



# WorkSafe SmartMove Certificate

## Horticulture Industry Module Study Guide



## Disclaimer

The State of Western Australia supports and encourages the dissemination and exchange of its information. The copyright in this publication is licensed under a Creative Commons Attribution 4.0 International (CC BY) licence.



Under this licence, with the exception of the Government of Western Australia Coat of Arms, the Department's logo, any material protected by a trademark or licence and where otherwise noted, you are free, without having to seek our permission, to use this publication in accordance with the licence terms.

We request that you observe and retain any copyright or related notices that may accompany this material as part of the attribution. This is a requirement of the Creative Commons Licences.

For more information on this licence, visit [creativecommons.org/licenses/by/4.0/legalcode](https://creativecommons.org/licenses/by/4.0/legalcode)

Date published: 1 March 2022

## Reference

Department of Energy, Mines, Industry Regulation and Safety. (2022, March 1). *WorkSafe SmartMove Certificate: Horticulture industry module study guide* (2nd ed). Western Australian Government.

## Contact

SmartMove Coordinator

Department of Energy, Mines, Industry Regulation and Safety (DEMIRS)

100 Plain Street

EAST PERTH WA 6004

Telephone: 1300 307 877

Email: [smartmove@dmirs.wa.gov.au](mailto:smartmove@dmirs.wa.gov.au)

## Contents

<b>Learning outcomes .....</b>	<b>4</b>
<b>Machinery, equipment and tools.....</b>	<b>4</b>
Let's have a look at how to stay safe .....	5
Examples of hazardous machinery and equipment .....	5
Quiz – Machinery and equipment .....	7
<b>Falls .....</b>	<b>7</b>
Falls from height.....	7
Slips, trips and falls .....	9
Quiz – Falls.....	9
<b>Manual tasks .....</b>	<b>10</b>
How does performing a manual task result in injury? .....	10
What can your employer do to prevent injuries from performing manual tasks? .....	11
Example of hazardous manual tasks - using trolleys .....	11
Quiz – Manual tasks.....	12
<b>Hazardous substances .....</b>	<b>13</b>
Example of hazardous substances .....	13
Common injuries and incidents from hazardous substances.....	13
How can you keep safe from hazardous substances? .....	15
Quiz – Hazardous substances .....	15
<b>Electricity.....</b>	<b>16</b>
Lockout procedure.....	16
Let's have a look at how to stay safe .....	17
Quiz – Electricity.....	17
<b>Noise .....</b>	<b>18</b>
What can your employer do? .....	18
What can you do to save your hearing?.....	19
Quiz – Noise .....	19
<b>Biological hazards – Legionnaires' disease.....</b>	<b>19</b>
Let's have a look at how to stay safe .....	20
Quiz – Legionnaires' disease .....	20
<b>Working in hot conditions .....</b>	<b>21</b>
What is heat stress? .....	21
What is heat stroke?.....	21
What can your employer do to keep you safe?.....	21
What can you do to be safe?.....	22
What should you, your employer or workmates do if someone has heat stroke? .....	22
Quiz – Working in hot conditions.....	22
<b>Spot the hazards .....</b>	<b>24</b>
Northam Winery and Nursery.....	24



Hazard notebook .....	24
<b>Horticulture industry module – Knowledge quiz .....</b>	<b>25</b>

# Horticulture Industry

## Learning outcomes

In this module you will:

1. Learn about common workplace hazards encountered in the horticulture industry
2. Identify existing and potential hazards at a workplace and learn how to report and record them
3. Understand how to prevent injuries from common workplace hazards
4. Learn how to eliminate workplace hazards and reduce risks

---

The horticulture industry involves cultivating plants for fruit, vegetables, nuts, flowers, turf and nursery products. Activities in this industry may include landscaping, maintaining gardens and nurseries, irrigating, pruning, planting, potting, fertilising, fruit picking, improving soil condition, treating weeds and pests. The horticulture industry employs a high proportion of young workers and, in some areas, seasonal workers.

Job roles for young workers in the horticulture industry may include nursery workers who help grow, maintain and sell stock, fruit picking on a vineyard or in an orchard, farm hands, a grounds persons, and horticulture plant operators. Young and seasonal workers are often inexperienced and unfamiliar with horticulture workplaces. Working in the horticulture industry may become hazardous.

Major hazards found in the horticulture industry are:

- Machinery, equipment and tools
- Falls
- Manual tasks
- Hazardous substances
- Electricity
- Noise
- Biological hazards – Legionnaires' disease
- Working in hot conditions

---

## Machinery, equipment and tools

*A vineyard worker was killed after he was pulled into an automatic grape picking machine. The worker was standing next to the machine when a piece of his clothing got caught in the equipment and he was pulled in.*

In the horticulture industry, young workers work with a wide range of machinery, equipment and tools. The most common injuries to young workers are from:

1. Being hit or crushed by moving parts of machinery or equipment (e.g. booms or mechanical arms)
2. Being hit or struck by ejecting objects (e.g. parts, components, products or waste items)

*Machine guarding can prevent or reduce access to dangerous areas of the machine. A guard may be any shield, cover, casing, or physical barrier intended to prevent contact between a hazardous machine part and any part of an operator or operator's clothing. A guard can perform several functions such as protecting you from moving parts, containing ejected parts from the machine, and preventing emissions escaping.*

3. Being hit, trapped or crushed by powered mobile plant, equipment and vehicles (e.g. cherry pickers, tractors and loading trucks).
4. Being hit by moving objects or tools (e.g. garden scissors, pruning shears, pruning saw or shovel).

## Let's have a look at how to stay safe

- Keep all guards of the machinery and equipment in place. It is there to protect you from moving parts. Any guard removed during cleaning or servicing must be replaced by an authorised person before you use the machine.
- Use machinery, equipment and tools correctly and safely. Follow safe work procedures. Ask your supervisor to show you if safe work procedures are not available.
- When first using machinery, equipment and tools, you must be trained and supervised until you are competent. You may be buddied up with an experienced worker so skills, knowledge and experience can be shared.
- Don't work alone with machinery unless it has an emergency stop mechanism.
- Keep tools clean and well-maintained. Clean and sharp tools can reduce injuries.
- Store each tool in its own space to project the tool and to prevent injuries from unintended contact.
- Wear Personal Protective Equipment (PPE) given to you and wear clothing that won't get caught.

