4.1 Animals - Injuries to people

Introduction
The transport, receipt and slaughter of animals provides a particularly unique workplace that can be exceedingly hazardous. Workers who work in these areas need to be experienced in handling animals.

AMIC has published National Animal Welfare Standards at Livestock Processing Establishments Producing Meat for Human Consumption. These standards outline not only a number of practical issues related to the design and construction of facilities for handling or holding livestock, but also the receiving, handling and holding of livestock prior to slaughter, stunning of livestock prior to slaughter and work animals used throughout the process.

These operational standards represent the Australian meat industry’s view on minimum standards for handling and husbandry practices in both the domestic and export market, and the facilities and equipment necessary to safeguard the welfare of slaughter animals.

Stock delivery

Good animal husbandry practices that reduce the animals' stress lead to not only a safer place of work for workers working in these areas, but a better quality of product. A growing body of knowledge available on animal welfare issues has established that the more stressed, hungry, thirsty or tired an animal is prior to slaughter, the more glycogen is lost which converts to lactic acid in the muscle when slaughtered and raises the pH specification, in turn creating poor quality ‘dark meat’.

Transport and receipt of animals
(Also see 'Roadways, holding paddocks, yards, lairages and walkways' hazard inspection checklist in Part 3.6.1, for a comprehensive list of factors to be checked when ensuring a safe place of work is provided for workers in these work areas).

There should be clearly marked access and egress to the site that is compatible with the transport vehicles used for livestock delivery, and for visitors and workers. Experienced livestock handlers should be used to unload, move and draft livestock quietly and
efficiently off transport vehicles to minimise the risk of injury or stress. Workers who handle livestock should be regularly monitored to ensure they remain competent at this task. Workers should be trained and aware of the following:

- correct lifting techniques for lifting and feeding out bales of hay
- animal behaviour (eg, know characteristics of breed of animal, how animal behaves when cornered or with young)
- the situations when animals need to be treated as an emergency slaughter case
- (uncontrollable or lame animals or animals with extremely wide horns), or humanely destroyed, and be licensed to use firearms if needed
- not to use cattle prods indiscriminately and never to use them on the more sensitive parts of the animal
- use paddles, canvas or leather flappers, soft polythene pipes and rattles to only encourage movement of stock, not to startle animals
- certified to use forklifts/mechanical aids to remove dead animals
- correct procedure for handling gates which should be easily operated and routinely maintained
- correct handling of dogs (if used) which need to be kept under control and muzzled.

Dog should be muzzled

While lighting should be adequate if animals are delivered at night, it should be diffuse to eliminate shadows and bright spots that may cause animals to baulk. Yards should have multiple holding pens, no 90 degree turns or corners on race and escape areas for workers. Yards and lairages should be well designed and appropriate to the stock processed eg, a higher fence barrier is needed for cattle than for sheep, a completely enclosed dark pen is needed for deer. The floor surfaces of pens, races and yards should be self draining and easily cleaned to prevent the build-up of blood, body fluids and water, and yards and lairages should be regularly hosed down to control and reduce dust, excreta and urine.

Cattle prods should be checked and tagged, regulated to the lowest possible voltage and should not exceed 32 Volts (RMS).
Slaughter
(Also, see ‘Slaughter Floor’ hazard inspection checklist in Part 3.6.1, for a comprehensive list of factors to be checked when ensuring a safe place of work is provided for workers in the slaughter area).

Access to the knocking box, restraining crush and adjacent area should be restricted to appropriately trained and protected workers. Only one animal should pass through the knocking box to the landing area at a time and a cattle head capture unit should be used to restrain the animal in the knocking box. Knocking boxes should be designed to minimise bending and twisting while stunning, and the work area directly below the knocking boxes must be clearly visible to the worker operating the release of the knocking box to release the stunned animal. It is advisable to have an audible or visible signal in place to alert workers that a stunned animal is being released from the knocking box or restraining crush. Operators who stun animals using electricity should wear an insulated glove, and the apron of the conveyor presenting animals for electrical stunning should be insulated to avoid electrocution.

There should be secure storage for stunning devices and all electrical equipment should be checked and tagged, including stunners, knocking guns and chain hoists. A backup, readily accessible stunning device should be available in the event of failure of the principle stunner.

There should be a safe escape route available for workers in sticking pens and suitable backup bollards or barriers should be in place to prevent inadequately stunned animals escaping onto the slaughter floor. A cradle or a bench should be used to minimise bending when the stunned animal is presented for sticking and there should be a safe system of work in place to protect workers from knife cuts and run-through injuries when reflex kicking occurs (particularly with halal kill) while rodding animals. Workers should be trained in the skills of maintaining a smooth rodding motion to avoid muscular fatigue and consideration should be given to regular rotation onto other tasks to relieve the burden on the one arm carrying out the rodding activity. Wherever possible rodding should be carried out on a flat surface rather than with a hanging carcase to reduce lower back strain. The use of weasand plugs now also acts as an extra control measure for reducing the work in rodding. Workers need to ensure the weasand is not full of regurgitated material that needs to be forced back up into the stomach.

Chains used to hoist animals must be regularly checked and tested for twisted or bent links, stretched links, visible cracks or pitting, nicks or gauges or distorted or damaged attachments (shackles etc). Hooks must have no visible distortion, cracks, nicks, gouges or pitting and workers should be aware of their safe load limits. Hooks should run freely, not be flat, and bearings not worn. There should be a safe system of work for regularly cleaning and greasing rails and overhead chains.
Escaped animals
Where an animal escapes it should be restrained or contained in a particular area, retrieved by a humane means of conveyance if possible, and taken to the sticking area or holding pen for treatment.

If this is not possible and the animal poses a threat to the safety of workers it should be treated as an emergency slaughter case, or humanely destroyed.

This may require the use of firearms. An worker using a firearm must have the relevant endorsed shooters license, and all firearms must be stored in a lockable cabinet. The calibre of firearm used should be large enough to ensure death from a single shot. All efforts should be made to ensure that the animal is contained in an area that is cleared of other workers. Prior to discharging the firearm, the line of fire must be very carefully assessed to ensure safety in the event of a missed shot.

The animal should be shot at as close a range as possible to minimise the possibility of the bullet ricocheting and provide maximum impact. The firearm must not be fired while the animal is moving its head.

Two guns should be available, in case one falls into the enclosure with the animal.
4.2 Asbestos

Asbestos is a naturally occurring mineral fibre. Small quantities of asbestos fibres are present in the air at all times, and are being breathed by everyone. Asbestos has been used in a wide number of products due to its excellent thermal, acoustical and mechanical properties.

Until the early 1980s, asbestos was commonly used in asbestos cement sheeting (fibro), water, drainage and flue pipes, roofing, guttering and flexible building boards (eg, Villaboard, Hardiflex, etc) and so is found in many public buildings, schools and houses. Similar cement sheeting products are used today, but are free of asbestos.

The risk of asbestos to health

As inhalation is the predominant route of entry into the body, asbestos fibres pose a risk to health if airborne. The effect of asbestos on health is dependant on:

- length of duration of exposure
- the concentration of airborne asbestos fibres
- the size and form of the fibre.

People who have suffered health effects from exposure to asbestos have generally worked in either the asbestos mining or milling industry, worked in industries involved in making or installing asbestos products, or are from the immediate families of these people. In all of these situations there was exposure to high levels of airborne dust, from either the processes involved or from the clothes of the workers. These exposures occurred over a number of years and at levels many times higher than allowed by present day exposure standards.

Exposure standards

Exposure standards are set at levels which will protect workers from adverse health effects. They allow for a worker being exposed to the hazard at that level every day of their working life (approximately 45 years) without damaging their health.

The levels are determined from the results of research, animal trials and the effects of exposures in the past.

Developed by the Australian Safety and Compensation Council (was the National Occupational Health and Safety Commission), the occupational exposure standards in Australia are some of the strictest in the world. They have been adopted throughout Australia.

Particle size

The size of the asbestos particle is critical in determining whether there will be a risk to health from inhaling the fibres. Fibres that are around ten microns or less long and three microns or less wide are the
most likely to remain in the lungs. (A human hair is approximately 20 to 100 microns wide). Fibres larger than this tend to be removed by the normal clearance mechanism of the throat and lungs.

**Asbestos materials**
If asbestos fibres are in a stable matrix material such as bonded in asbestos-cement sheeting, they can not become airborne and therefore will not be a risk to health. **Provided these products are maintained in good condition, they present no risk to health.** However, precautions must be observed during any alterations, demolition or removal of these products, when there is the opportunity for fibres to become airborne. In asbestos material such as pipe lagging and sprayed-on insulation, the fibres are not bound in a matrix and are much more likely to release high concentrations of fibres into the atmosphere when damaged. These forms are generally covered with a durable exterior protection which minimises damage, and the subsequent release of fibres. Only a licensed asbestos removalist can handle these materials.

**Removal of asbestos**
The *National Code of Practice for the Safe Removal of Asbestos (2005)* has been adopted in all Australian States and sets out the practices that people working with asbestos should follow.

**Identification**
The most important aspect of dealing with asbestos is knowing that it is there. Once it is identified then the precautions described in the *National Code of Practice for the Management and Control of Asbestos in the Workplace (2005)* can be used to effectively manage any risks to health.

It is advisable that organisations keep an asbestos register. After an inspection for the presence of asbestos, the register would list where asbestos material have been found. The register should be made available to anyone who would come into contact with asbestos containing materials, especially contract maintenance personnel, to ensure they are aware of the presence of asbestos in the workplace. It is also advisable that stickers or signs are used to warn individuals of the presence of asbestos.
4.3 Bullying and workplace violence

Workplace bullying and violence is an occupational health and safety issue that can affect workplace health and well-being. Workers can become ill or stressed, resulting in them being absent from the workplace due to bullying. Bullying can result in a worker suffering:

- a stress-related illness, ranging from headaches and nausea to more serious illnesses
- resulting from a weakened immune system, thus making the worker vulnerable to serious illnesses or disease
- psychological illnesses such as depression and or anxiety, leading to panic attacks and
- in some cases to the victims contemplating or committing suicide
- an inability to sleep and chronic fatigue
- an increased risk of suffering a work-related injury
- a physical injury.

Workplace bullying does not necessarily involve the use of physical violence, such as punching, kicking, or other forms of inflicting pain. Indeed, research shows that only 10% of bullying in the workplace involves some form of physical assault.

The most common form of bullying involves verbal abuse, constant 'nit picking', threats, sarcasm, sabotaging of a worker’s work, ostracising individuals etc. Bullying and harassment can be directed from employers to workers, workers to workers, and workers to employers. However, research from Employee Ombudsman’s reports highlight that the most commonly reported forms of workplace bullying are:

- constant and unjustified criticism
- punishment for no apparent reason
- giving the worker being bullied the most unpleasant or menial tasks in comparison to others within the workplace
- humiliating a worker by using sarcasm, criticism and insults in front of clients or other workers
- denying training or promotional opportunities
- constantly checking a worker’s work more than others in similar positions
- deliberately withholding important information
- overloading a worker with work and not allowing sufficient time for that work to be undertaken, then criticising the worker for taking too long to complete the tasks required.

Legal issues

Workplace bullying is a legal issue and may be unlawful in a number of different areas. If the bullying involves some form of physical harm eg, initiation ceremonies or physical assault, it is unlawful and is covered by criminal law. Such behaviour should be immediately reported to the police. The person behind the bullying can then be prosecuted and convicted. If convicted, the bully can receive a fine or a prison sentence.
Where the bullying is connected with a worker’s race, disability, gender, sexual preference, age, marital status etc., the Equal Opportunity Legislation can be contravened. In addition, bullying that has any form of sexual component could be considered as sexual harassment. Under this legislation action can be taken against the bully and an employer who fails to take reasonable action to prevent it.

Workplace bullying is also an offence under State and Territory occupational health, safety and welfare legislation. Employers are required to provide a safe place of work for workers, and are required to control workplace hazards including hazards that affect workers psychological health and well-being. In addition, most OHS legislative requirements include an obligation to develop and implement policies related to health, safety and welfare of persons at work, including bullying and harassment within the workplace.

Workers have a responsibility not to place other workers at risk of a workplace injury or illness. A worker who bullies others while at work is guilty of an offence and can be prosecuted and fined.

**Strategies to prevent bullying**

Employers must take action on the receipt of a formal complaint. A formal complaint must be in writing, and should follow the procedure developed within the organisation and should outline a consistent pattern of behaviour from the offender. Workers making a formal complaint should keep a copy of the document.

Workers should be informed to follow the following procedure, in the event of being bullied:

- attempt to identify who is doing the bullying
- keep a diary and make notes about each incident eg, documenting when and where the bullying occurred, who was involved, how it made them feel, potential witnesses etc. This enables a pattern of events to be established and is particularly important if a claim is made for compensation
- discuss the problem with their supervisor or elected health and safety representative
- not retaliate
- not resign or seek a transfer
- make a formal complaint.

Refer also to Section 4.15 Stress.

4.4 Confined spaces

Introduction
Confined spaces in the meat industry are significant hazards that are not always recognised for their true danger. A number of fatalities have occurred in the meat industry over the past decade in confined spaces. While confined space accidents are avoidable, the meat industry needs to ensure that the dangers of confined spaces are not underestimated. All efforts should be made to train and educate personnel in the correct safe work procedures and to make them aware of the hazards they may face while working with confined spaces. In addition, meat industry personnel should be trained to resist the urge to rescue, as would-be rescuers generally account for one-third of workers who have died in confined space incidents, and a single fatality can easily turn into a multiple fatality when workmates try to rescue a collapsed worker from a confined space.

Legal requirements

The following statement was taken from the Australian Safety Compensation Council (ASCC) website re confined spaces’ Australian Standard at the time of printing


Australian Standards revised their Standard in 2001 and are currently revising it again. The revised standard was not jointly declared by NOHSC and therefore the AS2865-1995 remains the declared National Standard of NOHSC. The ASCC will be considering the future of this declared standard.

You should check with your local OHS Authority for current responsibilities and guidance relating to confined spaces."

Hence, unless the state authority has specifically stated differently, the accepted standard is:


Definitions vary in different State and Territory legislation, but the joint Australian Standard/Worksafe Australia National Standard AS 2865 Safe working in a confined space defines a confined space as an enclosed or partially enclosed space that is at atmospheric pressure during occupancy; is not intended or designed primarily as a place of work; and may have restricted means for entry and exit. It may also:
- have an atmosphere which contains potentially harmful levels of contaminant;
- not have a safe oxygen level (ie, outside of the parameters of between 19.5% and 23.5%); or
cause engulfment (by drowning or by explosive gases).

Most State and Territory legislative requirements include requirements that designers, manufacturers or suppliers of confined spaces must ensure that, so far as is reasonably practicable, the design eliminates the need for a worker to enter a confined space, and if entry is required, that the confined space is provided with a safe means of entry and exit. It is recommended that a policy be developed that includes a register to be kept of all confined spaces, and outlines the company procedures for managing confined spaces.

Employers must identify any confined space associated with performing work and any reasonably foreseeable hazards associated with working in that confined space. All confined spaces must be appropriately identified with signage, and an employer must also ensure, before any work that involves entry into a confined space is commenced for the first time, that a written risk assessment is undertaken by a competent person (see Part 4.4.1 for a risk assessment proforma adapted from AS 2865). An employer must also ensure that the risk assessment is retained for at least five years.

Before a worker enters a confined space, an employer must ensure, so far as is reasonably practicable, that the confined space contains a safe oxygen level, the atmospheric contaminants are reduced below the relevant exposure levels, and that flammable contaminant are below 5% of their lower explosive limit (LEL). Some State OHS Regulations state that AS 2865: Safe working in a confined space is an approved code of practice under their OHS&W Act. An approved code practice is designed to provide practical guidance on

- how a particular standard of health and safety can be achieved.
- approved codes of practice should be followed unless there is another solution that
- achieves the same or a better standard of health and safety.

Section 14 of AS 2865: Safe working in a confined space outlines the education and training requirements that employers must provide for all workers required to work within or on a confined space. This includes not only initial training but also retraining at appropriate intervals, and persons knowledgeable in all relevant aspects of confined space entry, hazard recognition, use of safety equipment and methods of rescue must conduct that training. Training should be evaluated and reviewed in consultation with relevant workers or their representatives to ensure that the training was clearly understood, as well as to identify when further training is required.

AS 2865: Safe working in a confined space can be downloaded from the ASCC at http://www.ascc.gov.au/

Confined spaces hazards
Two main types of hazards exist within confined spaces: atmospheric and physical hazards. Atmospheric hazards are usually defined within the three categories of oxygen deficiency, toxic gas or combustible gas. The only way these atmospheric hazards can be accurately detected and evaluated is with a gas detection device. It is important to recognise that the human senses of sight, smell or taste cannot detect the presence of
some hazardous gases eg, hydrogen sulphide in blood tanks is undetectable at 150 parts per million (ppm). Further hazards associated with working in confined spaces that are specific to the meat industry include biological hazards eg, bacterium such as Blood tanks are confined spaces Legionella, E. coli, viruses such as hepatitis A, B or C; and zoonotic organisms (dealt with elsewhere in this reference guide).

Oxygen deficiency can be caused when another gas displaces oxygen eg, carbon dioxide from dry ice stored in a chiller or freezer, methane from rotting organic matter in a sewer, halocarbon from leaking refrigerant in a chiller, or nitrogen from liquid nitrogen used as a coolant in a container.

Combustible gases can cause fire or explosion, either by static electricity, friction, electrical equipment or chemical reactions. Combustible gases found in the meat industry include natural gas and methane.

Toxic gases in the meat industry include:
- hydrogen sulphide, which can build up in blood tanks, stickwater storage or holding tanks from rendering plants (exposure to hydrogen sulphide at 10 ppm over a prolonged period may be harmful, and above 1000 ppm is fatal)
- carbon monoxide from the exhaust of petrol or gas operated forklifts
- ammonia, used in most meat plants for refrigeration; leakages can occur in freezers, cold stores, chillers or engine rooms
- sulphur dioxide released from preserved coagulum or blood products
- chlorine gas used in water treatment at some plants.

However, while attention is justifiably drawn to the atmospheric hazards of confined spaces, most accidents that do occur are physical in nature ie, from slips, trips or falls. The types of hazards which can exist in confined spaces that may lead to physical injuries include:
- restricted or tight access
- inadequate ladders
- deep pits
- poor lighting
- electricity in wet areas
- lack of machine guarding or handrails
- lack of safety equipment, tools or lifting equipment and so on.

In the meat industry, examples of confined spaces can include:
- storage tanks, rendering vats, boilers, pressure vessels and other tank-like compartments usually having only one opening for access and egress
- open top spaces of more than 1.5 m in depth (a shallower pit is more affiliated to a trench, see relevant local legislation for trenches), such as blood pits or degreasers, which are not subject to good natural ventilation
- pipes, sewers, tunnels, shafts and ducts, covered augurs and similar structures
- sometimes cold rooms, freezers, smoke rooms and ovens.
Due to restricted ventilation, most confined spaces are subject to moisture, condensation and slime growth, which magnify the dangers of slips and falls. Severe corrosion can lead to ladders, gratings and handrails becoming unsafe. The dangers of slips and falls can be minimised by cleaning the confined space before work is undertaken to eliminate the risk. Where that is not possible, use suitable safety equipment ie,

- safety boots with non-slip soles and a heel
- an approved safety harness with lifeline and fall arrest system attached.

When working in confined spaces, special care must be taken when using equipment that is required for given tasks. Tools should be lowered on ropes, in metal buckets attached to ropes or in a secure canvas bag, and workers should use correct manual handling procedures and not attempt to lift heavy objects.

Lack of personnel is often a significant problem but to comply with legislation, entry into confined spaces should never be permitted unless there are personnel stationed outside the confined space to assist those personnel inside in the case of an emergency.

Safety protective equipment should be worn to protect the workers from protrusions in areas where there is restricted movement. Gloves and waterproof coveralls and good hygiene habits must be adopted to protect against infection.

In most cases, pre-planning and following a structured safe/standard work procedure will prevent physical injury.

**Harnesses and lifelines**

The use of systems to prevent falls or reduce the seriousness of a fall is often understated and overlooked when working in or on a confined space. In addition, the array of fall restraint, safety lines and harnesses available is extensive and sometimes confusing. Some key principles are:

- it is better to use a "fall restraint" system as this can prevent a fall and hence there is no need for a fall recovery protocol
- if only fall arrest systems are used, they must include a recovery method that is designed and documented and workers trained on the recovery method.
Harnesses, breathing apparatus and lifelines should be stored appropriately
AS/NZS 1891.1:2007 : Industrial fall-arrest systems and devices - Harnesses and ancillary equipment

Harnesses
The most suitable harness for confined space entry work is a full parachute-type harness. This type of harness consists of a full-body harness with shoulder straps and belt strap with thigh straps. The lifting point is by a spreader bar above the head. The harness must comply with AS 1891.1: 2007 Industrial fall-arrest systems and devices – Harnesses and ancillary equipment. In addition AS/NZS 1891.4: 2000 Industrial Fall-Arrest Systems and Devices – selection, use and maintenance specifies that harnesses used in confined spaces must be so designed that the wearer remains in an upright position while being lifted by a rescue line.

It is essential that harnesses fit correctly. While most types are freely adjustable by means of adjusting buckles, it is recommended that harnesses be purchased to suit the size of the wearer. In special cases they should be ‘made to order’ for the specific wearer.

Personnel who need to wear harnesses should be fully instructed in the method of donning and adjusting the harness. It should be tight enough to ensure that the body will not fall through the harness but also should be comfortable and not exert too much pressure on the shoulders or pelvic area.

Lifelines
Ropes used to connect someone in a confined space to personnel outside the space must also comply with the appropriate Australian Standards. A properly manufactured lifeline would normally have at least one snap hook spliced to it which enables its attachment to the anchor point on the harness. Ropes and lines used for this purpose should never be used for any other purpose. They should be regularly inspected for wear and tear, fraying or visible damage. Fibre ropes must be handled with care. They must not be dragged over rough surfaces or flattened by foot or vehicle traffic, possibly causing a weak spot in the rope. Confined space entry crews should practise knot tying, so that where a rope needs to be tied off in a hurry a suitable knot, correctly tied, is used.

Lifelines must never be attached or anchored to a movable object such as a vehicle. There have been recorded cases where vehicles have been moved or driven away by unsuspecting persons, resulting in serious injuries to the personnel attached to the lifeline.

Tripod and mechanical lifting devices
It can be a difficult operation to remove someone quickly in a vertical position from a confined space. One or two persons pulling on a lifeline would find it very difficult, if not impossible, to lift or pull an inert body from a confined space. The best means of controlling the lifting or lowering of a worker into a confined space is a tripod and lifting device. The advantages of these types of devices include:

• portability and ease of setting up in most situations
• one worker can winch or rope another worker up without assistance from the wearer of the harness
• a fall arrest facility control can be provided, including the lowering of personnel in the knowledge that there is no danger of them slipping from a ladder or step irons.

It is important that personnel entering or working in a confined space realise that lifting devices and ropes are designed and intended to lift personnel, not materials or equipment. It is vastly preferable to spend the few minutes it takes to set up a tripod and mechanical lifting device each time an entry is performed, than to waste vital minutes setting them up to rescue someone who has collapsed in the space while all the equipment remains packed or folded up in a storage area or vehicle.

**Ventilation**

Together with gas detection, ventilation provides the key to safety in confined spaces ie, if adequate ventilation can be carried out and maintained, and the atmosphere can be tested and maintained as safe, confined space entry should not present problems from an atmospheric point of view.

Ventilation of confined spaces depends on the type of space, the purpose of ventilation and the frequency of entry ie, some structures incorporate mechanical ventilation which is either continuous (to help stop corrosion) or designed to activate when the confined space is entered.

It is essential that prior to any entry into a confined space, some form of ventilation is carried out in sufficient time to ensure that the space is safe to enter. Also, any ventilation should be maintained for the duration of time that the confined space is inhabited.

Ventilation of confined spaces is required to maintain adequate levels of oxygen and to displace concentrations of hazardous gas.

When ventilating a confined space, it is preferable to introduce fresh air at the bottom of the space and discharge it near the top. All areas of the space should have a positive flow of air throughout the time of entry.

**Natural ventilation**

It is important to note that natural ventilation may not be considered sufficient to maintain hazard free conditions during occupancy of a confined space. In some instances, open-air vents are either not provided or are blocked off to prevent odours or illegal access. Depending on the type of work that is carried out, natural ventilation may not be sufficient to dilute the toxins to a safe level or displace hazardous atmospheres.

**Mechanical ventilation via a ventilation fan**

These units are generally driven by a petrol engine or generators and have flexible ducting attached to direct the airflow into the confined space. Where air is blown into a confined
space, it must be blown through this ducting, the opening of which must be as remote as possible from the confined space opening. Ventilation should continue until a positive air current comes out of the confined space that is to be inhabited.

The mechanical air blown should always be positioned away from, and at least downwind from, the confined space opening to ensure that any atmospheric contaminant is not recirculated back into the confined space.

Oxygen should never be used to ventilate a confined space. Oxygen enrichment enhances potential explosions and fire and is also hazardous. An oxygen rich environment can also result in hyperventilation.

**Safe work procedure/risk assessment**

It is essential that time be set aside to discuss, outline, document and implement step-by-step standard safe work procedures for entry into each confined space. Each entry into a confined space should be treated as a separate task and the risk assessment should be completed for each task. The objective of the assessment is to determine not only the step-by-step job procedure, but also a description of the work to be undertaken, various ways in which the work could be undertaken, and the hazards involved. (See Part 4.4.1, *Confined space risk assessment sheet*, adapted from AS 2865)

The step-by-step work procedure must include the following:

- is it necessary to enter the confined space?
- the size and make up of the work group conducting the confined space entry
- equipment required
- checks to be performed
- procedures for work to be carried out
- correct packing and stowing of equipment after use.

**Is it necessary to enter?**

This may appear to be an unnecessary question to ask, however some confined spaces may not require anyone to enter the space. Obviously if the task/inspection can be performed without requiring anyone to enter, then for safety reasons, entry should not occur. An example relevant to the meat industry is when cleaning a blood pit, where rather than entering the pit, the cleaning could be done by a high-pressure hose and cleaning solvents are not used, or if they are, they are not applied by a worker using a brush.

**Work group**

The size of the work group for a confined space entry will depend on the nature of the work to be performed. It will be particularly dependent on the number of personnel required to enter the confined space at any one time. It is essential that contact be maintained continuously with the worker in the confined space and that the safety line or mechanical lifting device be manned at all times while the worker is in the confined space.
Where it is necessary for more than one worker to enter the confined space, it is necessary to have an additional worker outside the confined space, such that each worker inside can be rescued in the event of an emergency. One member of the work group should be given the responsibility of coordinating the actions of the group and insuring that all necessary checks and precautions are taken. AS 2865: Safe working in a confined space requires that no entry to a confined space takes place until written approval is gained.

This approval is to take the form of a formal entry permit (sample proforma provided in Part 4.4.2, Confined Space Entry Permit adapted from AS 2865) issued by an 'authorised person'. An authorised person is a competent person authorised in writing by the employer to undertake specific tasks eg, place locks on isolating equipment, test the atmosphere or supervise the safe execution of the work in the confined space. The requirements for this approval are outlined in the Australian Standard together with the sample permit form, which must be completed before any entry takes place.

