

6. ERGONOMICS AND MANUAL HANDLING ON FARMS



THE HAZARD



Ergonomics involves fitting the job to the person. Any relationship between the human, the farm task and the farm task environment involves ergonomics. Elements of the physical (machinery, work layout) and social environment (work organisation and processes) contribute to ergonomic problems.

One of the major causes of these ergonomic problems is manual handling which leads to back, joint and muscle problems. Manual handling means any activity requiring the use of human force to lift, lower, push, pull, carry or otherwise move, hold or restrain any static or moving load. Heavy lifting, work requiring poor postures and repetitive work can lead to these joint and muscle problems.

HAZARD IDENTIFICATION

Nearly all tasks on farms involve ergonomic problems. The common ones which should always be assessed include:

- A. Machinery Operation
 - 1. Driving mobile machinery and vehicles
 - 2. Using workshop tools
 - 3. Using other machinery; for example, a wool press or hammer mill
- B. Manual Handling
 - 1. Lifting/Lowering
 - 2. Pulling/Pushing
 - 3. Carrying
 - 4. Holding/Restraining
- C. Stock Handling
 - 1. Cattle and sheep handling
 - 2. Shearing
 - 3. Milking



How do I go about doing an ergonomic assessment ?

Identification of ergonomic problems is assisted by:

1. Direct observation

The essence of an ergonomic assessment of a task is the direct observation of jobs and tasks. Use of checklists and walk through surveys ensures a systematic approach to direct observation.

2. Consultation with Other Farm Workers

Farm workers with a practical day to day knowledge of jobs will often be able to accurately identify risks to health and safety. Consultation with workers allows for all risk factors to be identified including housekeeping, maintenance requirements, labour requirements and working hours.

3. Analysis of Workplace Injury Records

If workplace injury records are available, they will allow the identification of where and in what jobs ergonomic injuries have occurred.

HOW DO I DO AN ERGONOMIC ASSESSMENT?

An ergonomic assessment of farm work tasks needs to consider the following aspects of the job:

1. **Actions and movements.** These should be smooth rather than jerky and the extreme ranges of movement should be avoided. It's easier to pull or push a load than to lift, put down or carry it.
2. **Working posture and position.** Bending, twisting and reaching movements should be reduced as much as possible. Stooping for extended periods should be avoided.
3. **Duration and frequency of manual handling.** The length of time taken to do a particular task, and how often the task is repeated will affect how tired the muscles become and thus, the likelihood of injury. Changing jobs regularly will ensure that different muscles are used while others are rested.
4. **Location of loads and distances moved.** There is much less strain on the back if the load is held in front of and close to the body. There is less risk of injury when a load is moved short distances at a time.
5. **Weights and forces.** Pulling a load is less hazardous than pushing it. Moving a lighter weight poses less risk than the same movement with a heavy weight. In general, loads over 20 kg are likely to increase the risk of back injury.
6. **Characteristics of loads and equipment.** Obviously, an animal is more dangerous to lift than an inert load due to its movement and the extra forces which it may generate. Moving sheet material is hazardous because of potential twisting of the spine and injuries to the hands. Long loads are less easy to control and it is especially important that these are kept close to the body.
7. **Workplace and workstation layout.** Workers should be able to keep an upright and forward facing posture and have good visibility of the job. Working levels should be no lower than hip-height with hands operating at or below waist-height. Frequently-used tools, plant and equipment should be placed within easy reach.
8. **Work organisation.** When work is organised to flow smoothly and there are adequate numbers of workers for the job, there is less risk of injury.
9. **Work environment.** Keeping the floor and work surfaces uncluttered, clean and dry will reduce the risk of injury from manual handling. Climate and lighting will also affect the degree of risk in the work environment.
10. **Skills and experience of workers.** Anyone involved in manual handling tasks should have received instruction in how to move loads safely with or without mechanical aids. These people are then obliged to use these techniques.
11. **Personal characteristics of workers.** Young people may be at increased risk of injury due to risk-taking behaviour and an attitude that they are capable of moving most things. As people under 18 years are still developing, they should not shift loads of more than 16 kg unless team lifting or mechanical aids are used. Older people may be at increased risk of injury due to the cumulative effects of body strain and slower reflexes. Some workers may also have impaired sight or hearing which needs to be taken into account.
12. **Clothing.** This needs to be snug-fitting so that it doesn't get in the way of the lifting technique and yet loose enough to enable free movement. Protective clothing that lets the worker keep the load close to the body will reduce risk. Appropriate footwear such as boots with a non-slip sole will need to be worn. Gloves should be available as they are often useful for ensuring a good grip on the load.
13. **Permanent or temporary special needs of workers** such as returning to work from an illness or holiday or having a specific disability. Workers with chronic conditions, including those with arthritis which worsens with age, require special consideration.

To identify further ergonomic and manual handling hazards, refer to the following Guidance Notes:

- * Tractor Rollovers, Runovers and Power Take-Offs (Numbers 1, 2 and 3)
- * Noise on the Farm (Number 4)
- * Farm Machinery (Number 5)
- * Animal Handling (Number 10)
- * Workshop Safety on the Farm (Number 11)
- * Industry Specific Notes (Numbers 21-)
- * Vibration



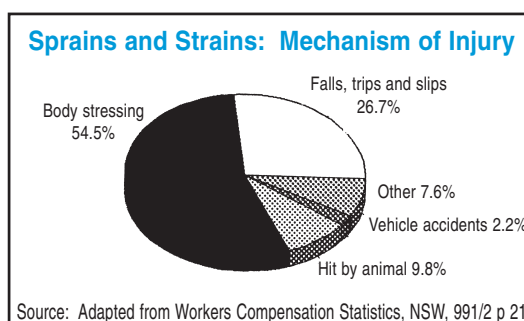
THE RISK

1. *Who is at risk*

- All people who work on farms are subject to ergonomic hazards which may result in muscle and joint injury.
- Individuals with a history of muscle or joint problems, those who are required to perform heavy lifting or those required to perform repetitive tasks are at particular risk of injury.
- Shearers are especially at risk of manual handling injury due to the long-term effects of poor posture and the tasks they perform which involve pulling, pushing, twisting, stooping and lifting.

2. *Nature of potential injury/illness*

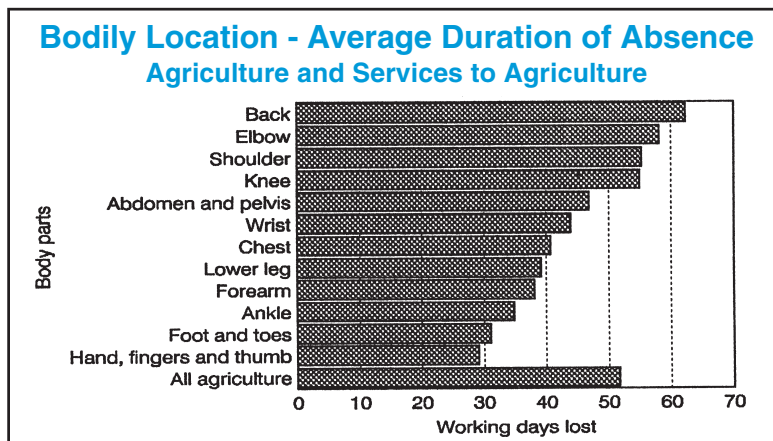
- Manual handling related injuries are a significant cost burden on industries. In 1988 / 89 sprains and strains accounted for the largest number of workers compensation claims in NSW. Injuries to the chest, abdomen and back made up 25% of all compensable injuries.¹ In Queensland during the 1992/93 financial year there were over 1000 workers compensation claims in the farming and pastoral industry relating to sprains and strains.
- These claims cost in excess of \$3,500,000.²
 - Manual handling problems include:
 - back injuries
 - soft tissue sprains and strains
 - hernias
 - fractures
 - occupational overuse syndrome
 - acute and chronic muscular pain
 - joint inflammation
 - tendonitis
- Sprains and strains are the most common manual handling injury and the chart below shows how those injuries occur.