### Remember:

*Never use machinery, equipment and tools you have not been trained to use.*

## Examples of hazardous machinery and equipment

### Grape crushers

Grape crushers with augers (a drilling device) are widely used in wine production. The grape receival bins feeding the augers vary in size. Some bins are large enough for a person to fall into. Others are small hand fed receival bins where a person can easily reach the auger at the bottom of the bin with their hand.

Receival bins must be guarded with appropriate grid or mesh barriers to prevent people falling into, or becoming entangled in them, and to prevent a person's body parts coming in contact with the auger. Extreme care must be taken when cleaning the auger. The power supply to the grape crusher must be isolated, locked and tagged with a 'personal danger' tag and 'out of service' tag before commencing the cleaning.

### Tractors

*A tractor operator turned on the ignition of a tractor while not sitting in the driver's seat. The tractor, which was in gear, moved suddenly and injured the operator and his passenger.*

Tractors are powered mobile plant (PMP) that causes many serious injuries and fatalities in the horticulture industry. Hazards from operating tractors include an operator falling off while driving or sitting in a stationary or moving tractor, or being hit or run over by a tractor, or being trapped between a tractor and its attached machinery.

### Let's have a look at how to stay safe

Operators must be trained to operate a tractor safely and without risk to themselves or others. Safe operation includes.

- following all safety instructions
- keeping all shields and guards of a tractor in place
- turning on the tractor from the driver's seat only and using the seatbelt, if there is one
- never leaving a tractor jacked up, and the motor of unattended tractor running
- taking the starter key of the tractor away when not in use
- never getting off a moving tractor
- passengers only using the passenger seat

## Forklifts

*A worker at a pesticides manufacturer was struck by a reversing forklift while he was walking back into the factory after checking a truck driver's invoices. He suffered severe leg injuries and was hospitalised for a long time.*

A forklift is a high risk load shifting machine that can lead to serious injuries or fatality if not operated properly. In Western Australia, forklift operators must be over 18, hold a license to perform this type of high risk work and wear a seatbelt when operating the machine. The seatbelt is to keep the operator in the forklift in the event of a roll over.

The most frequently reported injuries from forklifts are:

- operators falling while getting into or out of forklifts
- operators suffering muscular stress due to a combination of inappropriate seating, vibration and manual handling
- operators and others being hit by falling objects while in forklifts
- co-workers or pedestrians being hit by moving forklifts or moving parts of a forklift
- co-workers or pedestrians being trapped or caught between a moving forklift, or moving parts of a forklift and a stationary object
- collisions between forklifts and other vehicles or stationary objects
- forklifts tipping over.

### *What to look out for if you have forklifts in your workplace?*

Forklift routes should be safe for both forklift operators and pedestrians. Workplaces should be clearly sign-posted to indicate vehicle movement, well lit, well maintained and free from damage to surfaces, obstructions, grease or slippery substances. When forklifts are operated nearby, you should:

- make sure you understand everyone's tasks
- wear a high visibility vest so that the forklift operator can see you
- be aware of your surroundings by looking out for other vehicles or forklifts using the area. Remember that operators cannot always see pedestrians
- not be distracted with:
  - talking or texting on a phone
  - walking around listening to music through earphones
  - day dreaming.

### **Remember:**

*Under safety laws in Western Australia, forklift drivers or operators must be at least 18 years of age and be properly trained and licensed.*

## Vehicle incidents

Serious incidents can occur when vehicles and powered mobile plant are being used at a workplace. Traffic management must be in place to address hazards.

To avoid incidents, your employer should have a traffic management plan in place. This should include:

- Traffic routes wide enough for the largest vehicle using them. They should be one-way (if possible) and have clearly signed traffic instructions.
- Clear signage, barriers and/or designated walkways defining the areas where pedestrians may have access
- Marked reversing areas so drivers and pedestrians can see them easily.
- Fixed mirrors at blind corners
- Management of vehicle speed.
- Clear communication between the vehicle or plant operators and all people on the ground (voice, radio, hand signals).

- Requirement for people working around mobile plant wearing high-visibility clothing so they can be seen clearly.
- 

## Quiz – Machinery and equipment

1. Guards are fitted to machinery:
    - a. to protect you from moving parts
    - b. as a temporary permanent part of the machine
    - c. to keep the machine clean
    - d. none of the above
  2. Always switch off the engine and apply the parking brake before dismounting the tractor.
    - a. True
    - b. False
  3. Receptacles of grape crushers do not need to be guarded.
    - a. True
    - b. False
  4. When vehicles or mobile plant operate nearby, you should:
    - a. be aware of your surroundings by looking out for other vehicles or mobile plant using the area
    - b. talking or texting on a phone
    - c. walking around listening to music through earphones
    - d. day dreaming
- 

## Falls

Falls have been the cause of many injuries in horticulture. Workers are at risk of slips, trips and falls at level and falling from height.

### Falls from height

*A worker fell three metres while cleaning the outside of a six-metre wine fermentation tank using an extension ladder which was unsecured. The worker sustained serious head injuries.*

Falls from height is a fall from one level to another. Many horticulture tasks require workers to be working at height such as picking fruit, maintaining trees, and ascending and descending ladders. These present a real risk of falling.

### What can your employer do?

Your employer must manage the risks of falls from height. Where possible, it is best to avoid or limit the need to work at height. If this cannot be avoided, your employer must provide safe systems of work including providing fall protection systems to access areas where there is risk of a fall. These are:



- fall injury prevention devices such as fall-arrest systems (e.g. safety harness), roof safety mesh, safety net, guard railing, scaffolding, and elevating work platforms (e.g. cherry pickers)
- work positioning systems include travel restraints which are designed to prevent workers from reaching an edge where they could fall.
- Providing and ensuring correct use of ladders.

## Areas where workers are at risks of falling from height

### *Use of ladders*

Many falls occur from incorrect use of ladders. Your employer must provide ladders that are suitable for the task and make sure they are looked after. Ladders are only to be used for light work or easy to reach places.

