



11. Safety in the Farm Workshop:

a Practical Guide

AUSTRALIAN CENTRE FOR AGRICULTURAL HEALTH AND SAFETY

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Contents

Health and Safety in the Farm workshop: a practical guide

1: Introduction

1.1 This publication – Its purpose

This publication aims to provide practical guidelines for employers and workers to improve and ensure the safety of those who work in farm workshops, and those who are in the vicinity of areas where fabrication, machinery service, maintenance and repair is undertaken.

The document briefly provides guidelines on the hazards and risks associated with working in farm workshops and practical guidelines on how to implement effective occupational health and safety (OHS) risk control that will not only reduce risk, but will assist farmers to meet OHS regulatory requirements, and improve productivity.

The publication has been prepared under the direction of the Farmsafe Australia National Farm Machinery Safety Reference Group, comprising representatives from industry, occupational health and safety, injury research centres, producers and manufacturers.

1.2 Health and safety problems in the workshop

People working in the farm workshop are exposed to risk of injury and illness associated with a range of hazards. Up to 20 percent of farm injuries presenting to hospital emergency departments are caused by farm maintenance work. More than 30 percent of these are eye injuries and more than 30 percent are hand injuries.

Hazards associated with work in the farm workshop include:

- Poor workshop design and layout
- Electricity
- Welding
- Oxyacetylene welding and cutting
- Grinding
- Using power hoists
- Using power and hand tools
- Battery charging
- Tyre changing

The types of injury range from death, serious injury requiring hospitalization and down time, to “nuisance” injury that stops work for a short time, or makes work slower and reduces productivity.

1.3 Legal obligations of the people in agriculture production enterprises

State OHS Acts are similar in all states in that they lay down the responsibilities of key parties involved in reducing risk of injury and illness associated with work.

Responsibilities of ***employers*** include:

- Consultation with workers to implement OHS program
- Provision of a safe working environment
- Organisation of safe systems of work
- Maintenance of work areas, machinery and equipment in a safe condition
- Ensuring safe use, handling, storage and transport of plant and hazardous substances
- Assessment of health and safety risks to employees and others in the workplace, and institution of effective risk control measures
- Provision of adequate information, induction, instruction, training and supervision to employees
- Provision of adequate facilities for the welfare of workers

Employees also have responsibilities. Workers must take reasonable care of the health and safety of themselves and others, and cooperate with management in (its) efforts to comply with occupational health and safety requirements.

Employers and self-employed persons must ensure the health and safety of people visiting or working at their places of work, who are not their employees, by not exposing them to risk - this includes contractors.

Manufacturers, designers and suppliers of plant and substances for use by people at work must make sure that they are safe and without risks to health when properly used. They must also supply adequate information to ensure safe use.

Each of these OHS obligations must be met in all agricultural industries and on each individual enterprise.

2: Finding and fixing safety problems in the workshop

The key processes (or steps) that must be set in place to manage OHS risk are:

1. Involve your workers - Consultation

There must be ways for workers to actively participate in the OHS program of the enterprise. How managers and employers involve workers will be different on different properties and methods may include:
- Regular meetings where safety issues are discussed
- Systems whereby safety representative are nominated to have specific responsibility for liaison between workers and managers

Whatever system is in use, it is essential that there is a clear commitment to safety of the owner and manager, and that this is obvious by the safety behaviour and activity taken on a day-to-day basis.

2. Look for unsafe conditions and unsafe practice – *Hazard identification*

Safety hazards must be identified in a systematic way.

This means that property owners, managers and workers must identify those jobs and situations that may cause injury or illness, not only to people doing the work, but also to bystanders and visitors.

Hazard identification should be an ongoing and be carried out:
- At least annually
- When systems are changed – new equipment, changed facilities, changed practice

All workers should be actively encouraged to report anything that could be considered hazardous to health and safety – any unsafe condition, or unsafe action needs to be identified and action taken to make the system safe.

3. For each hazard, consider the likely outcome – *Risk assessment*

Risk associated with each hazard must be assessed in terms of the severity of the potential harm that could occur, and the likelihood that such an outcome could occur – generally greater if workers are frequently exposed to the hazard. The risk matrix may help with assessing the risk: (see Fig 2.1)

4. Control risk using the hierarchy of control approach – *Risk control*

Risks must be controlled to prevent injury. The hierarchy, or order of effectiveness, is as follows:

1. Elimination of the hazard
Where possible, the hazard must be eliminated, or removed from the workplace. This is obviously the most effective way to reduce risk. While it is often not possible to eliminate a hazard, OHS regulations require employers to consider this option. If it is not possible, then the next most effective solution should be sought and put in place.

2. Substitution for a hazard of lesser risk
Where it is not possible to eliminate a hazard altogether, consider whether the hazard can be substituted for something that will do the same job, but is less risky.

3. Isolation of hazard from worker and other engineering controls
In most hazardous situations it is possible and practicable to improve the design of work and/or

Consequence of injury	Frequency of exposure hazard			
	Daily	Weekly	Monthly	Rarely
Kill or disable	**HIGH**	**HIGH**	**HIGH**	**HIGH**
Several days off work	**HIGH**	**HIGH**	**MEDIUM**	**MEDIUM**
First Aid	**HIGH**	**MEDIUM**	LOW	LOW

Fig 2.1: Risk Matrix

isolate the worker from the hazard. This is the basis of most of the safety improvements that should be put in place by horticultural enterprises to reduce risk of injury as well as to be compliant with OHS regulations.

4. Administrative controls

Administrative controls include safe operating procedures or rules, organising work in such a way that reduces risk, giving safety induction and training to workers, supervising unskilled workers and providing safety information to workers about the safety risk associated with the work to be done and how these risks can be minimised.

5. Personal protective equipment

Personal protective equipment must be provided and used where workers cannot be protected from a hazard by a control measure higher up the order (1-4 above). This includes providing helmets to protect from head injury for riders of motorcycles and ATVs.

These guidelines suggest the higher order controls in the first instance, with the lower order, less effective controls that depend on individual behaviour lower in the list. In practice, best practice in OHS risk management will require a mix of controls for the high risk hazards.

5. Keep a written note of your OHS activity – *Record keeping*

Records of all activity in your OHS program must be kept.

These are not steps to be taken on a once-off basis. The process would be better illustrated in this way: (see Fig 2.2)

These processes should become a key part of the management of the whole business. Successful businesses invest significantly in OHS in terms of time, money and commitment at all levels. These businesses understand that overall performance of the business benefits from good OHS practice. Such businesses do not accept that the major responsibility for workplace health and safety rests in the workers themselves, rather the opposite – that safety is a key management responsibility, and involving workers is a critical management skill.