¹Workcover Authority of NSW (1990). Workers Compensation Statistics 1987-88 and 1988-89

²Worker's Compensation board of Queensland (1992/93) Industry Statics: Farming and Pastoral

- Wear and tear on the spine is a particularly common problem. Increased pressure on the discs between the vertebrae from frequent or prolonged bending or lifting can cause a disc to protrude or even rupture, resulting in severe pain and disability. Back injury results in the lengthiest absence from farm work out of all manual handling injuries as shown in the following chart.



3. Degree of risk and priority for action

In assessing the degree of risk associated with any ergonomic problem, ask yourself the following questions:

- How common are ergonomic and manual handling injuries ?
- How severe are these injuries likely to be ?
- How often and for how long is an individual exposed to ergonomic hazards?

Use of the Priority Table to rate health and safety hazards can help to establish the priority for action for a particular ergonomic hazard. For example, a tractor with a seat which is too low causes the driver to be cramped and unable to see properly without straining or standing up. If this seat is unable to be adjusted, this hazard will have a HIGH priority for action and action should be taken immediately. However, if workshop tools are not kept within easy reach but the workshop is used only rarely, the priority for action will be LOW. Action is not needed but the worker should look at ways of improving work processes.

Priority Table

How serious is the likely injury from manual handling ?	How often do I or others perform manual handling tasks ?			
	Daily	Weekly	Monthly	Rarely
Permanent disability	High	High	High	High
Several days off work	High	High	Medium	Medium
First Aid Treatment	High	Medium	Low	Low

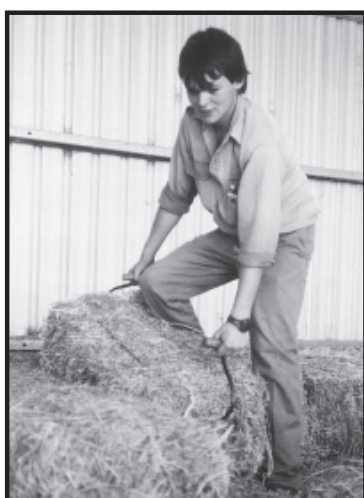
Source: Adapted from Worksafe Australia. Plant in the Workforce: Making it Safe. Commonwealth of Australia. August. 1995

The assessment of risk level and control of ergonomic hazards for a number of specific farm tasks can be undertaken by using the following system. This system looks at the ergonomic features which will influence the degree of risk of these common farm tasks.



- A. Machinery operation
- B. Manual handling
- C. Stock handling

The control measures for each task type will not be suitable for everybody. They are presented as options which are available to reduce the risk of injury while not interfering with farm productivity. In fact, well-designed control measures should increase productivity by decreasing human physical demands **and** reducing the cost of injury.



An option which may seem impractical to one person in their particular situation may well be possible for somebody else in their circumstances. Where an option may not be practical at present, it may become so in the future; for instance, when planning the purchase of new machinery and tools or designing new sheds and workshops.



CONTENTS

Hazard	Page Numbers
A. Machinery Operation	6
<i>A1 Driving mobile machinery and vehicles</i>	6
<i>A2 Using workshop tools</i>	9
<i>A3 Using other machinery</i>	12
B. Manual Handling	15
C. Stock Handling	20
<i>C1 Cattle and sheep handling</i>	20
<i>C2 Shearing</i>	23
<i>C3 Milking</i>	26



A. MACHINERY OPERATION

A1 - Operating mobile machinery and vehicles

Tasks which involve driving mobile machinery or other vehicles need to be assessed using the following ergonomic principles.

THE RISK

The level of risk is influenced by the following:

1. Actions and movements

Controls which are difficult to reach or which are of size and shape which make them difficult to grasp will affect safety. This effect will be either in terms of poor machinery control as well as risk of manual handling injury.

Controls which give too much resistance can cause muscle or joint problems.

Placement of pedals and hand controls can cause the operator to be in a bad working position leading to muscle or joint problems.

Where controls are not clearly marked to show function and direction of movement, the risk of uncontrolled movement of the machine causing injury is increased.

2. Posture and position

When using machinery in a paddock which requires the operator to look backwards often or for long periods, the continual twisting of the back increases the risk of injury.

If the operator is cramped due to insufficient space between the seat, controls, floor and cab, the angle of joints and muscles will result in fatigue and potential for injury. Conversely, if the space is too great, the longer distances to reach have potential for muscle and joint strain as well as compromising the safety of the operator through inadequate control of the machine.

3. Workplace and workstation layout

Seats must be considered from the point of view of cushioning, height in relation to the floor, back angle, location of the driver relative to controls and lumbar support. Seats which are unsuitable create a higher risk of ergonomic problems such as whole body vibration, limited range of joint movement and poor working posture. A full-height seat back on a tractor which pulls an implement will cause awkward posture and thus, increase the risk of chronic injury.

High vibration levels increase fatigue and the likelihood of whole body vibration or “white finger” vibration which is caused by regular exposure to vibration through the hands (often from a steering wheel). Vibration is increased when driving over rough ground or at higher speeds. The risk from vibration will be increased by the type of seat, the RPM of the engine, type of tyres and construction of the vehicle.

Cabs need to be large enough for the biggest worker. Cabin height is important as, if a suspension seat is installed, more space between the floor and seat is usually required. Failure to allow for this increases the risk of injury from hitting the head on the roof, especially when crossing rough ground. Inadequate leg room under the steering column can injure the upper legs as well having the potential for entrapment in an emergency. Keeping the floor of the cab clean and dry will reduce the risk of slipping.

Poor visibility from the cab increases the risk of muscle and joint injury by forcing the operator to sit awkwardly or in a twisted posture. For instance, when ploughing, the operator needs a good view of the plough and the ground in front and behind.



4. Work environment

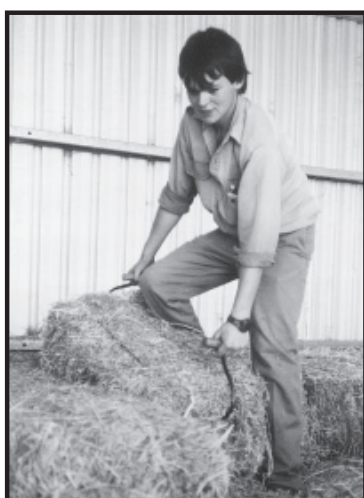
The environment includes noise levels, lighting and thermal comfort. Exposure to damaging noise will increase fatigue as well as lead to hearing impairment as exposure time increases. More than 60% of Australian farmers have significant noise-induced hearing loss. (See Guidance Note: Noise on Farms. Number 4).

Poor lighting in the workplace increases the risk of injury. The problem may be glare or alternatively, shadows where lighting should be focused. For instance, when ploughing at night, external lights which are not positioned correctly may lead to environmental hazards being unseen. Inadequate lighting within the cab could also lead to the wrong controls being moved.

Temperature of the external environment will affect the comfort and health of the worker. For instance, when harvesting, heat stress could be a problem if air-conditioning is inadequate. On the other hand, sowing in the colder months when air-conditioning is inadequate could result in loss of concentration due to the cold.

Where cabin seals and filters are inadequate in tractors and harvesters, exposure to organic dusts or chemicals increases the risk of respiratory problems or long-term poisoning effects.

