tank  
  − air leaks  
  − regulator adjustment  
• hand tools  
  − replacement of lost components  
  − sharpening drill bits  
  − sharpening scrapers. |
| 1.4     | **OHS hazards** in the workplace are identified, risk assessed and reported according to enterprise requirements. | What **hazards** may be associated with maintenance activities?  
Workplace hazards may include exposure to loud noise and fumes, solar radiation, dust, and hazardous substances. It may also include oil and grease spills, electricity, mechanical malfunctions and entanglement with machinery from exposed moving parts including hydraulics.  
What **enterprise requirements** may be applicable to this standard? | **Learning experiences for the HSC must address:**  
An awareness of potential hazards including:  
• physical hazards  
  − unsafe tools and equipment  
  − uneven surfaces  
  − electricity  
  − chemical or fuel spill  
  − fumes  
  − noise  
  − dust |
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<td>2 Perform scheduled maintenance</td>
<td>2.1 Suitable <strong>personal protective equipment</strong> is selected, used, maintained and stored according to OHS requirements.</td>
<td>What <strong>personal protective equipment</strong> may be relevant to this standard? This may include boots, hat/hard hat, overalls, gloves, protective eyewear, safety harness, hearing protection, respirator or facemask, and sun protection (sun hat, sunscreen).</td>
<td>Learning experiences for the HSC must address: Selection, use, maintenance and storage of (PPE) appropriate to work task. A range of PPE including: • footwear • head protection – hard hat, sun hat and helmet • gloves • overalls • apron • respirator • face mask</td>
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Standard Operating Procedures (SOPs), industry standards, production schedules, Material Safety Data Sheets (MSDSs), work notes and plans, product labels, manufacturers specifications, operators’ manuals, enterprise policies and procedures (including waste disposal, recycling and re-use guidelines), and supervisors oral or written instructions.

- exposed machinery parts
- obstacles
- biological
- hazardous substances
- ergonomic
- inappropriate use of tools and equipment
- poor manual handling
- psychological
- dealing with emergencies
- working alone

A basic understanding of risk assessment:
- identify hazards
- assess associated risks
- strategies to control/eliminate risks.

An awareness of appropriate occupational health and safety (OHS) strategies including:
- select, use and maintain appropriate personal protective equipment (PPE)
- sufficient drinking water
- basic first aid training
- access to first aid kits
- safe work practices and procedures
- access to appropriate communication devices
- emergency plan
- safety signs
- environmental policies.
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<td>2.2</td>
<td>Greasing, lubrication and other <strong>basic servicing of machinery</strong> is carried out according to manufacturers specifications and enterprise requirements.</td>
<td>What <strong>OHS</strong> requirements may be relevant to this standard? Safe systems and procedures for: • operating and maintaining machinery including hydraulics and guarding of exposed moving parts • hazard and risk control • manual handling including lifting and carrying • the provision of safety decals and signage • handling, application and storage of hazardous substances • outdoor work including protection from solar radiation, dust and noise • lock out or danger tag procedures • protection of people in the workplace • the appropriate use, maintenance and storage of personal protective clothing and equipment.</td>
<td>• hearing protection • eye protection – goggles, safety glasses and face guard • sunscreen • waterproof clothing. Importance of correct fitting PPE. Maintenance of PPE according to manufacturer’s instructions and enterprise Standard Operating Procedures (SOP): • cleaning and decontamination • correct storage • regular checks for damage • repair/replacement of worn, malfunctioning or damaged equipment/parts • disposal of single-use equipment.</td>
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Learning experiences for the HSC must address:
Basic servicing techniques according to work task including:
- scheduled servicing
  - oil changes
  - filter cleaning and replacement
  - battery condition
  - lubrication
  - engine coolant replacement
  - belt tension
- pre-start and safety checks
  - tyres
  - oil
  - electrical
  - hydraulics
  - engine
  - operator controls.

What **machinery** may be covered in this standard?
This may include motorised equipment and implements. Motorised machinery may include sprayers, tractors, mechanical pruners, harvesters, turf mowers, rotary hoes, chainsaws, hedge trimmers, winches, vehicles and motorcycles.