You must be supervised when you first use ladders and until you are competent. Before using a ladder, conduct safety checks. Check that the ladder:

- is industrial-rated (do not use a domestic ladder)
- has no damage, including loose or missing parts
- is properly put up, secure and located on a firm footing
- able to handle the weight of both the worker and objects being carried
- protrudes at least 900 mm beyond the landing for the platform it is being used to access.

Make sure that you maintain “three point contact” when going up or down a ladder. This means two hands one foot, or two feet one hand.

### *Access to wine fermentation tanks*

Wine fermentation tanks are used to store wine during the fermentation process. The tank vary in size and height. Your employer should provide fixed stairs, landing or scaffold formwork to any tall wine fermentation tanks that pose a risk of a person falling. Edge protection in the form of a guard rail should be provided and extended around the top hatch of tanks.

Portable ladders must not be used to provide permanent access to tanks and elevated walkways.

### *Mobile elevated work platforms – cherry pickers*

Mobile elevating work platforms such as cherry pickers, are a type of aerial work platform that involves a bucket or surface at the end of a hydraulic lifting system used for height work. In the horticulture industry, cherry pickers are widely used to harvest fruit.

Using cherry pickers may expose workers to various hazards including falls from height, being crushed or injured by overhead objects and electrocution when coming into contact with live power lines.

### *Let's have a look at how to stay safe*

- If the mobile elevating work platform has a boom over 11 metres, then the operator must be licensed and be over 18 years of age. Smaller elevating work platforms require the employee to be sufficiently trained and competent when using one.
- Check that an area around and beneath the cherry picker is cleared and blocked off while it is in use. There is a risk of other people being injured if tools, equipment or things aren't properly secured and fall from the cherry picker.
- Conduct pre-operational (pre start) checks as required by the manufacturer.
- Follow manufacturers' safety instructions and operate the cherry picker from stable ground.
- Be aware of power lines. If it must be operated near power-lines, safe clearance limits must be maintained.
- Damage to any parts of a cherry picker should be promptly reported and repaired.
- Do not climb in or out of the platform while the cherry picker is elevated.
- Wear PPE such as a hard hat, body harness and safety boots while operating a cherry picker. Harnesses help prevent people from sustaining serious injuries when working at heights and play an integral role in emergency rescue.

## Slips, trips and falls

Slips, trips and falls are described as falls on the same level. These types of injuries can result in serious harm and lengthy time off work. The injuries can also affect young workers in their everyday social and school lives and may mean they cannot play sport or engage in physical activities or hobbies.

A slip, trip and fall may cause injuries, including:

- broken bones when colliding with an object or hitting the ground
- cuts if it occurs near sharp objects
- sprains or strains.

### What causes slips, trips and falls?

- Slippery floors from water or liquid spills.
- Stepping on felled branches, fruit, leaves and objects on the ground.
- Steps and different floor levels.
- Unstable, loose, or uneven surfaces.
- Wearing unsuitable shoes.
- Poor lighting.
- Clutter left in walkways.

### What can your employer do to prevent slips, trips and falls?

- Allow safe movement in the workplace, including entries and exits that are free of obstructions.
- Ensure floors and surfaces in the workplace are well-maintained and installed with task appropriate surfaces.
- Provide adequate lighting for safe movement.
- Ensure sufficient space to work.
- Maintain workplaces to be clean and tidy.
- Provide tools and equipment to assist you to work safely.
- Ensure workers wear suitable footwear with appropriate treads that are kept clean.
- Install ramps in areas where the floor level changes and trolley access is required.
- Guard rails or other safeguards are provided on ramps and stairs.

### How can you prevent slips, trips and falls at work?

- Wear suitable shoes with treads that are kept clean – incorrect footwear can cause slips and trips
- Clean up spillages straight away
- Keep walkways clear of obstacles, especially during high traffic times
- Carry items only at a height that you can safely see over to avoid trip hazards and bumping into things
- Limit working outdoor when dark and/or take additional precautions as required

---

## Quiz – Falls

5. Which of the following will reduce the risk of falling from height?
  - a. Practicing Ninja warrior skills
  - b. Using fall arrest systems (such as a safety harness)
  - c. Being brave
  - d. Ask your work mate to work at height on your behalf
6. Who can operate a forklift?
  - a. Any worker

- b. Truck drivers
  - c. Only trained and licensed workers
  - d. No one
7. Before using a ladder, safety checks should include ensuring that the ladder:
- a. has no damage, including loose or missing parts
  - b. is properly put up and secured
  - c. is industrial rated
  - d. all of the above
8. What can your employer do to prevent slips, trips and falls at work?
- a. Provide adequate lighting for safe movement
  - b. Maintain workplaces to keep them in a clean and tidy condition
  - c. Ensure workers wear suitable footwear with appropriate treads that are kept clean
  - d. All of the above
- 

## Manual tasks

*A young farm mechanic manually pushed tractors forward to move them. He developed sciatica when he was 22 years old. Sciatica is a set of symptoms including pain in the lower back, buttock, and/or various parts of the leg and foot. In addition to pain, which is sometimes severe, there may be numbness, muscular weakness, and difficulty in moving or controlling the leg.*

Manual tasks are any activity or sequence of activities that requires a person to use their body (musculoskeletal system) physically to perform work such as lifting, lowering, pushing, pulling, carrying, moving, and holding or restraining a person, animal or things.

Most jobs require several types of manual tasks to be performed. However, not all manual tasks are hazardous. The most common injuries and health issues that can arise from performing hazard manual tasks are musculoskeletal injuries, which affect the muscles, bones and/or joints.

Examples of musculoskeletal injuries are:

- sprains and strains of muscles, ligaments and tendons (e.g. back strain)
- joint injuries
- disc protrusion or disc herniation of the back
- nerve injury or compression
- muscular and vascular disorders (e.g. carpal tunnel syndrome or repetitive strain injury)
- soft tissue injuries

## How does performing a manual task result in injury?

Contrary to popular belief, it's not just the weight of an object that creates the risk of musculoskeletal injuries. Workers are at risk of suffering injuries due to:

- increased effort (force)
- awkward postures
- applying pressure on one part of the body
- performing the same action quickly and repeatedly
- lifting heavy objects

## What can your employer do to prevent injuries from performing manual tasks?

- Your employer has a responsibility to provide and maintain a safe workplace. If you are about to perform hazardous manual tasks and you are unsure how to go about it, ask your employer or supervisor for assistance.
- Your employer should provide you with \*risk management and \*\*task-specific training where hazardous manual tasks have been identified at your workplace.