Pedals, steps, platforms and floors which are not kept slip-resistant will increase the risk of a slip, trip or fall. Slipping from the steps of tractors and machines onto uneven ground is a common cause of injury and can also result in runover by the machine.



5. Skills and experience of the worker

Workers who are untrained or inexperienced in the operation of mobile machinery and vehicles are more at risk of injury. Only when they are aware of the ergonomic hazards can they take steps such as adjusting the seat and controls to reduce the risk of injury from these hazards.



6. Age of the worker

The spine of an older person will not cope as well as that of a younger person from vibration transmitted through the seat and floor of machinery. The damage from vibration will build up over time so the damage may not be immediately obvious in a younger person but will become evident over a period of time. Therefore, if vibration is not reduced on the tractor, header, ATV or other mobile machinery, people of any age are at risk of fatigue and whole body vibration injury.



7. Clothing

Those workers who do not wear appropriate clothing such as sturdy boots with non-slip soles are more likely to be injured; for example, a slip from the steps of a machine. Those who do not wear appropriate clothing for hot, cold or humid environments are more at risk of heat stress or injury from loss of concentration caused by cold.

8. Special needs of workers

Any worker who has a special physical need will be more at risk of injury if this need is not taken into account. For example, a person who has had recent abdominal or back surgery will be more at risk of further illness if they spend long hours sitting on a harvester at harvest time.

CONTROL MEASURES

1. *Elimination of the hazard*

- It is rarely possible to eliminate all ergonomic problems after the machinery and equipment has been purchased. At the time of purchase, consideration needs to be given to the ergonomic features associated with it.
- In considering elimination of the hazard, a decision must be made about whether a hazardous task or one which uses poorly designed machines is absolutely necessary. For instance, contracting an aerial sprayer eliminates the need to use the tractor and therefore, all the ergonomic hazards associated with tractors.

2. *Substitution for a lesser hazard*

- This option often involves using a newer model machine which usually has the benefit of better ergonomic design. For instance, the latest model tractor will have a seat with vibration dampers, adjustable armrests, height and weight support.

3. *Engineering/design options*

- When buying new machinery, look for controls which are easy to grasp, move in logical directions, offer the right amount of resistance and are within easy reach of the operator. They need to be adjustable for a tall or short operator if more than one operator uses the machine.
- Installing a swivel seat will reduce the time in which the spine is twisted when an implement is being trailed. A seat which is adjustable to the height of the operator enables a good relationship between the operator, controls and the cabin.

4. *Safer work practices and procedures*

Pre-operational

- ✓ Check the engine, lighting, ventilation, position of the seat relative to the operator, task, controls and cab, presence of personal protective equipment and condition of tyres.
- ✓ Adjustment of the seat and controls or any other feature of the machine which is able to be adjusted to suit the size and working position of the operator will reduce ergonomic hazards.

Operational

- ✓ Frequent, short breaks when driving mobile machinery or vehicles will reduce muscle fatigue and therefore the risk of injury.
- ✓ Surfaces of machinery must be even and kept clean and dry.

When not in use

- ✓ Maintenance and prompt repair of ergonomic components such as seats, controls, air conditioning, lighting and machinery parts will reduce the risks associated with vibration, awkward posture, temperature extremes, poor visibility, noise and dust or chemicals.

5. *Personal protective equipment and clothing*

- Sturdy boots with non-slip soles are essential to reduce the risk of slipping on or from the machine. Hearing protection may be necessary, depending on the machine. When dismounting or mounting the machine frequently, sun protection such as a hat, shirt with a collar and sunscreen may be needed. As always, when working around machinery, snug-fitting clothing which cannot be caught on anything is best.

A2 - Using workshop tools

Tasks which involve using workshop tools need to be assessed using the following assessment principles. Control measures are presented as options; some of which will suit some people and not others. However, unsuitable ones at present can be planned for in the future.



THE RISK

The level of risk is influenced by the following :

1. Actions and movements

The need for twisting not only increases the risk of injury but also makes work much less efficient. Work which is not performed smoothly may damage muscles and joints when carried out over an extended period of time. In the workshop, workers are placed at high risk of back sprain and strain. Where a tool is operated by a single finger (trigger action), the risk is increased.

2. Working posture and position

The requirement to work in cramped uncomfortable positions increases the risk of injury through muscle fatigue and strain.

If tools or materials essential to the task are above shoulder reach, or require forward bending of the back, twisting of the back or sideways bending of the back, the risk of injury is increased.

3. Duration and frequency of movement

The risk of injury from any posture or position will be increased further by the duration and frequency of the position. In the workshop, the use of smaller muscle groups such as those of the hands is frequently repetitive in nature and therefore, overloads muscles, causing fatigue and strain.

4. Locations of loads and distances moved

When loads associated with the workshop task are situated further from the operator, the risk of moving that load each time to the operator is higher than if the load was conveniently located. This risk is even higher if the load is above shoulder height or below mid-thigh height.

5. Weights and forces

Any load above 20kg which must be moved during a workshop task increases the risk of back injury.

If the operator is seated and has to apply a lot of force, the risk is increased. If a task involves sliding, pushing or pulling an object with high friction, the risk of injury is increased.

6. Workplace and workstation layout

Tools and benches which do not enable good posture and reduce movements such as reaching, bending and generally extending joints to extreme ranges, increase the risk of injury.

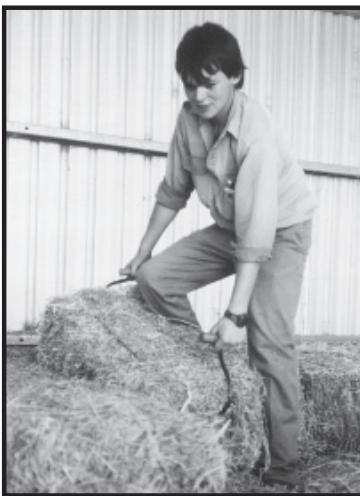
Frequency and duration of actions and movements will also be increased when the workshop areas are not well-positioned.

When space is inadequate for movement of legs and feet or for the movement associated with the task, the risk of injury is increased.

7. Work organisation

Where there is no effective maintenance program for tools and work areas, the risk of injury increases.

Where work is rushed as when there is a shortage of workers, fatigue increases the risk of injury.



8. *Work environment*

Exposure to damaging noise increases fatigue and leads to hearing impairment as exposure time increases (See Guidance Note: Number 4. Noise on Farms).

Climate or temperature of the workshop will affect the comfort of the worker and therefore, the level of concentration and reaction to hazards. In the case of very cold weather, muscles are more likely to be injured. In the case of very hot weather, heat stress is possible.

Lighting in the workshop which casts shadows or creates glare where light needs to be focused will increase the risk of injury.

Floors and surfaces which have oil or other fluids on them increase the risk of injury. Uneven floors increase the chance of tripping over.

Poor ventilation leads to a dusty or toxic atmosphere where gases or fumes build up. This increases the risk of respiratory illness or general discomfort of the worker and may lead to lapses in concentration.

When tools are not replaced in their correct positions, injury may result from reaching for them or falling over them while handling loads.

9. *Skills and experience of the worker*

A lack of training in identification and control of workshop hazards increases the risk of injury. Inexperienced workers are also at greater risk.

10. *Age and personal characteristics of the worker*

People who have impaired vision are at increased risk of injury.

If heavy loads are moved within the workshop, generally people under 18 years are at greater risk of injury because they are not yet physically mature. Likewise, older workers, for instance, those over 60 years have decreasing muscle and joint strength and are therefore at greater risk of injury. However, this is often offset by their higher levels of experience and skills.