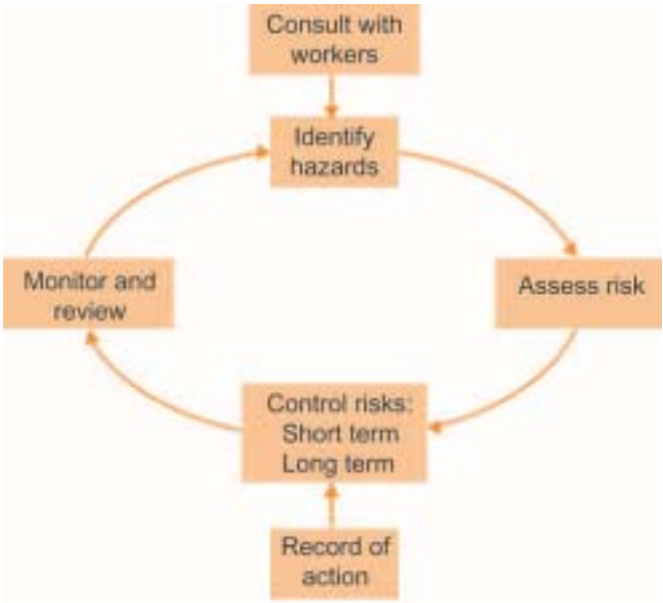


Fig 2.2

3: Hazards, risk and risk controls in the farm workshop

This section gives practical examples of how the principles outlined in the section above (2. Finding and fixing safety problems in the workshop) can be put into practice in the farm workshop.

3.1 Farm workshop design for safety

One of the most important issues to consider when planning for safety in and around the farm workshop is the overall plan and layout of the various sections in relation to each other. Smooth flow of work and machinery and equipment is not only efficient, but is generally safer for workers, contractors and other bystanders.

Workshop with unobstructed access

Hazard and Risk	Risk Controls
Poor design and layout poses risk of injury and chronic medical conditions associated with poor working conditions, unnecessary handling of equipment, exposure to dust and noise, and the risk of collision with plant and people	Review the design and layout of the workshop, taking into account the flow of work and machinery Consult with workers to identify potential hazards and improvements that could be made to workshop layout.

3.2 Traffic flow, and access to work

The safety of people should be ensured in planning and organising traffic flow in and around the workshop.

Well constructed stairs with a handrail

Hazard and Risk	Risk Controls
Workers and visitors to the workshop are at risk of injury if access to the workplace is cluttered, if stairways and walkways are in an unsafe condition, and if there is risk of collision with traffic or other people.	Access to the workshop for all workers and visitors should be clearly defined and separated from vehicular traffic Machinery and other items that reduce visibility should be located away from doorways and corners and other high traffic areas Workshop floors should be kept clear of slip and trip hazards Hazardous conditions or locations should be sign-posted. Provide wide steps with a non-slip surface when access is required to heights Provide a handrail around all platforms where there is a risk of falling (Some states have legislation which outlines a specific minimum height) Provide a handrail on all steps higher than one metre Ensure that all stairways and walkways comply with Australian Standard AS1657-1992 Fixed platforms, walkways, stairways and ladders – Design, construction and installation.
Visitors and children in the workshop may be at risk of injury due to their lack of education about the hazards that exist	Farm family rules that restrict access of children except under close adult supervision should be enforced by family and workers Direct all visitors to a safe area with clearly marked signs

3.3 Operator Skills

OHS legislation requires employers to provide adequate information, induction, instruction, training and supervision to employees.

Register of training

Hazard and Risk	Risk Controls
Workers who are unskilled in the work process and unaware of the safety risks are at a higher risk of injury and illness in the workplace and place others in the workshop at a higher risk.	All workers must undertake safety induction which includes: • Information regarding the risks associated with various processes undertaken, and equipment used, in the workshop • Specific rules that have been developed to minimise the risk of injury and illness • How to report hazards that they identify in the workshop Ensure that all workers are competent to perform the work required of them Provide specific information, instruction training and supervision to all workers Keep a record of assessment and training of workers

3.4 The Workshop Work Environment

There are a number or specific work environment hazards in many workshops that commonly pose risk of injury or illness. These risks must be eliminated or controlled to ensure the health and safety of workers and to comply with OHS regulations.

Hazard and Risk	Risk Controls
Temperature	
Excessive heat in the workshop may put workers at risk of heat exhaustion and may decrease the likelihood of workers wearing protective equipment	Reduce heat in the workshop by installing vents and/or windows for cross ventilation, using fans or painting the roof white to reflect the heat Encourage workers to wear light, cool clothing – this should not be at the expense of personal protective equipment that is required for the job being done Ensure workers take frequent breaks when working in hot conditions and reschedule work to avoid working in the workshop in the hottest part of the day
Excessive cold in the workshop may make existing medical conditions worse eg. arthritis, and may increase the risk of injury from the wearing of excessive clothing which may restrict range of movement	Reduce excessive cold by stopping draughts and providing heating

Hazard and Risk	Risk Controls
Light	
Poor lighting increases the risk of collision when moving from bright sunlight into a dark workshop Poor lighting may increase the risk of slips, trips and falls and errors in work Flickering lighting may effect concentration and lead to medical conditions such as headache	Ensure lighting is adequate by providing lighting over benches Provide portable lighting for work on machinery

A well lit workshop

Australian Standard approved ear muffs

Hazard and Risk	Risk Controls
Noise	
Noise is a common hazard in the farm workshops posing risk of permanent hearing loss and tinnitus (ringing in the ears) for workers. Damaging noise levels are generated by operation of machinery and equipment including portable welders, air compressors and power tools Noise is increased if music is played. A rule of thumb is that if you have to raise your voice to be heard by a person about one metre away then the noise level exceeds the safe level. To properly assess risk, noise levels at work stations should be measured. Maximum exposure that is permitted by OHS regulations is 85 dBA for 8 hours per day.	Elimination of the noise hazard is generally not practical for farm workshops where mechanical systems are in use in fabrication and the process of maintaining, servicing and repairing machinery and equipment When choosing new equipment or machinery consider the noise it produces and find out if less noisy equipment is available. Sometimes mufflers or similar add-ons such as noise covers that reduce noise are available. Where possible locate noisy equipment such as a generator and air compressors away from the main work area