**Checks to be performed**

Several checks should be performed before any entry takes place. History confirms that confined space accidents have often occurred when no one took responsibility for making any checks before the entry took place. It is important to have a routine and formal checking procedure before any entry. This develops good safety habits, and if performed correctly, will also ensure that no problems will be encountered unexpectedly. The types of checks that should be made are as follows:

- **confined space** - has ventilation being commenced? Is it satisfactory? Is there any isolation required? (ie, pipelines to be blanked off, pumps to be locked out) Has gas detection being performed? Is it continuing? What is the method of entry? By step irons (condition?), ladder (is a portable ladder needed?)? Are necessary signs, barricades correctly set up at site?

- **worker selection** - aptitude and fitness? Trained? Use of equipment/emergency procedures/trained in cardio pulmonary resuscitation (CPR)/communication etc

- **equipment** - is all required equipment available? Emergency equipment on-site and crew briefed on requirements? Equipment checked for serviceability, air capacity, wear, obvious faults? Is equipment being used correctly? Have all connections, adjustments, knots been checked?

- **type of work to be performed** - any special requirements to be taken into consideration for cleaning, welding, spray painting/degreasing agents etc? Protective measures taken?

- **entry** - continually monitor atmosphere, ventilation, worker in confined space. Is standard/safe work procedure still appropriate? Are there any changing conditions, need for suspension of work?
• **after exit** - confirm all persons/equipment accounted for, pack/stow equipment correctly after properly cleaning, mark equipment for servicing if needed ie, gas detector, breathing apparatus etc, secure all openings before isolation mechanisms removed, ensure necessary hygiene practices are observed, review operation.

The adoption of a standard operating/safe work procedure not only leads to good work habits, but also will ensure the confined space entries will occur with no unknowns. Any danger, no matter how remote, should be taken into consideration. It is far better to perform confined space entry tasks with overdone safety procedures than to effect an urgent rescue operation when something goes wrong.

**Rescue procedures**

Provided a fully-trained confined space entry team takes the proper safety precautions, the need for any emergency rescue should be reasonably remote. However due to the great difficulties associated with rescuing unconscious persons in immediate danger of their life from confined spaces, it is very important that some consideration be given to emergency procedures. It should be noted that most work crews (such as the SES or equivalent) are not trained emergency rescue personnel and are thus relatively unprepared for implementing emergency procedures where required in confined space situations.

**Dangers to rescuers**

It should be further noted that extreme caution should be taken before implementing an emergency rescue operation. Too many confined space accidents have resulted not only in the death of the worker in the space, but also to more than one rescuer who sprang to the aid of the victim. Unfortunately too many would-be rescuers have fallen victim to their good intentions to perform a rescue, oblivious to the dangers that led to the situation.

It is essential that observers outside the confined space be trained in the correct procedures that should be followed should a confined space incident occurred. At no time should the observer enter the space, or permit anyone else to enter, unless specific precautions are taken to protect the rescuers from suffering a fate similar to the worker to be rescued.

**Specific precautions**

There are many good reasons why all precautions should be taken when entering confined spaces. Where there is no immediate danger to the health of the worker in the confined space, the problems of removing that worker can be carefully determined without panic or pressure of time.

However where it is considered that a worker in the confined space has been exposed to a hazardous atmosphere, a quick rescue is necessary to save that worker’s life. This is a situation where fatalities, even multiple fatalities, can occur.
If someone is overcome by a hazardous atmosphere and rendered unconscious, it is essential that they be rescued from the space as quickly as possible. If the victim is not breathing, it is widely recognised that brain damage will occur if breathing is not resumed or artificial respiration commenced within four minutes. To revive someone in this situation would require removal from the hazardous atmosphere in the first instance. If the confined space entry crew is relying on emergency services (such as the Fire Brigade, State Emergency Service) for professional rescue support, it is important to assess how long it will take them to reach the site. Emergency services will need to be there in less than four minutes.

Where a worker enters a confined space with no safety equipment, it has been proven that it would take most individuals considerably longer than four minutes to prepare the rescuer for entry, locate the victim, put a rescue harness on the victim and winch that worker from the space.

Therefore it is essential that all safety equipment be in operation on-site when confined spaces are entered. This will ensure that, at the first sign of danger, the worker in the space can be quickly and safely removed.

Rescue of helpless victims from contaminated atmospheres
- Immediately call for other personnel to assist you. Have someone notify emergency services.
- Assist the rescuer to don the approved type of breathing apparatus.
- Attach a lifeline to the rescuers harness and secure the free end.
- Rescuer enters the structure and assists in removing the victim.
- Carry out first-aid procedures immediately and continue until emergency services arrive.
- Notify management of the plant.
- Do not disturb the site until an inspection by management has been made to determine the situation.

First aid
AS 2865: Safe working in a confined space states that all personnel required to enter a confined space should be trained in first-aid, including cardio pulmonary resuscitation (CPR). A suitable training course in CPR and general first-aid techniques should be accessed from your local St John Ambulance or Red Cross. It is recommended that workers be retrained in CPR at least annually.
4.4.1: Confined Space Risk Assessment Sheet
(Adapted from AS 2865:1995)

<table>
<thead>
<tr>
<th>CONFINED SPACE LOCATION</th>
<th>Date of assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>/ /</td>
</tr>
</tbody>
</table>

*This assessment sheet must be completed for all confined spaces.*
Note: Complete and attach extra sheets if there is insufficient space.

1) Description of the work to be undertaken:

2) Describe the various ways this work could be undertaken:
   a)
   b)
   c)

3) The potential Hazards present at this Confined Space:
   1) Atmospheric/Chemical Hazards
      (Gases, Dust, Fumes, Oxygen Deficiencies, etc.):
      Level of RISK (Estimated)
      Low = 1             High = 5
      a)
      b)
      c)
      d)
2) Physical Hazards  
(Flooding, Engulfment, Slips/Falls, Noise etc.)

<table>
<thead>
<tr>
<th>Level of RISK (Estimated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low = 1</td>
</tr>
<tr>
<td>High = 5</td>
</tr>
</tbody>
</table>

a)  

b)  

c)  

4) Selecting the Safest Method from Section 2, Describe in detail the ACTUAL method employed to complete the work (Attach extra sheet if required)  

5) EMERGENCY AND RESCUE PROCEDURES

a)  

b) Special Notes:

* Note - If the work procedure or description of work to be undertaken changes - a new Risk Assessment must be complete.

NOTE - This Assessment Sheet must be kept on File for 5 years minimum
### 4.4.1 Confined Space Entry Permit
(Adapted from AS 2865:1995)

<table>
<thead>
<tr>
<th>1. Location of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. No. of Employees</td>
</tr>
<tr>
<td>3. Name of Competent Person (please print)</td>
</tr>
<tr>
<td>4. Description of work</td>
</tr>
<tr>
<td>5. Requested by: Title:</td>
</tr>
<tr>
<td>6. Entry Date: / Entry Time (Approx.) am/pm</td>
</tr>
</tbody>
</table>

**THE WHOLE OF THE REMAINING DETAILS MUST BE AUTHORISED ON SITE BY THE COMPETENT PERSON BEFORE WORK IS TO PROCEED AND ONLY THE WORK LISTED MAY BE UNDERTAKEN!**

7. **ISOLATION OF THE CONFINED SPACE** (as per AS2865, Sections 11.8 - 11.13) *(tick as appropriate)*

- a) Pipelines (Water, Gas, Steam, Waste water etc.)
- b) Mechanical/Electrical Drives
- c) Sludges/Deposits/Waste
- d) Harmful Materials/Chemicals
- e) Electrical Services
- f) Others (Radiation etc.)
- g) Warning Notices, Portable signs, Danger Tags, Locks have been installed (where practicable)

**COMPETENT PERSON**

**DATE:** / **TIME:** am/pm

8. a) Has the Gas detector been calibrated recently? **Yes** **No**

b) Due date of next calibration: / /  

**Atmospheric tests (Fill in results below)**

- a) OXYGEN CONTENT %
- b) TOXIC GAS PPM (Specify type of Gas Tested)
- c) COMBUSTIBLE GAS % of LEL

**CONDITIONS SAFE TO ENTER?**

- WITH Supplied Air Respiratory Device (NO COMBUSTIBLE GAS)
- WITHOUT Supplied Air Respiratory Device

**COMPETENT PERSON**

**DATE:** / **TIME:** am/pm

**NOTE:** CONTINUOUS MONITORING OF THE ATMOSPHERE IS REQUIRED.

9. **PERSONAL PROTECTIVE EQUIPMENT REQUIRED ON SITE:**

- a) Supplied air respiratory protection (cylinders FULL)
- b) Safety harness, life line and/or rescue rope
- c) Eye protection
- d) Hand protection i.e. gloves
- e) Foot protection (with heels)
- f) Protective clothing i.e. overalls
- g) Hearing protection
- h) Head protection i.e. hard hat
- i) Face protection i.e. shield
- j) Other (please specify)

**COMPETENT PERSON**

**DATE:** / **TIME:** am/pm

10. **STANDBY PERSONNEL AND RESCUE ARRANGEMENTS**

(a) Standby personnel are

(b) and

**COMPETENT PERSON**

**DATE:** / **TIME:** am/pm
11. **Hazards identified with this confined space**

12. **PRECAUTIONS:** The following precautions have been implemented:

   (a) Warning notices, barricades HAVE been placed correctly.
   (b) SMOKING has been BANNED from the Confined Space Site.
   (c) Ignition sources have been removed from within 6 metres of the entry/exit point
   (d) NO Chemical Agents OTHER than those listed below SHALL be permitted in the Confined Space:

   1) 
   2) 
   3) 
   4) 
   5) 
   6) 

   (e) Any special precautions required (please list)

---

**ENTRY PERSONNEL**

I/We understand the safety procedures required for entry/exit for working in a confined space and the safety protective equipment to be used and a working knowledge of the equipment to be used:

<table>
<thead>
<tr>
<th>EMPLOYEES NAME</th>
<th>SIGNATURE</th>
<th>TRAINED RECENTLY?</th>
<th>ENTRY YES/NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**AUTHORISATION FOR ENTRY:** The confined space described above, is, in my opinion, safe for the work detailed in section 4 of this document to be carried out, provided that the precautions listed are adhered to.

**PERMIT VALID**

<table>
<thead>
<tr>
<th>FROM am pm</th>
<th>TO am pm</th>
<th>DATE /</th>
<th>COMPETENT PERSON: DATE /</th>
<th>TIME am/pm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**TASK COMPLETED:** ALL Persons, equipment, plant and materials HAVE been withdrawn. The work has been completed and the ACCESS to the confined space has been secured.

**THE FOLLOWING OBSERVATION/S OF UNSATISFACTORY ASPECTS OF THE OPERATION IN THIS CONFINED SPACE ARE NOTED FOR ATTENTION PRIOR TO UNDERTAKING A SIMILAR OPERATION** (Attach extra sheet if required).

**ACCEPTANCE OF THE COMPLETED JOB:**

I accept the work as defined in section 4 of this permit is completed.
4.5 Dangerous goods

Dangerous goods (or dangerous substances) in the meat industry present a variety of physical and chemical hazards. They are classified according to the nature of the hazard they present, based on the United Nations recommendations (Commission of the European Communities, 'Legislation on dangerous substances - Classification and labelling in the European community, vol. 2', Office for the Official Publications of the European Community, Luxembourg [regularly updated]). Australia has adopted the United Nations system, as this practical system helps workers to quickly recognise the properties and dangers of dangerous goods.

Legislative requirements

The National Standard for the storage and handling of workplace dangerous goods (NOHSC:1015 [2001]) and its accompanying National code of practice for the storage and handling of workplace dangerous goods (NOHSC: 2017[2001]) generally guide the management of dangerous goods across Australia. Copies of the standard and code can be accessed from the ASCC website (see Preface for details). The standard and code have generally been used as the basis for most State and Territory governments legislation.

The standard and code holds the manufacturer or the importer accountable for identifying the hazards associated with the dangerous goods and for making those hazards known to all who may subsequently handle or use them, principally through labelling and material safety data sheets (MSDS).

The occupier of premises where dangerous goods are stored or handled is in turn accountable for identifying hazards, assessing risks and eliminating or reducing them as far as is practicable. A key element in the standard and code is the requirement for the occupier to consult with workers on matters concerning induction, training, provision of information, hazard identification, risk assessment, risk control and proposed changes and structures, plant, processes or systems of work that might lead to increased risk.

Dangerous goods in the meat industry

Dangerous goods are divided into nine classes according to their dangerous properties. Classes 1, 2, 4, 5 and 6 are further subdivided into subclasses. Substances within classes 3, 4, 5, 6 and 8 are also subdivided into packaging groups (PG), which indicate the degree of danger (PG 1 equates to great danger, PG 2 equates to medium danger and PG 3 equates to minor danger).

Except for very small packages, all packages and containers that hold dangerous goods must carry the correct Class Label (diamond sign). The labels show the nature of the hazard by the colour and symbol, and the class of the goods by the numeral.
Substances can be both hazardous and dangerous; dangerous substances are defined by the Australian code for the transport of dangerous goods by road and rail (ADG Code – available from the relevant state environmental protection agency), while hazardous substances are defined elsewhere within this reference guide.

Dangerous goods that are found in the meat industry may include but are not limited to:
- ammonia
- chlorine (in all its forms)
- carbon monoxide
- flammable refrigerants
- liquefied petroleum gas (LPG)
- petrol
- cleaning chemicals
- corrosives (such as caustic soda or hydrochloric acid)
- poisons.

**General properties of dangerous goods**

Any product or substance that is held in the workplace that has any of the following symbols displayed on it must be handled with care. The instructions must be read carefully and manufacturer’s recommendations for mixing, decanting and using it must be followed. First aid instructions need to be prominently displayed. Appropriate protective equipment supplied as specified by the manufacturer. Workers should not eat, drink or smoke while using any dangerous goods products. If the organisation stores or uses large amount of products (in some cases 250 litres) that display any of the following symbols, a licence may be needed (for further information contact the Dangerous Substances Branch of the OHS regulatory authority in your State or Territory). Storage requirements of dangerous substances vary according to the licensed limit within each class (if the limit is exceeded, the company needs a licence).
Class 1 - Explosives
These are substances or articles manufactured or used to produce a practical effect by explosion or pyrotechnic effect. Examples: gunpowder, gelignite, fireworks, fuses, detonators.

Class 2 - Gases subsections within this category include:

Class 2.1 - Flammable gases
These are gases which ignite on contact with a source of ignition. Most flammable gases are heavier than air, and as such will flow to lower areas, such as drains, pits, confined spaces, valleys, etc. Some flammable gases have a subsidiary risk classification of toxic (2.3), or corrosive (8) etc. Examples of flammable gases include dissolved acetylene, hydrogen, liquefied petroleum gas (LPG)

Class 2.2 - Non flammable, non-toxic gases
These are gases that are not flammable when exposed to a source of ignition. Some of these gases are liquefied. Generally most non-flammable compressed gases are heavier than air, in some cases up to six to seven times heavier. Some non-flammable gases can have a subsidiary risk category of oxidising (5.1) or corrosive (8). Examples of non flammable, non-toxic gases include compressed air, nitrogen, oxygen, refrigerated liquid air.

Class 2.3 - Toxic gases
These are gases liable to cause death or serious injury to humans if inhaled. Most toxic gases have a perceptible irritating odour. Some of these gases can also have a subsidiary risk such as flammable (2.1), oxidising (5.1), corrosive (8) or in some cases can be both oxidising and corrosive eg, nitrogen dioxide. Generally most toxic gases are much heavier than air. Examples include ammonia, chlorine (gas), carbon monoxide, methyl bromide, nitric oxide.

Class 3 - Flammable liquids
These are liquids which can be ignited on contact with a source of ignition and will burn. Class 3 substances are broken down into three packaging group designators depending on their flashpoint or initial boiling point, but only including liquids having a flashpoint less than 61 degrees celsius. Substances, which have a flashpoint above 61 degrees celsius, are considered to be less dangerous by virtue of their lower fire hazard. The vapours from all substances within class 3 have a more or less narcotic effect and prolonged inhalation may result in unconsciousness or even death. Examples of flammable liquids include petrol, kerosene, paint thinners.

Storage and handling needs to occur in compliance with AS 1940: Storage and handling of flammable and combustible liquids.
Class 4 - Flammable solids
Subsections within this category include:

Class 4.1 - Flammable solid - The substances in this class are solids that are easily ignited by external forces, such as sparks and flames, and are readily combustible or liable to cause or contribute to fire through friction or may be self-reactive. Examples include sulphur, red phosphorus, matches.

Class 4.2 - Spontaneously combustible substances - The substances in this class possess the common property of being liable to heat spontaneously and to ignite. Some of these substances are more liable to spontaneously ignite when wet by water, or when coming in contact with moist air. Some may also give off toxic gases when they are involved in a fire eg, carbon, white phosphorus, calcium dithionite.

Class 4.3 - Dangerous when wet - Substances which emit flammable gases when in contact with water eg, aluminium phosphide, calcium carbide.

Class 5 - Oxidising substances
Subsections within this category include:

Class 5.1 - Oxidising agents - eg, hydrogen peroxide, calcium-chloride (dry pool chlorine), ammonium nitrate and (liquid or solids) eg, MEKP, benzoyl peroxide.

Class 6 - Toxic substances
Subsections within this category include:

Class 6.1 (a) - Toxic substances - These are substances which are liable to cause death or serious injury to human health if swallowed, inhaled or absorbed through the skin eg, calcium cyanide and arsenic compounds.

Class 6.1 (b) - Harmful substances - These are substances which are harmful if swallowed, inhaled or absorbed. Examples include lead acetate.

Class 7 - Radioactive substances
This Class includes materials or combinations of materials which spontaneously emit radiation eg, uranium

Class 8 - Corrosives
These are substances which are either solids or liquids which will damage living tissue, goods or equipment on contact, by chemical action. Examples include hydrochloric acid, sodium hypochlorite (liquid pool chlorine), sodium hydroxide (caustic soda).
Class 9 - Miscellaneous dangerous goods
These are substances and articles which present a danger not covered by other
Classes eg, aerosols, dry ice, asbestos.

Hazchem codes
The Hazchem Emergency Action Codes (commonly known as the Hazchem Codes)
are designed to provide coded information on the fire fighting medium to be used in
an emergency, as well as for clothing and equipment (including breathing apparatus)
for personal protection when there is the risk of an incident with a substance which
is classified as a dangerous substance. Other situations that are covered include a
violent reaction or explosion, spillage action and whether or not evacuation should
be considered.

Emergency planning
An emergency plan is essential to cover all eventualities and to avoid disaster
should any sort of mishap occur eg, a spillage, fire or explosion. Guidance in the
development of a simple and practical emergency planning procedure is outlined in
the 'emergency and first aid' section of this reference guide.

Australian Quarantine Inspection Service (AQIS)
Chemicals used within the meat industry, particularly for export companies, are
subject to approval by AQIS, and the List of chemical compounds approved for use
at establishments registered to prepare goods prescribed for the purpose of the
export meat orders can be found at the AQIS web site: http://www.daff.gov.au/aqis

While export companies must comply with this list, in general domestic companies
also seek to comply with this list due to strict quality requirements within the
Australian market.

It must be noted that AQIS approval does not imply that the use of chemicals noted
on the list are without risk to health and safety.

Dangerous substances manifest
In emergency situations eg, a spillage or fire involving dangerous substances, where
the fire service is required, a dangerous substances manifest should be prepared
and available to show the emergency personnel. Information on the preparation of a
dangerous substances manifest can be found within the National Code and
Standard mentioned earlier.

Information needs to be current, simple and accurate, and include a register of
substances, the quantity stored, and the dangerous goods class as outlined in the Australian code for the transport of dangerous goods by road and rail (ADG Code) to help the fire fighting personnel deal with the emergency.

A site plan should also be prepared which shows storage area floor plans, appropriate bunding (the absence of which has significant environmental implications for the meat industry under the Environmental Protection Act) and the locations of each category of dangerous goods or hazardous substances.

At the very least, all staff should have access to a register of hazardous and dangerous substances (it is suggested that a copy is kept next to the fire alarm panel in case of emergency).
4.6 Diseases - Occupational

Introduction
Zoonotic organisms are exceptional survivors due to their hardy nature, and there is not only a significant risk of contracting a zoonotic disease (a disease that can cross from animals to humans) in a meat plant, but also in a stockyard, sale yard or while transporting animals. Our respiratory, alimentary and optical systems are all possible conduits for transmission of zoonotic diseases, as are open wounds and unwashed hands combined with a cigarette to the mouth during a tea break.

The three main zoonotic diseases in the meat industry are Q fever, brucellosis and leptospirosis. Other diseases include anthrax, fungal skin diseases, hydatids, erysipeloid (streptococci infections), orfs (the same organism that causes an orf in humans causes scabby mouth in sheep), salmonella, tetanus, tuberculosis, and warts.

Risk areas include abattoirs, slaughterhouses, knackeries and animal by-products establishments such as rendering works. A very low level of risk exists for workers employed in boning rooms separate from abattoirs (infected offal may slip through the surveillance system), and smallgoods establishments with no slaughtering capacity.

As it is rarely possible to identify an animal infected with a zoonotic disease, all animals should be treated as suspect, and universal precautions, such as the following general hygiene measures, should be taken as preventative measures.

General hygiene measures
The first general precaution is to provide training for all workers on the risks of zoonotic infections and possible control measures, particularly for those engaged in high risk tasks, as well as skill based training to assist them in identifying and controlling the risks. Other general precautions include adequate personal hygiene facilities and proper use of these, and laundering of all work clothes on-site or by professional off-site laundry. The following four principal precautionary measures are particularly important and will be cover in more detail ie, design, work practices, personal protective equipment and first aid.

Design
The employer should ensure that:

- hand washing facilities are readily accessible to all workers at appropriate intervals. The water supply should be delivered via a single outlet at a temperature between 35 to 40 degrees Celsius, and a foot or peddle activated hand washing basin supplied
• a liquid soap dispenser containing an antibacterial agent, paper hand towel dispenser or hand dryer and waste paper bin is provided at the exit door
• ventilation in slink rooms or condemn rooms is scrutinized and still pockets of air are modified if detected
• air-conditioning and ventilation systems minimise the possibility of exhaust from areas of high risk being dispersed throughout other parts of the plant eg, by separating intakes from exhaust vents
• chutes for offal, slinks (unborn calves) and carcase remnants are fitted with flaps or covers to minimise the escape of aerosols from slink or condemn rooms or screw conveyors to other parts of the plant
• all areas of the plant, including yards, rendering areas and skin sheds, are designed and maintained to ensure efficient drainage and prevent formation of puddles
• workstations for removal of stock hides that are affected by mud, dags or caked manure are equipped with ventilation and exhaust systems to reduce the dispersal of dust
• yards and holding pens are designed and maintained to ensure regular and easy cleaning, including the drainage of urine
• floors in change rooms and toilets are cleaned daily with a fungicide/germicide and showers have rapid drainage facilities.

Work practices
The employer should ensure that work methods for handling animals are such that:
• there is negligible contamination of the worker, carcase, equipment by urine, faecal material, intestinal contents, milk or birth fluids
• the unnecessary slicing of potentially infected lesions is avoided
• every effort is made to ensure that workers do not have contact with urine or urine-contaminated material
• contamination of any type is removed from carcases to prevent contagion for workers further down the production line within the confines of the plant, dogs are muzzled to ensure they cannot eat potentially infected offal and become a source of tapeworm or hydatid infections
• personal and soiled work clothing are not kept together in lockers and work clothing is laundered by the employer with a view to minimising the risk to employees and their families. (NB. export meat orders prohibit the storage of any work and personal clothing together in lockers).
Personal protective equipment
The employer should ensure that all workers are provided with the correct personal protective equipment for the tasks they are required to perform. For example:

- when known infected animals are being processed, disposable gloves, goggles, surgical masks or a full-face protective shield should be provided for slaughterers (disposable items should be disposed of appropriately after use)
- waterproof boots should be made available for all tasks
- plastic aprons, gloves and eye protection should be provided for workers who bleed and skin slinks and if there is any contamination of clothing by blood or birth fluids, workers should change into a clean set of clothing before breaks for smoko or lunch.

First aid programs
The employer should ensure that:

- workers who have animal products splashed into their eyes, nose or mouth are trained in what to do and have access to facilities so they can immediately wash their face and rinse out their mouth
- workers who are cut and require suturing receive appropriate advice from their medical practitioner regarding the suitability of returning to work in specific areas
- first aid kits in rendering areas are equipped to deal with burns and dust in the eyes
- lacerations are promptly cleaned and dressed with waterproof bandages
- workers are trained to report any flu-like symptoms.
- More information on first aid can be found in the first aid section (Part 7) of this reference guide.

Brucellosis
Brucellosis is also known overseas as undulating fever, due to the fact that the classic fever symptoms endured by the sufferer undulate up and down. Some sufferers are ill for weeks or months, and some never fully recover, requiring regular hospital attention for chronic chest infections, polyarthritis in all joints (causing 20-30% loss of mobility), and/or significant damage to kidney function. The gutting point of the slaughter chain presents the most risk, with feral goats and feral pigs that are pregnant particularly infectious. Slinks are also a significant risk.

“Bovine brucellosis (Brucella abortus) was eradicated from the Australian cattle herd in 1989 and is presently considered an exotic animal disease in Australia. Caprine and ovine brucellosis (caused by Brucella melitensis) has never been reported in Australian sheep or goats. Swine brucellosis (caused by B. suis) is confined to small areas of northern Australia where it occurs in feral pigs and occasionally spills over into domestic pigs. B. suis was not detected in domestic piggeries during 2005. [In 2005 42 cases of brucellosis were reported in Australia]. Species data was available
for 31% of notifications (n= 13). Of these 10 were *Brucella suis*, (all acquired in Queensland) and 2 cases from New South Wales and a case from Victoria were *Br. melitensis* (all overseas acquired).”


**Leptospirosis**

Leptospirosis is found in domestic pigs. However, once the kidney is removed from the pig there is no further risk unless it is pierced in the removal process and urine is spilled onto the carcase, raising the risk significantly for workers further down the line. The need for personal protective equipment (gloves, aprons, masks, goggles) at this point is vital. Ventilation and cooling is also an issue that frequently needs improving, and can reduce the risk.

Leptospirosis is also found in dairy cows (pasteurisation kills the organism in the milk), and while the primary producer is at significant risk, particularly when using a herringbone milking shed where the design puts the farmer in direct line when a cow urinates, dairy cows eventually end up at abattoirs, and the meat industry shares the risk.

**Skin diseases found in the meat industry**

Skin diseases such as dermatitis are prevalent in the meat industry, including irritant dermatitis (limited to the area of skin that comes into contact with the agent causing irritation), and allergic dermatitis (an allergic response to contact with a sensitising agent, such as a particular type of soap). Other substances inherent within meat processing plants eg, stomach bile or blood, can also cause irritant or allergic dermatitis. Any break in the surface of the skin can increase the risk of skin disease and cuts, abrasions, sore spots; calluses and the drying effects of constant hand washing can all increase the risk.

Prolonged contact with water or other solutions (including sweat inside rubber gloves) softens and weakens the skin, increasing the risk not only of dermatitis, but also of bacterial infections such as paronychia, an infection around the fingernails. Other potential bacterial infections in the meat industry may be legionella (usually associated with the air-conditioning system) and E coli (associated with faecal matter).
Legionella

Legionnaires' disease is commonly caused by *Legionella pneumophilia*. It results in a severe form of pneumonia, which may be accompanied by confusion, diarrhoea and kidney failure.

Symptoms include rapid onset of high fever, non-productive cough, chills, headache and general ‘aches and pains’. The incubation period is usually two to ten days. Less than 5% of the exposed persons are likely to become ill, but up to 30% of these may die.