11. *Clothing*

Those workers who do not wear sturdy boots with a non-slip sole and preferably, a steel toe-cap will be at increased risk of injury from slipping or dropping a load. Clothing which is so tight that it restricts movement or so loose that it can be caught on protruding objects or in machinery increases the risk of injury. Where clothing is not appropriate to the temperature of the workshop, heat stress or injury from lapses of concentration brought on by the cold can result.

12. *Special needs of workers*

Any worker who has a special need will be more at risk of injury if this need is not taken into account. For example, a worker with arthritis in the hands may need a reduced workload or specially adapted tools.

CONTROL MEASURES

1. *Elimination of the hazard*

- One example of this might be getting rid of tools which are not functioning properly or which can't be adjusted to the most efficient size. Alternatively, the task which is undertaken in the workshop may be eliminated; for instance, by using the local engineering firm to undertake the task.

2. *Substitution for a lesser hazard*

- Using a sharp saw rather than a blunt one reduces the risk of vibration, sprains or strains.

3. *Engineering/design options*



- The simplest way to ensure comfortable and effective work is to make bench heights suitable to the worker. If bench work gives you a sore back from stooping, raise the bench height. If you develop shoulder or neck pain from having to work with your shoulders raised and arms out, lower the bench height. In addition, try and have tools appropriate to the job in hand within easy reach, either store them in racks appropriate to the job, or plan ahead and have the tools laid out ready for the job.
- Tools need to be easy to use and a range of grip sizes available. Tool handles are available which enable a normal range of movement of the hands and arms. Tools with a hand grip rather than a finger control (trigger grip) are generally better to use over extended periods.
- A mobile hydraulic forklift or fulcrum and bar/hook in the workshop will reduce the risk of moving loads from the ground to the bench.
- Lights over benches and work areas reduce the risk of injury. Portable lights can be used where lighting is inadequate for the task.
- Ensuring that there are adequate windows and doors in the design of the workshop will reduce the risk associated with poor ventilation.



4. *Safer work practices and procedures*

Pre-operational

- ✓ Check lighting, ventilation, condition of tools, amount of working space and the presence of appropriate personal protective equipment.
- ✓ Adjustment of benches and tools to suit the task and the size of the worker will reduce ergonomic hazards.

Operational

- ✓ Regular short breaks from a task and rotation of tasks with others to utilise different muscles will reduce fatigue.
- ✓ Floors need to be level and kept free from fluid spills. Bench tops also need to be kept dry, uncluttered and maintained so that they are splinter-free.
- ✓ Use personal protective equipment as required; for example, hearing protection.



When not in use

- ✓ Tools, supplies and spare parts can be stored in areas where nobody will trip over them. Put equipment away out of reach of children.



5. *Personal protective equipment and clothing*

- Sturdy boots with a non-slip sole and preferably a steel toe-cap should be worn. Hearing protection may be necessary, depending on machinery used and length of exposure time. Gloves are necessary for many tasks in the workshop to ensure a good grip and to help prevent skin lacerations. However, they must not be worn when working with rotating machinery.
- Clothing needs to be snug-fitting so that it doesn't tangle in any machinery or hinder any manual handling tasks yet loose enough to encourage movement.

A3 - Using other machinery

Tasks which involve using other machinery such as pumps, hammermills, wool presses and post-hole diggers need to be assessed using the following ergonomic assessment principles. Control measures are presented as options; some of which will suit some people and not others. However, unsuitable ones at present can be planned for in the future.

THE RISK

The level of risk is influenced by the following:

1. *Actions and movements*

Any actions which are jerky or cause discomfort or pain increase the risk of injury. Thus, any two actions performed at the same time when one action holds an unsupported fixed position increases the risk of injury.

Using joints to their extreme range of movement increases the strain on them, especially if the action occurs over a long period of time or is repetitive.

If a worker is required to bend to one side to lift an object or exert a force, the risk of injury is increased.

2. *Working posture and position*

Stooping, twisting or bending the spine increases the risk of injury.

3. *Duration and frequency of the movement*

Where the movements involved in using the machine are repetitive or of long duration, the risk of muscle fatigue leading to injury is increased. There is also the risk of loss of concentration caused by boredom.

4. *Characteristics of loads and equipment*

If the machine has sharp edges or protrusions, is very hot or cold or blocks the view of the worker when being used, the risk of injury is increased.

5. *Workplace and workstation layout*

Positioning of the machinery controls affects the posture of the worker and therefore the degree of risk.

6. *Work organisation*

Inadequate maintenance of the machine increases the risk of injury.

If there are not enough workers to do a job, fatigue and inefficient work procedures increase the risk of injury.

7. *Work environment*

Exposure to damaging noise increases the risk of noise-induced hearing loss. This is common on Australian farms with more than 60% of farmers having significant noise-induced hearing loss. (See Guidance Note: Noise on Farms. Number 4).

Poor lighting increases the risk of injury. The problem may be glare or alternatively, shadows, where lighting needs to be focused.

Air temperature of the workplace where the machine is used affects the comfort and health of the worker. For instance, heat stress can be a problem in very hot weather while muscle and joint injury can occur when the task is undertaken in very cold weather.

Exposure to organic dusts or fumes increases the risk of asthma in susceptible people or long-term poisoning effects.

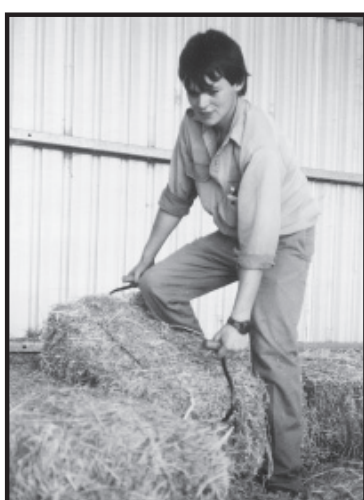


8. Skills and experience of the worker

If the worker is alert to the hazards involved in the task and has the necessary skills to avoid them, the risk is reduced. For instance, the worker may be aware of the need for taking short frequent breaks from the task.

9. Clothing

Those workers who do not wear appropriate clothing such as sturdy boots with a non-slip sole and a steel toe-cap are more at risk of injury.



10. Special needs of the worker

Any worker who has a special need will be more at risk of injury if this need is not taken into account. For example, somebody who has just returned to work after a holiday may not be as fit as they were or may be unfamiliar with a machine purchased while they were away. Failure to take these factors into account will increase the risk of injury for that worker.

CONTROL MEASURES

1. Elimination of the hazard

- Having the job contracted out will eliminate the hazard on the farm; for example, grain could be crushed off the farm, eliminating the need for a hammer mill.

2. Substitution for a lesser hazard

- Using a machine which is well-designed rather than one which poses a risk of muscle and joint injury is an example of substitution.

3. Engineering/design options

- Use of machinery which requires less people to operate it is a design development which may reduce the risk by exposing fewer workers to the hazard.

4. Safer work practices and procedures

Pre-operational

- ✓ Maintenance and prompt repair of ergonomic components such as controls, lighting, machinery parts etc will decrease the risks associated with vibration, awkward positions, poor visibility, noise, dust or chemicals.
- ✓ Check lighting, ventilation, working surfaces around the machine, amount of working space and the presence of appropriate personal protective equipment.
- ✓ As with any tasks which require muscular effort, a warm-up period before starting the task is helpful in reducing muscle injury.



Operational

- ✓ Frequent short breaks when using other machinery will reduce muscle fatigue and therefore decrease the risk of injury.
- ✓ Use personal protective equipment; for example, hearing protection.
- ✓ Ensure good visibility by having an unobstructed working area and adequate lighting to help reduce injury. Surfaces of machinery as well as the ground around it need to be kept clean and dry.

When not in use

- ✓ Ensure that children are separated from the machine by having fenced play area for small children and designated out of bounds areas for older children.