Hazard and Risk	Risk Controls
Noise (continued)	
(NB - With each 3dBA increase in noise level there is a doubling of the intensity of the noise so the exposure time has to be halved. Therefore, if the noise level is 88dBA the maximum exposure limit will 4 hours)	Noise may also be reduced by: • fitting sound absorbing materials to ceilings and walls, • improving exhaust systems, • installing noise dampers, • using double-glazed glass • proper maintenance and repair of machinery and equipment Provision of suitable earmuffs and earplugs will be necessary where the noise level cannot be reduced to acceptable levels.
Electricity	
Electrocution from work under, and the movement of machinery and equipment under, overhead powerlines is a major risk.	Overhead power lines or workshop access should be relocated where there is a risk of contact with vehicles or other machinery and equipment Overhead powerlines should be clearly identified

Hazard and Risk	Risk Controls
Electricity (continued)	
Many electrical accidents are caused by faulty wiring and electrical installation. Overloaded installations also cause problems - with too many appliances on the one circuit or when heavy duty equipment is used on a circuit not designed to supply the required electricity. Electrocution is more likely to occur when: • Fixed wiring, electrical cords or equipment has been installed, altered or repaired by anyone other than a registered electrician • Damaged equipment, extension leads, wiring or fittings are used • There are unprotected wires near plugs • Too many appliances are used at once, overloading circuits • Fuses or circuit breakers with incorrect ratings are used • Work is undertaken too close to overhead powerlines • Earth connections on fixed electrical items are corroded or not properly connected • Electrical equipment is used in wet areas Trenches or holes are dug and connect with underground cable	The risk of electric shock and electrocution can be eliminated by the use of air powered tools when possible A Residual Current Device (RCD) should optimally be installed at the fuse box to provide protection across the whole electrical system. If the whole system is not protected, then portable RCD's can be plugged directly into electrical outlets. (Note that Circuit Breakers are not RCD's. They offer no protection to people.) Only licensed electricians should undertake electrical installations, extensions, alterations and repairs. RCD's should be checked regularly. (For more information on RCD's see information box on page 24) A system of regular inspections of electrical leads, fittings and equipment to identify electrical hazards should be put in place. (Note that in some states routine testing and tagging of electrical extension cords and appliances is required by law.) See Australian Standard AS/NZS3760:2003 In-service safety inspection and testing of electrical equipment. Workers should be instructed to report any faulty electrical equipment or installations immediately. Use extension cords only when there is no alternative Unwind extension cords fully when in use and always use a heavy duty cord Route extension cords to protect them from damage from machinery and animals Avoid using double adapters – install additional power points where required Store tools where they will not be damaged Use extreme caution when working in damp or wet conditions

Residual Current Device fitted to circuit

Extension cord suspended off the floor

Hazard and Risk	Risk Controls
Smoking in the Workshop	
Smoking is a well-known risk to the long-term health of smokers, and exposure to exhaled smoke is a well established risk for bystanders Flammable materials and situations may also exist in the workshop increasing the risk of fire and explosion	No-smoking rules should be established and enforced within the workshop, including within the eating and mess areas Outdoor areas where workers may smoke should be safe from traffic hazard.
Amenities	
Lack of amenities such as toilet, washing and eating facilities and clean cool drinking water may reduce productivity and increase the risk of ill health	Provide hand washing a clean toilet facilities as well as a sheltered place for workers to eat and take breaks away from workshop hazards Provide a source of cool, clean drinking water

3.5 Welding

The electric arc welding process involves risk of injury and illness associated with electricity, emission of harmful fumes, sparks, the generation of heat and radiation emitted during the welding process. These risks apply not only to the person undertaking the work but also to bystanders. These risks can be eliminated by having welding work done in town by an engineering works. However, if this is not practicable, below are some measures that will control the risk associated with these hazards.

Hazard and Risk	Risk Controls
Electric shock or electrocution can result from contact with live components of a welding circuit	Do not touch the electrode or metal parts of the electrode holder with skin or wet clothing Keep welding cables and electrode holders in good condition Keep welder cables off the floor Supply and ensure the use of dry leather gauntlet gloves
Inhalation of fumes from the welding rod or the surface being welded can result in respiratory problems	Ensure adequate cross ventilation Use welding rods that produce a low fume Supply and ensure the use of face masks or respirators where necessary
Sparks generated during the welding process may result in fire and/or explosion	Do not weld near flammable or combustible items (petrol, paints, thinners, cardboard, paper, acetylene, charging batteries) Take care when welding in dusty conditions as dust particles may oxidise and result in a flash fire or explosion Ensure material being welded does not have a flammable coating, or contain flammable materials Never fuel portable welders when running Ensure appropriate emergency equipment is available eg.. First aid kit, fire extinguisher

Fire extinguisher readily available

Australian Standard approved welding helmet

Hazard and Risk	Risk Controls
Flash burns to the eyes and burns to the skin may result from exposure to radiation from the welding arc Heat generated during the welding process may result in burns to the skin	Weld in a screened area to protect other workers from radiation Ensure clothing, gloves and hands are free from grease and oil Do not weld with cigarette lighter in pockets Take care when quenching hot items in water Mark hot items with a soapstone Supply and ensure the use of appropriate eye protection including welding helmet or hand held face shield and a fire retardant apron Display signs which highlight the hazards associated with using the welder
When using portable welders there is a risk of noise induced hearing loss and entanglement in moving parts	Ensure all guards are in place and functional on portable welders Supply and use of ear muff or ear plugs where necessary

Portable welder

3.6 Oxyacetylene welding and cutting

The use of oxygen and acetylene gas in the workshop carries with it some very high risks to the person doing the work and also to others in the workshop. To eliminate these risks, work requiring oxyacetylene cutting or welding may be done in town at an engineering works. If this is not practicable, an alternative cutting method may be employed such as the use of a power tool or hand tool. If this substitution is not possible then below are some measures that can be used to control the risk.