Many infections by *Legionella pneumophilia* do not result in recognisable signs and symptoms. Up to 30% of healthy Australians may show evidence of such infection by positive antibody tests.

Mode of transmission of Legionnaires' disease

Under favourable conditions, very high concentrations of the bacteria can be present in the water of cooling towers. These Legionella bacteria can infect humans through aerosols being breathed in and becoming deposited in the lung.

Protection of maintenance personnel

Personnel working on, or in close proximity to, cooling towers where the water is known to be infected, must be provided with personal protective equipment to prevent any infection by bacteria and for protection from exposure to chemicals used during maintenance, cleaning and disinfecting operations. Appropriate respiratory, skin and eye protection should be selected by a qualified occupational health and safety professional.

Where it is necessary for personnel to work in confined spaces, safety instructions contained in AS 2865 *Safe working in a confined space* must be observed. The water circulation systems of cooling towers should be switched off and the mist allowed to settle before personnel enter the towers.

Prevention and control measures

It is not possible to eradicate Legionella from the environment. However, the chain of events that lead to Legionnaires' disease can be broken, preventing the disease's development. In air-conditioning systems:

- ensure conditions do not favour rapid growth of the microbes
- eliminate drift of potentially contaminated droplets from cooling towers, or at least reduce it to 0.02% of the circulated water regularly test for total bacteria count.

For an effective control strategy of legionella, cooling towers and hot-water systems
should be designed to not favour bacterial growth. Safe operating procedures must be followed and plants must be regularly maintained. There should be easy and safe access to plant and equipment that requires regular maintenance. Plants with cooling towers on site should refer to their relevant State or Territory authorities for specific requirements.

**Maintenance schedules**

Maintenance schedules of all water systems should follow the requirements of *Australian Standard AS 3666, Air-handling and water systems of buildings - Microbial control - Design, installation and commissioning - Section 5*.

**Infectious diseases found in the meat industry**

Lacerations form the highest incidence of injuries in the meat industry, therefore the issues of HIV/AIDS and Hepatitis B and C need to be considered. Hepatitis B vaccination should be available for first-aiders and universal precautions need to be undertaken in all situations, as all human blood, fluids and body tissues should be considered potentially infectious.

Human immunodeficiency virus (HIV) is the name of the virus that infects and progressively attacks a certain type of white blood cell that is a vital part of the body’s immune system. People infected with HIV may be free of illness for months to years before symptoms appear. Most infected people develop AIDS within 10 to 15 years. Acquired Immune Deficiency Syndrome (AIDS) is a condition in which the body's immune system loses its ability to fight off infection. As a result the body becomes vulnerable to infections that would not normally cause illness, and to certain cancers. There is progressive damage to the immune and other body systems, generally resulting in death. There is currently no preventative vaccine or cure for HIV/AIDS.

The hepatitis B virus mainly affects the liver. About six months after infection, symptoms may develop, ranging from mild to severe flu-like illness. Most people recover fully. However 5-10% of those infected remain chronic (long-term) and infectious carriers of the virus. Even those who have never had symptoms can be carriers and infect others. Current treatments for hepatitis B are only partially successful. However, a preventative vaccine is available.

The hepatitis C virus also affects the liver. When infection first occurs, most people do not have any symptoms. While a few of those infected get rid of the virus, about 80% become chronically (long-term) infected. It often takes 10 or more years for the symptoms to appear. The most common symptoms are stomach pain, nausea and tiredness. There is no preventative vaccination available for hepatitis C.

**Tetanus**

The bacteria are spread from the environment to open wounds where they can enter the blood stream. Toxins (poisonous substances) produced by the bacteria affect the nervous system, causing symptoms such as: muscle spasms; trismus (lockjaw); difficulty talking; difficulty breathing; and stiffness and/or pain in the shoulders, back and neck.

Tetanus is a vaccine preventable disease. Workers should be covered by tetanus immunisation through a vaccination program through childhood and as a young adult, and then receive a booster every 10-20 years. If a significant injury is suffered after five or more years have elapsed since the previous dose, a person may be given the vaccination again to ensure coverage. Further information is available from *Australian Immunisation Handbook 8th Edition 2003*, found at [http://www9.health.gov.au/immhandbook/pdf/handbook.pdf](http://www9.health.gov.au/immhandbook/pdf/handbook.pdf)

**Q fever**

The most notable zoonotic disease in the Australian meat industry is Q fever, a recognised occupational hazard for those working with live and slaughtered cattle, sheep, goats and kangaroos. Workers most at risk are the meat processor, including contractors and random plant visitors, farmers and stock workers, stock transporters, feedlot workers, livestock traders, shearers, and associated professionals and veterinary personnel.

**What is Q fever?**

Q fever first surfaced in the 1930s when workers at a Brisbane meat plant became unwell with an unknown fever. The diagnosis was written as 'query' fever, later abbreviated to Q fever.

Q fever is caused in humans by the highly contagious and virulent *Coxiella burnetii* rickettsia-like bacterium. It can be carried by a variety of domestic and wild animals, without the animal displaying signs of infection. Transmission to humans can occur via direct or indirect means. With direct exposure fine mists or very small droplets can be released into the air during the slaughter and processing of infected animals, or when handling infected offal and products of conception. Indirect exposure can occur in windy conditions as organisms can be blown for a kilometre or more in dry windy weather and humans then inhale infected dust. Moving animals in pens or holding yards, and animals being transported on trucks, can also raise infected dust.
As the organism can survive in harsh conditions for many months in a dry state, it is a constant and often hidden source of infection.

Signs and symptoms include sudden onset of acute fever, chills, profuse sweating, cough, severe headache, muscle pain and weakness. Often a diagnosis of influenza is made and laboratory tests are required to confirm the diagnosis of Q fever. Individual responses will vary, with some experiencing no illness and it only becoming apparent that the worker has come into contact with Q fever when antibodies are detected in a blood sample or with a positive skin test reaction. Others may just feel off-colour and may not seek medical attention. Typically however, the fever lasts seven to 10 days, is accompanied by excessive sweating (needing many changes of clothes and bed linen), nausea, vomiting, diarrhoea and anorexia. Often the person loses between 6 to 12 kg of weight if the acute episode is prolonged. Occasionally hospitalisation is required, as persons with pre-existing heart valve damage could be at risk of developing endocarditis, or the central nervous system, lungs, liver, kidney, testes, heart muscle or tissue could be affected. Abnormal liver function tests are common. Death is possible, but very rare. Generally the illness lasts between one to six weeks and most sufferers gain lifelong immunity to further infection.

QFS follows about 20% of acute Q fever cases and can include prolonged debility and fatigue, exhibiting features similar to chronic fatigue syndrome. As this condition can last for five to ten years or longer, the cost to the industry is considerable, and patients suffer from an incapacitating fatigue on minor exertion, sweating at night, loss of mental alertness, occasional personality change, muscle and joint pains, depression and other unpleasant symptoms.

Incidence
Q fever is a notifiable disease in all States and Territories under public health legislation. The following materials are an extract from an Australian Government Department of Health and Ageing report: Australia’s notifiable diseases status, 2005: Annual report of the National Notifiable Diseases Surveillance System (NNDSS) – Zoonoses. Further information can be obtained from http://www.health.gov.au/internet/wcms/publishing.nsf/content/cda-cdi3101a15.htm
In 2005, 355 cases of Q fever were notified to the NNDSS, a decrease of 23% on 2004. At 1.7 cases per 100,000 population, the Q fever notification rate in 2005 was lowest since 1991 (Figure 60). The highest rates of notifications were from Queensland (157 notifications, 4 cases per 100,000 population) and New South Wales (142 notifications, 2 cases per 100,000 population). ...Q fever has long been associated with work in the Australian livestock industry and abattoir workers are at high risk of infection. Since October 2000, abattoir workers and shearers have been eligible for free vaccination under the National Q Fever Management Program (Figure 61). The second phase of the Q fever vaccination program began in October 2001 to include workers in the beef, sheep and dairy industries and was completed on 30 June 2004. However, Victoria and South Australia have extended the Program until 30 June 2006 and Queensland has extended it until 30 June 2007.

Figure 60. Trends in notification rate for Q fever, Australia, 1991 to 2005
Figure 61. Notification rate for Q fever, Queensland and New South Wales, 1999 to 2005, by month of onset*

However it is generally thought that these statistics do not reflect the true incidence rate due to under-reporting. This is contributed to by the disease occasionally being subclinical (very mild) and not requiring medical intervention by a treating medical practitioner who misses a diagnosis, or by limited pathology testing.

**Risk management**

Risk management for Q fever follows the same philosophy as outlined in the core of all occupational health and safety legislation in Australia ie, the duty of care for the employer to provide a safe work environment and safe place of work.

<table>
<thead>
<tr>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>The most effective way to manage this occupational risk and protect at-risk individuals is to conduct a pre-screening and vaccination program.</td>
</tr>
</tbody>
</table>

The guidance material in the following sections requires adaptation to State or Territory legal requirements, and is aimed at assisting plants to comprehensively address Q fever. Additional information can be obtained from:

- The Q-Fever register http://www.qfever.org/. At this site, users can:
obtain up-to-date information about Q-Fever
- access the ‘Resources’ section which includes forms and fact sheets that can be used in a Q-Fever program
- find a local vaccinator
- check if an employee or potential employee has been vaccinated
- other useful links.

- A Q fever information kit for the Australian meat industry was produced in December 1997. It is obtainable from MLA. Critical points of the kit are referred to in this section.

**Risk identification**

It is not possible to identify an animal with Q fever, as they do not display any outward signs of infection. Therefore all stock should be considered as potentially infectious. Within each organisation, analysis of workers compensation claims data for Q fever will need to be interrogated to identify the areas where the greatest numbers of Q fever cases have occurred. These areas could include yards, slaughter floors, the tripe room, load out or even the office. As the infected dust can be ducted from the high-risk area to other areas by air-conditioning or via the ventilation system, not only workers in outlying areas can be affected, but also residents in surrounding residential areas.

**Risk assessment**

Most tasks in meat processing plants must be assessed as potential risks, due to the extreme hardiness of the organism and the fact that the air-conditioning can recirculate aerosols and dust in ventilation systems. Any individual is at risk of becoming infected, but those most at risk are new workers who haven’t developed immunity. Non-immune visitors, especially those making random visits to the workplace, are also at risk of developing Q fever.

Tasks where there is the likelihood of exposure to contaminated aerosols or dust include:
- driving livestock vehicles
- receiving and signing out livestock vehicles at the gatehouse
- all stock work in the paddock, yards, pens and the race to the slaughter floor
- washing down stock prior to slaughter
- stunning, shackling, removing the hock
- operating the automatic hide stripper
- handling the hides, fleece and hair when trimming or any part of tanning operation
- skinning slinks and collecting foetal blood
- processing of by-products
- cleaning livestock transport trucks, internal/external building structures and the yards, pens and holding yards
gardening, and general plant maintenance including painting, carpentry and fencing.

Three possible risk assessments for the beef kill floor are as follows:
1. If the risk encompasses exposure to faecal contaminated dust, the risk assessment should include consideration of dag removal, sticking, skinning hind legs of carcasses contaminated by caked mud and dags, and disposal of condemned carcasses

2. If the risk encompasses a splash of urine, milk or birth fluids, the risk assessment should include factors such as the removal of the anus, vulva, tail, udder, bladder, uterus and evisceration, the process and chutes used for disposing of these parts, the slaughterers' skill levels, urine spillage when using the automatic hide remover, the number and placement of workers likely to be splashed, systems for immediate clean-ups, personal protective equipment provided and access to hygiene facilities.

3. Risks associated with the creation of aerosols should include an assessment of water temperature and cleaning systems (cleanup water, if not sprayed judiciously, can create multiple sprays of fine droplets of water, thereby disseminating possibly infected dust throughout the room being cleaned).

**Risk control**
The general hygiene measures that are outlined in the introductory section of this chapter are clearly desirable; however, an airborne infection such as Q fever can only effectively be controlled by vaccination. A Q fever vaccination program should be made available to all workers who work in a meat processing plant.

A visitor program also needs to be developed. As part of this program, consideration should be given to non-immune visitors wearing appropriate respiratory protection (ie, a class P2 particulate respirator) in high risk areas of the plant.

**Pre-screening and vaccination programs**
Currently in Australia the only vaccine available for protection against Q fever is Q-Vax from CSL (Commonwealth Serum Laboratories) Ltd. Prior to vaccination, pre-screening must be carried out via blood test and a skin test to investigate past exposure to Q fever.

It is also advisable to take a history of past work practices, lifestyle and any illness that might have been Q fever. Seven days after pre-screening, the skin test is examined and the results from the blood test are interpreted. If there is no evidence
of past exposure to Q fever, vaccination can proceed. Only those subjects with a negative skin test should be vaccinated, as vaccination of positive subjects may result in severe adverse reactions.

**Vaccination**

It takes approximately 15 days for immunity to develop to Q fever following vaccination. Occasional side effects may be experienced including tenderness at the site, or more rarely, fever and sweating. Occasionally vaccine failures have occurred after a correctly performed vaccination, presumably due to individual biological variations. However the vaccine appears to be more than 95% effective.

**Planning a Q fever vaccination program**

Information designed to assist the employer plan and implement a Q fever vaccination program are provided on the Q-Fever Register [http://www.qfever.org/download.php](http://www.qfever.org/download.php). This includes information and forms to assist with:

- the practicalities of planning a program
- information about screening and vaccination requirements
- information useful for worker education
- sample worker questionnaires, explanatory covering letter, and a Q fever release of information authority form.

Visitors to the plant, including contractors and labour hire workers, should be required to show proof of immunity to Q fever before gaining entry to the plant. It is important that a broad definition of *visitors* is taken to be at risk, and the plant is obligated to inform all of the following that they should show proof of immunity to Q fever before gaining entry to the plant, for example: sales representatives; researchers; local council and electricity workers; overseas product buyers.

**Administrative requirements**

Recommended administrative considerations include a zoonoses card to be distributed to vaccinated workers for their records and to show their treating practitioner, a signed formal consent form, and a pre-screening protocol. An overall daily register recording all activities within the program is also highly advisable. Maintaining records is critical and a complete record of the vaccination and pre-vaccination screening should be maintained and filed in the worker’s medical file. It is also recommended that an alphabetical register be kept.

**Coordinator’s responsibilities**

The coordinator’s responsibilities include being aware of the confidentiality issues of receiving medical information, such as pathology reports by facsimile that need to be screened from public viewing. The facsimile machine needs to be prepared and ready with paper to take reports (up to two sheets being issued per person) and needs to be placed in an area where other workers have no access. One suggestion...
to maintain confidentiality is to use the series number used on the daily register instead of the worker’s name on the pathology request forms. Care should be taken to ensure that workers who were absent on the pre-screening days are followed up.

Maintaining a program
Because of the high turnover in the meat industry, a pre-screening and vaccination program will need to be maintained and ongoing. Some meat processors have adopted a 'no jab, no job' protocol for new workers, to ensure they fulfil their legal obligation of not placing a worker into a situation of jeopardy. With the national Q fever register now established, the Q fever status of prospective workers is more readily available for employers to be reassured that the worker is covered. The zoonoses card indicating participation in the previous program can also help to exempt some new workers from further screening.

Ideally, new workers should be screened, and if eligible, vaccinated before coming onto the plant. If this is difficult, the new worker should be screened on the first day of the induction program. Until immunity is established the new worker should work in a low-risk area of the plant up to, and including, the 15 day post-vaccination period. While working in a low-risk area will not completely remove the possibility of exposure to Q fever, due to the dispersal of contaminated dust around the plant, it may minimise the risk of direct exposure to infected aerosols. An appropriate risk management strategy should be implemented to ensure protection from the disease until immunity is developed.

The meat processor that utilises local pathology services and on-plant providers may only need to conduct the skin testing on site. If the blood sample is taken at the local pathology practice, laboratory results need to be returned to the on-plant provider, enabling the vaccine to be ordered prior to reading the skin test. If the local medical practice conducts the pre-screening procedures the pathology laboratory results will be directed there, as will be the case if the loce alphabetical register.
4.7 Drugs and alcohol

The mix of alcohol and drugs in the workplace can severely impair an individual’s ability to make safe decisions and reactions in time of need and can have fatal consequences. The use of drugs and/or alcohol in the workplace can be a sensitive matter, with employers often unsure of how to handle the issue and workers reluctant to broach the issue when it involves discussing the habits of fellow workers. No industry is immune from the use of drugs or alcohol, however drugs such as marijuana are commonly used by shift workers, assembly line or factory workers where boredom is a factor (as in the meat industry).

Legal issues

Occupational Health, Safety and Welfare legislation across Australia in general requires that employers ensure health, safety and welfare at work by the provision of a safe working environment and safe system of work, and that workers take reasonable care to avoid affecting the health and safety of others and cooperate with employers in efforts to comply with occupational health and safety. An organisation’s approach to health and safety may affect the likelihood of drug and alcohol use in the workplace, where addressing OHS issues, including having a policy on drugs and alcohol, are fundamentals of good management practice. Policies and procedures need to be developed in a fair and reasonable way, with good consultation and endorsement from workers. Possible issues that may need to be addressed in a policy and procedure are as follows:

- a process for interviewing drug or alcohol affected workers in a private location along with another worker to act as witness (preferably an elected worker representative or a safety committee member)
- a process identified to get impaired workers home, either by having another person drive them home or have a person nominated by the worker called to pick them up
- appropriate disciplinary action identified in consultation with all workers for any worker using or under the effects of alcohol or drugs while at work
- follow up meetings
- situations where police may be involved
- exemptions (alcohol only) for social occasions on site
- any proposed drug and alcohol random testing plans*
- specialist referral mechanisms and support mechanisms for affected workers
- legal advice from company lawyer.

*It should be noted that, with regard to random drug testing, the issues of impairment for work can render testing an expensive waste of time, for example someone may have taken marijuana up to three weeks ago, still have it detectable via blood or urine tests, but have no impairment for work. Indeed there is a reasonable body of evidence that shows that drug testing is of limited effect as it...
does not measure impairment or ability to do a job, and some industries (eg, the mining industry) favour impairment testing, rather than random drug or alcohol testing. Random drug testing can also be very expensive and there are concerns over privacy and civil liberties (especially when urine testing is concerned ie, there may be tampering of the sample, either at the time or after the gathering of the sample) and finally there may be issues with confidentiality of medical information.
4.8 Electricity

Introduction
Electricity is the one source of danger in constant use in every meat plant across Australia. Electricity cannot be seen, smelt or heard, but exposure can be fatal. Death from electric shock comes from cardiac arrest or in some cases spasm of the respiratory muscles, which is slower but just as fatal without immediate artificial respiration. Exposure to electricity can also cause serious burns.

Most fatalities occur while operating electrical tools and equipment such as hand power tools, cutting tools and even electric kettles in smoko rooms.

The key to ensuring that workers are safe from risks to health and safety caused by electricity is well designed, manufactured, installed and maintained equipment. Instruction, information and training in the safe use of tools and equipment is also vital to ensure people are safe at work. Occupational Health and Safety Regulations in all States outline legal requirements to assist employers to eliminate or minimise the risks associated with electricity.

Definitions

**Competent person:** A person who has acquired, through training, qualifications, experience or a combination of these, the knowledge and skills to perform the required task correctly.

**Electrical installations:** Any electrical wiring, accessory, fitting, consuming device, control or protective gear, or other equipment associated with wiring situated in or on a workplace.

**Residual Current Device (RCD):** A device intended to isolate circuits when there is a current flow to earth eg, a short or the equipment is immersed in water.

Legislative requirements
State or Territory legislation provides minimum requirements for the safety of electrical installations, appliances and equipment. In certain circumstances legislation requires the use of residual current devices (RCDs) for protection against earth leakage hazards.
Performing electrical work
The legislation requires that a competent person must carry out any work performed on an electrical installation in the workplace. The competent person in this case would need to have a suitable electrical licence. (Note: Licensed electrical workers and contractors are responsible for the safety of their electrical work.)

Inspection or testing of electrical equipment
Legislation outlines the importance of inspecting and testing electrical commitment. Most state authorities base their recommendations on the Australian standard AS 3760: In-service safety inspection and testing of electrical equipment. However, some states (such as NSW) outline specific inspecting and testing for higher risk tools and equipment but then adopt a risk management approach for inspecting and testing the safety of lower risk electrical equipment such as office equipment. AS 3760 also outlines how regular electrical equipment inspections and testing are to be conducted. It also states that “when equipment is new, the supplier is deemed responsible for the initial electrical safety of the new equipment. New equipment need not be inspected or tested … [and the employer to] ensure it is tagged in accordance with Clause 2.4.2” (p 6).

Legislation indicates that a competent person must carry out inspection and testing tasks.

The following table shows who would be considered to be competent under specific circumstances.
Table 7: Competent persons for electrical tasks

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Performance Indicator/Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine inspection of equipment - checking for external damage, frayed or</td>
<td>Person who is familiar with the equipment (such as the user of the equipment).</td>
</tr>
<tr>
<td>damaged cords etc.</td>
<td></td>
</tr>
<tr>
<td>Routine inspection of equipment - checking for external damage, frayed or</td>
<td>Person who is trained in the use of earth testing meters (such as continuity meter or an</td>
</tr>
<tr>
<td>damaged cords etc.</td>
<td>ohmmeter).</td>
</tr>
<tr>
<td>Protective earth testing of equipment.</td>
<td>Person who is using the RCD and has been instructed on how to use the built-in test button.</td>
</tr>
<tr>
<td>Insulation resistance testing of equipment or isolation transformers.</td>
<td></td>
</tr>
<tr>
<td>Push button test of portable RCD.</td>
<td>Person who is trained in the use of an RCD tester.</td>
</tr>
<tr>
<td>Performance test of portable RCD - to measure the tripping time and tripping</td>
<td>This training could be provided in-house, by a qualified electrician, through trade school or</td>
</tr>
<tr>
<td>current.</td>
<td>by the supplier of the RCD tester.</td>
</tr>
<tr>
<td>Push button test of non-portable RCD.</td>
<td>Person who is using the RCD and has been instructed on how to use the built-in test button.</td>
</tr>
<tr>
<td>Performance test of non-portable RCD - to measure the tripping time and tripping</td>
<td>Licensed electrician is required if it is necessary to access the supply distribution board.</td>
</tr>
<tr>
<td>current.</td>
<td></td>
</tr>
</tbody>
</table>

**Competent Person**
Person who is trained in the use of insulation resistance testing meters (such as insulation resistance meter or appliance tester).

**When should RCDs be provided?**
You should consult your State regulations to access information on when to use RCDs. Whether or not an RCD is required may depend on whether the installation is new or an existing one.
New installations
Your State legislation generally states that employers must ensure a risk assessment is undertaken before the installation of any new electricity supply in the workplace. Appropriate action must then be taken to either eliminate or control those risks.

Where the supply of electricity in the new installation is provided to a socket outlet at a workplace, a non-portable RCD must be installed if it is reasonably practicable.

Existing installations
For existing electrical installations, portable RCDs are required where electricity is supplied to portable electrical equipment and there is no non-portable RCD installed.

What is portable electrical equipment?
When considering the use of RCDs, it is important to understand what portable equipment refers to. It is any electrical equipment that is moved around a workplace while it is being operated. This is equipment that a person would normally be holding or controlling while it is operating. A register should be made of all movable electrical equipment in a meat plant, and regular checks made as outlined in legal requirements. Some examples of movable electrical equipment in the meat industry include:
- cattle prods
- electrical stun guns
- carcase splitters
- whizzard saws
- hock cutters.

This stun gun is a piece of movable electrical equipment
RCDs also need to be installed where an assessment indicates that damage to the supply cord could occur between operations. This is equipment normally stationary while in operation, but because it is frequently relocated, the supply cord could become damaged.

Some examples are:
- electric fans and heaters
- portable welding equipment
- items of hire equipment
- audiovisual equipment
- computers on wheeled trolleys.

**Exemptions from the use of RCDs**

There are some exemptions from the use of RCDs that will affect some workplaces. The following situations are exempt from the use of an RCD:
- extra low voltage AC systems not exceeding 32 Volts
- direct current systems
- isolating transformers that comply with AS/NZS 61558.2.6:2001: Safety of power transformers, power supply units and similar - Particular requirements for safety isolating transformers for general use. These isolate the electrical installation or equipment from the earthing system of the electrical supply, minimising the earth leakage hazards
- unearthed output from portable generators. Portable generators present minimal risk from earth leakage hazards.

Note: for information on the maintenance of RCDs, refer to your State electrical regulations and to AS 3760.
4.9 Environmental hazards

Introduction
Factors in the meat industry work environment that influence risk include hot and cold temperatures, lighting and noise. The issue of adequate lighting for the differing circumstances found in meat plants is discussed later in this section, while noise is covered in the relevant section in Part 4. What is too hot for one worker may be quite comfortable for another, as humans vary significantly in their metabolism. Contributing factors to how hot or cold we perceive the environment to be can include age, pregnancy, physically demanding tasks, standard of health or fitness, body weight and clothing worn. Outside factors can also influence heat or cold, including radiant heat sources such as sunlight or furnaces, the speed and direction of air movement, and the level of humidity.

Notwithstanding that, by its nature, the meat industry provides extremes of both hot and cold temperatures, and these temperatures can significantly affect work performance, comfort and physiological stress levels. The following information is provided to help management, in consultation with workers, develop and implement company OHS policies for work in both hot and cold environments.

Cold environment
Exposure to cold in the work environment can cause injury or illness, or aggravate the affects of other workplace hazards. The first response of the body to a cold environment is to try to maintain its core temperature and vital functions by reducing any heat loss from the skin. The blood vessels in the skin and underlying areas constrict, posture is compromised and shivering occurs. Of great relevance to workers in temperature controlled areas in the meat industry, these reactions result in a loss of dexterity and sensitivity, and therefore there is an increased risk of accidents and/or muscle or soft tissue damage.

More serious physical responses to exposure to cold include hypothermia, where the body’s core temperature drops to a dangerously low level (most cases occur in air temperatures of between 1°C and 10°C), and frostbite, which is the result of areas of the body freezing. The type of behaviour that might be expected at the first sign of hypothermia includes bizarre or non co-operative behaviour, followed by slowness and lethargy. Urgent medical treatment is required.

Areas where workers may be exposed to cold conditions include:
- refrigerated areas including, but not limited to, loadout, smallgoods rooms and boning rooms
- chillers
- freezers
- outdoors in winter.
Assessing the risks associated with working in cold environments requires consideration of:

- temperature - accident rates increase as temperatures fall below 19°C
- air movement - the combined effect of wind and low temperature can produce a condition known as 'wind chill', in which cooling or freezing of exposed flesh increases rapidly as the wind velocity increases
- length of exposure
- nature of the work - where work requiring little movement is performed in temperatures below 18°C, or where active, muscular work is performed in temperatures below 15°C, the risk of injury is increased.

Suggested solutions for control of these risks include both general advice and more specific advice relating to work in freezing chambers.

**General advice when working in a cold environment**

Production requirements or hygiene regulatory requirements may determine the temperature in sections of the meat industry workplace, so raising the temperature to a safe and comfortable level is often not possible. Where this is the case, the employer, in consultation with workers, should ensure that the temperature is no lower than it needs to be to meet those requirements.

Fans used in a refrigerated work area should be designed and installed in such a way that wind chill is minimised. The fans should not direct the flow of cold air directly onto workers, but should be fitted with a diffuser, such as an air sock, to ensure an even temperature throughout the work area.