5. Personal protective equipment and clothing

- Sturdy boots with a non-slip sole and preferably a steel toe-cap should be worn. Hearing protection may be necessary, depending on machinery used and length of exposure time.
- Clothing needs to be snug-fitting so that it doesn't tangle in any machinery yet loose enough to allow free movement.

B. MANUAL HANDLING

The assessment of risk involved in manual handling tasks will cover all types of manual handling tasks.

- Lifting/lowering
- Pulling/pushing
- Carrying
- Holding/restraining



THE RISK

The level of risk is influenced by the following:

1. *Actions and movements*

The risk of injury is increased where:

- The load is not shared evenly between both hands or is lifted by one hand only. (For example, carrying a bucket)
- The load is pushed or pulled across the front of the body. (For example, pushing or pulling a sheep).
- The worker has to bend to one side. (For example, stacking hay).
- Two actions are required at the same time and one action is unsupported and in a fixed position. (For example, holding an animal with one hand while operating the drench gun with the other).

2. *Working posture and position*

Bending such as when lifting hay bales or twisting of the spine such as when shovelling or carrying sheet material will increase the risk of injury.

3. *Duration and frequency of manual handling*

The more often and the longer the time period over which the lifting, lowering, pushing, pulling, carrying and holding of loads is done, the higher the risk of injury. The risk from prolonged manual handling tasks will be affected by the fitness of the worker.

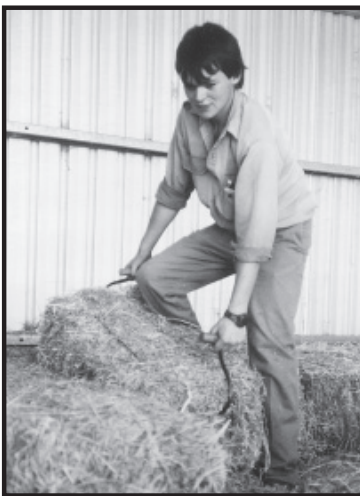
4. *Location of loads and distances moved*

The risk of injury increases directly with the distance the load is moved. If the worker has to lift loads from above shoulder height or below mid-thigh height, this extension of muscles and joints increases the risk of injury.

5. *Weights and forces*

The following practices increase the risk of manual handling:

- Pushing or pulling while seated without good seating and solid foot support.
- Sliding, pushing or pulling an object which is difficult to move.
- Where loads over 4.5 kg are lifted while in a seated position.
- Where loads over 16-20 kg are lifted from the standing position.
- Moving loads between 16-55kg.
- Moving loads above 55kg without mechanical assistance or team lifting.



6. Characteristics of loads and equipment

The dimensions, stability, rigidity, predictability, surface texture and temperature, grips and handles of a load will affect the degree of risk.

If the load is an animal, the risk of injury is increased because of the possibility of movement of the animal requiring jerky muscle action.

Moving sheet material is hazardous because of potential twisting of the spine and injury to the hands.

Long loads are less easy to control and it is especially important that these are kept close to the body.

7. Workplace and workstation layout

If there is inadequate space for the movements required, injury is more likely. Equally, if mechanical handling aids are not readily available, the risk of injury is increased.

8. Work organisation

The availability of adequate labour will influence the degree of risk, especially at busy times. Inadequate labour will not only result in dangerous manual handling technique because of the inability to perform team lifting but will also affect the disrupt a smooth work flow.

9. Work environment

Floors which are not clean, dry, level and obstacle-free increase the risk of injury from manual handling. Places such as sheep yards which have obstacles within them or very rough or muddy ground increase the risk.

Manual handling in very hot or cold environments can lead to heat stress or muscle damage when muscles are cold.

Inadequate lighting or excessive glare can result in poor visibility which increases the risk of dropping a load.

If there is inadequate room for a worker to apply the correct manual handling technique, the risk is increased.

10. Skills and experience of the worker

Workers who have not received adequate training in manual handling hazards and techniques are at increased risk of injury. These people may not have the experience to recognise hazardous tasks. If the task is beyond the physical capacity of the worker, the risk is higher.

Anyone involved in manual handling tasks should have received instruction in how to move loads safely. This includes the correct use of mechanical aids. These people are then obliged to use these techniques.

11. Age and personal characteristics of the worker

If people under 18 years are lifting loads of more than 16 kg, they are increased risk of injury. Workers in this age-group may consider that they are not vulnerable to injury and may tackle jobs which are beyond their capabilities. They may also continue to work when muscle discomfort is occurring or even when injury has already occurred.

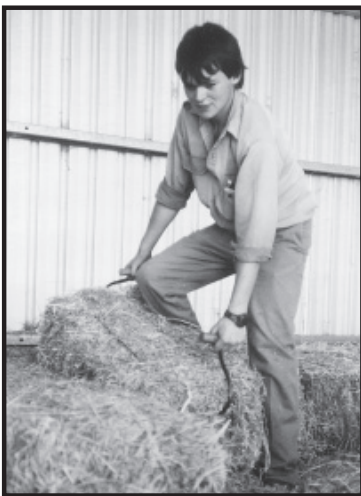
Older people such as those over 60 years have decreasing muscle strength and endurance as well as a decrease in joint flexibility which reduces their tolerance for working in awkward postures. However, the gains of experience and training in older workers may compensate for the decrease in strength.

12. Clothing

Clothing which restricts movement increases the risk of injury and likewise, clothing which is too loose-fitting may hinder the manual handling technique.

13. Special needs of workers

Workers who are just returning to work after a long absence may be at greater risk of injury because of loss of strength or unfamiliarity with the task or manual handling technique. Specific disabilities may increase the risk of injury.



CONTROL MEASURES

Control measures need to be designed which reduce the human requirement to lift excessive weights, bend or twist, exert excessive push/pull forces, adopt uncomfortable postures for long periods and minimise repetitive work. These control measures, as previously mentioned are presented as options, some of which will suit some people and not others. However, options which unsuitable at present can be planned for in the future.

1. Elimination of the hazard

- An example of elimination of the hazard is the improvement of pastures to eliminate the need for hay. Another example is to introduce bulk delivery of fertiliser in truck loads rather than 25 kg bags and use bulk handling equipment and methods.

2. Substitution for a lesser hazard

- Substitution could involve substituting the load or a mechanical aid to reduce the risk. For example, changing the load may mean a reduction in load sizes. A reduction in bag size substitutes a lesser manual handling risk. Alternatively, replacing small hay bales with large round hay bales which must be moved by mechanical means will reduce the risk of manual handling injury.

3. Engineering/design options

- There are numerous mechanical handling aids on the market that will reduce the amount of manual handling required and therefore decrease the risk of injury. Almost any task can be modified to decrease the risk of manual handling problems.

Lifting

- Objects may pose a manual handling risk if they are too heavy or awkward to safely lift or if they are so light that work becomes fast paced and overly repetitive. Engineering solutions for lifting hazards often result in objects being packaged in larger units and handled remotely or the object being handled by tools that improve leverage, grip and decrease the lift distance.
- Bale hooks are an example of an engineering solution to a manual lifting problem. Drum levers are another example whereby the object is not modified but the handling characteristics are changed. Mobile hydraulic platforms are often used to reduce the range of lift needed in storerooms, coupled with storage of heavy objects at just below waist height. They are a cheap and effective manual handling control measure.