What **enterprise requirements** may be applicable to this standard?
Standard Operating Procedures (SOPs), industry standards, production schedules, Material Safety...
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<td>Data Sheets (MSDSs), work notes and plans, product labels, manufacturers specifications, operators’ manuals, enterprise policies and procedures (including waste disposal, recycling and re-use guidelines), and supervisors oral or written instructions.</td>
<td>Learning experiences for the HSC must address: Working principles of: • 2-stroke engine • 4-stroke engine • diesel engine • petrol engine. Signs of common mechanical faults including: • failure to start • noise • smoke • rough running • inefficient operation • worn bearings • worn chains and sprockets • broken belts • broken studs and bolts • cracked welds • damaged seals and gaskets • blocked cooling systems • perished hoses and connections • corrosion of components • blocked filters • broken exhausts • incorrect clearances and tolerances • broken switches • damaged electrical leads • bad electrical connections • dirty fuel.</td>
</tr>
<tr>
<td>2.3</td>
<td>Equipment is adjusted according to manufacturers specifications and enterprise requirements.</td>
<td>How might mechanical faults be defined in this standard? Basic faults reasonably within the scope of a non-mechanic and may include damage, wear, malfunction or unsoundness. What machinery may be covered in this standard? This may include motorised equipment and implements. Motorised machinery may include sprayers, tractors, mechanical pruners, harvesters, turf mowers, rotary hoes, chainsaws, hedge trimmers, winches, vehicles and motorcycles.</td>
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<tr>
<td>2.4</td>
<td>Basic diagnostic techniques are applied and mechanical faults are identified and rectified according to manufacturers specifications.</td>
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<td>2.5</td>
<td>More serious or complex faults are reported for referral according to enterprise requirements.</td>
<td>What <strong>enterprise requirements</strong> may be applicable to this standard? Standard Operating Procedures (SOPs), industry standards, production schedules, Material Safety Data Sheets (MSDSs), work notes and plans, product labels, manufacturers specifications, operators’ manuals, enterprise policies and procedures (including waste disposal, recycling and re-use guidelines), and supervisors oral or written instructions.</td>
<td>Learning experiences for the HSC must address: Awareness of potential serious faults including: • steering wear • wheel alignment • brake adjustment • clutch adjustment • engine knocking • transmission noise • engine overheating • electrical short circuiting • hydraulic oil leaks • brake fluid leakage • tyre wear and damage. Reporting of serious faults including: • documentation on job card • notification to supervisor • danger tagging where appropriate.</td>
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<tr>
<td>3 Complete maintenance activities</td>
<td>Tools are cleaned and stored according to OHS and enterprise requirements.</td>
<td>What <strong>tools and supplies</strong> may be required? This may include hand tools, hand held power tools, grease guns, safety equipment, cleaning and maintenance supplies including grease, fuel, oil, chemicals, water steam, power and air. What <strong>OHS</strong> requirements may be relevant to this standard? Safe systems and procedures for: • operating and maintaining machinery • including hydraulics and guarding of exposed moving parts • hazard and risk control • manual handling including lifting and carrying • the provision of safety decals and signage • handling, application and storage of hazardous substances • outdoor work including protection from solar radiation, dust and noise • lock out or danger tag procedures • protection of people in the workplace • the appropriate use, maintenance and storage of personal protective clothing and equipment.</td>
<td>Learning experiences for the HSC must address: Tool cleaning requirements as necessary including: • removal of grease and oil • sharpening • anti-rust treatments • repair and service • replacement of missing or damaged items.</td>
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<td>3.2</td>
<td>Waste from maintenance activities is collected, treated and disposed or recycled according to enterprise environmental requirements.</td>
<td>What positive environmental practices may be relevant to maintenance activities? This may include the reduction of excessive noise and exhaust emissions, the safe use and disposal of maintenance debris including oil containers, fuel and chemical residues. It may also include preventative measures with regard to soil disturbance, dust and increased run-off flows caused by servicing, maintenance and cleaning activities.</td>
<td>Learning experiences for the HSC must address: Environmental requirements for dealing with waste including:  - recycling  - paper-based products  - plastic  - worn components  - metal components  - disposing of used coolant and brake fluid  - used engine and transmission oils  - cleaning mechanical parts in approved wash bays  - managing spills to prevent contamination of waterways.</td>
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<tr>
<td>3.3</td>
<td>Work areas are cleaned, returned to operating condition and maintained according to OHS and enterprise requirements.</td>
<td>What OHS requirements may be relevant to this standard? Safe systems and procedures for:  - operating and maintaining machinery including hydraulics and guarding of exposed moving parts  - hazard and risk control  - manual handling including lifting and carrying  - the provision of safety decals and signage  - handling, application and storage of hazardous substances  - outdoor work including protection from solar radiation, dust and noise  - lock out or danger tag procedures  - protection of people in the workplace  - the appropriate use, maintenance and storage of personal protective clothing and equipment.</td>
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### What processes should be applied to this competency standard?

There are a number of processes that are learnt throughout work and life, which are required in all jobs. They are fundamental processes and generally transferable to other work functions. Some of these are covered by the key competencies, although others may be added. The questions below highlight how these processes are applied in this competency standard. Following each question a number in brackets indicates the level to which the key competency needs to be demonstrated where

0 = not required  
1 = perform the process  
2 = perform and administer the process  
3 = perform, administer and design the process

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<tr>
<td>1.</td>
<td>How can <strong>communication of ideas and information</strong> (1) be applied?</td>
<td>Information with regard to complex mechanical faults may be reported and referred for repair or replacement.</td>
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<tr>
<td>2.</td>
<td>How can <strong>information be collected, analysed and organised</strong> (1)?</td>
<td>Information with regard to machinery servicing, identified faults and repairs undertaken may be documented for reference and analysis, and organised by reports.</td>
</tr>
<tr>
<td>3.</td>
<td>How are <strong>activities planned and organised</strong> (1)?</td>
<td>Machinery maintenance activities may be planned and coordinated with maintenance schedules and work schedules, or sequenced as required.</td>
</tr>
<tr>
<td>4.</td>
<td>How can <strong>team work</strong> (1) be applied?</td>
<td>In the application of communication, methods and procedures to complete individual tasks to achieve scheduled maintenance requirements.</td>
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<td>5.</td>
<td>How can the use of <strong>mathematical ideas and techniques</strong> (1) be applied?</td>
<td>Basic mathematical techniques may be applied in the calculation and measurement of volumes, weights and consumption, particularly in relation to lubrication and fuel requirements.</td>
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<td>6.</td>
<td>How can <strong>problem-solving skills</strong> (1) be applied?</td>
<td>Tool faults or malfunctions will need to be repaired or replaced to complete and minimise disruption to scheduled maintenance work.</td>
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<td>7.</td>
<td>How can the use of <strong>technology</strong> (1) be applied?</td>
<td>To communicate, measure and record information with regard to machinery maintenance, usage and performance.</td>
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