Concrete floors and steel workstands further conduct the cold in a refrigerated work area and can increase discomfort, particularly for workers whose work requires them to stand in one position for extended periods of time. Rubber matting, aluminium stands and boots with thick rubber soles can reduce the discomfort significantly. Protective clothing should be provided as appropriate where engineering and administrative controls do not adequately reduce workers' exposure to the risk of thermal stress from cold.

The employer should recognise that different workers have different responses to cold, and that one worker may have a need for protective clothing while another may be comfortable without it. In particular, recognition should be given to the needs of workers whose work entails minimal movement eg, scale operators in boning rooms.

Workers may suffer chilblains or even frostbite when working in an environment that is too cold for them, in which case not only will relevant medical attention be
required, but also a comprehensive hazard management plan to alleviate the problems.

**Advice specific to working in freezers**

Any freezing chamber having dimensions sufficient to permit one or more persons to enter should be constructed to incorporate the following safety provisions:

- an escape door that can be opened outwards readily from the inside when every externally operated lock or catch is fastened
- a safe means for opening any door that is normally operated electrically or pneumatically by hand, and the means to prevent injury which may be caused by a closing door
- an alarm, operated by means of illuminated buttons or by chains hanging near the door, and incorporating a fixed or flashing signal and buzzer or bell which is audible or visible in a busy workplace
- there needs to be visible signals and a path to an emergency exit in the event of a lighting failure
- emergency lighting.

Truck loading bays and freezing areas should be designed so there is a gradual transition, or buffer zone, into the extreme cold of freezers, thus avoiding a build-up of condensation which can cause wet, slippery conditions. Freezer doors need to be properly maintained, and kept closed while work is carried out within the chamber to ensure that there is no hot air being released into the cold store, causing a build-up of ice and creating frosty, slippery conditions. Frosty conditions also cause a corrugated road effect resulting in extreme vibration when driving forklifts.

Only electric forklifts should be used in freezing chambers or when loading containers, as the carbon monoxide exhaust emissions from gas and petrol-powered vehicles pose an unacceptable risk to health and safety.
Protective clothing
All workers entering, or working in, or adjacent to the opening of freezing chambers should be provided with suitable clothing to protect them against the affects of cold stress.

Unauthorised entry or operation
Freezing chambers and associated machinery rooms, auxiliary plant rooms, switch rooms and the like should be clearly identified and warning notices posted that unauthorised persons must not enter. For specific information related to working in confined spaces (some plant with freezing chambers are classified as confined spaces) see the section on confined spaces elsewhere in this reference guide.

Housekeeping
The interiors of freezing chambers should be kept clean and the contents stored in an orderly manner. Particular attention should be giving to avoiding the build-up of ice on floors and ensuring that waste materials such as broken pallets are not allowed to accumulate to the extent where they pose a hazard. Antifreeze materials should be used on floors where possible.

Environmental heat
Background
High temperatures and excessive humidity can lead to workers suffering from heat stress or hyperthermia. If hyperthermia is suspected it is important to note that ample drinking water is required, not salt tablets. Hot working conditions can cause a number of health problems ranging from minor to life threatening. These include:

- heat rash and skin rashes, the most common being prickly heat
- fainting (note, medical assistance is required to ensure that the worker is not suffering from heat exhaustion or heat stroke)
- excessive sweating can cause a loss of salt from the body resulting in painful muscle cramps known as heat cramps
- heat exhaustion, a serious condition which can be caused by the changes in the body's chemistry due to hot conditions. Usually accompanied with nausea, weakness, headache and intense thirst. Medical attention is required promptly
- heat stroke, a life-threatening emergency. The body's heat regulation is lost and body temperature rises to dangerous levels. The worker may be dizzy, weak, confused and may collapse. Medical attention is required urgently.

When the body produces or receives heat energy, its temperature rises as sweat is produced (a defensive mechanism to lose heat). The blood flows to the skin to be cooled (flushing, redness), which forces the heart to beat harder, and the blood flow to vital internal organs is reduced.
As heat increases the load on the heart, workers with high blood pressure or a pre-existing heart condition are particularly vulnerable.

Areas where workers may be exposed to heat stress in the meat industry include:
- rendering areas
- kill floors, especially in summer
- cooking areas
- ovens and smokehouses
- stockyards, pens and outdoor loading areas.

**Measuring the level of heat stress**

Where hot areas are identified, e.g., beef legging stands under a low tin roof or non-fluorescent lights or work areas adjacent to smallgoods ovens, careful monitoring of the heat stress is required.

In Australia, there are currently no legal limits to the amount of heat that workers can be exposed to. Therefore, good management strategies require that a heat stress management policy and procedure be developed in consultation with workers, and applied when necessary.

Assessment of the risk of heat stress requires not just a measurement of the temperature, but also consideration of:
- heat radiation, such as from hot uninsulated roofs
- humidity (level of moisture in the air), such as in a tripe room or silverside cooking area,
- reducing the ability of the air to evaporate perspiration, thus hindering body cooling
- air movement, which may need to be increased in a hot area to assist in the evaporation of perspiration and relieve discomfort
- the type of work being done and the length of time workers are exposed to hot and/or humid conditions
- any pre-existing conditions that place affected workers at risk.

The heat stress burden can be measured by various means, including the use of an ordinary dry-bulb thermometer to establish a baseline, and then in heat stress conditions, by using a variety of tools.

A more traditional way of measuring heat stress levels was just using wet bulb globe thermometer (WBGT). However, a more comprehensive method, known as the Thermal Work Limit (TWL) (that was originally developed to assist in the mining industry) can provide a more useful method for assessing heat stress. The TWL has now been included in the Australian Institute of Occupational Hygienists (AIOH) Heat Stress Standard. It is a rational heat stress index that calculates the "limiting"
metabolic (work) rate that moderately fit and healthy, euhydrated, acclimatised persons can sustain in any given environment and takes into account all the relevant environmental factors (air temperature, wind speed, radiant heat, relative humidity and barometric pressure), clothing insulation and vapour permeation and user-defined limits on allowable sweat rates and deep body core temperatures.

The TWL is available from Mine Ventilation Australia. A free copy of the TWL model, designed to run as an Excel worksheet, is available for download from their website. A full copy of the model and other heat stress evaluation tools is also available from MVA.


Local exhaust system in rendering plant reduces heat and humidity

Managing the Risk

Engineering controls are particularly useful in keeping temperatures comfortable, including:

- thermostatically controlled heating and cooling
- fans to circulate air, and exhaust fans to extract and exchange air
- ventilation systems to assist in the movement of air around the workplace
- heat barriers such as awnings and shields
- insulation or isolation of sources of heat generation
- insulation of roofs and walls
- external ducting of heat sources.

Where the risks of heat stress cannot be completely eliminated, such as in slaughtering or rendering areas (particularly in the summer months) the employer should ensure provision of:

- regular rest breaks in a cool environment
- cool clean and palatable drinking water (this should be provided to all workers, but additional outlets may be needed in hot areas)
- suitable clothing that allows tasks to be performed with comfort.

Administrative controls that could be implemented include additional regular work breaks or additional relief workers. Whatever control measures are used, the employer should ensure that:
- work environment temperatures are monitored
- the effects of heat stress are known by supervisors and all workers potentially exposed to the risk.

**Lighting**

Lighting in the meat industry should be designed and installed to effectively reveal the task, and to provide a safe and comfortable visual environment. The quality of light eg, colour or glare, is as important as the quantity. Information on lighting can be sourced from the following Australian Standards:
- AS/NZS 1680.0.1 Interior lighting – Safe Movement
- AS/NZS 1680.1 Interior lighting - General principles and recommendations
- AS 1680.2.1 Interior Lighting – Circulation spaces and other general areas
- AS/NZS 1680.2.4 Interior Lighting – Industrial tasks and processes
- AS 2293.1 : Emergency escape lighting and exit signs for buildings - System design, installation and operation

Factors that need to be considered in the assessment of lighting in the different areas found within meat plants include:
- lighting that is adequate for each task eg, centrally directed lighting may not be adequate when a piece of meat hangs between a worker and the light source, so local lighting for that task may be required
- unwanted reflections eg, a worker conducting tasks that involve facing a white wall, glare from which should be avoided
- differences in illuminance ie, luminous contrast ratio, when moving from a well lit area into a dimly lit area vision may be temporarily impaired while the eye adjusts to the change in brightness, increasing the risk of injury
- brightness of task surrounds compared to a dimly lit task, where the eye is attracted to the brightest light in the visual field, creating fatigue as a worker needs to force concentration of their vision back on the task at hand.
Table 8: Standards for lighting within meat industry workplaces, per AS 1680.1 - Interior lighting - General principles and recommendations.

*Lux is the international system unit measurement of illumination, equal to one lumen per square metre.

<table>
<thead>
<tr>
<th>Task</th>
<th>Recommendations for Service Illuminance</th>
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<tbody>
<tr>
<td>Slaughtering</td>
<td>200 Lux*</td>
</tr>
<tr>
<td>Boning, cleaning, cooking, grinding, canning, packing and cutting</td>
<td>400 Lux</td>
</tr>
<tr>
<td>Inspection (eg, AQIS)</td>
<td>600 Lux</td>
</tr>
</tbody>
</table>
4.9.1 Sample Procedure: Climatic Conditions Affecting Work

Purpose
This procedure outlines the management of work involving extremes in climatic or particular workplace conditions and facilitation of improved management of working in excessive heat or cold conditions.

Definition
Heat stress is the total heat burden to which the body is subjected by both external and internal factors; whether or not it results in adverse effects depends on the level of heat stress and the effectiveness of the body’s cooling mechanisms.

Several factors contribute to heat stress and an individual's ability to cope such as:

- air temperature
- radiant heat
- air movement and humidity
- physical exertion and metabolic heat production
- clothing,
- physiological factors - degree of acclimatisation, physical fitness, age, dehydration and pathological conditions eg. heart disease, fever and some medications.

Standards
- Occupational Safety and Health Act 1984
- Occupational Safety and Health Regulations 1996

Roles and Responsibilities
Supervisors are responsible for:
- implementing this procedure in their area of responsibility and accountability
- identifying heat or cold hazards
- completing risk assessments and implementing appropriate risk control measures in consultation with employees.

Employees are responsible for:
- not placing themselves or others at risk of injury
- reporting heat or cold hazards to their supervisor or health and safety representative as soon as becoming aware of them
- participating in the development of appropriate risk control measures for identified hazards to eliminate or minimise risk
- using control measures and any other action as required, which is designed to protect health and safety

Health and Safety Representatives are responsible for:
- assisting Line Managers, supervisors and staff in the identification and assessment of heat or cold health and safety risks.
Procedure

Work Area and Employee Monitoring
Where staff may be exposed to effects of excessive heat or cold, a risk assessment shall be undertaken using the risk assessment Form OSH 0321. Dry bulb temperature and humidity data loggers shall be located within areas of concern to provide accurate data measurement for work areas. Data is downloaded by the OSH Coordinator using “eTemperature” software and the results used to calculate Thermal Work Limit in form 3.7.1. A Thermal Work Limit (TWL) is determined from these measurements and guidelines for work limits are outlined on the form 3.7.2.

A refractometer is available which measures the specific gravity of urine and indicate hydration levels. Where the thermal work limit (TWL) is less than 140, dehydration testing shall be undertaken at the end of the shift. Outside workers also face the added hazard of exposure to ultraviolet radiation and consideration must be given to the provision of appropriate protective clothing, glasses and skin protectors. In cold conditions the body may be unable to acclimatise to cold and therefore must be protected from loss of heat.

Environmental and climatic variances impact differently on individuals. Consideration should be given to using the following strategies:
- rotation of employees engaged in heavier tasks
- scheduling regular rest breaks
- altering the location of work
- providing alternative work
- rescheduling of certain work to other days or limiting it to cooler periods of the day
- providing a supply of cool drinking water
- ensuring appropriate fluid intake
- erecting of temporary shade covers to reduce effects of direct sun
- using air circulating fans or portable coolers at the work site
- providing suitable PPE and light protective safety clothing where appropriate
- installing roof and wall insulation in buildings
- insulating radiant heat sources associated with furnaces or processes
- installing fans
- installing equipment to facilitate natural ventilation
- installing ducting to remove hot exhausts
- installing air conditioning or heating
- providing appropriate wet weather clothing for outdoor workers who may be exposed to inclement wet weather conditions.
### References

<table>
<thead>
<tr>
<th>Form</th>
<th>Description</th>
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<tbody>
<tr>
<td>4.3 form</td>
<td>OSH Risk Assessment JSA</td>
</tr>
<tr>
<td>3.7 form</td>
<td>Psychometric Chart (to manually calculate wet bulb temperature)</td>
</tr>
<tr>
<td>3.7 form</td>
<td>Thermal Work Limit Calculation and Charts</td>
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<tr>
<td>3.7 form</td>
<td>“Are you drinking enough?”</td>
</tr>
</tbody>
</table>

### Procedure Owner

Risk Manager
4.10 Hazardous substances

The Hazardous Substances Regulatory Package was developed nationally to ensure that consistent legal requirements for the control of hazardous substances would apply in States and Territories across Australia. The national package was developed and is reviewed and updated by the National Occupational Health and Safety Commission (NOHSC), with the active involvement of employers, unions and occupational health and safety authorities in Australia.

The majority of NOHSC Standards have been adopted or are under consideration for adoption by each State and Territory. This includes the National model regulations for the control of workplace hazardous substances [NOHSC:0002(1994)] and the National Code of practice for the control of workplace hazardous substances [NOHSC:0003(1994)]. Once a State or Territory has investigated the compatibility of the national standard with their respective OHS Act and consulted with local industry and trade union bodies, the national standard gets adopted as the Regulation. These hazardous substance regulations and codes of practice then outline the legal obligations aimed at minimising the risk to health from work with hazardous chemicals and other hazardous substances.

These materials/resources are referenced in most hazardous substances regulations. As they are called up in regulations they represent mandatory requirements. The publications are:

- Exposure standards for atmospheric contaminants in the occupational environment
- (NOHSC May 1995) - used by an employer for determining an exposure standard for the purposes of risk control
- Approved criteria for classifying hazardous substances (NOHSC 2004) - used by manufacturers and importers to decide whether substances they make or import are hazardous

(Note: This replaces the previously published List of designated hazardous substances).

**Common substances used in the meat industry**

The following list of chemical compounds used in the industry do not require AQIS approval. However, they may still be described as ‘hazardous’ as listed on HSIS.

Chemical compounds not requiring AQIS approval include those used solely:

- as ingredients in prescribed goods
- as denaturants
in laboratories for analytical and similar use
in offices or areas in a registered establishment where prescribed goods are not prepared
in cafeterias or retail food service areas
in space heating systems or cooling towers
in treating materials such as skins and hides
in holding pens, stock trucks and the like (except insecticides)
in sewage or waste water systems outside buildings
in secondary cooling loops
on the exterior of buildings or areas immediately adjacent to the exterior of buildings for cleaning or maintenance of vehicle exteriors
in workshops for cleaning machinery, removing grease and oil or lubricating equipment for use in inedible product areas
marking inks used for the application of information to outer packaging materials used as coverings of prescribed goods.

Chemical compounds requiring AQIS approval include:
  - chemical compounds for use in areas where edible food products are prepared, handled or stored
  - cleaning compounds
  - sanitising compounds
  - compounds provided for personnel care
  - pesticides
  - cooling and retort water treatments
  - boiler treatments
  - compounds for steam lines, or primary water cooling loops
  - pig scald treatments
  - tripe processing chemicals
  - lubricants for use in areas where incidental or no contact with edible product may occur
  - branding inks
  - odour neutralising agents.

These substances may still be designated as ‘hazardous’ and hence may still need to consider the provision of MSDS, specific labelling, inclusion on the hazardous substances register, and signage requirements.
What is a hazardous substance?

Hazardous substances regulations apply to substances that have health effects. The most common health effect is skin irritation (dermatitis). Other health effects include occupational asthma, chemical poisoning, chemical burns and long-term diseases such as cancer. The type of health effects will depend on the particular hazardous substance.

The regulations apply to those hazardous substances that are used or produced in a work activity. Hazardous substances may be:

- very toxic
- toxic
- harmful
- corrosive
- irritant
- sensitising
- carcinogenic
- mutagenic
- toxic to reproduction.

Often hazardous substances will be industrial chemicals. However, they may be pesticides, paints, drugs, cosmetics, a food product or any other substance that is hazardous to health and is used or produced in a work activity (eg, by-products in the meat industry).

Hazardous substances include some dangerous goods (ie, substances covered by the dangerous goods legislation). However these are only included as hazardous substances if they have health effects because the hazardous substances
regulations focus on controlling risks to health. Safety hazards such as flammability, explosiveness and dangerous chemical reactions are controlled under the dangerous goods legislation (see relevant section in this reference guide).

**How do hazardous substances affect health?**

Whether illness or disease occurs will depend on the amount of exposure, the route of exposure and other factors, such as whether a worker is exposed to other hazardous substances and the worker's own sensitivity to the substance's effects. The route of exposure is the way that hazardous substances get into a worker's body. The most common ways are by breathing in the substance (inhalation) or skin contact. Some hazardous substances can be absorbed through the skin and substances can be accidentally swallowed (eg, by eating or smoking with contaminated hands). Accidental injection through the skin is possible but is less common, although cuts and lacerations in the meat industry can present a potential entry source.

Health effects may be acute, resulting from short-term (usually high) exposure or chronic, resulting from long-term (often low level) exposure over a period of time. Chronic effects may not occur for many years - they are hard to predict in advance and when they do occur it may be hard to identify what caused them.

**How to find out whether a substance is hazardous**

Manufacturers and importers must determine whether substances are hazardous to health by referring to the national Hazardous Substances Information Services (HSIS). It provides information on all identified, designated hazardous substances in Australia [http://hsis.ascc.gov.au/Default.aspx](http://hsis.ascc.gov.au/Default.aspx) (Note: This replaces the previously published *List of designated hazardous substances*).

If a substance is hazardous it must be appropriately labelled and a material safety data sheet (MSDS) must be provided. The MSDS contains information on the hazards of the substance and how these can be managed.

*For users, the easiest way to determine if a substance is hazardous, is to look on the label for the words 'hazardous', 'caution', 'poison', 'dangerous-poison', 'harmful', or 'corrosive', or other advice about specific health effects. The supplier of a hazardous substance (except a retailer) must provide an MSDS which can also be checked for information about health hazards.*

For substances produced in the workplace eg, emissions, for which there is no label or MSDS, the employer will need to identify the substance and check the HSIS database.
If you are uncertain, a substance should always be assumed to be hazardous unless there is information to show that it is not. Additional information can be requested from the manufacturer or supplier, or from your local workers compensation authority or from your local OHS regulatory authority.

**Information employers must obtain about hazardous substances**

Employers must obtain information about health effects of hazardous substances and the precautions needed to protect workers’ health and safety. This information will be needed for:

- instructing and training workers about health hazards, safe use and handling of hazardous substances
- assessing risks to health from work with hazardous substances
- making decisions about appropriate control measures to prevent or minimise exposure to hazardous substances.

Hazardous substances purchased from suppliers should include basic health and safety information on the container label. A material safety data sheet (MSDS) must also be provided by the supplier for any hazardous substance that is for use at work. This must be done the first time a hazardous substance is supplied to the purchaser, or if requested at any other time. The employer must ensure that the MSDS is obtained from the supplier when or before the hazardous substance is first supplied to the workplace.

An MSDS should clearly identify the hazardous substance, state its recommended uses, provide health hazard information, and describe the precautions to be followed for the safe use, handling and storage of the hazardous substance. Further information about what should be included in an MSDS will be available in your State or Territory code of practice for the preparation of a material safety data sheet.

Sometimes an MSDS is obtained but the information is not complete, or supplementary information may be sought on the health hazard and precautions for safe use and handling. In this case employers can ask the supplier for additional information that will assist in the safe use of a hazardous substance. This might include a National Industrial Chemical Notification and Assessment Scheme (NICNAS) summary report (if one is available) which provides more detailed advice about health hazards and control measures. NICNAS is the Commonwealth regulatory laboratory for industrial chemicals, and was established in 1990. NICNAS ensures that new industrial chemicals entering Australia are assessed for their health and environmental effects before they are used or released into the environment. For more information about NICNAS, visit their website at [www.nicnas.gov.au](http://www.nicnas.gov.au). A sample MSDS is provided in 4.10.2.
Information employers must provide about hazardous substances

Employers must provide the following:

- **Labels on containers.** Employers must ensure that all containers of hazardous substances used or produced in the workplace are appropriately labelled until the containers are cleaned so that they no longer contain any hazardous substance. Hazardous substances purchased from a supplier must already be labelled, as described in your State or Territory approved code of practice for the labelling of workplace substances. However, if a hazardous substance is put into another container (decanted) at the workplace, the employer will need to label the container with the product name and basic health and safety information (risk and safety phrases) from the supplier’s label.

  Containers of decanted substances must be labelled in this way unless the hazardous substance is used up immediately and the container cleaned so that it does not contain any of the hazardous substance. If the container is not labelled, and the substance in the container is not known, the container should be labelled ‘Caution, do not use: unknown substance’. It should then be stored until it can be appropriately labelled, or if it cannot be identified, it should be disposed of safely, after checking with the Environment Protection Authority.

- **Identify the contents of pipes and other enclosed systems.** Enclosed systems, including pipes and process vessels, which contain hazardous substances must be identified. This may be done by colour coding eg, brown for oil, violet for corrosive (as described in AS1345 - Identification of the contents of piping, conduits and ducts).

- **Access to MSDS and hazardous substances register.** The employer must make an MSDS for a hazardous substance readily accessible to any worker who could be exposed to that hazardous substance. The MSDS should also be available to supervisors, health and safety representatives and committee members.

- **A hazardous substances register must be kept.** This must list all of the hazardous substances used or produced at the workplace and must contain the supplier’s MSDS. The register should also be readily accessible to workers, supervisors, health and safety representatives and committee members. The register must include all hazardous substances that are supplied to the workplace - these can be readily identified from labels and MSDS. It must also include hazardous substances produced at the workplace.
as product for supply to others, or as by-products, emissions and wastes. A sample register can be found at 4.10.1.

- **Information and training.** Employers must provide instruction and training to workers who could be exposed to hazardous substances. This should include advice about health hazards, reading labels on containers and how to access the MSDS. The following paragraph outlines more fully the training workers should have about hazardous substances.

- **Health surveillance.** Health surveillance is the monitoring of workers’ health to identify health effects or other measures of exposure to a hazardous substance. Health surveillance includes biological monitoring, which is the measurement of a hazardous substance in the body (eg, the level of a substance in the blood or exhaled air). Health surveillance must be done if the assessment identifies that there is a significant risk to health, and the workers are exposed to any of the hazardous substances listed in the health surveillance schedule of the relevant State or Territory regulations (eg, asbestos). Health surveillance must be performed under the supervision of a legally qualified medical practitioner who is adequately trained in the tests or procedures necessary.

Training that workers should have about hazardous substances

Employers must provide induction and training to all workers who could be exposed to hazardous substances at work.

The amount of induction and training and the material covered should be appropriate to the risk to health. The assessment of the health risk with hazardous substances will provide important guidance on the training needs of particular workers (see following paragraphs).

The employer must keep records of induction and training. Records should include the names of workers who received training, an outline of the course, and details of training providers. Induction and training records should be kept for five years.

All workers who could be exposed to hazardous substances at work need induction and training, as well as workers who supervise others who work with hazardous substances.

**Hazardous substances induction and training program**

A hazardous substances induction and training program should include:
• container labels and how to understand them
• material safety data sheets (MSDS), how to access them and how to understand them
• information about hazardous substances, including the type of health effects, the risk involved in particular work, the degree of exposure and how the hazardous substance can get into the body (route of entry)
• the hazardous substances assessment process and how workers can contribute
• work practices and procedures for the safe use, handling, processing, storage, transportation, clean up or disposal of hazardous substances
• the correct use and maintenance of control measures
• the proper use and fitting of personal protective equipment
• emergency procedures, incident reporting and first aid
• information about any monitoring - what is needed, why and access to results
• information about any health surveillance if it is needed
• the duties of suppliers, employers and workers under the Hazardous Substances Regulations.

Training methods should take account of workers' knowledge and experience, and should be practical and include hands-on sessions where appropriate. If literacy levels are low, then verbal or visual training methods should be used. If workers are from non-English speaking backgrounds, training should be provided in the languages used by workers at the workplace.

Training should be evaluated to ensure it has been effective in increasing workers' understanding about hazardous substances and the need to use control measures to minimise risks to health. Training should be updated each time there is a change in health hazard information about substances or a change in the work practices or control measures. Induction and training should be provided to new workers, workers who are performing particular work for the first time or workers who need a refresher.

Identification of hazardous substances and assessment of risks to health

Note: This process must be followed for every hazardous substance on site

The purpose of risk assessment is to determine whether workers are at risk from exposure to hazardous substances used or produced in the workplace, and if they are, to decide on appropriate control measures to prevent or minimise their risk.
Employers might do the assessment themselves or they might delegate the task to other workers in the organisation (e.g., managers, supervisors or health and safety officers). Sometimes an outside consultant might be called in to help with more difficult assessments. However, as far as possible, assessments are better to be done in-house. The concept for risk assessment in hazardous substances is that it be carried out for particular work, rather than for a whole workplace or a particular hazardous substance. Therefore, a practical way to approach assessment is to divide up the workplace, work processes or jobs to identify the units of work that will be assessed. There are three basic steps that should be included in any assessment:

**Step one - Identify the hazardous substances**
The first step in assessment is to identify all of the hazardous substances used or produced in the unit of work being assessed. To identify hazardous substances:

- check the suppliers label - look for a signal words eg, 'caution', 'poison', 'dangerous poison', 'hazardous' and risk phrases that identify the type of health hazard
- check if there is an MSDS from the supplier - the MSDS should say if the substance is 'hazardous according to the criteria of NOHSC' and the health hazard section should describe the health effects

Your in-house hazardous substances register should list all the hazardous substances used or produced in any work at the workplace.

**Step two - Review information about the hazardous substances**
The second step in assessment is to obtain information about each hazardous substance used or produced in the work being assessed. The primary source of information will be the MSDS (if one is available) which should provide information about the health hazards of the substance if it is breathed in, swallowed or if there is contact with the skin or eyes. The MSDS should also advise on precautions for the safe use of the hazardous substance. Labels, information guides and other health and safety reference sources may also be used. For consumer packages that are unopened on the premises, the product label provides information about emergency procedures and first aid. This enables planning to deal with spills, leaks or fire involving the hazardous substance.

**Step three - Identify any risk of exposure**
The third step in assessment is to inspect the work to find out whether workers might be exposed to the hazardous substances by breathing in fumes, dust or other airborne contaminants, by swallowing them (from contaminated hands or face), or
by skin or eye contact. Remember to include one-off exposures that may occur eg, during repainting or resealing floor surfaces. The inspection should also look at what control measures are used, whether they are effective in controlling exposure and whether they are properly used and maintained. If exposure to hazardous substances is not properly controlled it will be necessary to decide what control measures are needed to prevent or minimise exposure. A form to assist with this is included in 4.10.3.

**Detailed assessment**

Some work with hazardous substances may require more detailed assessment. This is likely if:

- there are complex chemical processes or exposures
- there is the possibility of a significant risk to health eg, because of high levels of exposure or the nature of the health hazard is very serious
- after completing the three basic assessment steps there is still uncertainty about the risk to health or control measures needed.