Other mechanical aids which may be used are:

- Special trolleys to move and tilt drums
- Post drivers for fencing
- Small mobile hoists
- Mobile ramps on skids for towing behind a truck or utility for use in loading and unloading
- Tools such as crowbars, trolleys, hooks and jacks. Hooks are particularly useful for manoeuvring hay bales into position so that they can be picked up and carried close to the body

Twisting and Poor Postures

- The requirement to work in cramped uncomfortable positions and the need for twisting not only increases the risk of injury but also makes work much less efficient. Changes to workshop and storage shed layout often allows for better occupational health and improved efficiency.
- The simplest way to ensure comfortable and effective work is to make bench heights suitable to the person doing the job. If bench work gives you a sore back from stooping, raise the bench height. If you develop shoulder or neck pain from having to work with your shoulders raised and arms out, lower the bench height. In addition try and have tools within easy reach, either store them in racks appropriate to the job and at hand, or plan ahead and have the tools laid out ready for the job. Controls should be easily reached without stretching or stooping.

Moving Materials

- Forces required to push, pull and carry materials, bags, feed, drums and animals are often large enough to cause injury. These forces can be reduced by using barrows, trolleys, slings, hoists and the like.
- Waist-high sheep manipulators will turn the sheep at the shearer's pace. If used with a sheep loading conveyor and another conveyor transporting the whole fleece to the wool classer who then has the table and wool press conveniently situated, the work flow is smooth and manual handling risks reduced.

4. Safer Work Practices and Procedures

Before undertaking manual handling tasks

- ✓ Taking enough exercise, eating a healthy diet and getting enough sleep will enable the body to better cope with everyday stress.
- ✓ A warm-up period before you commence heavy work will reduce manual handling problems.
- ✓ Ensuring that there are enough people to complete a task safely will reduce the risk of injury. For instance, when unloading or loading materials, two people can finish the task faster and with less muscle and joint stress than one.

When undertaking manual handling tasks

- ✓ A safe procedure for manual handling involves planning the handling. Before commencing to move anything, the situation should be assessed as to whether the task really needs to be done and whether it can be done safely given the number of people and resources available. If a task requires extra people to assist, it should not be attempted until these people are available. The area where the handling is to take place should be cleared of unnecessary obstacles. Appropriate mechanical aids should be in place and protective equipment such as boots or helmets worn.



- ✓ Proper lifting techniques and team lifting are work practice controls that can reduce muscle and joint-skeletal injuries from manual handling. Training in these lifting techniques is essential.
- ✓ Tasks which require cramped posture should be avoided or redesigned so posture is improved or else it is undertaken for only short periods. Joints are best used within a normal range of movement without extreme flexion or extension.
- ✓ Use personal protective equipment such as gloves where appropriate.
- ✓ Taking frequent breaks from the task and changing jobs to use different muscles are ways of reducing muscle fatigue which can lead to injury.
- ✓ Simple rules relating to correct body techniques are as follows:

1. Bend the knees, keep the back straight, load close to the body and use the leg muscles, supporting the load by the weight of the body as much as possible.
2. Hold loads as close to the body, at waist height if possible.
3. Avoid twisting the spine.



5. Personal protective equipment and clothing

- The most common and useful piece of personal protective equipment for manual handling are gloves. Correct glove selection for specific jobs can increase grip and therefore contribute to load stability.
- Clothing should not be so tight as to restrict movement yet should be snug fitting so that they don't get in the way of the lifting technique. For some tasks, steel toecaps are needed in case a load is dropped. A non-slip sole must always be worn.



C. STOCK HANDLING

Jobs which involve animal handling need to be assessed using the ergonomic risk factors already outlined. Control measures, as previously mentioned are presented as options; some of which will suit some people and not others. However, unsuitable options at present can be planned for in the future.

C1 - Cattle and sheep handling

Animals are the most common agent of manual handling injury. Cattle, being large animals are the obvious cause of some of this injury which is usually acute and often severe. Sheep are the most common agent of animal related manual handling injury. They put backs, knees and feet most at risk because sheep, being a smaller animal are able to be lifted. In contrast with cattle handling, sheep handling involves getting into the yards with sheep. Workers are therefore likely to suffer chronic injury from pushing sheep around in the yards.

THE RISK

The level of risk is influenced by the following:

1. Actions and movements

Moving animals is likely to result in sudden, jerky movements because the animal will need to be restrained; for instance, when lifting and carrying a sheep. At times, a sheep may be pushed across the front of the body, increasing the risk of injury. Sheep drenching is a time of increased risk because of moving the sheep through the yards and races and then holding the sheep with one hand and using the other in an unsupported position to give the drench.

2. Working posture and position

Working with sheep in particular is likely to involve prolonged and/or repetitive bending. Sheep have a habit of getting into positions which make them difficult to grasp, causing the worker to reach for them, thus increasing the risk of manual handling injury.

3. Duration and frequency of manual handling

As sheep and cattle are usually handled individually in large numbers for many tasks, repetition of movements may lead to strain of the muscles in the hands, arms, shoulders and back. For instance, when marking calves, the constant movement required to position the calves is likely to cause injury. If this task is done over a long period of time, the risk is increased.

4. Location of loads and distances moved

When catching animals in order to restrain them in a cradle, the risk increases as the distance they are from the cradle increases. Where the animal has to be reached for, especially if it is below mid-thigh height (lambs, for instance) the risk is higher.

5. Weights and forces

As an adult sheep weighs over 16 kg, the risk of injury from lifting it is higher than a load which is under 16 kg. People tend not to try and lift a beast. However, the force which may be required to restrain such an animal carries a high risk of injury. During sheep and cattle handling, there is often heavy equipment to move such as gates and sliding bolts. Pulling, or sliding or pushing these structures may require great exertion and therefore increase the risk.

6. Characteristics of loads and equipment

Sheep and cattle are unpredictable creatures which may require greater force to restrain or move. They are often disturbed and excited which makes them more difficult to handle and increases the risk of injury. As they are not the easiest object to grasp, sudden reaching movements of the handler or movements used to restrain a struggling animal are potentially very hazardous.



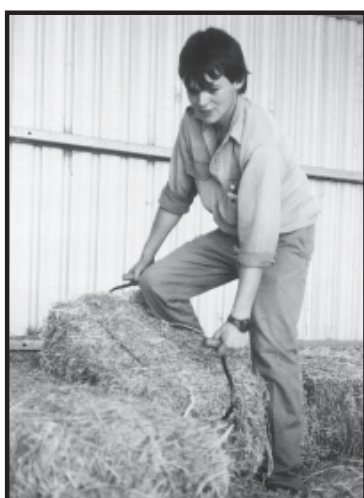
7. Workplace and workstation layout

Design of yards and races will affect the likelihood of manual handling injury. Where these are not of the best design to encourage a free flow of animals, the worker is likely to be crowded and have inadequate space for feet and legs. Treating cattle in a crush can result in awkward posture and poor visibility of the task.

8. Work organisation

Where sheep and cattle work involves long hours of physical effort, the risk is higher. This is made worse if there are inadequate people for the job.

Where stock are not flowing smoothly through yards due to bad handler techniques, bad yard design or inadequate workers, the risk of injury is increased because of handler/animal contact to push the animals along.



9. Work environment

Where work is carried out in very cold conditions, muscle injury is more likely. If the environment is very hot, heat stress is possible. Where the ground is slippery or uneven, the risk of injury from slipping or tripping is higher. Excessive dust can cause respiratory problems and lead to lack of concentration which may increase the risk.

10. Skills and experience of the worker

Inexperienced workers, especially those without a good understanding of animal behaviour are at increased risk of injury. Workers who haven't been trained in the techniques of holding and moving animals are at greater risk of injury.



11. Age and personal characteristics of the worker

Workers under the age of 18 are at greater risk due to their immature physical development. They are also at greater risk because of their risk-taking attitudes and a common attitude that they are invulnerable to injury. They may also be inclined to go on working when the first sign of injury appears.