*\*Risk management is the steps required to manage workplace hazards described as SAMM – Spot the hazard; Assess the risk; Make the changes; Monitor and follow-up.*

*\*\*Task specific training is the practising of actual tasks that will be performed.*

Task specific training should be provided:

- during induction to the task
- as part of your refresher training
- when work tasks are about to be changed or introduced

There are a variety of ways you can be trained. Methods include a buddy system, demonstrations, training by observation, training by staff meetings, toolbox talks, and practice sessions.

After the training, you should be able to:

- recognise the risks and the sources of those risks, and in discussion with your employer or supervisor decide the best way to minimise them
- prepare the workplace layout and surroundings to perform manual tasks safely
- prepare the load for manual handling, where applicable
- organise the task and work flow to minimise the risk of injury
- use relevant mechanical aids, handling devices and tools provided to you (i.e. trolleys, wheel barrows or trailers used for feed preparation, feeding horses and manure collection, feed supplied in bulk).

*Manual tasks can cause injury immediately (e.g. lifting something heavy and injuring your back) or over time through gradual wear and tear on your body. The way you handle things on a daily basis will make a difference.*

## Example of hazardous manual tasks - using trolleys

Common manual tasks causing strain injuries are pushing and pulling heavy trolleys. Trolleys have been used as a tool to prevent hazardous manual tasks in several horticulture workplaces, mainly in plant nurseries and garden centres.

Trolleys that are not maintained, incorrectly used or overloaded can result in strain injuries, especially when:

- they are difficult to manoeuvre over uneven or mismatched surfaces
- they are being moved over large distances or up steep slopes
- they are difficult to grip due to the absence or poor location of handles
- their wheels are too small or poorly maintained
- the combination of the trolleys and its load is too heavy

## Let's have a look at how to stay safe

- Your employer must provide trolleys that suits the load, work space, tasks and physical characteristics of workers who use them. The trolleys should require minimal push/pull forces to move so as to reduce the risk of strain injuries and the risk of slipping while trying to move and control a trolley.
- Trolleys should be stored in an easy to reach place considering distance, obstructions such as doors or steps between storage and trolley use areas.
- Task specific training in safe use of trolleys should be provided to workers.

## Quiz – Manual tasks

9. How does performing a manual task result in injury? Choose **all** that apply
- increased effort (force)
  - awkward postures
  - natural postures
  - applying pressure on one part of the body
  - performing the same action quickly and repeatedly
  - lifting heavy objects
10. When should you receive task-specific training to perform manual tasks?
- During induction to the task.
  - As part of your refresher training.
  - When work tasks are about to be changed or introduced.
  - All of the above.

## Case study

Oleg works at a local plant nursery. Each day he performs manual tasks which may put him at risk of musculoskeletal injuries. Oleg's tasks consist of repetitive bending to pick up many small pots on the ground over a long period. Although, the weight lifted is only a few kilograms each time. Oleg also carries bags of fertilisers and other products weighing up to 25 kilograms, and drags trees in large bags and plants in heavy pots along the ground.

The plant nursery floors often contain spillages of soil and that after the reticulation has been on, the pathways can be very wet. Oleg usually wears thongs to work to keep his feet dry.

Oleg's other duties include serving customers and working at a cash register.

11. From your observations, what are some of the risk factors present in Oleg's manual tasks?  
Choose **four** correct options.
- Frequent periods of repetitive bending to ground level
  - Serving customers
  - Manually lifting weights of up to 25 kg
  - Dragging very heavy weights
  - Slippery pathways
  - Working at a cash register
12. Please suggest ways to assist Oleg to manage his manual tasks.  
Choose **four** correct options
- Ask his employer to purchase suitable trolleys to transport bags of products and heavy pot plants
  - Use team lifting to get heavy trees or pots onto a trolley
  - Ask his employer to purchase a pot lifter
  - Improve housekeeping to keep pathways clear and dry

- e. Continue wearing thongs to keep his feet dry
  - f. Stop serving customers
- 

## Hazardous substances

*A worker was constantly exposed to pesticides when spraying fruit trees. The worker suffered nerve damage, blurred vision and poor balance due to organophosphate pesticide exposure.*

A hazardous substance can be any solid substance, liquid, gas or dust that may cause you harm. Hazardous substances shouldn't be a problem most of the time, but things can go wrong if you:

- get them on your skin
- eat or drink them by mistake
- breathe them in
- mix substances so they become dangerous
- mistake one substance for another

In horticulture hazardous substances include fuels, solvents, fertilisers, pesticides, agricultural dusts, acids and cleaning agents.

## Example of hazardous substances

### Pesticides

Many materials used in horticulture such as insecticides, herbicides and fungicides, collectively known as pesticides, are harmful to health. Pesticides are designed to kill pests, but some of them can cause harm to humans.

Exposure to pesticides can cause acute, as well as chronic effects. Examples of acute effects include stinging eyes, rashes, blisters, blindness, nausea, dizziness, diarrhoea and death. For chronic effects, pesticides have been linked to cancer, Alzheimer's disease, ADHD, and damage to reproductive systems.

Pesticides can be used safely in the workplace, with appropriate risk control in place.

## Common injuries and incidents from hazardous substances

### Toxicity

Toxicity is the degree to which a toxic substance can damage an organism. Pesticides are highly toxic if not used correctly.

To confirm whether the product is toxic, look for the danger hazard symbol on the product's label or its safety data sheet.

In pesticides, toxicity is indicated by one of the following three warning statements written in large print:

- DANGEROUS POISON – indicating high toxicity
- POISON – indicating moderate toxicity
- CAUTION – indicating low toxicity

### **Be aware!**

*Some chemicals can release toxic gas when in contact with liquid or moisture. A common fumigant, aluminium phosphide, can kill insects (weevils), animals (mice and rats) and humans by releasing toxic phosphine gas.*

*Corrosive chemicals are usually incompatible with other chemicals and with each other. When they are mixed or combined, they can release a toxic gas, (i.e. when liquid chlorine which is a base, comes into contact with acid, it releases poisonous chlorine gas).*

### Chemical burns

A chemical burn happens when skin or eyes come into contact with a corrosive chemical such as an acid or a base.