NOHSC has produced a *Guidance note for the assessment of health risks arising from the use of hazardous substances in the workplace*. This provides more details and advice on how to do these assessments.

**Record of assessment**

If an assessment indicates that there is not a significant risk to health, and exposure to hazardous substances is under control, a note should be made in the Hazardous Substances Register to indicate that each of the three steps of the assessment have been done.

If the assessment indicates that there is a significant risk to health, a report must be made of the assessment and kept for at least five years. A form to assist with this is included in 4.10.3. If the assessment indicates that monitoring or health surveillance is required, the assessment report must be kept for 30 years.

**Review of assessment**

*After five years each assessment should be reviewed if the work assessed is still being done. An assessment should be revised whenever there is a significant change to the work eg, different hazardous substances are used or new work methods are introduced. It should also be revised if there is new information about the health hazards, if adverse health effects are reported or detected in health surveillance, if monitoring shows inadequate control of exposure or if improved control measures become available.*

**Controls for exposure to hazardous substances**
Employers must take action to prevent exposure to hazardous substances at work, or if that is not reasonably practicable, to ensure that exposure is adequately controlled to minimise risks to health.

For some hazardous substances exposure standards have been set. These apply where a substance is a contaminant in workplace air (eg, as dust, fume or gas). The level of the hazardous substance in workplace air, when monitored for an appropriate time period must not exceed any relevant exposure standards. The exposure standards are listed in NOHSC’s *Exposure for atmospheric contaminants in the occupational environment* and should also be in the supplier’s MSDS. About 700 of the more common hazardous substances have exposure standards. Adequate control means controlling exposure to as low a level as is reasonably practicable, whether there is an exposure standard or not. The aim is to minimise the health risk. If there is an exposure standard but it is reasonably practicable to control exposure to below this level, then it is desirable that this should be done. An important reason for keeping exposure to as low as is reasonably practicable is the possibility of workers being exposed to one or more substances at the same time. The combined effects (synergistic) of chemicals in mixtures can be more hazardous to health than the individual substances.

**Control measures**

Exposure to hazardous substances may be prevented by eliminating the substance from the workplace eg, via new technology, or using manual or mechanical means rather than chemical means to achieve the same ends. However, if it is not possible to eliminate the substance, adequate control of exposure to hazardous substances may be achieved by the following:

- Substituting the form in which the hazardous substance is used eg, if dermatitis is occurring with a certain type of hand washing cleaning agent, assess whether a less hazardous substance can be used that will still achieve the desired effect.
- Isolating the process from workers by distance or barriers that prevent exposure eg, processes that produce hazardous fumes, should be isolated to an area where there are few workers, and those that are exposed are then adequately protected.
- Engineering controls eg, local exhaust ventilation systems, which require considerable engineering expertise, can be highly effective if properly introduced ie, a fume cupboard
- in a laboratory, or a water trap in a drain where chemical fumes may blow back. Ongoing maintenance and air monitoring is critical to ensure that the exposure remains minimised.
- Safe work practices eg, ways of working that reduce exposure, such as purchasing chemicals in ready-to-use packages instead of decanting, purchasing chemicals in granule forms instead of powders that can produce
dust when handled and ensuring that eating, drinking and smoking is not permitted in areas that contain hazardous substances.

Adequate control may be achieved by using more than one type of control measure. It is not acceptable to rely solely on using personal protective clothing or equipment (eg, respirators, gloves etc) to protect workers. Personal protection should only be used to provide extra protection, or where other control measures are not reasonably practicable eg, using acid resistant gloves and aprons in hook rooms.

Decisions about appropriate control measures should be made during the assessment. It is important to consider all possible ‘routes of entry’ into the body. For example, if the substance may be breathed in, the control measures should control the amount of hazardous substance in workplace air. If the substance can be absorbed through the skin, contact with the skin must be prevented or minimised.

Note the manufacturer’s instructions for first aid requirements – in this case a deluge of water can be provided by an emergency safety shower.

Maintenance of control measures
All control measures must be regularly maintained. This includes regular testing of control measures eg, exhaust ventilation, to check they are working effectively and repaired as necessary. If personal protection is used, it should be properly cleaned and checked before it is used again.

Storage
Hazardous substances must be stored in accordance with the manufacturer’s instructions. The place where the substances are stored should be listed on the hazardous substances register. Appropriate signage must be used in the storage
area to warn workers that hazardous substances are present, and the appropriate personal protective equipment must be supplied to ensure workers are not exposed.

First aid
Check the MSDS and label for the substances’ first aid requirements and the treatment required for various exposures. Substances can enter the body by inhalation, by swallowing, or by contact with skin.

Australian Quarantine Inspection Service (AQIS)

As noted at the beginning of this section, chemicals used within the meat industry, particularly for export companies, are subject to approval by AQIS. This information can be found at the AQIS web site: http://www.daff.gov.au/_media/documents/aqis/exporting/meat/approvedchemicalguidelines.pdf

While export companies must comply with this list, generally domestic companies also seek to comply with this list due to strict quality requirements within the Australian market.

It must be noted that AQIS approval does not imply that the use of chemicals noted on the list are without risk to health and safety. In particular with hazardous substances, AQIS approved materials may still be hazardous, as noted in the following table.
4.10.1 Hazardous Substances Register

Department Name: ________________________________________________________________

<table>
<thead>
<tr>
<th>PRODUCT NAME</th>
<th>USAGE</th>
<th>SUPPLIER DETAILS</th>
<th>STORAGE LOCATION</th>
<th>MAXIMUM QUANTITY</th>
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4.10.2 Sample Material Safety Data Sheet

STATEMENT OF HAZARDOUS NATURE

COMPANY DETAILS

Company:

Address:

Telephone Number:

Emergency Telephone Number:

IDENTIFICATION

Product Name:

Other Names:

Manufacturer’s Product Code:

UN Number:

Dangerous Goods Class and Subsidiary Risk:

Hazchem Code:

Poisons Schedule Number:

Use:

Physical Description/Properties

Appearance:

Boiling Point/Melting Point:

Vapour Pressure:

Specific Gravity:

Flashpoint:

Flammability Limits:

Solubility in Water:
Other Properties:

Ingredients:

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<tr>
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<th>CAS Number:</th>
<th>Proportion:</th>
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HEALTH HAZARD INFORMATION

Health Effects

Acute:
- Swallowed:
- Eye:
- Skin:
- Inhaled:

Chronic:

First Aid
- Swallowed:
- Eye:
- Skin:
- Inhaled:
  - First Aid Facilities:

Advice to Doctor:

PRECAUTIONS FOR USE

Exposure Standards:
Engineering Controls:
Personal Protection:
Flammability:

SAFE HANDLING INFORMATION

Storage and Transport:
Spills and Disposal:
Fire/Explosion Hazard:

OTHER INFORMATION:
CONTACT POINT:
### 4.10.3 Sample Hazardous Substances Risk Assessment Form

**Hazardous Substance Risk Assessment Work Sheet**

<table>
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<tr>
<td>Disposal</td>
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<tr>
<td>Information / training</td>
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<tr>
<td>MSDS / hazard register</td>
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<td>Emergency and first aid</td>
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**Qualitative risk assessment**

Refer to risk calculator table

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<th>Likelihood</th>
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**Description of risk**

**Recommended controls measures**
4.11 Manual tasks

Introduction
Manual tasks means "a task comprised wholly or partly by any activity requiring a person to use his or her musculoskeletal system in performing his or her work and can include the use of force for lifting, lowering, pushing, pulling, carrying or otherwise moving, holding or restraining any person, animal or item." (National Standard for Manual Tasks, 2007, p 15).

Hazardous manual tasks means:
   a. “a manual task having one of the following characteristics:
      i. repetitive or sustained application of force;
      ii. repetitive or sustained awkward posture;
      iii. repetitive or sustained movement;
      iv. application of high force;
      v. exposure to sustained vibration;
   b. a manual tasks involving the handling of a person or an animal; or
   c. a manual task involving the handling of unstable or unbalanced load or loads which are difficult to grasp or hold.” (National Standard for Manual Tasks, 2007, p 15).

In terms of tasks in the meat industry, this translates to a whole range of activities including rodding, boning, cutting and packing activities, pushing bins, loading pallets, lifting and throwing product, cleaning and many activities in the yards.

Part 1 has highlighted that injuries related to manual tasks is the most frequent (48% of all injuries in meat processing) in the meat industry in Australia. Injuries also cost more than the average claim ($4,800/claim ct $3,700 for all injuries). Therefore, it is a critical area of risk management for meat processing plants.

Resources
The Australian Safety and Compensation Council (ASCC) has developed the following manual handling documents that are relevant to the meat industry:
   • National code of practice for the prevention of occupational overuse syndrome [NOHSC:2013(1994)]
   • Guidance note for the prevention of occupational overuse syndrome in the manufacturing industry [NOHSC:3015(1996)].

As noted in Part 3, these are offered as a basis for a nationally consistent regulatory framework, but they are not legally enforceable until State or Territory governments adopt them as regulations or codes of practice under their relevant OHS Act. It is not the intention of this reference guide to reproduce the excellent information that is available directly from
these publications. However they can be accessed and downloaded free of charge from the ASCC website at http://www.ascc.gov.au/ascc/HealthSafety/HazardsSafetyIssues/ManualTasks/ManualTasks.htm

The National Standard for Manual Tasks (2007) outlines:
- Definitions
- Responsibilities of various ‘duty holders’ including employers, designers, manufacturers, suppliers and workers
- An overview of the risk management process as it relates to managing hazardous manual tasks.

The National Code of Practice for the Prevention of Musculoskeletal Disorders from Performing Manual Tasks at Work (2007) provides a great deal more detail on all of these topics. It is extremely useful in that it outlines how hazardous manual tasks can be identified, assessed, controlled and reviewed/evaluated. It also contains a number of excellent and detailed tools to use in the risk assessment procedure. While these tools are extremely useful and are particularly good at educating staff in the process, they can initially seem a little overwhelming. For example, the risk assessment and control tool is 18 pages long. However, once staff are more familiar with the relevant risk factors and possible control options, other available tools may prove useful. For example, the Task Analysis tool found in the Queensland Department of Employment and Industrial Relations’ “Manual Tasks Code of Practice” (2000).

In addition to the national standard, codes of practice and guidelines reflecting the urgent need to address this significant and costly hazard for the meat industry all over Australia, Meat and Livestock Australia (MLA) and many States have carried out additional work in the area of manual handling within the meat industry. Excellent examples of risk control in meat works, including job redesign, mechanical handling equipment and training are outlined in the following resources.

Table 9: Some Meat Industry Specific Manual Task Resources/Ideas

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<tr>
<td>1.</td>
<td>RedMeatHub</td>
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<tr>
<td>2.</td>
<td>Ergonomic Best Practice Case Studies from Meat Processing Plants in Australia (2000), MLA</td>
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The following advice and suggested solutions for manual tasks in the meat industry, have been developed with due reference to the information laid out in the above standard, codes of practice and guidance note.
Manual Tasks Risk Management

While there is a legislative obligation placed on every employer in the meat industry to conduct risk identification and assessment, not all employers possess either the expertise to carry out successful risk assessment, the social or technical expertise to make decisions, or the necessary resources to implement control measures. Hence the importance of using a team approach to problem solving and the detailed resources as outlined above.

The key to effectively managing a manual task hazard (like any other hazard) is to analyse the hazard and its cause, and then systematically control the hazard. The risk management process consists of four main stages:
1. Hazard identification
2. Risk assessment
3. Risk control

These stages are outlined in general terms in Part 3. It is particularly important that the sections on how to identify hazards and priority setting (Parts 3.2 and 3.3) are understood. This section concentrates on the management of specific hazardous manual tasks.

Manual tasks risk management should be carried out:
- in consultation with workers and their representatives
- when any hazardous manual task is identified
- when any change occurs within a task that may introduce a new manual task risk
- prior to the introduction of any new practices or techniques.

Once a task has been selected to assess, the following steps should be taken.

Stage One - Hazard identification

This stage involves identifying the manual tasks in the workplace that could be hazardous. This involves:
- Gathering and reviewing available information. This includes using all the methods/information sources outlined in Part 3.2. However, it should also include information about specific activities such as tasks:
  - workers find difficult to do
  - that require more than one person to do
  - that are new or have changed
  - required to be done due to unexpected events (eg breakdowns)
- Once the initial list has been compiled, analyse each task to determine if it contains any of the characteristics of a Hazardous Manual Task as per the definition in the Introduction above (page ??). Detailed assistance with this analysis can be obtained from the National Code of Practice for the Prevention of Musculoskeletal Disorders from Performing Manual Tasks at Work referred to above.
- Note: This process is about identifying tasks that may be hazardous. These tasks will then be assessed (stage two) to determine if it is actually hazardous
Record which of the tasks from the initial list have been determined to be possibly hazardous.

**Stage two - Risk assessment**

This stage involves an assessment of the risks for the possible hazardous tasks that were identified in stage one. This requires the assessors to determine:

- Whether the task poses a risk of injury
- The sources of the risk.

Remember, it is important to consult with others who are actively involved in the task (e.g., health and safety representatives, operators who routinely carry out the task, supervisors in the relevant area) to gain an accurate picture of the task requirements.

Initially record any information about the task, injury and claims history associated with the task to be assessed. This also allows the opportunity for some historical information about the level of risk that has been found in the task in the past.

The National Code of Practice proposes that the task be described in terms of:

- “Activities which make up the task
- Work processes and systems of work used
- Skills and experience used
- Work area design and layout, and
- The working environment.

During the assessment take into account all reasonable variations in the task, for example, seasonal peaks in workload, the organisation of work during maintenance and when staff are on leave.” (National Code of Practice for the Prevention of Musculoskeletal Disorders from Performing Manual Tasks at Work, 2007, p 35)

Then determine the risk factors for the task. The National Code of Practice outlines the risk factors in terms of direct or contributing factors.

“Direct risk factors are:

- the postures and movements of the worker including repetitive awkward postures and sustained awkward posture
- the fourth is involved in the task including high force, jerky or unexpected forces and speed and force
- the direction and frequency of the task including frequency, repetition, duration

The contributing risk factors are:

- the work environment including cold, heat, humidity, wind, lighting, floor surfaces and housekeeping
- systems of work, work organisation and work practices including high workloads and tight deadlines, little latitude for workers to influence workload or work methods and unsuitable or insufficient resources such as staffing levels, equipment and guidance available to workers
exposure to vibration including whole-body vibration, and hand/arm vibration."


Detailed assistance with this assessment can be obtained from the National Code of Practice on pages 34 to 57.

Once the risk factors have been determined for a task, and assessment can be made whether the task is in fact hazardous. If deemed to be a hazardous manual task, stage three needs to be implemented ie steps taken to control the risk factors associated with the task.

**Stage three: Risk control**
Risk control follows the standard application of the hierarchy of controls for the management of a hazardous manual task. In terms of applying the hierarchy of hazard management to manual handling, the three elements are as follows:

1. **Can the task be eliminated? ie is the manual task necessary**
   This is clearly the most effective approach but will not always be possible. However, by critically considering ‘why’ the task is being done, workplaces can often find that the entire task, or at least parts of the task can be eliminated. For example, by redefining a process some steps may be able to be eliminated.

2. **Can the risk factors associated with the task be eliminated or minimised?**
   Risk factors associated with the task often be either eliminated or minimised through engineering, design or redesign of the process.

   Possible ways of eliminating the risk to consider:
   - Can the workplace design or layout be changed?
   - Can the nature of the load be changed?
   - Can the working environment the altered?
   - Can the items used during the task be altered?
   - Can work organisation or work practices be altered?

   Examples could include assessing whether another method can be used, or developing mechanical aids (eg, using conveyors rather than dump bins).

   Once again detailed assistance with the selection of appropriate controls can be obtained from the National Code of Practice and from the case studies outlined below and in the resources outlined in Table 9 above.

   An excellent example of eliminating or minimising a manual task hazard by design is when severing then transferring the beef head between the main chain and the head chain.
Reducing risk through altering work reorganisation can involve reviewing the work organisation to reduce double handling or balance work rates/rest schedules, which, when not well-managed, significantly increase the risk of fatigue and injuries. A good example of reducing fatigue through work reorganisation is task rotation between boning and slicing. This reduces physical fatigue by using different muscle actions. It is sometimes difficult in the meat industry to get significant variation in body movements because of the repetitive and similar nature of many tasks. However some form of rotation is critical.

Some examples of task rotation can include:

- boning versus slicing tasks (boning requires forceful, repetitive, upper limb movements);
- slicing also involves repetitive movements in the knife hand but the force of the slicing movement is less, therefore reducing the total repetitive physical exertion required by the operator)
- standing versus sitting tasks
- high effort slaughter tasks (eg, punching out sheep) versus working with air tools
- high effort muscular force (eg, lifting beef head) versus a task with low levels of lifting (eg, working in the knocking box).

3. Can the risk factors be minimised?
If the risk factors cannot be eliminated then it must be taken to try to minimise the risk.

Note: this is the least preferred option for controlling risk factors and hence should not be used until, and unless, the other risk factors have been considered.
These controls include providing information, instruction, training, supervision and personal protective equipment. They are often used in combination with one another.

Once the decision had been taken on the control to the implemented, an action plan needs to be developed and monitored to ensure that the required changes are implemented.

**Stage four: Monitor and evaluate**

This stage involves monitoring and reviewing the risk control measures that have been implemented. The primary purpose of this is to determine the effectiveness of the controls implemented, and hence to consider if further steps need to be taken.

When evaluating, it is important to:

- Check with the people who do the task, that the task is actually easier to perform
- Ensure that the risk factors that were intended to be controlled have actually been controlled
- Make sure that the changes made have not created any unexpected risks/problems.

If any problems are encountered, the risk assessment will need to be revisited and alternative control considered.

**Tips for good manual task assessments**

- A team, not an individual, should conduct them. This provides not only a cross-section of opinions about what hazards exist, but a reality check when it comes to assessing the risk involved in the hazard.
- Tasks should be measured against standards. Using a checklist derived from a nationally excepted standard provides a more consistent approach and gives accurate findings into the level of risk.
- They should include knowledgeable persons, health and safety representatives, operators, engineers and anyone who may have an understanding of the task being assessed. They will be able to offer valuable supplementary information to complete
an all encompassing risk assessment and offer more comprehensive solutions. If they are not able to attend the audit, they can be approached at a later time for their input.

- Be specific. Wherever possible quantify hazards eg, rather than saying the load is heavy, measure its weight. Rather than saying worker has to reach a long way, measure and specify the distance. This provides more detail about the level of risk.

- Challenge customs and practice. The response to change can sometimes be "we have always done it this way", or "I have never hurt myself on the job, it can't be a problem".

- We need to analyse the hazards and manage these and not rely on luck as the main reason for not being injured. One day that luck might run out.

- When assessing the level of risk, consider the number of workers exposed, how often they are exposed, any combination of hazards, and any variations in the process (seasonal, different types of meat, chilled or fresh meat etc).

Case studies
Surveys within the meat industry reveal the pressing need for practical case studies linked to common, everyday tasks within the meat industry which present significant manual handling hazards. The following case studies outline a number of these tasks in terms of their hazards and offer possible risk control solutions.

Knocking box
The hazards involved when stunning beef in the knocking box with no shoulder or head restraint means the operator often bends over to reach the animal, as well as risks hitting their arm against the animal or the knocking box. Vertical bars to restrain the head and a front-angled ledge to elevate the head and neck ensures that the animal's head is in a good position for stunning. In addition a rear ram can be used to operate a lever to push the animal forward. These modifications improve the operators' working posture and restrain all sizes of animals in the box.
Cradle used when sticking
When stunning cattle without a cradle the animal sometimes falls out of the knocking box, requiring significant manual handling to get it into position for sticking. The installation of a cradle supports the animal in a position to stick, with less movement of the animal, reducing the risk of injury for the operator.

Lifting equipment
Installing a hydraulic tub lifter can eliminate the hazards of walking up steps with containers to pour contents into a machine several times per shift.

Whizzard knife
When cutting fat from a carcase with a non-powered knife, the repetition of movements combined with the increased grip strength required can increase the risk of occupational overuse injury. A whizzard knife can reduce the frequency of cuts to complete the task; cost of knife approximately $3000 to $5000.

Tub trolley design
Using a trolley can eliminate the hazards associated with repetitive lifting of 10 to 15 kg tubs.
**Tongue or cheek cleaning machine**
Installing a rotating cleaning machine at the point where the tongues or cheeks are removed from the carcase can eliminate the double handling of putting product in a dump bin on the kill floor.

![Image of tongue or cheek cleaning machine]

**Bulk containers**
Transporting bulk containers on pallets can be achieved by forklifts or by hand operated lifters.

**Transport bins**
The task of transporting meat product within the processing plant can be facilitated by the use of dump bins with large nylon wheels.

![Image of transport bins]
Punching out sheep
The bending and twisting involved in this task can lead to a significant risk of manual handling-related injury, including injury to the spine and general occupational overuse injury. Recommendations include task rotation, manual-handling training, and an exploration of the possibility of automating or semi-automating the task.

Boning room table and layout
One size does not fit all! Adjustable heights of boning tables and equipment can reduce poor operating postures and allow for different heights within operators. In addition an adjustable height table allows for the height to be adjusted between light boning or trimming tasks and more physically demanding boning tasks. A workstation layout where operators face each other and are at right angles to the conveyor belt, with a chute on the other side into which to throw off-cuts, is recommended. This allows each operator to adjust the table height according to their height and requirements, eliminates the need for a trolley when off-cuts go down the chute, meat can be put straight into it a carton on the roller conveyor belt, there is an easy reach to the conveyor belt to grasp meat, and a hinged system on the roller conveyor allows the operator to lift up a one-metre section of the rollers when leaving the processing area.
Two operators working at a boning table

Boning room layout
Sorting in boning room
Sorting involving numerous workers spaced along a sorting belt can be a hazard. Operators are often not able to keep up with the product due to the speed of the conveyor, space constraints with many combinations of product being sorted into many different bins, overreaching, high-speed repetitive work, and no adjustment to the workstations to accommodate different sized operators. An alternative sorting method advocates a rotating table that is adjustable in height to accommodate different heights of operators, allows the task to be self-paced and improves reorganisation of the sorting process, resulting in fewer bins and less congestion in the room.
Hot water hose attachment (any area of any plant)

This case study won the SA Meat Industry OHS Committee annual worker award for the worker who developed the concept. Cleaners were suffering injuries from using hot water hoses, needed for washing down work areas. The old method involved cutting off a section of the end of the hose, with a piece of metal wrapped around the end of the hose that heated up as the hot water passed through it. Through a process of trial and error the company developed their own attachment for the end of the hose, made on the lathe in their workshop. The shape and bulk of the plastic attachment improved the ergonomic grip required by the worker, and the risk of getting burned for the operator was reduced.
Roller conveyor system
When a change of direction of movement of a carton on a roller conveyor is required it can involve additional pushing and pulling effort from the operator. A swivel roller ball surface can be used to move the carton through a change in direction of 90 degrees. Approximate cost of the marbled conveyor $1500 per metre. Alternatively a flexible roller system can be used at a cost of approximately $2000 per three-metre conveyors.

Loadout area
A ram on a forklift can eliminate manual handling when loading a pallet into a container.
4.12 Noise

Introduction
Noise-induced hearing loss is the most compensated industrial disease in Australia. Long-term exposure to excessive noise will damage hearing. The meat industry comprises a number of different areas or situations that can create excessive noise e.g., live animals in the yards or in the lairages, metal hooks on rails, compressed air, power tools and the movement of trolleys on concrete floors.

Noise can be described as unwanted sound that may damage a worker's hearing. Noise or sound is made of a relatively small change in air pressure. The changes in pressure are detected by the eardrum and carried to the hair cells (see Figure 11) in the cochlea of the inner ear. These hair cells convert the pressure changes to electrical impulses, which are sent to the brain. The brain is then able to process these electrical impulses into meaningful sounds. The extent of damage caused by noise depends on the total amount of noise received over time. Noise destroys the sound-sensitive cells in the ear.

Figure 11: Anatomy of the ear
As the noise becomes louder and more intense, it takes less time to cause damage. A worker's ability to hear can become temporarily or permanently impaired if the worker's unprotected ear is exposed to loud noise. The human ear has a remarkable range, therefore noise needs to be presented in a logarithmic unit i.e., the decibel (dB) where each increase in three dB is equivalent to doubling the energy of the noise in an area.

Prolonged exposure i.e., eight hours exposure to noise levels of 85 dB(A) and above can cause noise-induced hearing loss, as can exposure to a one-off noise (e.g., a shotgun blast at approximately 140 dB(A)) which can cause not only immediate hearing damage but also physical pain. The socially isolating effect of noise-induced hearing loss is profound and noise-induced hearing loss is irreversible and incurable.

The benefits of reducing excessive noise in the meat industry include:
Key definitions

**Decibel (dB)** - the measure of how much noise (or sound pressure level) expressed in a logarithmic scale where each increase in three dB is equivalent to doubling the energy of the noise in an area.

**dB(A)** - noise levels are commonly expressed in dB(A), with the 'A' weighting following the average human hearing response and enabling the intensity of noise with different frequency characteristics to be compared.

**Leq** - the equivalent noise level is the continuous steady state noise level which would contain the same energy as the time varying noise for hearing conservation purposes. This value is obtained over a period of eight hours.

**L Aeq 8 hour** - the ‘A’ weighted equivalent noise level measures over an eight hour period.

**Noise control for abattoirs**

Traditional efforts within the meat industry to control noise have largely used administrative controls ie, rotation of workers and the use of personal protective equipment. In 1995 the Meat Research Corporation (now called Meat and Livestock Australia) commissioned a number of projects aimed at providing information and advice on engineering control options, to help the meat industry achieve best practice in noise reduction. A synopsis of the projects is reproduced throughout the rest of this chapter. The project findings were aimed at abattoir owners, engineers, OHS committees and OHS representatives as a practical guide to provide basic noise solutions.

Acceptable noise levels are stated as those lower than 85 dB(A) National standard for occupational noise 2000 found at [http://www.ascc.gov.au/ascc/AboutUs/Publications/](http://www.ascc.gov.au/ascc/AboutUs/Publications/). The National code of practice for noise management and protection at work (NOHSC: 2009 - 2004), and the website as above, provides practical guidance on how the National standard for occupational noise can be achieved. In general a high proportion of abattoirs have noise levels in excess of 85 dB(A). Peak levels are largely due to metal-to-metal contact ie, 111 dB(A), from dropping metal hooks and rollers into metal bins, in knocking areas with 96 dB(A) and animal noise from pigs prior to slaughter as high as 104 dB(A).

Several noise problems common to the meat industry have been assessed and a number of solutions and options are summarised as follows:
Noise from overhead fans in chillers and freezers can be reduced by doors being interlocked with variable speed control units, reducing the fan tip speed, using multi-blade low noise fans, running fans at lower speed during loading and fitting sound attenuators to fans.

Noise on the kill floor can be reduced by nylon coating on metal rails or by redesigning the chain to minimise metal-to-metal contact.

The noise of air knives on the kill floor and in the boning rooms can be reduced by air mufflers being fitted to exhausts to decrease the noise, regular maintenance, lower speed of knives where possible and testing and purchasing alternative designs.

The noise of hide pullers on the kill floor can be reduced by applying dampening materials to the rear of chutes or plates, installing alternative materials on chutes, reducing the height and speed of fall of chains and hide, redirecting exhaust air away from the work area, applying dampening material to the inside of the drum or by purchasing low noise equipment.
The noise of using an explosive knocking system while knocking can be reduced by using alternatives to traditional explosive knocking such as electric stun guns for mutton, carbon dioxide for pigs, pneumatic knocking guns for beef, and by isolating the knocking area from the rest of the plant.