12. Clothing

Clothing which is too tight and restricts movement or too loose and gets caught on objects such as gates, increases the risk of injury. Footwear which is not sturdy and with a non-slip sole increases the risk of slipping over or having the foot crushed. If a hat and glasses is not worn while working with animals outside, the risk of sun damage and eye irritation is higher.



13. Special needs of the worker

Workers who are returning after a break from work because of illness or holidays are more at risk because of lack of familiarity with the task and perhaps loss of fitness or strength. Lack of conditioning and fitness for the job increases the risk of injury.

Workers who have any disability; for instance, amputated fingers on one hand or sight or hearing impairment, are at greater risk of injury if modifications to the work process are not made.

The most effective control measures are likely to be engineering/design options and safer work practices.

1. *Engineering/design controls*

- Effective design of yards and races (on an uphill slope with round yards and curved races) will ensure the smooth flow of animals into and around the area. Gates which slide backwards and forwards along the race rather than across it will pen the animals up more effectively and reduce the need to reach for animals.
- Vaccination guns which have a pistol grip put less strain on the fingers and hands.
- Mechanical aids for restraining animals in the appropriate position for the task are helpful in reducing injury.
- A trailer and crate taken around the paddock means that one person doesn't have to lift a sheep onto the back of a utility on his/her own. An hydraulic arm or ute lift has the same purpose.

2. *Safer work practices and procedures*

Before undertaking tasks associated with sheep and cattle

- ✓ A good knowledge of animal behaviour will help workers to complete tasks more quickly and with less risk of injury.
- ✓ All workers need training in correct methods of catching, holding, lifting and moving animals. In particular, they need instruction in how to move animals safely into and through yards.

When undertaking tasks associated with sheep and cattle

- ✓ A warm-up period before commencing work will help reduce manual handling injury.
- ✓ When carrying out repetitive tasks such as vaccination or drenching, frequent short breaks will help reduce muscle strain.
- ✓ Having enough people (and dogs, if working with sheep) for the job will ensure that work will flow more smoothly. For example, when moving sheep or cattle around yards or into trucks, having enough people and dogs will save workers from rushing or reaching.

After undertaking tasks associated with sheep and cattle

- ✓ Maintenance and repair of yards and mechanical restraints will reduce the risk of injury from failure of equipment or holding structures such as gates.

3. *Personal protective equipment and clothing*

- Sturdy boots with a non-slip sole will protect the foot and help prevent slips. Gloves can be used to protect the hands for some tasks which do not involve fine movement of the fingers. During outside work, a hat, shirt with a collar and sunscreen will protect the worker from the sun.
- Wear clothes which are not so tight as to restrict movement but snug enough that they don't get caught on gates or horns.

C2 - Shearing

Activities such as penning, shearing/crutching picking up, wool skirting/rolling, wool classing and wool pressing are frequent causes of manual handling injury. An assessment of the level of risk in these activities will use the following ergonomic assessment principles.



THE RISK

The level of risk is influenced by the following:

1. *Actions and movements*

Exerting force with the hands and arms at a distance from the trunk while in a flexed posture, particularly if this posture has been maintained for over two minutes increases the risk of injury. Extreme ranges of movement occur when shed hands have to drag reluctant sheep through the pen or over the gate.

2. *Working posture and position*

Long periods of bending and/or twisting of the spine increase the risk of damage.

3. *Duration and frequency of manual handling*

The risk of injury is higher the longer the job is undertaken and the more frequently the task is undertaken in one work period.

Individuals who are overworked will be at increased risk. Thus, where a work activity such as shearing is seasonal, the risk may be higher.

4. *Location of loads and distances moved*

Where sheep gather at the rear of the catching pens, this necessitates dragging them over long distances which increases the risk of injury.

As a sheep is handled from below mid-thigh height, this carries an increased risk of injury.

Fleeces which have to be carried a long way from the bin to the wool press increase the risk of injury

5. *Weights and Forces*

As the average-sized sheep weighs around 45 kg, the risk of injury is high because of the heavy weight. Between 16 and 55 kg, the risk rises proportionally so heavier sheep pose a greater risk. Generally a worker should move a load above 55 kg (such as bigger rams) with assistance.

Where fleeces are not carried close to the body, the risk of back injury will be higher.

6. *Characteristics of loads and equipment*

When moving a sheep, the risk is increased because of the force exerted to restrain the animal if it struggles.

Wool presses which are in need of service and maintenance may increase the risk.

7. Workplace and workstation layout

The risk of injury is increased when catching pens are large and the shearer has to drag sheep long distances.

If chutes have a physical (for example, a step) or behavioural barrier (for example, dark shadows), sheep will be more reluctant to enter them and therefore require greater effort to move.

Catching pen gates which have nails or bolts protruding from them are more likely to cause injury.

The risk of injury from twisting and turning is higher when there is poor alignment between the catching pen, catching pen gates and stands or between the let-go chute and the shearer's finishing position on the stand. Left-handed shearers also require consideration on these terms.

Twisting also occurs when removing wool from bins which are too narrow.

Raised boards reduce lifting but, if not well-positioned, may cause shed hands to have to reach for fleeces during shearing. Consideration must be given to shearers falling from raised boards, particularly if shearing larger or more active sheep.

Most sheds are inadequately lit and therefore increase the risk of injury.

8. Work organisation

The flow of work is important in the woolshed. Consideration should be given to paths of all workers - shearers, board boys and wool classers. Risk of collision should be minimised.

9. Work environment

Very cold temperatures outside in the yards or inside the woolshed increase the risk of muscle injury. On the other hand, very hot temperatures are liable to cause heat stress.

Inadequate lighting reduces visibility and increases the risk of injury.

Noise from presses and shearing plant can increase the risk of hearing damage and may result in loss of concentration which increases the risk of injury.

Floors of sheds or shearing boards which are not even, uncluttered, clean and dry increase the risk of injury. Likewise, the surface of yards increases the risk of slipping or tripping if the ground is very uneven or slippery.

Petrol or diesel engines sometimes create a hazard by emitting fumes into the shed.

10. Skills and experience of the worker

Any workers who have not been trained in manual handling techniques are at increased risk of injury. Inexperienced workers will be at increased risk due to their limited skill in recognising hazards and evaluating tasks.

11. Age and personal characteristics of the worker

Workers who are under 18 years of age are at greater risk of injury due to their lack of physical maturity. They will probably also have less experience than an older worker which places them at even greater risk.

Older workers who have decreasing physical strength are at greater risk but this may be tempered by their depth of experience.

12. Clothing

Where workers do not wear appropriate clothing or personal protective equipment, they are at increased risk of injury while shearing. For instance, a worker who wears clothing with loose ends such as long sleeves which are not buttoned up or rolled up neatly may be caught on the horns of a sheep or on the corner of a pen.



13. Special needs of the worker

Any workers who are returning to work after an absence because of holidays or illness, for example will be at greater risk of injury because of reduced fitness and conditioning. A disability such as impaired vision places workers at increased risk of injury.

CONTROL MEASURES

Management of shearing hazards is a highly specialised area which has been extensively dealt with by other people and organisations. Refer to the following for more detailed information on control of shearing hazards:

- * Guidance Note: Number 22. Woolshed Safety
- * Kondinin Group. Shear Sense
- * Freeman, Bob. Managing Shearing to Improve Productivity
- * SA Farmers Federation. Reduce Injury.



C 3 - Milking

Ergonomic and manual handling hazards abound in the dairy. These mostly occur during yarding, animal handling, milk line maintenance and lifting. Most non-fatal injuries on dairy farms occur in the milking shed. These are often the result of kicks from cows or occur while opening/closing gates. Back, shoulder and knee injury frequently result from working in awkward postures and using repetitive actions. Tasks involved in milking need to be assessed using the following ergonomic assessment principles.