Some common cleaning agents like bleach, toilet and drain cleaners and disinfectants include corrosive chemicals.

#### **Be aware!**

*Corrosive chemicals can “eat through” clothing, metal, and other materials.*

*You must be trained and supervised when using corrosive chemicals.*

*You must wear PPE and suitable clothing when using corrosive chemicals.*

*First aid should be given for chemical burns as soon as possible.*

*Strong acids and strong bases react very dangerously when mixed together – they can boil and splash anything nearby.*

### Suffocation (Asphyxia)

Asphyxia is caused by a lack of oxygen in air resulting in deficiency of oxygen in the blood.

Confined spaces can present risk of asphyxia if someone overcome by gases, fumes or vapours or if there is insufficient oxygen. When present in high concentrations, common gases (nitrogen, carbon dioxide, helium, and propane) can displace oxygen in the air, especially within a confined space. Inhaling too much of these common gases can cause dizziness, disorientation, abnormal heart function, unconsciousness and even death.

Horticulture workplaces contain a number of areas that may be considered confined spaces. These include water tanks, chemical spray vats, mixing tanks, irrigation header boxes, pipes, culverts and deep trenches.

#### **Be aware!**

*Most asphyxiant gases are colourless and odourless so their presence in high concentrations may not be noticed.*

*Working in confined spaces is dangerous and additional measures may be required to conduct work safely.*

### Flammability and explosion

Fumes from flammable liquids when mixed with air in certain proportions can create an invisible hazardous atmosphere that can ignite.

Ignition sources can be obvious like cigarettes, or less obvious like static electricity (zapping), hot surfaces (stoves, lamps), and electrical installations (powerpoints, switches and switch boards).

Common flammable liquids in the workplace are petrol, solvents, methylated spirits, acetone, adhesives, paints, perfume, methanol, ethanol and degreasers.

#### **Be aware!**

*You must not reuse “empty” containers that used to contain flammable chemicals. Even if they are properly cleaned, residual fumes inside empty containers can still create hazardous atmospheres that can explode if a spark is present.*



*Angle grinders produce ignition sources such as heat and sparks. Never attempt to cut or apply heat to drums that have contained flammable liquids or flammable gasses.*

*Areas where flammable liquids are used, mixed, or transferred from one container to another must be kept well ventilated and well separated from offices, warehouses and other places where people can gather. In the case of a spill or leak, you need to remove any ignition source if it is safe to do so.*

## How can you keep safe from hazardous substances?

- Read the label – look for warning labels and signs. Always follow the safety warnings.
- Read the safety data sheet (SDS) for more information about the product and how to use it safely. Your employer must provide (or have available) safety information documents for any substances or products that are hazardous.
- Check the hazardous substance register at your workplace. It is a legal requirement that your employer must keep a current register of each hazardous substance that may be used or stored in the workplace.
- Don't eat, drink, and smoke when you are using or near a hazardous substance or dangerous goods.
- Don't keep food near hazardous substance or dangerous goods.
- Always use the PPE and clothing provided by your employer.
- Know what to do and where to go if a substance affects you. If you don't know, check with your employer.
- Keep ignition sources away from any chemicals that are potentially flammable.
- Maintain good housekeeping standards – declutter and avoid build-up of combustible materials around any chemical storage.

---

## Quiz – Hazardous substances

13. Select **three** correct actions you would take to keep yourself and others safe from hazardous substances.
- a. Read the product label
  - b. Read the product SDS
  - c. Follow safe work procedures
  - d. Smell the substance
14. Which of the following statements is correct?
- a. Asphyxia is caused by a lack of oxygen in air resulting in deficiency of oxygen in the blood.
  - b. Mixing pesticides in a confined space is safe
  - c. Pesticides are designed to kill pests and humans.
  - d. None of the above
15. Identify **four** potential risks that can arise from using hazardous substances in the workplace:
- a. chemical burns
  - b. cold and flu
  - c. flammability and explosion
  - d. suffocation
  - e. exposure to toxic or poisonous substance
  - f. musculoskeletal injuries



- g. fall from a height
- 

## Electricity

*A farmer hit overhead power lines with his tractor. He jumped out of the tractor but his hand still held on it. He was seriously injured when 11,000 volts passed through his body via his hand. He needed skin grafts on his body and four and a half toes and his middle finger had to be amputated.*

Electric shocks happen when a person becomes part of an electrical circuit and the current flows through their body. Electricity passing through the body can cause convulsions (involuntary contractions of the muscles) and the heart to stop beating, as well as internal and external burns. It can also cause secondary injuries resulting from falls or collisions and fire hazards resulting from an electrical fault.

The most common causes of electrocution in horticulture are usually caused by:

- contact with overhead wire, usually when using equipment
- faulty electrical tools
- working with or near equipment that people think is off or isolated, but is actually on or 'live'
- installation and/or repairs being undertaken by an unqualified repairer
- the absence of a \*residual current device (RCD) and lack of its testing

*A \*residual current device (RCD) is a safety switch or life-saving device designed to prevent you from receiving an electric shock if you touch something live, such as a bare wire. If you are using portable electrical equipment and extension leads at work, it must have an RCD installed at the switchboard, built into a fixed socket or through a portable RCD outlet. The RCD must be regularly tested. This is a legal requirement.*

## Lockout procedure

When cleaning, maintaining or adjusting machinery and equipment, a lockout procedure is required to safeguard the workers who carry out the tasks.

Lockout is a safety procedure to ensure that dangerous machines are properly shut off and are not able to be started up again prior to the completion of maintenance or repair work.

The lockout procedure is used when:

- servicing or repair work places workers in danger
- a machine guard is removed for servicing

There are three steps involved in locking out machines and equipment: Lock, tag and test.

## Lock

This means the electrical circuits must be shut down and locked.

This is when a lock is put on an ON switch so the machine can't be turned on. Only the person who put it on can remove it. If that person isn't available, strict rules need to be followed to ensure it is removed safely.

There are a wide range of locks that can be used in this process. These can be:

- switches with a built-in lock
- chains
- jaws or hasps
- padlocks.