Operation of equipment using appropriate personal protective equipment

Flint Lighter

Hazard and Risk	Risk Controls
Using oxyacetylene for welding and cutting may result in burns to the skin from the flame, from hot metal or from steam when quenching hot objects	Ensure clothing, gloves and hands are free from grease and oil Handle hot metal with pliers or tongs Light flame with a flint lighter or pilot light only, not matches or cigarette lighters Take care when quenching hot items in water Mark hot items with a soapstone

Hazard and Risk	Risk Controls
	The following should be provided for all individuals undertaking oxyacetylene work: • appropriate eye protection including goggles and/or face shield • fire retardant apron • heat resistant gloves • close fitting clothing • enclosed leather footwear In addition to providing the above equipment, supervisors must be vigilant in ensuring its use
The flammability of oxygen and acetylene increases the risk of fire and explosion The hot spatter produced during oxyacetylene work may ignite combustible material	If any doubt exists regarding the safe distance from flammable material then a fire resisting screen should be used Do not undertake oxyacetylene work near flammable or combustible items (petrol, paints, thinners, cardboard, paper, charging batteries) Shut off the blow pipe when not in use Check connections for leaks with soapy water Ensure cylinders are chained upright in well ventilated area – do not secure around the valve Fit flash arresters to oxygen and acetylene lines near the bottle and non return valves near the hand piece Leave cylinder key in position when fuel gas cylinder valves are open Keep hoses away from the working area to prevent contact with flame, heat sparks or hot spatter Ensure appropriate emergency equipment is available eg.. first aid kit, dry powder fire extinguisher and fire blanket
Moving heavy oxygen and acetylene cylinders poses the risk of back and other musculoskeletal injuries	Mount cylinders that are in use on a trolley

Clearly visible emergency equipment

Mobile oxyacetylene

Oxyacetylene cylinders chained in position

3.7 Grinding with a bench grinder or angle grinder

Eye injuries and hand injuries are particularly prevalent in farm workshops. The high velocity metal produced from grinding, and exposure to a quickly spinning grinding wheel, certainly contribute to these injuries. In some instances it may be possible to substitute the grinder for a manual filing or cutting tool with which there is less risk associated. However, if this is not practicable below are some measures that will assist in controlling the risks associated with using grinders.

Hazard and Risk	Risk Controls
High velocity particles that are generated during grinding may result in eye injury to both the operator and bystanders	Ensure that all appropriate guards are in place and functional Do not exceed the recommended wheel speed and size as the wheel may fly apart Keep bystanders clear when grinding work is being undertaken Provide and ensure the use of appropriate eye protection when grinding including goggles and/or a face shield

Bench grinder with appropriate guards in place

Operation of angle grinder using appropriate protective equipment

Hazard and Risk	Risk Controls
Hand injury may result from exposure to the grinding wheel and items that have become hot from the grinding process	Ensure the bench grinder tool rest is adjusted as the wheel wears to avoid jamming between the wheel and the rest (the rest should never be more than 2mm from the wheel) Use clamps or a vice to hold work Consider not wearing gloves when using the bench grinder
The grinding process often generates a lot of noise that may result in noise induced hearing loss to both the operator and bystanders	Glue a 6mm piece of rubber to the tool rest of bench grinders to reduce vibration and noise Provide and ensure the use of hearing protection (ear muffs or plugs) when grinding is being undertaken

3.8 Using hoists in the workshop

In many workshops there is a requirement to lift and move heavy objects. To minimise the risk of manual handling injuries hoists are often used and they pose a very serious risk to the health and safety of people working in the workshop. The term hoist encompasses cranes, both vehicle mounted and floor, and overhead chain hoists.

Clearly visible safe working limit

Hazard and Risk	Risk Controls
When lifting materials there is a risk of failure of the hoist and crushing of a person beneath the falling load	The safe working limit (SWL) for the hoist should be clearly marked on it If a hoist is suspended from a beam in the workshop, the beam should be rated and the SWL clearly marked on it Workers should be trained in inspection and maintenance of hoists, chains and hooks, and load limits Loads should be lifted slowly to ensure the load is seated properly and the hoist is operating properly Ensure workers do not pass beneath or work under a load that is suspended by hoist only Workers should know and use the appropriate hand signals for operating a hoist, especially when working in noisy environments
Some hoists have pinch points and moving cables that may cause injury or entangle clothing	Ensure pinch points and cables are adequately guarded when possible Ensure that when using the hoist workers wear close fitting work clothing and non slip soled work boots, tie long hair back and do not wear dangling jewellery

3.9 Power tools, hand tools and air powered tools

Power tools, hand tools and air powered tools contribute to injury in the workshop. Whilst it is not often that these injuries are life threatening, they certainly result in significant loss of productivity.

Hazard and Risk	Risk Controls
Electric shock may result from poorly maintained power tools and electrical cords	Use compressed air driven tools or hand tools where possible Ensure that power tools cords are regularly inspected and tested by a qualified person Store tools where they and their cords will not be damaged Avoid working in damp and wet conditions

Electrical inspection tag

Work held securely in a vice

Hazard and Risk	Risk Controls
Hand injury including burns, cuts, abrasions and punctures may result from the use of power, compressed air driven and hand tools	Ensure the use of the right tools for the right job eg. use a ring spanner instead of a shifting spanner where possible Secure work with clamps or in a vice When using hand tools use a 'pulling' rather than a 'pushing' action – if a pulling action cannot be use then push the tool with the open palm of the hand Ensure adequate lighting where work is to be undertaken Ensure that workers wear hand protection when appropriate if they are at risk of hand injury – keep in mind that in some situations gloves may actually increase the risk of entanglement
Eye injury may result from high velocity flying particles and dust	Supply and ensure the use of appropriate eye protection, goggles and/or face shield, for workers and others who may be at risk of eye injury
Clothing may become entangled in power tools and compressed air driven tools, including the air compressor	Ensure guards are in place and functional Ensure that workers wear close fitting work clothing, leather work boots with a non slip sole, do not wear dangling jewellery and tie back long hair
The use of compressed air to power tools carries the risk of severe injury from air penetrating the skin and moving into the body	Ensure that workers always direct the air blast away from themselves and other people Never use compressed air to blow dust off clothing

An air compressor with the appropriate belt guard

Compressed air ducted into the workshop

Hazard and Risk	Risk Controls
Noise induced hearing loss may result from the use of power tools and compressed air driven tools (including constant running of an air compressor)	Locate the air compressor away from work areas and duct the air into the workshop Supply and ensure the use of appropriate hearing protection – ear muffs or ear plugs Ensure that all areas where hearing protection is to be worn are clearly identified

3.10 Battery charging

Gases that are produced during the charging process, when coupled with other workshop activities, can produce a very high risk workshop environment.

Right: Battery charging in a well ventilated area

Hazard and Risk	Risk Controls
Gases that are released during battery charging are flammable and may result in explosion	Always charge in a well ventilated area away from ignition sources including sparks produced by welding, oxyacetylene work and grinding Do not smoke around batteries that are charging Turn off the mains power before disconnecting charger clips to prevent sparks
Exposure to battery acid (electrolyte) may result in burns	Only purchase sealed batteries to eliminate the risks associated with electrolyte Obtain the appropriate material safety data sheet (MSDS) for the electrolyte Provide and ensure the use of the appropriate protective equipment if handling of electrolyte is required including neoprene, rubber or latex-nitrile gloves, chemical resistant apron, and eye protection
Lifting heavy batteries may result in back and other musculoskeletal injuries	Use correct lifting techniques Use mechanical devices for lifting and moving batteries Place batteries on a bench rather than the floor if they have to be lifted again to prevent bending

3.11 Tyre changing

Tyre changing in the farm workshop has been associated with very serious injury including amputation. This hazard can be eliminated form the workshop by having all tyre repairs done in town by a qualified person with the appropriate safety systems. If this is not practicable, below are measures that will assist in control the risks associated with changing and inflating tyres.