The impact noise while knocking can be reduced by a more rigid knocking box with solid panels to minimise vibration, securing the animal to prevent thrashing about, rotating the knocking box to reduce impact noise when the animal falls, nylon guides in the door mechanism to dampen the impact of the door against the frame or by modifying the gate closure mechanism.
Knocking box with solid panels

- Noise from processing equipment guards that cover motors, belts and chains that vibrate can be reduced by securing guards to machine, isolating guards from transmission sources or by replacing thin sheet steel guards with heavier materials and providing dampening materials on the guard.
- The noise from vacuum-packing machines in the packing and boning rooms can be reduced by additional air filtering, dampening the panelling of the machine, removing the vacuum machine away from the packing area, or by fitting low noise fittings to exhausts on the off-cut blower for the rotary type of vacuum machine.

Heavy metal guarding

Low noise fittings on vacuum rotary packer

- Noise from water pumps, air compressors and chillers, or boilers in plant rooms can be reduced by separating them from the main worker area, enclosing in acoustic enclosures, or using screw compressors instead of reciprocating compressors.
- Impact noise from hooks hitting each other and from metal-on-metal contact with metal rails and metal gates can be reduced by modifying roller controls, installing plastic gates, slowing down the movement of rollers, providing cushioning mechanisms or enclosing
- hook return conveyors.
Plastic gates on metal rail in chiller reduce noise and manual effort required

Acoustic enclosure and separation of compressor from worker area

- Hook impact noise from hooks hitting each other and from dropping into bins or crates can be reduced by using hooks with nylon inserts, reducing the height of the drop, modifying the design of the bin to reduce impact and dampen noise of hooks, relocating away from the main work area, using a non metallic chute or conveyor to transport hooks and slowing down the speed of the hook return by reducing the gradient.
- The noise from air conditioning outlets in boning areas can be reduced by using larger outlets and using alternative dispersion devices eg, air-conditioning socks, lower speed fans or fitting sound attenuators to duct work.
Air socks on air conditioning system in boning room reduce noise and wind chill factor

- The transmission of engine noise through flooring and connected equipment in production areas can be reduced by using buffers eg, polyurethane, or ensuring conveyors are not connected directly to hoppers of machines.
- The noise from workers tapping on handrails with the backs of knives on the kill floor and in production areas can be reduced by filling hollow sections of handrails with sand or cement.

Hooks with nylon inserts
Air knives, stainless-steel benches and hook and rail noise

A further project was carried out in consultation with suppliers of noise reducing initiatives and with six abattoirs across Australia to provide solutions for three common noise sources that require extra attention i.e., air-powered knives, impact onto stainless steel benches and impact of hooks on rails. While the project proved that engineering modifications could effectively reduce noise levels in abattoirs through a range of simple innovations, further evaluation within abattoirs is required to ensure that the initiatives are acceptable from other perspectives such as durability, cleaning properties, impact on productivity and maintenance requirements.

Air knives

Two commonly used air knives were tested before and after modification with findings of significant reduction in both Leq (continuous steady noise over a period of eight hours) and peak measurements.

Noise levels recorded with the Jarvis Dehider [L Aeq 8 hr 103.8 dB(A)] were reduced by the use of the Jarvis Muffler [L Aeq 8 hr 95.2 dB(A)] and by the use of the Silvent 705 muffler [L Aeq 8 hr 94.1 dB(A)].

Noise levels recorded with the Bettcher Whizard Model 1300 UZ [L Aeq 8 hr 106.0 dB(A)] were reduced by the use of the manufacturer’s muffler (CEJN320) [L Aeq 8 hr 73.4 dB(A)], the Silvent 705 on a short attachment [L Aeq 8 hr 82.8 dB(A)], and with the use of various
(Allied Witan M02, Allied Witan M05, Silvent 705) three-metre lengths of hose [L Aeq 8 hr 73-76 dB(A)].

Dehider fitted with muffler

**Stainless steel benches**
The results of dropping bones onto stainless steel benches both when benches are treated and untreated were compared and it was evident from these trials that the noise dampening properties of the treated stainless steel (covered with modified viscoelastic acrylic polymer tiles) reduced the noise levels significantly.

Whizzard knife fitted with muffler
Untreated stainless steel bench

Hook and rail noise
Hook and rail noise was assessed and control options were tested, including plastic surface of rails, polypropylene facing of the shackle return rail, plastic hooks (used for small stock, they virtually eliminate noise and are easy to clean), polypropylene and rubber at the end of the hook rail to absorb noise, aluminium hooks and screw feed rails.

A range of hook and rail configurations were measured when a beef rail descended between floors, had a curved corner rail system, had bare metal rails in the chiller and then, in the same chiller, tested with plastic surface rails. In each case noise modification methods led to significant noise reduction.

Equipment noise in all areas can be reduced by ensuring all future equipment purchases have noise specification ratings below the recommended levels and by ensuring equipment is installed such that noise and vibration is isolated from work areas.

The examples outlined above are good illustrations of the principles of noise control which includes modifying the noise source to reduce the noise output, removing or limiting the receiver from the area or preventing the exposure of the receiver. Noise control planning should be carried out in consultation with workers and should involve the development of a written noise control policy and program of action.

Noise control methodologies
Noise exposure can be controlled by modifying the noise source to reduce the noise output (engineering controls), removing or limiting the receiver from the area (administrative controls), or preventing the exposure of the receiver (personal protective equipment).

Engineering controls
Engineering controls at the source include the purchase of new plant, when the issue of noise reduction should be part of the design brief. Other options include:

- eliminating or replacing the plant or its operation by a quieter operation with equal or better efficiency eg, replace rivets with welds
- making design changes to reduce specific noise sources eg, avoid metal-to-metal contact with the use of nylon or polyurethane bumpers, improved gearing
- correcting specific machine elements causing the noise eg, adding vibration isolation mounting, mufflers or silencers
- ensuring plant is maintained properly eg, replacing worn bearings and gears, improving lubrication, tightening loose parts (particularly guards), tensioning slapping belts, balancing all rotating parts and preventing air or steam leaks
• isolating vibrating machine parts to reduce noise from vibrating panels or guards
• modifying materials handling processes to reduce the impact noise during handling and transport as far as possible eg, minimising the fall height of items on to hard surfaces, fixing dampening materials or stiffening panels to surfaces that are struck by materials or items during processing, absorbing shock through providing wear-resistant rubber or plastic coating, using conveyors instead of rollers (which are more likely to rattle) and controlling speed to better match production flow, thereby reducing noise generation due to stop-start impact noise.

Engineering controls within the noise transmission path will need to be considered when it is not possible to change or modify the noise generation at the source:
• isolating noise emitting equipment away from the majority of the work population eg, pumps, air compressors, fans
• isolating the noise source or the workers in an acoustic enclosure while distance is often the cheapest solution, it may not be effective in cases of excessive reverberation in some areas eg, with bone crushers
• use of full or partial partitions or barriers between the source of the noise and the receiver, especially when noise absorbing material is used on the noise source side
• walls and enclosures designed to limit noise can be constructed using sound absorbing as well as sound blocking elements ie, the denser and heavier the material the better the noise barrier eg, steel, brick, concrete, lead. Nb, small holes or openings in enclosures can severely limit the reduction achieved
• the use of traditional sound-absorbing materials (ie, polyurethane foams, rock wool, fibreglass, carpet) are often not practical in the abattoir environment due to the difficulty of cleaning and contamination risk.
• The prioritisation of engineering-based noise controls needs to take into account an assessment of the magnitude of the noise, the number of exposed workers, and the practicability of the solutions within your workplace.

Administrative controls
Administrative controls are modifications to the system of work to reduce either the duration of exposure or the magnitude of exposure. Examples include:
• organising schedules so that noisy work is done with as few workers as possible present planning to even out the workload and avoid busy times when machines are operating for longer hours
• keeping workers out of noisy areas if their job does not require them to be there
• job rotation ie, rotating workers out of noise affected areas for periods of time to reduce noise exposure.

Personal protective equipment (PPE)
When engineering and administrative controls will not be or are not practicable to reduce the exposure to noise below the requirements of the National standard for occupational noise, workers should be supplied with (and wear) effective personal hearing protectors. PPE should only be considered to be an interim measure until engineering control of
noise exposure can be achieved. Areas that may expose persons to excessive noise should be clearly marked (with the boundaries noted) and signposted accordingly. This includes areas, machinery and tools. The standard hearing protection warning symbol should be used AS 1319 Safety signs for the occupational environment.

Due to the difficulty of wearing hearing protectors for long periods of time and in certain environments, regular brief periods in quiet areas without hearing protection should be provided. These quiet areas should have levels of less than 80 dB(A) to be effective.

All hearing protectors should conform to AS 1270 Acoustics - Hearing protectors in both specification and testing. This includes information on the sound-reducing capacity, the methods used to test the protectors and the details of the laboratories carrying out the test. This information should be made available to workers and their representatives.

The decision between using either plugs or earmuffs should be made in consultation with workers who are wearing the products. The following points need to be taken into consideration:

- the degree of protection required
- the suitability of use in that environment
- the comfort, weight and clamp force of the protector
- the fit to the user
- the safety to the user and to fellow workers.

In general, plugs that are disposable or semi-reusable are made from sponge plastic, so that when they are squashed they slowly expand back to fill the ear canal. While they provide good fit and attenuation, they cannot be cleaned. Reusable plugs made from silicone rubber or acrylic, formed from an ear impression, can provide very good fit and attenuation, and can be cleaned, but are expensive to make.

Earmuffs are easy to fit, and useful in dirty and adverse conditions, and can be cleaned. However compliance in wearing earmuffs can be difficult; particularly when other PPE is required ie, safety glasses, goggles or a face shield.

**Measuring noise in abattoirs**

Noise assessments are undertaken to quantify the amount of noise to which workers are exposed (and hence the risk of hearing loss), and to help identify sources of noise and control strategies.

Some key considerations in planning a noise measuring program include:

- the assessment should take place during a representative workday, with the microphone of the sound measuring equipment as close as possible to the worker's ears in the normal working position
- noise measurement and exposure assessment should be undertaken in accordance with AS 1269, Occupational noise management. The instrument selected will depend upon the circumstances and the purpose of the assessment. All sound level metres and noise dosimeters should comply with the specifications handed down in AS IEC 61672.2 Electroacoustics - Sound level meters - Pattern evaluation tests and specifications
a noise assessments needs to be carried out in two stages as per AS 1269 – the preliminary assessment undertaken to obtain an indication as to whether a worker’s noise exposure may exceed the exposure standard, and a more detailed assessment where excessive exposure is noted, producing results in the form of Leq eight hour and peak noise level for each worker likely to be exposed

the assessment should be undertaken by a competent person with the necessary education and experience in interpreting the results obtained

introduced noise sources such as walkman-type radios or external radios will add to the overall noise dose the worker is exposed to in the workplace.

Audiometry

Audiometric testing may be useful, but it is relevant only within the content of a comprehensive noise management program. If there is no effective noise management program, audiometry merely records progression of hearing impairment and provides information about liability for compensation.

Only appropriately trained and experienced persons should carry out testing, and a copy of the results of the test should be given to the worker with a full explanation. A summary of the tests, without identifying individuals, should be made available to the organisation to assess the effectiveness of the noise management program. Workers who do have significant noise-induced hearing loss will need to be followed up not only through the workers compensation channel, but also in terms of the duty of care to provide a safe place of work, including protection from the noise in the environment, either by transfer from a noisy area or with effective personal protective equipment.

Pre-employment audiometry as part of a pre-employment medical assessment can be useful to ascertain a benchmark of noise-induced hearing loss prior to recruitment to a particular area and should be used to ensure a worker is not placed in an area that will put them further at risk.

If PPE is relied on for noise control, audiometry is essential to measure its efficacy in adequately protecting the worker from noise-induced hearing loss.

Australian Standards relevant to noise

- AS IEC 61672.2 Electroacoustics - Sound level meters - Pattern evaluation tests
- AS 1319 Safety signs for the occupational environment
- AS 1269 Set - Occupational Noise Management
- AS 1269.3 Hearing protection Program
- AS 1270 Acoustics - Hearing protectors
- AS 1055.1: Acoustics - Description and measurement of environmental noise - General procedures
- AS 2399 Personal noise dosemeters
4.13 Plant, equipment and hand-powered tools

The definition of ‘plant’ generally includes any machinery, equipment, appliance, implement or tool and any of these. This therefore includes anything from knives to carcase saws, from power tools to scaffolding and forklifts. However, including a knife as a piece of ‘plant’ in the definition of plant can vary from State to State. It is emphasised that one piece of plant may have numerous hazards associated with its operation ie, manual handling, respiratory, noise, trip and electrical hazards.

The National standard for plant [NOHSC: 1010 (1994)] was initially developed to ensure that consistent legal requirements for the control of hazards related to plant would apply in all States and Territories across Australia. While it is still current, most state authorities have now developed more recent regulations, codes of practice or guides and these should be used in preference to the National standard. These plant regulations/codes then outline the legal obligations aimed at minimising the risk to health from work with plant.

However, in 2006, Standards Australia published a series of standards relating to safety of machinery – AS 4024.1. These standards provide designers, manufacturers, suppliers, employers and users of machinery with guidelines to help reduce the risk of working with, or near, machinery. The series is divided into three major areas: safety principles; design parameters and ergonomics. A summary of what each standard covers is outlined in Table 10 below.

It is particularly important that these standards are referred to when:
- identifying potentially hazardous plant
- conducting plant risk assessments
- considering controls to manage risks
- when redesigning plant all workplaces.
Table 10: Summary of AS 4024.1 Series – Safety of Machinery

<table>
<thead>
<tr>
<th>SAFETY PRINCIPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AS 4024.1101-2006</strong></td>
</tr>
<tr>
<td>Provides a set of terms and definitions for use within other safety of machinery Standards and during discussions relating to machinery safety.</td>
</tr>
<tr>
<td><strong>AS 4024.1201-2006</strong></td>
</tr>
<tr>
<td>Specifies the basic terminology and methodology to be used by designers in achieving safety of machinery.</td>
</tr>
<tr>
<td><strong>AS 4024.1202-2006</strong></td>
</tr>
<tr>
<td>Defines the technical principles required to achieve safety in the design of machinery. Does not deal with injury to domestic animals, property or the environment.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RISK ASSESSMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AS 4024.1301-2006</strong></td>
</tr>
<tr>
<td>Specifies principles for the procedure of risk assessment by which the knowledge and experience of the harm related to machinery is gathered together to aid in assessing risks during all phases in the life of machinery. Guidance on the information necessary to allow risk assessments to be carried out is provided, as is a brief outline of some of the techniques available.</td>
</tr>
<tr>
<td><strong>AS 4024.1302-2006</strong></td>
</tr>
<tr>
<td>Provides principles for controlling risks to health resulting from the emission of hazardous substances from machinery.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ERGONOMIC PRINCIPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AS 4024.1401-2006</strong></td>
</tr>
<tr>
<td>Specifies the ergonomic design principles and terminology to be followed by designers during the process of designing work equipment, so as to achieve safety of machinery.</td>
</tr>
</tbody>
</table>
## DESIGN PARAMETERS

### Design of safety related parts of control systems

**AS 4024.1501-2006**
- **General principles**
  - Provides safety requirements and guidance on the principles to be used in the design of the safety related parts of machinery control systems. Categories are specified and the characteristics of the safety functions are described.

**AS 4024.1502-2006**
- **Validation**
  - Specifies the conditions and procedures to be followed for the validation by both analysis and testing of safety functions provided and category achieved by the safety related parts of control systems using the design rationale provided by the designer. When validating programmable electronic systems, this Standard does not provide complete requirements and can require the use of other Standards such as the AS 61508 series.

### Design of controls, interlocks and guarding

**AS 4024.1601-2006**
- **Guards - General requirements for the design and construction of fixed and moveable guards**
  - Specifies requirements for the design and construction of fixed and movable guards intended to afford protection from mechanical hazards at machinery.

**AS 4024.1602-2006**
- **Principles for design and selection**
  - Specifies principles for the design and selection of interlocking devices associated with guards. The principles are independent of the energy sources used on the machine.

**AS 4024.1603-2006**
- **Prevention of unexpected start-up**
  - Specifies means incorporated at the design stage intended to prevent an unexpected machine start-up. The means include energy isolation and dissipation. Applies to all forms of energy source including those external to the machine, such as wind, gravity and electro-magnetic.

**AS 4024.1604-2006**
- **Emergency stop - Principles for design**
  - Specifies functional requirements and the principles of design for the emergency stop of machinery without regard to the energy source used to control the functions. It does not apply to hand guided machines, hand held portable machines or to machines where the provision of an emergency stop would not reduce the level of risk to operator or other person.
## ERGONOMICS

### Human body measurements

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 4024.1701-2006</td>
<td>Basic human body measurements for technological design. Provides information and descriptions of anthropometric measurements as the basis for comparing population groups for ergonomists and others involved in the geometric design of places where people work.</td>
</tr>
<tr>
<td>AS 4024.1702-2006</td>
<td>Principles for determining the dimensions required for openings for whole body access to machinery. Specifies the minimum opening dimensions required to gain whole body access to machinery. The dimensions are more applicable to non-mobile machinery as there may be additional specific requirements for mobile machinery.</td>
</tr>
<tr>
<td>AS 4024.1703-2006</td>
<td>Principles for determining the dimensions required for access openings. Specifies minimum dimensions for access openings in machinery. Values for additional space requirements are provided. Applies primarily to non-mobile machinery, as there may be additional specific requirements for mobile machinery.</td>
</tr>
<tr>
<td>AS 4024.1704-2006</td>
<td>Anthropometric data. Specifies requirements for human body measurements required for calculating the dimensions of access openings in machinery.</td>
</tr>
</tbody>
</table>

### Safety distances and safety gaps

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 4024.1801-2006</td>
<td>Safety distances to prevent danger zones being reached by the upper limbs. Specifies the minimum safety distances from a barrier to the danger zone of a machine to prevent the danger zone being reached by the upper limbs of a person of age 3 years and above. The Standard is applicable only where safety can be assured by distance alone. The Standard will not provide sufficient protection against radiation or substances emitted from the machine.</td>
</tr>
<tr>
<td>AS 4024.1802-2006</td>
<td>Safety distances to prevent danger zones being reached by the lower limbs. Establishes values for safety distances to prevent access and to impede free access to danger zones of machinery, to prevent their being reached by the lower limbs of persons of 14 years and older. The distances apply where safety can be assured by distance alone and access by the upper limbs is not foreseeable by the risk assessment.</td>
</tr>
<tr>
<td>AS 4024.1803-2006</td>
<td>Minimum gaps to prevent crushing of parts of the human body. Establishes values for the minimum gaps relative to parts of the human body to prevent risk of crushing between two surfaces, at least one of which can move.</td>
</tr>
</tbody>
</table>
## DISPLAYS, CONTROLS, ACTUATORS AND SIGNALS

### Ergonomic requirements for the design of displays and control actuators

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 4024.1901-2006</td>
<td>General principles for human interaction with displays and control actuators. Specifies general principles to be followed when designing displays and control actuators on machinery to minimize errors on the part of the operator and to ensure an efficient interaction between the operator and equipment.</td>
</tr>
<tr>
<td>AS 4024.1902-2006</td>
<td>Displays. Specifies the ergonomic requirements for visual, audible and tactile displays for use in machinery. It provides guidance on the selection, design and location of displays to avoid potential ergonomic hazards associated with the use of displays.</td>
</tr>
<tr>
<td>AS 4024.1903-2006</td>
<td>Control actuators. Provides guidance for the design, selection and location of manual control actuators so they are adapted to operator needs, are suitable for the control task in question and take into account the circumstances of their use.</td>
</tr>
</tbody>
</table>

### Indication, marking and actuation

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 4024.1904-2006</td>
<td>Requirements for visual, auditory and tactile signs. Specifies requirements for visual, auditory and tactile methods of indicating safety related information. It sets out a system of colours, signs, marking and other means of indicating hazards and meeting emergencies. In addition, it sets out ways of coding visual, auditory and tactile signals to enable safe use and monitoring of machinery.</td>
</tr>
<tr>
<td>AS 4024.1905-2006</td>
<td>Requirements for marking. Specifies the requirements for marking machinery. Provides general rules on marking for identification, safe use in respect of mechanical and electrical hazards and in preventing the hazards arising from incorrect connections.</td>
</tr>
<tr>
<td>AS 4024.1906-2006</td>
<td>Requirements for the location and operation of actuators. Specifies the safety related requirements for actuators operated by hand or other parts of the human body at the man-machine interface. It applies to both single actuators, and groups of actuators.</td>
</tr>
<tr>
<td>AS 4024.1907-2006</td>
<td>System of auditory and visual danger and information signals. Specifies a series of both visual and auditory danger and information signals which take into account the level of urgency for the given circumstances. The Standard applies to danger and information signals that have to be perceived and recognized from each other. The Standard does not apply to fields covered by specific Standards or conventions, e.g. fire alarms, public transport or navigation signals.</td>
</tr>
</tbody>
</table>
General requirements for employers, owners, directors and installers

The following comments are general in nature, and need to be considered in the light of local state regulatory requirements and the Australian Standards as above.

A Plant Hazard Checklist Summary is provided in Part 4.13.1. All major plant and equipment can be recorded on this register, then a separate sheet used for electrical equipment registered. Part 4.13.2 contains a sample Plant Registration and Maintenance Schedule that can be useful to indicate when regular maintenance is required.

Hazard identification
Any reasonably foreseeable hazard that could arise from plant must be identified. A wide number of factors need to be considered when determining if a plant is potentially hazardous. This includes the intended use of the plant, the work environment, potential for injury, ergonomic needs, possible misuse or failure of plant. An example of a Plant Hazard Identification Checklist is included in Part 4.13.3.

Some specific hazards relating to pieces of plant found in the meat industry include the following:
- cutting hazards - eg, hock cutters, knives, bandsaws, carcase saws, horn cutters
- entanglement or crushing hazards - eg, conveyors, hide pullers, stun guns, tripe spinners, wrapping and strapping machines, augers
- electrical hazards

Two handed hock cutters dramatically reduce the risk of operator amputation
- high-temperature hazards - eg, sterilisers, pig singe chambers, hot water hoses, steam hoses, cookers and ovens
- falls from heights - eg, carcase hoists, rise and fall platforms, legging platforms
- impact hazards - eg, forklifts, tractors

Rise and fall platforms in use in combination with hide puller

Carcase saw in use

Risk assessment
Once a hazard has been identified, risks associated with the hazard must be assessed. Risk assessment could include inspection of the plant and its intended environment, testing, technical evaluation and analysis of injury data (see risk management Part 3). It must involve consultation with workers who use the plant and may include others such as designers, manufacturers, employers and plant operators.

A sample Plant Risk Assessment format is presented in 4.13.4.

**Control of risk**

If a risk to health and safety has been identified it must be eliminated, or where this is not reasonably practicable, the risk must be minimised by applying the following controls in this order:

**Firstly**

Apply engineering controls such as:
- substitution of hazardous plant with safer plant
- isolation of hazardous plant
- modification of the design
- appropriate guarding.

**Secondly**

Apply administrative procedures such as safe work procedures for the use of the plant.

**Thirdly**

Provide appropriate personal protective equipment for users of the plant and others who may be affected.

The risks associated with access and egress to parts of plant for cleaning and maintenance and to the operator’s workstation must be assessed including the need to provide emergency lighting, safety doors and alarm systems.

Any risks identified with exposure to dangerous parts must be eliminated or minimised by the application of control measures.

Suitable guarding of plant may be used as a hazard control measure. The guarding may be in the form of permanent fixed barriers, interlocking or a presence sensing system. Operational controls of plant need to be suitably identified, located and arranged to eliminate or minimise any risk to an operator’s health and safety. Emergency stops and warning devices are required if a risk assessment identifies the need for them.

**Duties of an employer**

The legislation requires an employer to identify hazards to health and safety in consultation with relevant workers, taking into account factors such as the intended use of the plant,
environmental conditions, potential for injury, ergonomic needs, access and egress, failure of plant and competency of operators.

**Hazards need to be identified:**
- before and during the introduction of plant or if any alteration or change is made in the use of the plant
- if new information associated with the safe use of the plant becomes available.

**The employer needs to assess the risks associated with the plant by:**
- inspection of the plant and work environment, safety audits, testing, technical evaluation, analysis of injury data and consultation with other persons such as designers,
- manufacturers, importers, suppliers and operators
- taking into account the layout and condition of the work environment, competency of the operator and any abnormal condition that is foreseeable
- identifying what records associated with maintenance, alterations, commissioning and installation are to be kept.

The legislation requires that employers provide training, instruction, information and supervision to persons as is necessary to minimise risks. The employer should ensure that any risks are eliminated or minimised by the application of control measures as outlined previously in *Control of Risk*. The employer should provide relevant health and safety information for the safe installation, erection, commission, use, testing, decommissioning, dismantling and disposal of plant. Employers must also ensure that risks during installation, erection or commissioning of plant are minimised.

**An employer should ensure that risk minimisation occurs during the use of the plant by developing safe systems of work, which include consideration of the following:**
- providing adequate information, training and supervision
- performing checks, tests, inspections, maintenance and cleaning
- repairing faulty plant by a competent person
- preventing any unauthorised interference or use
- ensuring that safety features are used and maintained
- the use of lockout/isolation devices, danger tags, and permits during access to the plant
- risk assessment of plant alterations are carried out by a competent person.

**If the plant is to be dismantled, stored or disposed of the employer needs to ensure:**
- that a competent person is used and relevant information is made available
- that any hazardous material requiring disposal is performed by a competent person.

**An employer needs to also keep records on plant that is under the employer’s controls such as:**
- plant specified in the legislation
- any plant where a risk assessment indicates such records should be kept.
The employer needs to also make records available to workers and health and safety representatives and transfer records on the sale of plant unless the plant is sold for scrap.

Employers have specific duties regarding some high-risk plant. The legislation outlines the duties that employers must follow in relation to the following high-risk plant:

- plant under pressure eg, boilers
- plant with moving parts eg, conveyors, hide pullers, stun guns, tripe spinners, wrapping and strapping machines, augers
- powered mobile plant eg, forklifts, tractors
- plant with hot or cold parts eg, sterilisers, pig singe chambers, hot water hoses, steam hoses, cookers and ovens
- electrical plant eg, stun guns
- plant designed to lift or move eg, carcase hoists, rise and fall platforms, legging platforms
- industrial robots
- lasers
- scaffolds
- lifts.

The relevant approved codes of practice should be checked to ensure the duties that are carried out are appropriate.

The duties of an erector or installer of plant

Erectors and installers need to identify, assess and control risks associated with the erection and installation of plant.

Erectors and installers should also take into account:

- the impact of the erection or installation process on the work environment
- access and egress requirements during erection, installation, inspection, maintenance, cleaning and use of the plant.

They need to also ensure that:

- designer or manufacturer's instructions are followed
- electrical installations are carried out in a way that minimises risks
- temporary structures are erected and dismantled in a way that minimises risks.
- The local relevant approved codes of practice should be checked.

Registration of plant designs and items of plant

Certain plant designs and items of plant need to be registered and cannot be manufactured, supplied or used unless the plant has a current design registration number issued by your local OHS regulatory authority. This includes different types of pressure equipment, lifts and cranes and amusement structures. Plant requiring registration of
design and individual items of plant which must be registered are specified in the appropriate schedules of your State or Territory plant regulations.