When the machinery is locked:

- there should be one key only for each lock (or set of locks) and this should be held by the person who put the lock on.
- all people involved in carrying out the work must fit their own lock at the same isolation point(s).

- locks must be clearly labelled (tag).
- locks must be removed upon completion of work or at the end of the shift. If the work will be continued by others, they must fit their own locks.

### Tag

This means to attach an information tag to a power source or piece of equipment warning others not to operate it.

A lockout tag:

- includes the name of the person working on the equipment, the time and date of the work and the equipment that's being isolated
- must be attached in a prominent position at each isolation point
- must be fitted and removed by the person who attached it, or by an 'authorised person'
- must be removed upon completion of the work or at the end of the shift. If the work will be continued by others, they must fit their own tags.

Two types of tags that are commonly used are danger tags and out of service tags.

### Test

This means that all power sources need to be checked with proper test instruments to make sure everything is de-energised before going ahead with work.

## Let's have a look at how to stay safe

- Understand the lockout procedure. Do not operate or use machinery and equipment that is being locked and/or tagged.
- Use machinery and equipment properly – regularly inspect wiring, cords, plugs and tools for obvious external damage and look out for shorting or sparking fittings
- Report any breakdowns or faulty machinery or equipment to your employer. It is the responsibility of your employer to make sure they are in good working order.
- Ensure all available power is RCD protected.
- Don't overload power boards with lots of appliances. Only use power boards fitted with overload protection.
- Use weatherproof outlets and fittings in areas exposed to wind and rain. Avoid using electrical equipment outdoors in wet conditions.
- Wear suitable footwear and clothing when using electrical equipment.
- Be aware of the locations of all safety switches and what equipment they cover in case equipment needs to be switched off in an emergency. You may ask this question during your induction.

### **Be aware!**

*Always check the location of power lines before you start work. Power line heights are deceptive. Know the operation and maximum height of your machine. Make sure tall items like balers and headers are kept well clear of overhead wires.*

*Your employer should erect signs to warn people that overhead power lines are on site.*

*Never stack irrigation pipes or park machinery under power lines.*

---

## Quiz – Electricity

16. When cleaning, maintaining or adjusting machinery and equipment, a lockout procedure is required to:
- a. safeguard workers

- b. safeguard machinery
  - c. identify hazardous energy
  - d. finish work
17. There are three steps in locking out machine and equipment. These steps are:
- a. lock, look and tag
  - b. lock, tag and test
  - c. tick, tock and tack
  - d. lock, test and try
18. An incident with electricity is usually caused by:
- a. installation and/or repairs of electrical equipment by a qualified electrician
  - b. contact with overhead wire, usually when using equipment
  - c. Use a portable RCD with a portable electrical tool
  - d. regularly inspect wiring, cords, plugs, and tools and equipment for obvious external damage
- 

## Noise

Noise from horticultural machinery and tools can cause permanent hearing loss and tinnitus. Damage can occur gradually over a number of years and remain unnoticed until it is too late. Hearing loss can lead to a loss in quality of life.

The hazard noise poses is dose related, and the higher the dose of noise, the greater the risk to the worker's hearing.

The noise dose is dependent on three factors:

- Intensity/Loudness: measured by a noise level meter and is described in decibels (dB)
- Frequency: the number of sound vibrations in one second and is measured in hertz (Hz)
- Duration: the length of time workers have been exposed to noise

In Western Australia, the law sets a workplace exposure standard averaged over eight hours to be 85 dB(A) or a peak noise level of 140dB. Any noise exposure above 140 dB can create almost instant damage to hearing. If you have to raise your voice to be heard, the noise level is likely to be 85 dB(A) or more.

Typical noises in horticulture that can damage hearing include:

- chainsaw 105-120dB(A), shotgun over 140 dB(C)
- orchard sprayer 85-100 dB(A)
- header 88-90 dB(A)
- bench grinder 90-95 dB(A)
- tractor 95-100 dB(A)
- pig shed at feed time 95-105 dB(A), angle grinder 95-105dB(A)

## What can your employer do?

Where the exposure standard is exceeded, your employer must provide solutions to noise hazards such as:

- choosing quieter machinery and equipment
- modifying equipment to reduce noise
- keeping equipment in good working condition

- Using portable noise barriers around static equipment like generators and concrete pumps
- isolating work areas from noisy machinery using distance or insulation;
- Limiting the time workers spend in noisy environment
- providing you with hearing protectors (i.e., earplugs and earmuffs) to use along with all other control measures

### What can you do to save your hearing?

To safeguard your hearing, you must wear the hearing protectors that have been given to you. It might seem like there is nothing wrong with your hearing, but the damage is done without you noticing it.

Hearing protectors, like earplugs and earmuffs, should be regularly cleaned, repaired and stored near noisy areas.

#### **Remember:**

*The most important factor for the effectiveness of hearing protection is wearing it.*

---

### Quiz – Noise

19. Noise levels are measured in:
- a. decimals or dM
  - b. decibels or dB
  - c. millimetres per second
  - d. dBs per second
20. To prevent hearing loss at work, the law sets a workplace exposure standard averaged over eight hours to be \_\_\_\_\_ dB(A)
- a. 85
  - b. 95
  - c. 140
  - d. 200
21. The most important factor for the effectiveness of hearing protection devices is:
- a. style
  - b. appearance
  - c. colour
  - d. wearing it
- 

### Biological hazards – Legionnaires' disease

Legionnaires' disease is an infectious disease of the lungs caused by bacteria. Most cases of Legionnaires' disease found in Western Australia were linked to *Legionella longbeachae* commonly found in gardening soils, potting mix and mulches. Workers are at increased risk of contracting the disease by inhaling airborne soil dusts that carry *Legionella*.

Early symptoms of the disease are often 'flu-like'. Acute infections may cause diarrhoea, vomiting, mental confusion, kidney failure and death. The disease can be treated with a course of antibiotics.

### Let's have a look at how to stay safe

Your employer must provide safe system of work to minimise the risks of exposing workers to hazardous working conditions.