Hazard and Risk	Risk Controls
Injury including amputation may result from split rim wheel assembly blow apart	Make available, and ensure the use of, a tyre cage for inflating tyres Inspect rims before placing tyres on them Ensure rim pieces are seated properly Inflate tyres in 10psi stages and check the rim after each inflation

Tyre cage for tyre inflation

Vehicle stand

Hazard and Risk	Risk Controls
Crush injuries may result from a machine that moves or falls whilst raised	Chock wheels at the rear axle Use blocks or stands to stabilise machinery that is raised rather than relying on a jack

3.12 Portable Ladders

Serious injury and death have resulted from improper use of portable ladders on farms. To reduce the risk of injury it is essential to ensure that the type and length of ladder is appropriate for the work to be done, and that the ladder is in sound condition, and complies with the Australian Standard for portable ladders (AS1892). Below are measures that will assist in control the risks associated with the use of portable ladders.

Right: Ladder placed using the "4 in 1" rule

Hazard and Risk	Risk Controls
Severe injury may result from falls from portable ladders Falling ladders and objects falling whilst a person is working on a ladder may cause injury to bystanders	Always use the “4 in 1” rule when working on ladders – for every 4 metres in ladder length it should be 1 metre out from the wall (a 6m ladder should be 1.5m from the wall at the base) When using the ladder to gain access to a working platform or roof the ladder should extend at least 1 metre above the platform or roof When the top of the ladder is supported against a surface that is not flat the top of the ladder should be secured Always face the ladder when climbing up or down Hoist materials up and down the ladder or attach them to a belt to ensure that both hands can be in contact with the ladder at all times Never stand any higher than the third rung from the top Work should only be carried out within an easy arms reach of the ladder Ladders should be inspected for damage and areas of weakness prior to use Extreme care should be taken when using ladders in wet and/or windy conditions Enclosed footwear with a non slip sole should be worn when climbing on ladders
Electrocution may result from contact with power lines and electrical circuits	Metal ladders should not be used where the risk of electrocution exists
Muscular sprains and strains may result from lifting ladders which are often heavy and awkward to move	Have a second person help when lifting and moving heavy or extra long ladders
Inappropriately stored ladders may cause people to trip, causing injury	Ladders should be stored in or on racks when not in use, preferably under cover

Residual Current Device:
Frequently asked Questions

What is a residual current device (RCD)?

An RCD is an electrical safety device capable of detecting very small leakages of current to earth and responding by either signalling the presence of the leakage or switching off the supply of electricity.

Why is an RCD necessary?

Whether a person survives an electric shock depends on the magnitude of the current and the time that it continues to flow. RCDs interrupt the supply of electricity before it reaches a magnitude, and flows through the body for such a time, that it causes serious health effects or death.

At what current does the RCD trip?

The tripping current of the usual type of RCD installed to protect final sub-circuits in Australia is 30mA.

How long does it take from the commencement of leakage until the RCD cuts in?

While the allowable operating time of RCDs is 300ms, it is usual to find an operating time of less than 50ms.

Does an RCD provide protection in all situations?

A properly functioning RCD will protect operators of appliances with earth connections. However appliances that are double insulated do not have an earth wire and as such do not have a residual current that is seen by the RCD. In the case where a double insulated appliance suffers gross damage and an active part is earthed, the RCD will operate. If an individual is involved, they will receive an electric shock, but will not be electrocuted. In the situation where a double insulated item is immersed in a conducting liquid which is in an unearthed container e.g. bath, and a person touches the water, the RCD will operate but the person will still receive a shock although not great enough to cause electrocution.

How are RCDs installed?

There are three broad types of RCD:
1. Fixed installation – non-portable unit that is installed into the switchboard and provides protection for the entire installation, or a selected circuit.
2. Fixed socket units – non-portable unit wired into a fixed socket and provides protection to equipment plugged into that particular socket
3. Portable – the portable unit is plugged into a socket and electrical equipment then plugged into the portable unit. Protection is provided only to equipment plugged into the portable unit. There are various models available.

What problems are encountered with the use of RCDs and how can they be overcome?

Unwanted tripping of RCDs:

- Incorrect installation
- A neutral to earth fault in the installation
- Accumulation of small leakages from a number of appliances

Reduced sensitivity or failure to trip – usually due to:

- Faulty RCD
- A neutral to earth fault (detected during testing via 'test' button)
- Presence of standing-residual-currents on a different phase

Either of these problems should be investigated by a licensed electrician.

Does an RCD require any maintenance?

RCDs should be regularly tested by a competent person as outlined below.

Source: AS3760 In-service safety inspection and testing of electrical equipment

Type of environment and/or equipment	Interval between inspection and tests for RCDs			
	Push button test by user		Operating time and push button test	
	Portable	Fixed	Portable	Fixed
1 Factories, workshops, places of work or repair, manufacturing, assembly, maintenance or fabrication	Daily, or before every use, whichever is longer	6 months	12 months	12 months
2 Environment where the equipment or supply flexible cord is subject to flexing in normal use OR is open to abuse OR is in a hostile environment	3 months	6 months	12 months	12 months
3 Environment where the equipment or supply cord is NOT subject to flexing in normal use and is NOT open to abuse and is NOT in a hostile environment	3 months	6 months	2 years	2 years

References:

Standards Australia. 2003. AS/NZS 3760 *In-service safety inspection and testing of electrical equipment.*

Standards Australia. 1998. SAA HB 113 *Residual Current Devices – What they do and how they do it.*

Worksafe Western Australia Commission. 1998. *Electricity Residual Current Devices - Guidance Note.*

Personal Protective Equipment:
Frequently asked Questions

There is a wide variety of personal protective equipment (PPE) currently on the market to protect against hazards in the workshop. The aim of this publication is to answer some frequently asked questions about personal protective equipment in an attempt to make selection of the appropriate equipment easier.