**Purchase and commission of new materials or equipment**

To ensure that the purchase, commission, use or storage of equipment and materials is free from occupational health and safety risks for all workers and contractors, it is important that purchasing officers, engineers, managers or supervisors consult with end-users, OH&S representatives and workers regarding the requirements of the equipment and/or materials to be purchased.

This serves to identify any potential hazard(s) and assess the associated risk of injury prior to purchasing the equipment and/or materials. Relevant user guides, instruction and service manuals will be useful as part of the consultation process during the risk assessment, and will also be helpful to ensure that the equipment meets relevant Australian standard and regulatory requirements.

If after evaluation, the equipment or material presents an unacceptable risk of injury, a suitable alternative should be sourced, or the supplier should be negotiated with to overcome the identified hazard.

If a hazardous substance (ie, cleaning agent, chemical based substance etc.) is purchased, a material safety data sheet (MSDS) must be provided by the supplier. If, as required by legislation, an MSDS does not accompany the purchased hazardous substance, a copy should be requested from the supplier.

When installing or purchasing new equipment or materials, it is important to ensure that users have appropriate competency certificates (if required), instruction and training prior to its use. If specific qualifications are required when using the equipment, then only those persons should operate that equipment.

Prior to using hazardous substances, management should ensure that users have been supplied with appropriate personal protective equipment as well as training in safe handling, storage and disposal measures (as determined by the MSDS).

A sample purchase evaluation checklist is provided in 3.6.6 which can be used to evaluate potential hazards prior to purchase.

**Plant in the meat industry**

A comprehensive outline of potential risk factors and control ideas for five examples of commonly occurring pieces of plant in the meat industry (knives, augers, bandsaws, forklift trucks, and hot water hoses) is outlined on the following pages.

**Knives**

Knife injuries are still significant with not only open wound injuries, but also with strains and sprains and disorders of muscles and other soft tissue injuries.
Most statistical analysis carried out in your State or Territory will involve interrogating data from your local workers compensation body or workers compensation claims agent. Injuries will normally be classified according to the Australian and New Zealand Standard Industrial Classification (ANZSIC) code, and broken down into mechanisms of injury and disease. Contact with knives will often be described as 'hitting moving objects' or 'being hit by moving objects'. These lacerations can include cuts to both the knife and the non-knife hand and forearm, cuts to the abdomen or the leg when a knife continues a downward motion and connects with the body, 'run through' lacerations where the knife hand slides over the edge of the knife delayed, or even amputations. Post-laceration infection is not uncommon, leading to extended time off work and rehabilitation where lacerations require suturing or skin grafts.

Knives used in the meat industry should comply with AS 2336: Meat industry - Handheld knives. There should be provision for regular cleaning of knife handles and knives throughout the working day and hand hooks should be provided where necessary, to be used as a gripping aid or to assist in moving cuts of meat from one operation to the next (the practice of using a knife to transfer meat by piercing or levering is to be discouraged at all costs). The workplace should be designed to minimise distractions from whatever the task is at hand and to reduce additional stresses and minimise fatigue eg, to reduce noise and provide comfortable working temperatures and reduce uncomfortable working postures. Clearly understood procedures should be in place to identify and safely dispose of knives that have worn down to the degree where there is a risk of the blade snapping.
Table 11: Summary of risk factors and control examples for knives

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Performance Indicator/Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• knife action creating a need for (depending on cut) constant grip, grip change midway through a cut, wrist rotation and deviation, limited range of movement, static loading of shoulder muscles, etc</td>
<td>• ensure that pouches are designed so that the blade of a knife cannot be exposed, an undue length of knife handle does not protrude, and only one knife can be stored in each compartment</td>
</tr>
<tr>
<td>• design of handle causing uncomfortable grip</td>
<td>• redesign the workplace to remove the need for inappropriate work practices eg, using a knife to transfer meat by piercing and levering</td>
</tr>
<tr>
<td>• poorly sharpened or worn blades</td>
<td>• provide sufficient work space for each worker to reduce the risk of one worker stabbing or cutting another</td>
</tr>
<tr>
<td>• inadequate steeling and sharpening</td>
<td>• redesign the workplace to minimise distractions from the task, reduce additional stressors and minimise fatigue eg, reduce noise, provide comfortable working temperatures and reduce uncomfortable working postures</td>
</tr>
<tr>
<td>• storage and transportation of unsheathed knives, including poorly designed or overcrowded pouches</td>
<td>• ensure that provision is made for regular cleaning of knife handles throughout the working day</td>
</tr>
<tr>
<td>• dropped knives</td>
<td>• ensure that spreaders, shackles, etc are of appropriate size for stock being treated</td>
</tr>
<tr>
<td>• transferring cuts of meat from one operation to the next crowded workspace, or work areas that impinge on thoroughfares</td>
<td>• provide training in correct work practices eg, to direct all knife strokes away from the body, where practicable, and in knife sharpening skills</td>
</tr>
<tr>
<td>• slippery handle from contamination by fat, body fluids, sweat/steam and lanolin (from fleece)</td>
<td>• provide training to allow safe and effective rotation, where appropriate, to minimise risk of occupational overuse injuries</td>
</tr>
<tr>
<td>• on conventional small stock chain - bodies falling while being worked on as hocks slip from spreaders</td>
<td>• where the nature of the task constitutes a risk of a knife cut to a particular part of the body, and where it is practicable to do so, provide personal protective equipment such as mesh gloves and arm or abdominal</td>
</tr>
<tr>
<td>• gripping meat with non-knife hand during knife work</td>
<td></td>
</tr>
<tr>
<td>• excessive force needed due to 'hard' meat</td>
<td></td>
</tr>
<tr>
<td>• repetitive movements</td>
<td></td>
</tr>
<tr>
<td>• speed of work</td>
<td></td>
</tr>
<tr>
<td>• poor lighting</td>
<td></td>
</tr>
<tr>
<td>• ensure that knives used comply with Australian Standard AS 2336 Meat industry - Hand-held knives</td>
<td></td>
</tr>
<tr>
<td>• consider alternative knife designs that bend the knife handle rather than the wrist</td>
<td></td>
</tr>
<tr>
<td>• seek suppliers of knives with different handle sizes</td>
<td></td>
</tr>
<tr>
<td>• ensure cutting edge of knives are correctly</td>
<td></td>
</tr>
<tr>
<td>• maintained to give the sharpest edge possible at</td>
<td></td>
</tr>
<tr>
<td>• all times</td>
<td></td>
</tr>
<tr>
<td>• ensure that workers only use knives</td>
<td></td>
</tr>
</tbody>
</table>
Methods to ensure this may include:

- training and retraining in knife sharpening skills,
- reviewing time needed and available for the sharpening of knives, provision of a trained fulltime person or automatic knife sharpeners
- select steels with design and length appropriate to the task
- fit steels with a guard securely fitted to the base of the steel which is designed to prevent the hand holding the steel from being struck by a knife
- locate oilstones so that they are convenient to workstations and in secure stands protected from passing pedestrian traffic by barriers, and set hand-held oilstones in a metal holder
- lubricate oil stones with light edible oil, water or liquid soap to provide a viscous surface upon which knives may be rubbed
- provide a constant supply of water to sandstones to allow the knife to move with ease on the surface, with safe drainage for excess water
- inspect grindstones regularly for grooves or cracks and other faults that may cause hazards, and repair or replace faulty grindstones immediately
- provide a clearly understood procedure for the identification and safe disposal of knives which have worn to the degree that there is a risk of the blade snapping
- ensure that knives are pouches when not in use, that unsheathed knives are never carried by hand from one place to another, placed on bench tops, left unattended in the workstation, or stored in lockers or other storage areas

- wear a thin cut resistant glove on the knife hand to protect from ‘run-through’ injuries
The issue of personal protective equipment is covered later in this reference guide, however, as noted above, blunt knives and poor training can contribute significantly to knife related injuries. Therefore the following section on best practice in sharpening knives is considered a valuable resource to include in this reference guide.

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**Selecting a knife**

When choosing a knife the following factors are important:

- type of steel the blade is made out of
- thickness of the blade
- length of the blade and of the knife
- shape of the blade
- type of handle.

In general, a broader, heavier blade is better for most slaughter purposes, such as skinning, and a thinner, flexible blade is better for boning and slicing. Most knives have blades between 125 to 175 millimetres long.
Parts of a knife

The handle
The shape of the handle needs to be comfortable to grip. It must also provide some safety, with the heel of the handle preventing the hand from slipping over the blade or the blade coming back through the hand.

Plastic-handled knives are easier to clean. However, they can be a safety hazard if fat builds up on the handle, thus increasing the chance of the hand slipping. Knives need to be cleaned regularly to prevent this happening.

Wooden-handled knives are less hygienic than plastic-handled knives as they absorb moisture, which can encourage the growth of micro-organisms that can contaminate the product. Wooden handles must be dried at the end of each shift to ensure that no damage has occurred to the handle.

Wooden-handled knives cannot be used at export-registered establishments or where State requirements prohibit their use.

The blade
Different parts of the blade have different names, as shown below.

Blades are made of manganese steel or carbon steel. Manganese is a type of stainless steel that will not rust. It is hard steel, which keeps its sharp edge longer than a carbon steel knife and is easier to keep hygienically clean.

Carbon steel knives are still in use although they are now less common. As carbon steel is softer than manganese, it is easier to sharpen. The main issue with carbon steel is that it rusts easily. To avoid this, at the end of each day the operator needs to:
- dry the blade
- rub the blade with emery paper to remove any rust
- smear the blade with oil.
Maintaining a knife in good order

Knives must be kept sharp at all times. This reduces the risk of an accident and ensures more efficient use. Grinding stones and oilstones are used to sharpen the blade, eliminate the shoulder and achieve the most efficient blade bevel.

Before the (knife) edge can be sharpened the operator needs to determine what shape the blade is to be. This depends on its shoulder and bevels, as the thicker the shoulder, the greater the angle of the bevel.

If the blade is too thick or has large shoulders the edge will quickly become dull and will not cut easily.
The bevel
The bevel is the pointed part of the blade and can be a different shape on different knives. Shapes of bevels differ as:
- different tasks need different shapes eg, boning, slaughtering
- types of steel (hard or soft) vary
- shape of blades vary.
The darker lines on the following diagram show the bevel.
The bevel should be about one millimetre wide. Both sides of the blade should have an even-bevelled surface at an angle of 20-25 degrees. The two bevels must meet precisely along the full length of the blade. This can be difficult along the curved part of the blade.

The (knife) edge
The (knife) edge is the point where the two bevelled edges meet. The edge will be very thin if both the shoulder and the bevel have been maintained correctly. This can result in the edge turning over and forming a 'lip' or 'feather'. The lip or feather must be removed or the edge will double or sometimes treble in thickness, and won’t cut cleanly.

The grindstone
A grindstone will need to be used to thin the shoulder of the knife to the desired shape, as shown in the following diagram. (A sandstone or emery wheel may also be used for this purpose.)

A constant supply of water should accompany the operation of the grindstone, to prevent
the blade from burning and also prevent damage to the knife and stone. The wheel should turn away from the operator and the knife edge should be facing away. If the knife faces towards the operator it can dig into the grindstone, causing it to twist rapidly and cut into the operator's hand.

To get a good flat cutting bevelled edge, the operator must press firmly on the blade, and repeat this process on both sides until both sides are identical. The knife is now ready to be honed.

The oilstone
An oilstone (or whetstone) can be used to shape or bevel the sides of the knife blade, which form the edge. This process is called honing the blade.

A large two-layered oilstone is the easiest to use. One side should be a medium-coarse abrasive and the other medium-fine.

Honing oil is used on the oilstone to stop the stone from getting blocked with small pieces of metal from the knife. Lubricating oils should not be used for honing as they form a sludge which makes it difficult to cut the metal from the blade.

When honing, the blade should be drawn across the oilstone from the heel to the point as shown in the following diagram. The knife must be kept at the same angle as when it was ground on the grinding stone.

The blade should be evenly sharpened on both sides. The knife is now ready to be steeled.

The steel
The steel is an implement used to straighten the edge of the knife. It does not sharpen the knife. It finishes off and maintains the edge that was achieved by applying the grindstone and oilstone.

When using the steel, the knife should be lightly stroked across a smooth sharpening steel to restore the shaving edge each time it dulls. This is done by placing the heel of the blade on the steel and lightly drawing the blade down across the steel at the same angle as the bevel.
The same amount of strokes should always be used on each side of the blade.

The thumb must be positioned on the same side as the fingers.

After using the steel the operator should sterilise the knife. The knife is then ready for use.

Preparing and maintaining sharpening equipment

The steel
A steel that is deeply serrated or pitted will need to be ‘bricked’ to give the desired finish. To do this the operator:

- places the brick on a firm surface and wets it with water
- takes the steel by the handle in one hand, and places their other hand firmly on the steel towards the tip. Then pressure is applied and the steel is rubbed across the brick
- this process is repeated, at the same time turning the steel each time slightly to obtain full coverage of the surface of the steel (this method does not remove the temper from the steel.)
- when the steel is smooth, it is dressed with wet and dry emery cloth. The steel is now ready for acid treatment. The purpose of this treatment is to pit the steel surface minutely to give the steel ‘bite’.

To maintain a good surface on the steel and protect it from becoming a source of contamination, it needs to be scrubbed thoroughly in hot soapy water, then dried at the end of production every day. It is also advisable to coat the steel with vegetable oil at the end of use each day.

The steel should be sterilised in the steriliser every day before it is used and wherever required by workplace procedures.

Other sharpening equipment such as grindstones and oilstones (whetstones) must also be prepared and maintained in good working order.
Grindstones
- There needs to be a continual supply of water on the stone when it is in use.
- There should not be any chips or pieces missing from the stone, as they can form a safety hazard and can damage the knife when grinding.
- The machine bearing needs to be maintained to ensure the smooth turning and shape of the stone.

![Diagram of a grindstone with a brick and a steel with arrows indicating direction of movement.]

Oilstone (whetstone)
The oilstone must be cleaned regularly with soap and water and also sterilised. This helps to prevent micro-organisms building up and maintains a better surface for honing. Oilstones should be stored correctly to ensure they don’t get contaminated, damaged or stolen.

Knife hygiene and food safety
A ‘product contact surface’ is anything that comes in direct contact with the product being handled. Knives are product contact surfaces, and can be used inadvertently to carry contamination from one product to another. Both visual contamination such as grease, ingesta, hair, wool and non-visual contamination such as micro-organisms or bacteria can contaminate meat production.
Therefore knives must be sterilised to kill micro-organisms or bacteria, by being immersed in a steriliser containing hot water at a minimum of 82°C. Knives should be sterilised:
- after grinding, honing or steeling
- if visually contaminated
- before commencing work for the day
- as required by workplace procedure or regulations eg, sterilising between carcases.

Augers (screw conveyors)
Most of the following also applies to belt, slat and tray conveyors, as well as overhead trolley conveyors and gravity slide and roller conveyors.
Table 12: Summary of risk factors and control examples for augers

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Control Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• unguarded augers at floor level or in a pit - stepping or falling into the trough and getting caught up in the screw</td>
<td>• fit u-troughs of screw conveyors with covers that are bolted on or electrically interlocked to ensure that operation without guards is prevented</td>
</tr>
<tr>
<td>• slippery floor and unguarded receiving points to auger- legs or whole body caught in the screw</td>
<td>• ensure that receival pits eg, at knackeries or rendering plants, are provided with barriers whenever possible</td>
</tr>
<tr>
<td>• augers carrying bladders, udders, uteri, slinks and placental material - splashing of potentially infective material and the release of potentially infected aerosols (see chapter on Diseases - Occupational)</td>
<td>• design waste chutes and covers for u-troughs containing screws to minimise the return of aerosols to work areas and eliminate the risk of workers slipping or stepping into them</td>
</tr>
<tr>
<td>• uncovered augers ejecting large bones or other waste matter</td>
<td>• ensure that areas around loading and unloading points and stop/start controls are free of congestion and obstructions</td>
</tr>
<tr>
<td>• clearing blockages while auger is turned on - falling into screw</td>
<td>• ensure that emergency stop controls are arranged so that the reactivation of the conveyor cannot take place until all stop controls have been returned to neutral position</td>
</tr>
<tr>
<td>• clearing blockages while auger is turned off – the power control out of sight of the worker clearing the blockage is turned back on while work is still being done</td>
<td>• ensure that the positions of controls are known to all persons working in the vicinity of conveyors as well as those working alongside conveyors</td>
</tr>
<tr>
<td>• using hooks or poles for clearing blockages</td>
<td>• ensure that poles or sticks are not used for clearing blockages of screws</td>
</tr>
<tr>
<td>• overflow of material at the discharge point results in slip, trip and fall hazard or increased infection risk</td>
<td>• ensure that automatic discharging conveyors are provided with an automatic stop so that when bins/chutes are full the conveyors stop</td>
</tr>
<tr>
<td>• height of elevated augers during maintenance procedures</td>
<td>• provide walkways or access platforms to facilitate repairs to elevated conveyors. Ensure that this area is fitted with stop controls, and access is restricted to authorised maintenance personnel</td>
</tr>
<tr>
<td>• unguarded flywheel or drive chain, sprockets and other moving parts.</td>
<td>• guard all moving parts presenting a pinch point or trapping or crushing</td>
</tr>
</tbody>
</table>
risk to prevent access by any part of a worker’s body or clothing
• design guards protecting other moving parts of conveyors eg, the drive mechanism, to be removable only by use of the key or other specialised tool
• Lockout or tag out when cleaning and with jams

Bandsaws
Aside from the information set out in the table below, the critical hazard controls related to using bandsaws safely are as follows:
• There should be an adjustable guard on the blade. An adjustable guard should be positioned at approximately 7.5 cm above the top of the carcase, providing enough clearance for the carcase on slightly different angles and providing enough vision of the carcase and the blade during the cutting process. Guarding is essential for the following reasons:
  ▪ the operators move at very high speed
  ▪ the operators work very close to the blade
  ▪ there is no protection in terms of gloves or forearm shields (would be unsafe as gloves could get drawn into the serrated teeth of the blade, exposing the operator to serious harm)
  ▪ the operators move next to the blade on a very frequent basis (at least 60 times per minute).
Operating a bandsaw is essentially a paced task, where the operator has to keep up with the person supplying the product to them. If the operator cannot keep up they may make mistakes that could lead to injury. New workers, or workers who are developing their skills on this task should be provided with a reduced rate of work to allow them to come up to speed safely.

Floor stability is critical ie, adequate housekeeping, a dry floor, and anti-fatigue matting securely fixed as to not cause a trip hazard.

Lighting should be maintained at 400 Lux as per AS 1680.2.4: 1997 Interior lighting: Industrial tasks and processes

Operators need extensive training on the safety of how to use a bandsaw and how to process the product safely through the machine, including keeping their hands as far as is practical away from the blade. A safe work procedure should set out the use of the machine with its associated hazards fully explained. Training records and safe work procedures should be readily available.

A more recent option for training associated with a bandsaw is the use of a laser projector (imported from Germany) to provide a visual warning prompt for bandsaw operators. The laser is lined up with the saw blade and provides a beam of light along the intended line of cut for the bandsaw operator to use as a guide. The beam of light acts as a visual prompt for the operator to keep hands and fingers clear of the blade.

Supervision is critical to ensure that workers are working at a rate they can manage safely. Supervisors need to monitor the rate to ensure that workers are not working beyond their capacity and not able to keep up with the supply the product.

Bandsaw in use
Table 13: Summary of risk factors and control examples for bandsaws

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Control Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• blunt blades</td>
<td>• fit u-troughs of screw conveyors with covers that are bolted on or electrically interlocked to ensure that operation without guards is prevented</td>
</tr>
<tr>
<td>• snapping of blades not replaced in time</td>
<td>• implement regular inspection and replacement procedures of bandsaw blades, and provide safe disposal facilities for discarded blades</td>
</tr>
<tr>
<td>• removal and disposal of spent blades</td>
<td>• ensure that the saw is switched off and isolated from the power supply during maintenance and cleaning operations, and when not in use</td>
</tr>
<tr>
<td>• wear on blade access hole in tray creates a catching surface for meat</td>
<td>• ensure that cleaning and maintenance of bandsaws includes the top and bottom pulleys and the scrapers</td>
</tr>
<tr>
<td>• scrapers designed for wiping blades clean accumulate excessive bone dust and moisture if not cleaned, or wear out</td>
<td>• provide an adjustable guard over cutting edge of blades so that only the minimum amount of the blade necessary for the task is exposed</td>
</tr>
<tr>
<td>• unguarded blades</td>
<td>• provide a system of portioning jigs to enable small pieces of meat to be cut</td>
</tr>
<tr>
<td>• unguarded drive mechanisms</td>
<td>• completely enclose by guards the top and bottom pulleys and all parts of the blade, except for that part between the top guide and the saw tray, to prevent any part of a worker’s body coming into contact with the blade</td>
</tr>
<tr>
<td>• trapping of mesh gloves in teeth of saw</td>
<td>• design and install all guards so that they can only be removed by the use of a special key, tool or spanner</td>
</tr>
<tr>
<td>• accumulation of cut meat on tray limiting work space</td>
<td>• ensure that blades are fitted with teeth facing in a downward direction</td>
</tr>
<tr>
<td>• lifting and manipulation of awkward loads eg, if a saw is used to break up a full quarter of beef</td>
<td>• ensure that workers do not operate bandsaws while wearing mesh gloves</td>
</tr>
<tr>
<td>• repetitive work and static load on particular cuts, particularly in a mutton break-up room</td>
<td>• ensure that bandsaw trays are large enough to hold the pieces of meat to be cut</td>
</tr>
<tr>
<td>• handling frozen meat for long periods</td>
<td>• design the work process to ensure that cut product is removed immediately from trays to prevent</td>
</tr>
<tr>
<td>• electrical risk from excessive application of water to tray</td>
<td></td>
</tr>
<tr>
<td>• increased manual handling risk if bench has no slipperiness</td>
<td></td>
</tr>
<tr>
<td>• bumping of bandsaw operator by adjacent workers or others passing by</td>
<td></td>
</tr>
<tr>
<td>• foreign body in eye from flying bone chips</td>
<td></td>
</tr>
</tbody>
</table>


accumulation
- organise work to reduce manual handling risk factors e.g., twisting while lifting, etc
- ensure that handling of frozen meat is limited in time to avoid loss of feeling and dexterity in hands and fingers due to the cold
- where water is required to reduce the stickiness of trays, provide mist sprayers to ensure that there is no excess
- provide emergency mushroom-shaped stop buttons on bandsaws in addition to normal stop/start controls so that they can be activated by operated knee pressure
- design the work space in such a manner as to prevent persons other than the operator of the saw from intruding into the workspace
- provide safety glasses.


Forklift trucks

General
Forklifts, properly known as industrial trucks or load shifting equipment, can cause serious or even fatal accidents to drivers or to adjacent workers if used incorrectly. A safe system of work is vital, as training operators to levels of proficiency will not necessarily lead to safe forklift operations if unsafe systems of work are used. Notwithstanding that employers must ensure that drivers meet training requirements before allowing them to operate forklift trucks, and must provide documentary evidence of training.

Safe systems of work with forklifts:
- clearly defined traffic areas where pedestrians are separated from forklift traffic and other vehicles
- speed restrictions and safety signage
- loading area is separate from high traffic areas
- mirrors and visual aids at corners
- flashing lights, audible reversing signals and driving lights
adequate lighting
- give way rules when needed
- traffic signs where appropriate
- forklift maintenance and reporting procedures
- forklifts with internal combustion engines which can expose workers to carbon monoxide
- are not used in confined spaces such as cool rooms or when loading containers (electric forklifts are used instead)
- operators are trained to wear their seatbelts and brace themselves and stay with the forklift if it becomes unstable and begins to roll over.

**Hazard protective mechanisms for forklifts:**
- forklifts must be fitted with overhead protective cabs [falling-object protection (FOPS)] to protect drivers and must be maintained in good working order and condition
- each machine should be fitted with the seat belts and side restraints
- guarding is in place to protect operators from moving hot parts and exposed wheels and chains
- an operator's manual is provided.

*NB, for competency requirements check State or Territory specific requirements (licensed supervisor, logbooks etc in NSW, Victoria)*

**Drivers should:**
- be 18 years or over
- be assessed by a registered assessor as being competent to operate load shifting equipment (registered assessors are registered within each State or Territory by the regulatory OHS authority)
- have received instruction on the particular type of forklift at the workplace and recognition from the employer to that effect.

**Driving safely**
Forklifts are specialised machines and therefore they require specialised training eg, forklifts have a very tight turning circle and will roll even at low speeds if turned too sharply. A forklift is a piece of plant with moving parts and therefore requires regular maintenance. Visibility when driving a forklift truck is always partially blocked, so vigilance must be kept to watch for other people and equipment. If vision is completely blocked by a load, the operator must drive in reverse, using caution. Operators must not drive with the load raised (this creates instability) and in particular must not carry a heavy weight on unstable ground. If in doubt of the load weight, the load should be lifted a little first to see how the forklift responds. All operators must be properly trained, instructed and supervised in the use of forklifts. It is advisable that all forklift drivers hold a current motor vehicle drivers license.

**Rules to remember**
- preoperative checks should be carried out before driving
operators should never allow others to ride on the forklift
• defects and faults must be reported to a supervisor
• unauthorised modifications should never be made to a forklift truck
• when changing LPG cylinders or refuelling:
  o change in well ventilated areas
  o turn off ignition
  o check for leaks
  o no smoking or naked flames
  o return empty cylinders to storage area
  o check all cylinder securing devices and connections.