You should take precaution to prevent exposure to the Legionella bacteria when handling soil products and other compost materials by:

- avoiding potting plants in unventilated areas (e.g. enclosed greenhouses)
- avoiding transferring potting mix from hand to mouth (e.g. rubbing face with a soiled hand)
- minimising dust generation by:
  - storing potting mix in a cool place, away from the sun
  - keeping soils and potting mix damp (e.g. moistening contents of bags through a small opening)
  - avoiding raising soil near evaporative coolers
  - watering gardens and composts gently (e.g. using a low pressure hose) .
- wearing PPE such as a face mask and gloves
- always washing hands after handling soil and potting mix, even if gloves have been worn. Legionella bacteria can remain on contaminated hands for up to one hour.

#### **Be aware!**

*It is a legal requirement that potting mix and garden soil products are correctly labelled and clearly displayed with health warning messages, for example:*

*Garden soils contain micro-organisms that may be harmful to your health.*

*Always wear gloves, keep damp while in use, avoid inhaling the mix and wash your hands after use.*

---

### Quiz – Legionnaires' disease

22. Legionnaires' disease is an infectious disease of the lungs caused by \_\_\_\_\_
- a. parasites
  - b. viruses
  - c. bacteria
  - d. smoke
23. To reduce the risk of contracting Legionnaires' disease, you should:
- a. wear PPE such as a face mask and gloves when handling soil and potting mix
  - b. store potting mix in a sunny spot
  - c. potting plants in unventilated areas
  - d. keep soil and potting mix dried to generate dust
-

## Working in hot conditions

*A seasonal fruit picker was new to Australia. On his fourth day on the job collapsed and subsequently died from heat stroke. His employer failed to instruct new workers on how to self-manage their work capacity in hot conditions and failed to provide sufficient information on how to identify heat-related illness.*

When working outdoors in hot conditions, workers are at risk of heat stress and exposure to solar ultraviolet (UV) radiation. The effects of heat stress range from discomfort to life threatening illnesses such as heat stroke. Sunburn can cause permanent skin damage and is a major risk factor for developing melanoma.

Heat may come from:

- hot climate conditions
- radiant heat from the surroundings such as heat trapped in ceiling space
- work where heavy PPE must be worn
- any combination of these factors

### What is heat stress?

Heat stress occurs when your body cannot cool itself enough through sweating to maintain a healthy temperature. Symptoms of heat stress include:

- cool, moist skin with goose bumps
- heavy sweating
- dizziness
- fatigue
- weak, rapid pulse
- low blood pressure upon standing
- muscle cramps
- headache.

### What is heat stroke?

Heat stroke is much worse than heat stress. Heat stroke symptoms include:

- body temperature above 40°C
- hot dry skin
- irritability
- speech problems
- confusion
- convulsions
- unconsciousness
- \*cardiac arrest.

*\*Cardiac arrest is potentially fatal; however, it is reversible in most victims if treated within a few minutes. Cardiac arrest is a life-threatening condition that requires immediate first aid (cardio pulmonary resuscitation – CPR) and medical treatment.*

### What can your employer do to keep you safe?

- Know the weather forecast and assess how to organise the day's tasks to avoid the risk of heat stress and heat stroke.
- Make shade available.
- Rearrange tasks and lighten the work in extreme heat.
- Provide workers with information on heat stress and skin cancer and ways to prevent both.
- Supervise workers to ensure they are working safely and that their skin is not exposed to the sun.

## What can you do to be safe?

- Wear protective clothing – all outdoor workers should be covered to elbows and knees, and workers with fair skin should wear long sleeves and long pants, wear a hat with a brim and safety glasses with UV protection.
- Apply sunscreen (SPF30+) 20 minutes before sun exposure. Make sure the back of your neck and arms are covered. Reapply as necessary.
- Drink approximately 250ml of water every 15 to 20 minutes during hot working conditions. Keeping well hydrated is a critical factor in avoiding heat illness.
- Take regular breaks. Know your limits. Practice self-pacing when working in hot conditions.
- Inform your employer if you have an underlying health condition (e.g. heart disease, high blood pressure and diabetes) that may increase your risk of heat illness.
- Maintain a healthy lifestyle, including a healthy diet and regular exercise.
- If you are feeling tired, dizzy or weak or you're having trouble concentrating, tell your supervisor. Rest in a cool, well-ventilated area, remove excess clothing, drink plenty of water and fluids, and apply a wet cloth, cold water or ice packs to the skin (particularly the neck, armpits and groin).
- Although water is generally adequate for fluid replacement, low joule cordials and electrolyte replacement solutions may be provided to encourage fluid intake. High sugar cordials and sports drinks are not recommended.

## What should you, your employer or workmates do if someone has heat stroke?

- First, call 000 for an ambulance.
- Lay the person down.
- Cool the person down by applying cold packs or wrapped icepacks to neck, groin and armpit areas.
- Use a wet towel, sheet or clothing to cover the person.
- If the person is fully conscious and able to swallow, provide water. Encourage them to take sips rather than large gulps.

### **Remember:**

*Urgent medical attention must be sought if the person becomes unconscious or has a seizure. In the case of cardiac arrest, CPR is required immediately and should continue until the paramedic arrives (ambulance). If available, attach an automated external defibrillator to the person as soon as possible and follow the step-by-step instructions.*

*A first aid officer is trained to perform CPR in your workplace.*

---

## Quiz – Working in hot conditions

24. \_\_\_\_\_ is the most serious form of heat stress.
- a. Heat rash
  - b. Heat exhaustion
  - c. Heat stroke
  - d. Heat waves
25. To avoid heat stress during hot work conditions, it is recommended that you drink at least 250ml of water \_\_\_\_\_ to replace lost fluids.
- a. every 15 to 20 minutes
  - b. during lunch break
  - c. every 2 to 3 hours

d. if needed

26. What should you do in the first instance when you suspect that your workmate is experiencing heat stroke?

- a. Call 000 for an ambulance
  - b. Lie the person down
  - c. Cool the person down by applying cold packs or wrapped icepacks to neck, groin and armpit areas
  - d. Use a wet towel, sheet or clothing to cover the person
-



## Spot the hazards

### Northam Winery and Nursery

There 6 hazards in this area. Try and find them all.