For all protective equipment there are some general principles that should be followed:

- All persons exposed to hazards in the workplace, that can not be controlled by other means, must be supplied with the appropriate protective equipment
- People who use PPE in the workplace must receive training in its correct use, fit, maintenance, and storage
- Areas where people need to wear PPE to reduce the risk of injury must be clearly identified with the appropriate signs
- Facilities should be available for the storage of PPE to ensure it remains clean and functional
- PPE should be available close to the hazard for which it must be worn
- When purchasing PPE ensure that it complies with the appropriate Australian Standard – A list of Standards is included at the end of this publication

Hearing Protection

What kind of hearing protection is available?

There are basically two different kinds of hearing protection, ear muffs and ear plugs.

Is one kind better than the other?

No, generally one is not better than the other, but you may find that one will suit a certain situation better than another. For example, people who wear spectacles may find it uncomfortable to wear ear muffs and when working in particularly noisy situations you may find that only ear muffs will provide the protection needed. In some situations it may be necessary to wear ear plugs and ear muffs although care should be taken not to over protect as this can effect how the wearer perceives useful sounds.

How do I know that what I am purchasing will give me adequate protection?

When purchasing hearing protection you need to make sure that it is rated to dampen the noise to an appropriate level. To do this you need to look for the SLC80 rating. This is the amount that the noise will be dampened by eg.. SLC80 rating of 20 will dampen the noise by 20 decibels (dB). When working in agriculture you should purchase protection that has an SLC80 rating of 20 or higher. You will find this rating on the packaging rather than on the muffs or plugs themselves.

How do I care for my hearing protection?

Ear plugs may be disposable or reusable. Generally, when they become soiled they should be cleaned in detergent and water and allowed to dry completely before the next use. If ear plugs lose their softness, or shrink, it is time for a new pair. Ear muffs need to be inspected regularly for damage. The cushioning should be soft with no cracks in it; you may be able to replace the cushions if they become hard or brittle. The cushions and the head band should be wiped clean and stored where they can be kept dry, clean and out of the sun.

How do i fit my ear muffs properly?

- Check to see how the ear muffs should be worn. Oval ear muffs should be worn with the oval vertical.
- Make sure your hair is not in the way as it may effect the seal
- Your ears should fit inside the shells
- Adjust the head band so that the ear muffs fit snugly on your head
- When wearing ear muffs fitted to a hard hat, both should be fitted to the individual to ensure a proper seal

How do I fit ear plugs?

- Check to see how the plugs should be worn, some may require moulding with your fingers, others are caps that sit over the opening of the ear canal
- When inserting the ear plug pull your ear up and back with the opposite hand to straighten the canal
- Wait a few seconds to allow the ear plug to expand in the ear canal

Eye Protection

What kind of eye protection is available?

There are basically four types of eye protection:

- Safety glasses – provide protection from low and medium velocity flying particles from in front of the wearer and may be tinted to provide protection when working in sunlight. They may be fitted with side shields to provide extra protection.
- Safety goggles – provide the same protection as safety glasses but with added side protection. They may also be designed to protect from splashes or dust and may be worn over prescription glasses.
- Face shield – Provide protection to the eyes, forehead, and face from low, medium and high velocity flying particles and splashes. Also available as an eye shield which protects only the eyes and forehead.
- Welding helmet – provide protection from non-ionising radiation from arc welding. The degree of protection will depend on the rating of the filter

Can I wear my prescription spectacles as eye protection?

Prescription spectacles generally provide inadequate protection against flying particles. There are a few alternatives for individuals who require prescription spectacles:

- Safety goggles or a face shield may be able to be worn over prescription spectacles
- Safety glasses may be able to be fitted with prescription lenses; these glasses will only provide protection against low velocity flying particles
- Contact lenses may be able to be worn instead of spectacles, allowing the appropriate eye protection to be worn. Contact lenses do not provide eye protection from flying particles.

How do I stop my safety goggles from fogging?

There are may anti-fogging products available on the market, and it is also possible to purchase anti-fog type goggles.

Respiratory Protection

What kind of respiratory protection is available?

There are basically two different ways that respirators provide protection:

1. Air purifying - purifies the air that is breathed by drawing it through a filter
2. Supplied air - supplies air that is respirable via an air line, air hose, or by carrying equipment that provides respirable air.

How do I know which one I need?

The situation in which you are working, and what kind of protection you require, will govern which kind of respirator you need. When working in situations where dust particles or vapour/gas is a problem an air purified respirator will mostly suffice, although there are some gases and vapours that are not able to be filtered out. When purchasing a respirator for this purpose, ensure that the filter is appropriate; some will only filter dust OR gas/vapours, whilst others will provide protection against both. An air purifying respirator with a gas and particulate filter will be sufficient for most workshop situations

Are there different types of air purifying respirators?

Yes, there are disposable respirators such as a dust mask, and there are reusable respirators with one or more disposable filters.

How do I know when to change the filter on my respirator?

The filter on your respirator needs replacing when it becomes difficult to breathe through or when you are able to smell through the filter. A good test is to open some acetone (nail polish remover) and hold it close to your face; if you can smell its strong scent, then the filter(s) needs replacing. The filter may also have an expiry date.

Hand Protection

What kinds of gloves might I need to work safely in the workshop?

The following table gives some general guidelines as to the kind of protection offered by different materials.

Type of work being done	Suitable glove materials
Handling hot objects	Leather / pigskin, aramid blends
Welding	Leather / pigskin, aramid blends
Steel fabrication, manufacturing	Leather / pigskin, neoprene, nitrile
Acid / solvent handling, degreasing	PVC, PVA, nitrile, neoprene, rubber, vinyl

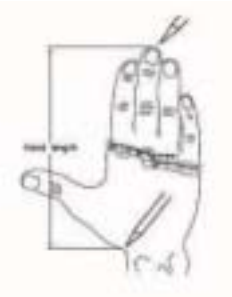
How do I fit gloves correctly?

Glove manufacturers should indicate two measurements for proper glove fit, hand circumference and hand length. To obtain these measurements follow the instructions below:

Hand circumference – this measurement is taken around the right hand knuckles at the base of the fingers (see figure below)

Hand length – this measurement is taken from the notch where the thumb joins the wrist to the tip of the middle finger (see figure below)

Source: AS/NZS 2161.1 (2000). Occupational Protective Gloves Part 1: Selection, use and maintenance



Foot Protection

What kind of footwear should people be wearing when working in the workshop?

An assessment of the kinds of hazards that exist in the workshop should be completed to identify what kinds of injuries the foot may sustain. This will assist in deciding which footwear is appropriate. The following table has been adapted from AS/NZS 2210.1:1994 *Occupational protective footwear Part 1: Guide to selection, care and use* and indicates the type of construction materials that are appropriate for hazards that may be encountered in the workshop.