Table 14: Summary of risk factors and control examples for forklift trucks

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Control Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>• collision with pedestrians, other vehicles and structures</td>
<td>• fit u-troughs of screw conveyors with covers that are bolted on or electrically</td>
</tr>
<tr>
<td>• excessive speed</td>
<td>interlocked to ensure that operation without guards is prevented</td>
</tr>
<tr>
<td>• use of forklift trucks as passenger vehicles or personnel lifts</td>
<td>• ensure that forklift trucks have adequate operating control eg, stop and start</td>
</tr>
<tr>
<td>• use of attachments such as crane jibs, clamps and work platforms</td>
<td>switches, braking, steering, horn and hydraulic controls, with legible</td>
</tr>
<tr>
<td>• load falling and injuring operator or other persons</td>
<td>instructions</td>
</tr>
<tr>
<td>• badly maintained floor surfaces</td>
<td>• fit appropriate warning devices eg, horns, flashing overhead lights and reverse</td>
</tr>
<tr>
<td>• • driving on temporary ramps and platforms</td>
<td>alarms</td>
</tr>
<tr>
<td>• driving over edge of loading dock</td>
<td>• provide convex mirrors on blind corners</td>
</tr>
<tr>
<td>• stacking on gradients</td>
<td>• where pedestrians and forklift trucks operate in the same work area, mark out</td>
</tr>
<tr>
<td>• overhead lines eg, electric power lines and outside water and refrigerant</td>
<td>designated forklift areas</td>
</tr>
<tr>
<td>lines, if contacted by load or mast</td>
<td>• provide barriers to prevent forklift trucks or their tines striking storage</td>
</tr>
<tr>
<td>• vibration via seat or operating controllers</td>
<td>racks, electricity control boxes, gas bottles, etc</td>
</tr>
<tr>
<td>• use of engine powered forklift trucks in confined spaces</td>
<td>• provide pedestrians safe areas where passageways open onto forklift transit</td>
</tr>
<tr>
<td>• operation or maintenance of forklift trucks by unqualified personnel</td>
<td>areas by installing speed humps or barriers</td>
</tr>
<tr>
<td>• refuelling and battery charging.</td>
<td>• ensure that forklifts used comply with AS 2359.1 Industrial Trucks – General</td>
</tr>
<tr>
<td></td>
<td>requirement, and AS 2359.2 Industrial Trucks - Operation</td>
</tr>
<tr>
<td></td>
<td>• ensure that forklifts are never used as passenger vehicles, and are used to</td>
</tr>
<tr>
<td></td>
<td>raise or lower personnel only if the forklift truck used is specifically</td>
</tr>
<tr>
<td></td>
<td>designed for that purpose or has as an attachment and</td>
</tr>
<tr>
<td>approved work platform designed for that purpose</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>• ensure that attachments used are designed for use with that forklift truck, and are supplied with correct instructions for use and with additional data plates specifying limitations of the forklift when operating with the attachments</td>
<td></td>
</tr>
<tr>
<td>• provide a non-slip surface on aisles, roadways, passageways, floors and ramps over which forklift trucks operate</td>
<td></td>
</tr>
<tr>
<td>• determine the type and size of the forklift to be used after identifying all planned purposes for its use and the limitations of the workplace eg, the height of power lines and entryways</td>
<td></td>
</tr>
<tr>
<td>• provide vibration damping seats, with lumbar support.</td>
<td></td>
</tr>
<tr>
<td>• use only electric powered forklifts inside freezers, containers and enclosed storerooms</td>
<td></td>
</tr>
<tr>
<td>• ensure that battery charging and all maintenance activities are carried out by trained and competent personnel</td>
<td></td>
</tr>
<tr>
<td>• ensure that only qualified and competent workers operate forklift trucks without direct supervision. Learner drivers should be under direct supervision of a qualified person</td>
<td></td>
</tr>
<tr>
<td>• implement regular inspection and maintenance procedures for all forklift trucks by an appropriately qualified person</td>
<td></td>
</tr>
<tr>
<td>• refuel petrol or diesel powered forklift trucks at locations specifically designed for that purpose.</td>
<td></td>
</tr>
</tbody>
</table>

**Copyright ©:** *National Guidelines for Health and Safety in the Meat Industry*, Australasian Meat Industry Employees Union and National Meat Association, 1995, pp 82 to 84.
The use of electric powered forklifts eliminates the risk of possible carbon monoxide poisoning that exists with the use of petrol or gas powered forklifts.
### Hot water hoses

**Table 15: Summary of risk factors and control examples for hot water hoses**

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Control Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>overheating of water</td>
<td>fit u-troughs of screw conveyors with covers that are bolted on or electrically interlocked to ensure that operation without guards is prevented</td>
</tr>
<tr>
<td>build-up of steam, bursting from hoses and/or valves when hoses turned on</td>
<td>set and maintain thermostat at safe levels, and ensure competent persons are available whenever work is being done with hot water hoses to adjust thermostats if necessary</td>
</tr>
<tr>
<td>the creation of excessive steam in work area</td>
<td>maintain water temperature at lowest possible level</td>
</tr>
<tr>
<td>creation of potentially infected aerosols (see Diseases - Occupational section)</td>
<td>provide appropriate personal protective equipment - boots, waterproof pants worn outside boots</td>
</tr>
<tr>
<td>burns from connection end if unplanned disconnection occurs</td>
<td>provide a length of hose sufficient to the task</td>
</tr>
<tr>
<td>the use of insufficiently insulated hoses</td>
<td>ensure that hoses used fit all requirements, including extremes of temperature and pressure</td>
</tr>
<tr>
<td>inadequate drainage, allowing hot water to pool, creating thermal, slip and fall hazards</td>
<td>if drainage is inadequate, limit the amount of water used eg, use smaller bore hoses and pressure guns, or implement work system changes, such as cleaning one section and waiting for water to completely drain before beginning the next</td>
</tr>
<tr>
<td>electrical risk where electric light and electrically powered equipment are in use or are still connected</td>
<td>where hoses are used to clean ceilings and walls, ensure that electric lights, fittings and switches are completely waterproof</td>
</tr>
<tr>
<td>hand guns for pressure hosing - connections, valves and selection of hose</td>
<td>ensure that taps, valves and hand guns are included in the regular maintenance inspection program</td>
</tr>
<tr>
<td>use of hand guns for washing boots</td>
<td>design boot wash troughs to include grate steps to present boots at the appropriate height and angle for cleaning</td>
</tr>
<tr>
<td>trip hazard from poor storage of hoses</td>
<td>install walk-through boot wash baths with fixed, replaceable brushes to clean soles and sides of boots</td>
</tr>
<tr>
<td></td>
<td>provide facility to loop and store hoses away from work floors when not in use.</td>
</tr>
</tbody>
</table>

Maintenance
Preventative maintenance is a critical part of any organisational health and safety program. Essentially preventative maintenance is an administrative control for risks associated with plant, equipment and tools. The checklists provided in 4.13.1-2 will help employers in the meat industry develop a program specifying a schedule for the maintenance of all equipment and workstations. This should outline the inspection and maintenance requirements of each piece of plant and equipment.

Critical issues for employers to ensure:
- Service manuals must be readily available for maintenance workers, including manufacturer's specific safety precautions.
- Maintenance (unless the actual machine operation is being tested) is only carried out once all associated machinery is completely shut down, including energy sources such as electricity, hydraulic, pneumatic, vacuum, spring loading, gravity or any combination of these.
- There are clear procedures in place for tagging out, locking out and reporting faulty machinery workers performing hot work, cold work, electrical, plumbing or gas fitting hold relevant and current qualifications and certificates.
- Where possible only maintenance workers should be permitted access to areas where breakdown maintenance is being carried out.
- Relevant personal protective equipment is provided in consultation with maintenance workers eg, appropriate clothing, welding material, safety helmets, lifejackets when entering effluent ponds (see section on confined spaces in Part 4.4).
- Equipment provided for maintenance is appropriate to the task eg, only fibreglass ladders are used in ‘live’ areas by electricians.
- Any area that is hazardous for untrained personnel to enter is clearly marked as a restricted access area.
- All maintenance personnel who need to enter confined spaces are trained appropriately.
- Plastic attachment to end of hot water hose reduces risk of burns and improves grip ergonomically.

Lockout/tag out
Each year, many workers are injured or killed by the uncontrolled release of hazardous energy. Many of these types of accidents could have been prevented by proper lockout/tag out procedures, which ensure that equipment is kept from being set in motion and endangering workers during maintenance or repair. The following set of guidelines has been prepared to assist workers understand the use of lockout procedures and danger tags.

What is lockout?
Lockout is the use of a special lock and system to prevent electrical, hydraulic, compressed air or coiled spring power from being accidentally turned on during
equipment maintenance or repair. In lockouts:

- disconnect switch, circuit breaker, or other energy-isolating mechanism is put in the safe ‘off’ position
- device is often placed over the energy-isolating mechanism to hold it in the safe ‘off’ position
- lock is attached so the equipment can’t be energized ie, turned on.

**What are danger tags?**

Danger tags are labels that are used to alert workers of a hazard in the workplace and prohibit them from coming into contact with the source of the hazard. The tag is usually affixed in a position where it will be immediately seen by anyone exposed to the hazard (eg, near the power switch or operator controls).

Danger tags usually carry the word ‘danger’ in large lettering although other words may be used additionally (eg, ‘do not use’ or ‘out of service’). They may also carry the following information:

- the time and date of fixing the tag
- the reason for affixing the tag
- the name of worker who affixed the tag
- a warning not to remove the tag.

To be effective, danger tags must be conspicuously placed and securely fixed into position. All workers and others likely to enter the work area must be instructed in the purpose of danger tags and the procedures for working in areas where these tags are affixed. Danger tags and other protective systems should only be removed after a competent person ensures that the danger has been rectified. An equipment danger tag should be considered to continue isolation during shift changeovers or downtime. The equipment danger tag should have names of personnel who are authorised to remove the tag eg, shift engineer, maintenance supervisor.

**When should you lock or tag out?**

Lockout/tag out is necessary whenever you are performing service or maintenance around any machine where you or your colleagues could be injured by an unexpected start up of the equipment or release of stored energy.

Some jobs for which lockout/tag out should be used are:

- when you must remove or bypass a guard or other safety device
- when you must place any part of your body where you could be caught by moving machinery
- repairing electrical circuits
- cleaning jammed mechanisms.

**Who applies lockout/tag out procedures?**

Only trained workers authorized to perform service or maintenance should apply energy isolation and lockout/tag out:
1. isolation of services should only be conducted by an expert (eg, electrician, plumber)
2. isolation for entry into equipment (eg, furnaces) should be conducted by the workers operating the equipment isolation of general equipment should be performed by the user.

### Table 16: 10 steps to lockout/tag out of hazardous energy
Except in emergencies, each device must be removed by the worker who put it on.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Think, plan and check Identify all parts of any systems that need to be shut down. Find the switches, valves or other devices that need to be locked out. Follow the correct procedure for the shutdown of equipment so that you don’t endanger anyone.</td>
</tr>
<tr>
<td>2</td>
<td>Communicate Tell workers affected by the lockout/tag out that you’ll be locking out the equipment and why.</td>
</tr>
</tbody>
</table>
| 3    | Locate all power sources Take any of the following steps that are necessary to guard against energy left in the equipment after it has been isolated from its energy sources:  
  - Inspect the system to ensure all parts have stopped moving  
  - Relieve trapped pressure  
  - Release the tension on springs, or block the movement of spring-driven  
  - Parts block or brace parts that could fall because of gravity  
  - Block parts in hydraulic and pneumatic systems that could move from loss of pressure  
  - Drain process piping systems and close valves to prevent flow of hazardous materials  
  - Dissipate extreme cold or heat (wear protective clothing)  
  - If stored energy can reaccumulate, monitor it to ensure it stays below hazardous levels |
| 4    | Neutralize all power Be sure to isolate all energy sources of main and secondary power supplies: at its source  
  - Isolate electrically  
  - Never remove a fuse instead of disconnecting  
  - Block moveable parts  
  - Drain or bleed hydraulic or pneumatic lines  
  - Lower suspended parts to the resting position. |
| 5    | Lock out all power sources Use a lock designed only for this purpose.  
  - Each worker should have a personal lock |
- fill tags out completely and correctly

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Verify all equipment is Make sure all danger areas are clear of personnel. isolated</td>
</tr>
<tr>
<td></td>
<td>verify that the main disconnect switch or circuit breaker cannot be</td>
</tr>
<tr>
<td></td>
<td>moved to the 'on' position</td>
</tr>
<tr>
<td></td>
<td>use a voltmeter or other equipment to check the switch</td>
</tr>
<tr>
<td></td>
<td>press all start buttons and other activating controls on the equipment itself to ensure the power doesn’t go on</td>
</tr>
<tr>
<td></td>
<td>shut off all machine controls when the testing is finished.</td>
</tr>
<tr>
<td>7</td>
<td>Turn controls back to 'off'</td>
</tr>
<tr>
<td>8</td>
<td>Perform necessary repairs Avoid doing anything that could re-activate the equipment or maintenance Don’t bypass the lockout when putting in new piping or wiring.</td>
</tr>
<tr>
<td>9</td>
<td>During a lockout/ A lock should never be removed without authorization. tag out situation</td>
</tr>
<tr>
<td></td>
<td>never turn on a machine during a lockout</td>
</tr>
<tr>
<td></td>
<td>never operate a machine that has been tagged</td>
</tr>
<tr>
<td></td>
<td>never bypass an engineering lockout or allow anyone else do so</td>
</tr>
<tr>
<td></td>
<td>never rely blindly on engineering safety features.</td>
</tr>
<tr>
<td>10</td>
<td>Removing lockout/tag out. After maintenance is finished, and before restarting equipment:</td>
</tr>
<tr>
<td></td>
<td>remove tools from the work area</td>
</tr>
<tr>
<td></td>
<td>after a lockout, ensure all guards are back in place before operating</td>
</tr>
<tr>
<td></td>
<td>equipment and all tools are removed from the machinery</td>
</tr>
<tr>
<td></td>
<td>ensure workers are a safe distance away while restoring energy.</td>
</tr>
</tbody>
</table>
### 4.13.1 Sample Plant Hazard Checklist Summary

<table>
<thead>
<tr>
<th>Description of Hazards, and Potential Hazards</th>
<th>Urgency to Control Hazard (score)</th>
<th>Hazard Controls</th>
<th>By Whom</th>
<th>By When</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Controls approved by: _____________________________________________ Date ____________________

---

OHS Reference Guide Australian Meat Industry
## 4.13.2 Plant Registration and Maintenance Schedule

<table>
<thead>
<tr>
<th>Plant Number</th>
<th>Plan Item</th>
<th>Storage Location</th>
<th>Planned Maintenance Schedule (mark X) Date of Year: __________</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Jan   Feb   Mar   Apr   May   Jun   Jul   Aug   Sep   Oct   Nov   Dec</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.13.3 Sample Plant Hazard Identification Checklist

Step 1 Identify the hazards

Plant and equipment can be hazardous in many ways, not only to the operator, but also to someone passing or standing nearby. Hazards may be obvious, like, missing guards, or a hidden, potential hazard, like pressurised hoses and pipes or electrical energy. All these hazards need to be identified. Examine the plant or equipment in question and talk about operating and maintaining the machine with supervisors and other workers, and mark an "X" against yes or no to the questions in the checklist. Add any comment you need to make.
<table>
<thead>
<tr>
<th>Hazard</th>
<th>Yes/No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Entanglement</strong> (Getting caught in a plant part or load)</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• Can clothes, hair, jewellery, etc. get caught in any moving parts or load?</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td><strong>2 Crushing</strong> Can anyone be crushed due to:</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• the plant's moving parts</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• lack of capacity for the plant to be slowed down, stopped or immobilised</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• between any materials; and the plant</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• between moving machinery and a fixed structure</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• anything or part falling off the plant</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• uncontrolled movement of the plant or its load</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• parts of the plant collapsing</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• come into contact with moving parts during testing, inspection, operation, maintenance</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• the plant tipping or rolling</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td><strong>3 Cutting</strong> Can anyone be cut, stabbed or punctured by:</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• any exposed parts of a blade or sharp edge</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• being caught between moving parts</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• being caught between the job and plant</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• material ejected from the plant</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• rapidly moving plant parts</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• other reasons.</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td><strong>4 Impact</strong> Can anyone be struck by:</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• moving plant parts</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• unexpected or uncontrolled plant movements</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• the plant, because it is mobile</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• parts or materials disintegrating</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• work being recycled</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• other reasons.</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td><strong>5 Electrical</strong> Can anyone be electrocuted or burned because</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• the plant is too close to electrical conductors</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• leads and plugs, can become damaged</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• water is lying near the electrical equipment</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• Lockout/isolation procedures are not in use</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• other reasons.</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td><strong>6 Slipping, tripping or falling</strong> Can anyone slip, trip or fall near the plant because:</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• floors around the plant are uneven or slippery</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• power tools, air hoses, oil lines etc lay on the floor</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• waste, off cuts or other materials are left laying on the floor</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• raw materials or product storage is not thought through</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• there is not enough room to move around the plant comfortably</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>• other factors.</td>
<td>[ ] [ ] [ ]</td>
<td></td>
</tr>
<tr>
<td>7 Falls from a height</td>
<td>Can anyone fall from a height because:</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td>× guard rails are missing or not fixed properly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>× there is a lack of stairs or ladders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>× there are unexpected holes or openings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>× floors/walkway surfaces are slippery or uneven</td>
<td></td>
<td></td>
</tr>
<tr>
<td>× walking surfaces are too steep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>× other factors.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8 Access/Egress</th>
<th>Can anyone be injured in any way because:</th>
</tr>
</thead>
<tbody>
<tr>
<td>× there is insufficient room to move around the plant:</td>
<td></td>
</tr>
<tr>
<td>– when operating it</td>
<td></td>
</tr>
<tr>
<td>– when repairing, installing or maintaining it</td>
<td></td>
</tr>
<tr>
<td>× there is not enough head room</td>
<td></td>
</tr>
<tr>
<td>× people have to reach too far to gain access to the equipment</td>
<td></td>
</tr>
<tr>
<td>× other reasons.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9 Ergonomics</th>
<th>Can anyone develop muscular or skeletal injuries because</th>
</tr>
</thead>
<tbody>
<tr>
<td>× seating for the operator is poorly designed</td>
<td></td>
</tr>
<tr>
<td>× there is excessive repetitive movement of the upper body limbs and joints</td>
<td></td>
</tr>
<tr>
<td>× body posture is constrained to fixed position</td>
<td></td>
</tr>
<tr>
<td>× control lever/switch labels and/or movement indicators are missing</td>
<td></td>
</tr>
<tr>
<td>× common use controls / operations are not within easy reach (450mm)</td>
<td></td>
</tr>
<tr>
<td>× mismatch of the plant with human behaviour, traits and natural limitations</td>
<td></td>
</tr>
<tr>
<td>× working height is not correct for heavy, medium or light work</td>
<td></td>
</tr>
<tr>
<td>× floors are too hard, uneven or slippery</td>
<td></td>
</tr>
<tr>
<td>× there is vibration from the plant or process</td>
<td></td>
</tr>
<tr>
<td>× ventilation is inadequate</td>
<td></td>
</tr>
<tr>
<td>× lighting is poor</td>
<td></td>
</tr>
<tr>
<td>× heating or cooling of the worker is inadequate</td>
<td></td>
</tr>
<tr>
<td>× others, refer to manual handling checklist.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10 High Temperatures</th>
<th>Can anyone be injured by coming into contact with hot plant parts, or hot materials from the plant.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>11 Noise</th>
<th>Can anyone be injured because:</th>
</tr>
</thead>
<tbody>
<tr>
<td>× noise from the plant is excessive</td>
<td></td>
</tr>
<tr>
<td>× Noise distracts workers from concentrating on the task.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12 Hazardous Substances</th>
<th>Can anyone be injured because</th>
</tr>
</thead>
<tbody>
<tr>
<td>× chemicals, oils, solvents or gases are used in the process</td>
<td></td>
</tr>
<tr>
<td>× fumes are given off in the process</td>
<td></td>
</tr>
<tr>
<td>× airborne dust is generated</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13 Pressure</th>
<th>Can anyone be injured because</th>
</tr>
</thead>
<tbody>
<tr>
<td>× pressurised pipes or hoses could burst</td>
<td></td>
</tr>
<tr>
<td>× pressure vessels are situated near the operation</td>
<td></td>
</tr>
<tr>
<td>× pressure relief valves are</td>
<td></td>
</tr>
<tr>
<td>– not maintained</td>
<td></td>
</tr>
<tr>
<td>– situated near the operator</td>
<td></td>
</tr>
<tr>
<td>× Compressed air is used:</td>
<td></td>
</tr>
<tr>
<td>– to blow dust off plants or the job</td>
<td></td>
</tr>
<tr>
<td>– to blow dust off workers.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14 Fire/Explosion</th>
<th>Can anyone be injured by</th>
</tr>
</thead>
<tbody>
<tr>
<td>× explosion of gases, vapours, liquids, dust or other substances, triggered by the operation of the plant</td>
<td></td>
</tr>
<tr>
<td>× If hot work is required:</td>
<td></td>
</tr>
<tr>
<td>– can the area be cleared of any burning materials, solvents and fuels</td>
<td></td>
</tr>
<tr>
<td>– is fire equipment available</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15 Asphyxiation</th>
<th>Can anyone be suffocated due to lack of oxygen, or atmospheric contamination</th>
</tr>
</thead>
</table>
## 4.13.4 Sample Plant Risk Assessment

### PLANT RISK ASSESSMENT

**Date:**  
**Revision date:**  
**Author:**

**Definition of Plant:** Plant, as defined by the OSH Act (WA) 1984 and Regulation 4.22 of the OSH Regulations (WA) 1996 includes any machinery, equipment, appliance, implement, or tool and any component or fitting thereof or accessory thereto, which is either ‘pressurised’ plant or ‘energised’ plant, other than plant energised by human or animal energy. Plant risk assessments are required to be conducted for all such plant for use in workplaces, and where plant or equipment is disposed of or sold. (See also Plant risk assessment checklist form OSH-021)

<table>
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<tr>
<th>Risk Assessment No.</th>
<th>Workplace:</th>
<th>Insert photo</th>
<th>Assessment Date:</th>
<th>Plant Description:</th>
<th>Plant ID:</th>
<th>Location of plant:</th>
<th>Assessed by:</th>
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<th>Item</th>
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<tbody>
<tr>
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<td>22.</td>
<td>Dusts</td>
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**Risk legend:**
- **E** Extreme: Unacceptable - immediate action required.
- **H** High: Priority action required - plus interim controls
- **M** Medium: planned action required within a reasonable time frame
- **L** Low: Low priority action required to control risks
- **I** Insignificant: May be acceptable without additional controls

**Control legend:**
- **IC** – Improvement Controls
  Identified controls or changes to the plant which will improve the physical safety of the plant.
- **OC** – Operating Controls
  Identified controls for the way in which the plant is used during operation, cleaning and maintenance.

<table>
<thead>
<tr>
<th>Item</th>
<th>Hazard Identified</th>
<th>Risk</th>
<th>Control</th>
<th>Controls required</th>
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**Additional Comments:**
4.14 Slips, trips and falls

Introduction
Slips, trips and falls are significant injuries within the meat industry. Statistical analysis of mechanisms of injury referred to in Part 1, has identified that slips, trips and falls are causing a considerable number of injuries.

There is a strong correlation between manual handling and slips, trips and falls injuries. Therefore control options in this section should be linked with the earlier section on manual handling to present the true picture of the complexity of these types of injuries. It is well known that there is significant under-reporting of these types of injuries, therefore the eradication of slips, trips and falls is a priority area for the meat industry to work towards.

Major contributing factors
There are four major contributing factors in slip, trip and fall incidents:

- floor surface
- footwear
- cleaning and maintenance
- human factors.

Each of these factors can be alleviated by good workplace design in association with the usual hazard management approach to any significant hazard ie, identification, assessment and control of the risk.

_Nonslip floor surface, good grip footwear and a regular cleaning regime reduces slip hazards_
Design
In relation to the design of floors, work platforms and passageways, the following points need to be specifically noted:

- Floors should be constructed/replaced in accordance with AS/NZS 3661.2: 1994 – Slip resistance of pedestrian surfaces – Guide to the reduction of slip hazards.

- Surfaces of floors, work platforms or passageways should be free from any hole, slope or uneven or slippery surface which is likely to cause a worker to slip, trip or fall; drop or lose control of anything being lifted or carried; or cause instability or loss of control of vehicles and/or their loads.

- Any holes, bumps or uneven areas resulting from damage or wear and tear which may cause a worker to trip or fall should be repaired as soon as possible; and barriers or conspicuous marking should warn workers away from this area until they are repaired.

- As per AS 1657, Fixed platforms, walkways, stairways and ladders - Design, construction and installation, slopes should not be steeper than necessary (one in eight, up to seven degrees for walkways, one in 2.7, up to 20 degrees for cleated or grated walkways), and moderate or steep slopes or ramps should be provided with a secure handrail when needed.

- Elevated work platforms (eg, first and second beef leg, hydraulic platforms used for carcase splitting) should have suitable restraints built in to reduce the risk of falling eg, kickboards, safety rails, or workers should wear harnesses. Markings on platforms where guard rails are not feasible (eg, loading docks) should be edged in a bright contrasting colour. Steps and ramps to work platforms should be fitted with slip resistant treads and surfaces and handrails should be fixed on. Areas beneath hydraulic platforms should be designated no-entry zones while platforms are operating.

- Protective strips should cover joints between different types of floor surfaces that are adjacent to one another, particularly the transition between indoor and outdoor surfaces.

- All surfaces that are likely to get wet and therefore become slippery (eg, with body fluids, urine, blood, fat, water, oil or cleaning materials) should be slip resistant. The appropriate surface will need to be balanced with the mandatory hygiene requirements for flooring in both domestic and export plants. Sheet vinyl or synthetic compound rubber sheeting may be suitable.

- Floors beside machinery should be slip resistant and kept free from slippery substances or loose materials. Areas such as these could cause injury if a worker was to fall against the machinery (eg, bandsaw).

- Slip resistant coating for floors (such as acid etching, paint and sand grinding and grooving) needs to be balanced with the hardness of the resultant surface, as a surface that is too hard will contribute to fatigue if prolonged periods of standing are required.
NB, anti-fatigue matting, platforms or sit-stand stools should be properly secured and should not jut out into aisle ways.

- Electric cords should not run across aisles, doorways or passageways.
- Lighting should be adequate, as per AS 1680.1 Interior lighting - General principles and
- Recommendations, AS 1680.2.4: 1997 Interior lighting: Industrial tasks and processes and/or AS 1680.0 Interior lighting – Safe Movement
- (see also Environmental hazards section in Part 4).

As with any hazard identification process, slips, trips and fall hazards can be identified through consultation with affected workers, statistical analysis and regular hazard inspections. Background information on the history of injuries can be sourced from your company specific first-aid data and workers compensation statistics. A hazard inspection checklist relevant to slips, trips and falls in the meat industry can be developed from the above points noted under design, in addition to the following points which should be considered in the hazard management process:

- systems of work eg, inadequate or overloading trolleys, too much haste required of workers to get their work done safely
- maintenance procedures that encourage open reporting of hazards that are then promptly addressed
- cleaning procedures including cleaning at times when the minimum amount of workers are present, keeping external paths and ramps free of debris, and controlling or minimising the risks from snow and ice in winter
- personal protective equipment such as suitable slip-resistant footwear and hard hats when necessary.
4.15 Stress

Across Australia, many studies have identified that workers feel stressed at work, resulting in medical problems such as headaches, sleep disturbances and stomach problems. Stress can also be caused by pressures and strain outside of the workplace. Nevertheless, a recent study of work-related mental disorder claims determined the most common causes as:

- workload pressures or inherently stressful types of work
- victimisation/discrimination/harassment
- a non-violent conflict
- hold-ups.

Stress can affect an organisation at every level. While the individual is affected in terms of physical symptoms, the organisation also suffers from decreased performance or productivity levels, increased conflict and absenteeism. Managers are also affected because they have to find ways to tackle the situation, and stress can become a significant problem for an organisation.

How to manage mental disorder claims

Work-related stress can only be alleviated by treating the cause, rather than the symptoms. Good management practices involve addressing stress as a potential issue. Psychological health can be enhanced by changes to work systems and practices including:

- involving workers in performance feedback procedures
- ensuring a close match between worker and job demands through access to skill development
- early identification of problems
- conflict resolution facilities
- clear job specifications.

To reduce stress and stress-related workers compensation claims in the workplace, employers need to take a risk management approach. Stress may seem nebulous and vague, but it must be addressed or it will cost the organisation dearly. The employer should identify where stress might be a problem, look at prevention and support strategies and implement practical measures to overcome it. Other ways of dealing with stress issues include training workers and managers, as well as developing programs to help people manage stressful situations.

Stress is reduced when the management of an organisation functions well and communicates with the workers, creating opportunities for feedback. Leadership and interpersonal skills of managers are critical factors that can affect the attitude of workers. Changes in management policy and working conditions that raise morale can bring
excellent and sustainable results. Showing flexibility and concern in traumatic or difficult situations can significantly reduce anxiety in the workplace. Stress should be recognised as an organisational health issue that can affect both individuals and organisations, and can be a significant risk if strategies and practices are not in place to address it.