### Hazard notebook

Fill in the hazard notebook

#	Spot the hazard	Assess the risk	Make the change	Monitor and follow-up
1	Person standing in front of a moving forklift	Critical	Ask the driver to stop immediately and advise the pedestrian to be more vigilant	Report it to your employer and suggest they review the safe work procedures
2				
3				
4				
5				
6				

## Horticulture industry module – Knowledge quiz

1. Guards are fitted to machinery:
  - a. to protect you from moving parts
  - b. as a temporary permanent part of the machine
  - c. to keep the machine clean
  - d. none of the above
  
2. Always switch off the engine and apply the parking brake before dismounting the tractor.
  - a. True
  - b. False
  
3. Receival bins of grape crushers do not need to be guarded.
  - a. True
  - b. False
  
4. When vehicles or mobile plant operated nearby, you should:
  - a. be aware of your surroundings by looking out for other vehicles or mobile plant using the area
  - b. talking or texting on a phone
  - c. walking around listening to music through earphones
  - d. day dreaming
  
5. Which of the following will reduce the risk of falling from height?
  - a. Practicing Ninja warrior skills
  - b. Using fall arrest systems (such as a safety harness)
  - c. Being brave
  - d. Ask your work mate to work at height on your behalf
  
6. Who can operate a forklift?
  - a. Any worker
  - b. Truck drivers
  - c. Only trained and licensed workers
  - d. No one
  
7. Before using a ladder, safety checks should include ensuring that the ladder:
  - a. has no damage, including loose or missing parts
  - b. is properly put up and secured
  - c. is industrial rated
  - d. all of the above

8. What can your employer do to prevent slips, trips and falls at work?
  - a. Provide adequate lighting for safe movement
  - b. Maintain workplaces to keep them in a clean and tidy condition
  - c. Ensure workers wear suitable footwear with appropriate treads that are kept clean
  - d. All of the above
  
9. How does performing a manual task result in injury? Choose **all** that apply
  - a. increased effort (force)
  - b. awkward postures
  - c. natural postures
  - d. applying pressure on one part of the body
  - e. performing the same action quickly and repeatedly
  - f. lifting heavy objects
  
10. When should you receive task-specific training to perform manual tasks?
  - a. During induction to the task.
  - b. As part of your refresher training.
  - c. When work tasks are about to be changed or introduced.
  - d. All of the above.

### Case study

Oleg works at a local plant nursery. Each day he performs manual tasks which may put him at risk of musculoskeletal injuries. Oleg's tasks consist of repetitive bending to pick up many small pots on the ground over a long period. Although, the weight lifted is only a few kilograms each time. Oleg also carries bags of fertilisers and other products weighing up to 25 kilograms, and drags trees in large bags and plants in heavy pots along the ground.

The plant nursery floors often contain spillages of soil and that after the reticulation has been on, the pathways can be very wet. Oleg usually wears thongs to work to keep his feet dry.

Oleg's other duties include serving customers and working at a cash register.

11. From your observations, what are some of the risk factors present in Oleg's manual tasks?  
Choose **four** correct options.
  - a. Frequent periods of repetitive bending to ground level
  - b. Serving customers
  - c. Manually lifting weights of up to 25 kg
  - d. Dragging very heavy weights
  - e. Slippery pathways
  - f. Working at a cash register
  
12. Please suggest ways to assist Oleg to manage his manual tasks.  
Choose **four** correct options

- a. Ask his employer to purchase suitable trolleys to transport bags of products and heavy pot plants
  - b. Use team lifting to get heavy trees or pots onto a trolley
  - c. Ask his employer to purchase a pot lifter
  - d. Improve housekeeping to keep pathways clear and dry
  - e. Continue wearing thongs to keep his feet dry
  - f. Stop serving customers
13. When cleaning, maintaining or adjusting machinery and equipment, a lockout procedure is required to:
- a. safeguard workers
  - b. safeguard machinery
  - c. identify hazardous energy
  - d. finish work
14. There are three steps in locking out machine and equipment. These steps are:
- a. lock, look and tag
  - b. lock, tag and test
  - c. tick, tock and tack
  - d. lock, test and try
15. An incident with electricity is usually caused by:
- a. installation and/or repairs of electrical equipment by a qualified electrician
  - b. contact with overhead wire, usually when using equipment
  - c. Use a portable RCD with a portable electrical tool
  - d. regularly inspect wiring, cords, plugs, and tools and equipment for obvious external damage
16. Noise levels are measured in:
- a. decimals or dM
  - b. decibels or dB
  - c. millimetres per second
  - d. dBs per second
17. To prevent hearing loss at work, the law sets a workplace exposure standard averaged over eight hours to be \_\_\_\_\_ dB(A)
- a. 85
  - b. 95
  - c. 140
  - d. 200

18. The most important factor for the effectiveness of hearing protection devices is:
- style
  - appearance
  - colour
  - wearing it
19. Noise levels are measured in:
- decimals or dM
  - decibels or dB
  - millimetres per second
  - dBs per second
20. To prevent hearing loss at work, the law sets a workplace exposure standard averaged over eight hours to be \_\_\_\_\_ dB(A)
- 85
  - 95
  - 140
  - 200
21. The most important factor for the effectiveness of hearing protection devices is:
- style
  - appearance
  - colour
  - wearing it
22. Legionnaires' disease is an infectious disease of the lungs caused by \_\_\_\_\_
- parasites
  - viruses
  - bacteria
  - smoke
23. To reduce the risk of contracting Legionnaires' disease, you should:
- wear PPE such as a face mask and gloves when handling soil and potting mix
  - store potting mix in a sunny spot
  - potting plants in unventilated areas
  - keep soil and potting mix dried to generate dust
24. \_\_\_\_\_ is the most serious form of heat stress.
- Heat rash
  - Heat exhaustion

- c. Heat stroke
  - d. Heat waves
25. To avoid heat stress during hot work conditions, it is recommended that you drink at least 250ml of water \_\_\_\_\_ to replace lost fluids.
- a. every 15 to 20 minutes
  - b. during lunch break
  - c. every 2 to 3 hours
  - d. if needed
26. What should you do in the first instance when you suspect that your workmate is experiencing heat stroke?
- a. Call 000 for an ambulance
  - b. Lie the person down
  - c. Cool the person down by applying cold packs or wrapped icepacks to neck, groin and armpit areas
  - d. Use a wet towel, sheet or clothing to cover the person
-