Type of hazard	Sole			Upper	
	Tread	Tread	Midsole	Type	Preferred Material
Falling or rolling objects	-	-	-	Ankle boot	Leather, PVC blends, polyurethane
Climbing ladders	Vulcanised nitrile rubber, polyurethane, PVC blends	Deep tread with heel	Arch support	Ankle boot	-
Sharp materials underfoot	Vulcanised nitrile rubber, polyurethane, PVC blends	-	Penetration resistant midsole	-	-
Wet concrete	Vulcanised nitrile rubber, polyurethane, PVC blends				
Oily greasy concrete	Vulcanised nitrile rubber, PVC blends				
Chemical degradation	Depends on the type of chemical - woven fabrics are not recommended for uppers where chemicals are present				

Generally, an ankle boot with a leather upper, non slip PVC sole and toe cap is adequate for work in the farm workshop

Other Protective Clothing

In addition to the specific equipment discussed here, people who work in farm workshops should be instructed to:

- wear close fitting work clothes or overalls made out of natural fibres. If further protection is required then a fire retardant apron may be worn when doing work that generates sparks. Clothing should be in good condition with no loose threads
- ensure that long hair is tied back
- remove any dangling jewellery that may become entangled. Finger rings and earrings may also cause injury if caught on protruding objects.

References:

AS/NZS 1269.3:1998 Occupational noise management Part 3: Hearing protector program.
AS/NZS 1336:1997 Recommended practices for occupational eye protection.
AS/NZS 1715:1994 Selection use and maintenance of respiratory protective devices.
AS/NZS 2161.0:2000 Occupational protective gloves Part 1: Selection, use and maintenance
AS/NZS 2210.1:1994 Occupational protective footwear Part 1: Guide to selection, care and use

Signs for the Farm Workshop:
Frequently asked Questions

Do I need to put up signs in the workshop?

To fulfil their legal obligation under the OHS Regulations employers must ensure that any person who may be exposed to a risk to health and safety at their workplace is informed of the risk, and that places where personal protective equipment (PPE) is required are clearly identified.

Can I make my own signs?

Signs that are used in the workshop in relation to safety should comply with Australian Standard 1319:1994 Safety signs for the occupational environment. These symbols and sign layouts have been specifically tested to ensure that they are easily understood by all people, including those with language or literacy barriers.

What specific signs do I need in my workshop?

You will need to have a look at your workshop specifically, the kind of work that is undertaken, as well as the number of people who work there at any one time. This will help you decide which kind of signs you need and where they should be placed. Care should be taken not to place too many signs close together – people may become confused or the message may not be absorbed due to the large amount of information. The table below from AS 1319 outlines some specific signs that may be appropriate for your workshop:

Prohibititon signs

(Indicate that an action or activity is not permitted)

Sign No.		Meaning
401		Smoking prohibited
402		Fire, naked flame and smoking prohibited
403		No pedestrian access
404		Water not suitable for drinking

Mandatory Signs		
(Indicate that an instruction must be carried out)		
Sign No.		**Meaning**
421		Eye protection must be worn
422		Full face mask respiratory protection must be worn
423		Half face mask respiratory protection must be worn
424		Head protection must be worn
425		Hearing protection must be worn
426		Hand protection must be worn
427		Foot protection must be worn
428		Protective body clothing must be worn
429		Face protection must be worn
430		Long hair must be contained or covered

Hazard Signs		
(Indicate hazards either life threatening or non life threatening)		
Sign No.		**Meaning**
441		Fire risk
442		Explosion risk
444		Toxic hazard
445		Corrosion risk
447		Electric shock risk

Emergency Information Signs		
(Indicate the location of, or directions to, emergency related facilities)		
Sign No.		**Meaning**
471		First Aid
472		Emergency (safety) eye wash
473		Emergency (safety) shower

You may decide to combine a number of these signs into one sign and/or add a written warning to the sign. An example of this might be:

Where should I put signs in the workshop?

Signs should be located where they are clearly visible and attract the attention of all people in the workshop. Prohibition, mandatory or hazard signs should be situated to give enough time after viewing the sign to heed the warning. They should be mounted in the line of sight in the vertical plane – approximately 1500mm from the ground.

References:

AS 1319:1994 *Safety signs for the occupational environment.*

4: Further information and useful contacts

State / Territory Health and Safety Authorities

New South Wales
WorkCover NSW
Ph: 13 10 50
www.workcover.nsw.gov.au

Australian Capital Territory
ACT WorkCover
Ph: (02) 6205 0200
www.workcover.act.gov.au

Queensland
Department of Industrial Relations – Workplace Health and Safety
Ph: 1300 369 915
www.whs.qld.gov.au

Victoria
Victorian WorkCover Authority
Ph: 1800 136 089
www.workcover.vic.gov.au

Western Australia
WorkSafe – Consumer and Employment Protection
Ph: (08) 9327 8800
www.safetyline.wa.gov.au

Northern Territory
Northern Territory WorkSafe
Ph: 1800 019 115
www.nt.gov.au/deet/worksafe

South Australia
WorkCover Corporation
Ph: 13 18 55
www.workcover.com

Tasmania
WorkCover Tasmania
Ph: 1300 366 322
www.workcover.tas.gov.au

National Contacts:

National Occupational Health and Safety Commission (NOHSC)
Ph: (02) 6279 1000
www.nohsc.gov.au

Standards Australia
Ph: 1300 65 46 46
www.standards.com.au

Farmsafe Australia
Ph: 02 6752 8218
www.farmsafe.org.au

Australian Centre for Agricultural Health and Safety
Ph: 02 6752 8210
www.acahs.med.usyd.edu.au

Health and Safety in the Farm workshop:a checklist

The checklists following should be used to identify hazards, and develop action plans to control the risk associated with those hazards, on a regular basis ie. at least annually, but more frequently if changes to the workshop, or the work being done in the workshop, changes.

These checklists may be copied so they can be used more than once, and any additional hazards that are identified, that are not already listed should be added so that the checklist is continually growing and becoming more relevant to each specific workshop

Owner / Manager: _____ Property Name & Address:_____

Phone: _____ Fax: _____ Completed by: _____Date Completed_____

C. Workshops	Yes No	Risk Level	Action Panel	Cost $	Target Date	Action Date	Person Responsible	Notes
Infrastructure								
Can all doors be opened from the inside and outside to allow quick exit in an emergency?								
Is there adequate workspace in the workshop?								
Are floors free of slip/ trip hazards including oil, tools, extension cords and rubbish?								
Does the workshop floor drain properly?								
Are work benches at an appropriate height for working and lifting?								
Is there good ventilation in the workshop?								
Is there good lighting in the workshop?								
Are lights covered where there is risk of bulbs being broken?								
Are jacks, cranes and hoists present to reduce lifting where possible?								
Are hoists routinely serviced and chains checked for wear?								

C. Workshops	Yes No	Risk Level	Action Panel	Cost $	Target Date	Action Date	Person Responsible	Notes
Infrastructure (continued)								
Is the minimum load bearing capacity clearly marked on jacks, cranes, hoists and gantries?								
Is shelving strong enough to hold loads?								
Is there a safety cage for the inflation of split- rimmed tyres?								
Are stands used to support raised vehicles, machinery and equipment?								
Are there safety signs in place when mechanical pit are in use?								
Is the mechanical pit covered when not in use and are covers in good condition?								
Are there separate rubbish bins for combustible and non-combustible material?								
Are gutters and areas around buildings clear of flammable debris and rubbish?								
Are ladders and other means of climbing onto roofs and tall structures stored away and inaccessible to children and other unauthorised persons?								

C. Workshops	Yes No	Risk Level	Action Panel	Cost $	Target Date	Action Date	Person Responsible	Notes
Infrastructure (continued)								
Do ladders comply with the Australian Standard for fixed or portable ladders?								
Is a fall arrest harness available when working on buildings and roofs?								
Are buildings and other structures with mezzanine type storage areas fitted with handrails to prevent falls?								
Electrical Tools and Power Supply								
Is all electrical work carried out by a licensed electrician?								
Are underground electrical cables clearly marked?								
Are overhead powerlines clearly marked and located clear of moving machinery?								
Is all electrical wire in conduit that is at risk of struck by a person or cut?								
Are all power tools double insulated?								
Are only heavy duty extension cords used?								

C. Workshops	Yes No	Risk Level	Action Panel	Cost $	Target Date	Action Date	Person Responsible	Notes
Electrical Tools and Power Supply (continued)								
Are all power tools and extension cords regularly inspected, tested and tagged?								
Is a Residual Current Device (RCD) fitted to the electrical circuit board?								
Is the RCD routinely tested? If no RCD is fitted to the electrical circuit board, is a portable RCD used?								
Is the portable RCD routinely tested?								
Are portable power tools unplugged and stored away when not in use?								
Is there any water problem posing an electrical hazard?								
Is the electric power board protected from the weather and water?								
Are electrical switches and power points undamaged?								
Are outside power points weatherproof?								
Additional Hazards								

C. Workshops	Yes No	Risk Level	Action Panel	Cost $	Target Date	Action Date	Person Responsible	Notes
Additional Hazards (continued)								
Equipment								
Are welder electrode leads and connections in good condition?								
Is ventilation adequate when welding?								
Are protective screens used to protect bystanders when welding?								
Are oxyacetylene cylinders used and stored secured in an upright position?								
Are flash arrestors fitted to all oxyacetylene equipment?								
Are pressure gauges on oxyacetylene cylinders in working order and well maintained?								
Are all oxyacetylene hoses and fittings in good condition and free of leaks?								
Are bench grinders located away from traffic areas?								

C. Workshops	Yes No	Risk Level	Action Panel	Cost $	Target Date	Action Date	Person Responsible	Notes
Equipment (continued)								
Are bench grinder wheels regularly dressed and tool rests correctly adjusted?								
Are bench grinder wheels guarded and eye shields in place?								
Are all power tool guards in place and well maintained?								
Is the air compressor properly guarded?								
Is the air compressor located away from work areas to reduce noise?								
Are batteries charged in a well ventilated area away from sparks and flames?								
Are pressure gauges available to correctly inflate tyres?								
Is Personal Protective Equipment (PPE) for all work including eye goggles, welding helmet, hearing protection and gloves?								
Is combustible material stored away from sparks and flames?								
Are exhaust systems on equipment in good order to reduce the level of noise/fume emissions and the risk of fire?								

C. Workshops	Yes No	Risk Level	Action Panel	Cost $	Target Date	Action Date	Person Responsible	Notes
Additional Hazards								
Emergency Preparedness								
Are appropriate fire extinguishers available in the workshop?								
Are fire extinguishers easily accessible and sign posted?								
Is a first aid kit readily available in the workshop?								
In an emergency, can emergency services be contacted?								
Additional Hazards								

C. Workshops	Yes No	Risk Level	Action Panel	Cost $	Target Date	Action Date	Person Responsible	Notes
Policy and Practice								
Have all workers been inducted for safe work in the workshop on this farm?								
Have all workers been trained/ instructed in the correct use of all tools and equipment in the workshop?								
Are floors kept clean and the workshop tidy?								
Is the condition of power tools regularly checked?								
Are gauges on oxyacetylene regulators well maintained and always turned off after use?								
Are tools, paints and other chemical products stored away safely after use?								
Are firearms and ammunition stored separately in appropriate lockable stores?								
Are mechanical devices used when moving heavy items such as 200 litre drums and otherheavy equipment?								
Is noisy equipment (where practicable) placed towards the front of the workshop to help dissipate sound?								

C. Workshops	Yes No	Risk Level	Action Panel	Cost $	Target Date	Action Date	Person Responsible	Notes
Policy and Practice (continued)								
Is Personal Protective Equipment (PPE) provided where required?								
Is there appropriate signage to warn persons entering the workshop of hazards?								
Do you encourage a NO SMOKING policy in the workshop, especially around flammable or combustible materials?								
Do you provide amenities for workers?								
Additional Hazards								

Health and Safety in the Farm Workshop: resource evaluation

We are very interested in your feedback regarding this resource so that we can continually improve it. Please complete the questions below and return to:

Fax: 02 6752 6639
Post: Australian Centre for Agricultural Health and Safety
PO Box 256
Moree NSW 2400

Have you used this Guide to help you with health and safety in the farm workshop?

❑ Yes ❑ No

If you answered yes above, how useful was the information in the Guide?

❑ Very useful ❑ Useful ❑ Not very useful ❑ Not at all useful

What was it about the guide that you liked?

.....
.....

What was it about the guide that you disliked?

.....
.....

What changes have you made, or do you plan to make, as a result of using this guide?

.....
.....

Please complete your details below if you would like to register with Farmsafe Australia to receive further information regarding health and safety issues on the farm.

Name: .....
Address: .....
Telephone: ..... Fax: .....
Email:.....

What type of enterprise do you have:

❑ Beef cattle	❑ Fruit	❑ Pigs	❑ Sheep and wool	Other:
❑ Cotton	❑ Grains	❑ Poultry	❑ Sugar cane	.....
❑ Dairy cattle	❑ Grapes	❑ Rice	❑ Vegetables	.....