RISK FACTORS

The level of risk is influenced by the following:

1. *Actions and Movements*

Tasks such as calving, feeding in the dairy, milking and cleaning milk vats/lines usually involve long periods of bending, lifting and twisting which can lead to muscle or joint strain and back injury.

Lifting milk buckets when rearing calves will increase the risk of injury, especially if the bucket is lifted by bending to the side to lift it and then carrying with one hand only.

2. *Working posture and position*

Repetitive forward or sideways bending and/or twisting of the spine while in the dairy will increase the risk.

Where the same posture is maintained for long periods without a change in position or a rest, the risk of injury is increased.

3. *Duration and frequency of the movement*

The longer the task takes and the more often the task is done, the higher the risk of injury. If it is done by a person who is not fit enough or strong enough, the risk of injury is increased.

The repetitive nature of tasks involved in milking means that muscles often do not have time to recover in between actions and this increases the risk of injury.

4. *Location of loads and distances moved*

The further the load is moved, the greater the risk. Where the worker has to reach below mid-thigh height or above shoulder height to grasp the load, the risk is increased.

5. *Weights and Forces*

If the load is above 20kg, the risk of injury is increased. If that load is handled for long periods or frequently, the risk is increased.

If the handling of the load takes place below mid-thigh or above shoulder height, the risk is increased and if it is moved long distances, the risk is increased.

The action of restraining an animal or pulling or pushing something in the dairy which is difficult to move will increase the risk.

6. Characteristics of loads and equipment

Animals have the capacity to move suddenly, requiring sudden additional effort to restrain or lift and so constitute a higher risk of injury than other loads. Where animals are disturbed or excited, this risk is even higher.

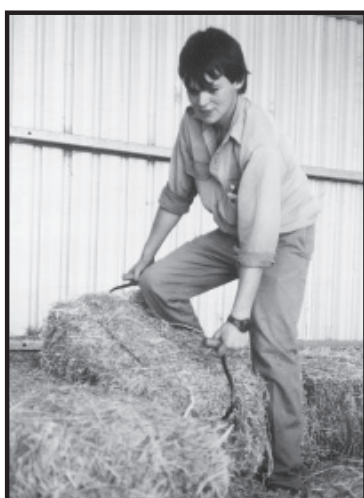
Animals and other objects in the dairy which are difficult to grasp or hold, wet or slippery or very hot such as water used for cleaning milk vats or lines increase the risk of injury.



7. Workplace and workstation layout

Rotary and herringbone systems, particularly those with gates increase the risk of crushing injury. However, these as well as the step-up dairy reduce the level of risk of back injury. Where the pit is not designed to the correct depth with taps, hoses, teat sprays and controls conveniently located so that reaching and cramped positions are avoided, the risk of injury is increased.

Layouts which do not encourage a good cattle flow resulting in bottlenecks increase the level of human/animal interaction required and therefore, the risk of injury is higher. The presence of rough muddy tracks will add to this problem.



8. Work Organisation

Where there are inadequate workers involved in milking, the risk of injury is greater due to those workers having to spend more time and use more effort to complete the task. There will be inadequate time for rest breaks and not enough people ensure task variety. For instance, by the time the workers get to clean the dairy shed and yards, they may be so tired that they are more prone to slip or trip. Inadequate workers will also restrict the flow of work, increasing the risk of injury.

9. Work environment

Sheds with floors or yards with surfaces which are very slippery, uneven or containing obstacles which could be tripped over increase the risk of injury while milking, transporting milk, and cleaning milk vats and lines.

Where workers spend long periods standing on concrete, muscle strain and discomfort may occur.

The temperature of the shed and the outside environment can increase the risk of muscle damage if very cold and heat stress if very hot.

There is a risk of noise-induced hearing loss when milking and storing milk.

Poor lighting where there are either shadows or glare increases the risk of slips, trips or falls when milking and feeding in the dairy.

Excessive dust in the dairy environment while feeding increases the risk of respiratory disease and foreign bodies in the eye.



10. Skills and Experience of the worker

Where a worker has not received training and instruction on identifying hazardous situations as well as correct manual handling techniques, the risk of injury is higher. An inexperienced worker is less likely to recognise potential hazards and therefore, the risk of injury for them and others is increased.

11. *Age and personal characteristics of the worker*

Dairy workers under the age of 18 years are at increased risk of injury due to their physical immaturity. They are also likely to be less experienced and therefore at greater risk as mentioned previously. This age-group tend to feel invulnerable to injury and feel they can do any task without risk.

Older dairy workers may be at increased risk of injury due to declining physical strength. However, if they are experienced workers, this may well lessen the risk of injury if it results in appropriate techniques being used.

12. *Clothing*

Clothing which restricts workers because of its tightness or gets caught on things because it is loose increases the risk of injury. Boots which don't have a non-slip sole and reinforced toe-cap place workers at increased risk of slipping or having their foot crushed when trodden on.

13. *Special needs of the worker*

Where workers have a disability which might be as slight as sight impairment, the risk of injury is increased.

If workers are coming back to work after illness or holidays, their fitness and strength may be lessened which will increase the risk of injury.

CONTROL MEASURES

1. *Elimination of the hazard*

- The construction of a new dairy is usually the only opportunity for elimination of the hazards. At this time, redesign of the dairy to improve cattle flow and eliminate ergonomic hazards can take place.

2. *Substitution for a lesser hazard*

- A substitution option might be to select against animals which are flighty or consistently aggressive.

3. *Engineering/design options*

- This option plays the most important part in controlling the risk involved in milking.
- The rotary and herringbone dairy system separates the milker and the cow. The use of electrical or manual winch driven backing gates improves the flow of cattle and therefore reduces the level of operator/cow contact. Gates are best designed to be operated from the pit, in places where they don't interfere with tasks and designed to reduce the risk of fingers being caught. Step-up, rotary and herringbone dairies reduce stress on the back and other body parts while milking. The right depth of the pit will ensure that the operator is in a comfortable position. Taps, hoses, teat sprays and controls need to be positioned so that the operator is not cramped and does not have to reach for them. Cup application must not require bending or raising the arm above a 90 degree angle.
- Kick rails which are supported from above reduce the risk of kick injuries and of hands being jammed against pipes.
- A crush or bail area for veterinary tasks set up as near to the dairy as possible will reduce the risk of injury.



- Effective lighting, heating and cooling in the shed will reduce discomfort and the risk of injury.
- Lifting devices and lifting platforms can be installed and used where necessary. Cow lifters in particular would be a useful manual handling device which could be bought by a co-operative of producers to minimise costs but still provide access to equipment.
- Third line or reverse-flow cleaning systems reduce the risk of injury from carrying or moving hot water. Alternatively, the use of a hot water delivery hose which allow for output of hot water into buckets where they are being used will reduce the distance required to carry hot water buckets.
- Improved yard or wall surfaces as well as output hoses will reduce muscular effort when cleaning up.

4. Safer work practices and procedures

Before milking

- ✓ Training of all people who work in the dairy in risk assessment related to manual handling and ergonomics in the dairy and yards as well as the correct manual handling techniques will reduce the risk of injury.
- ✓ A warm-up period before the start of work will help reduce the risk of injury.

While milking

- ✓ People who are not working in the dairy ought not to be in the dairy. Children, in particular, have no place in the dairy unless they are fully competent in carrying out the tasks which they undertake. Alternatively, if children have to be at the dairy due to lack of child care, a safe play area should be used which completely separates the child from the dairy hazards but allows an adult enough visibility to supervise while carrying out milking tasks.
- ✓ Taking frequent breaks from a task and changing tasks to use different muscles are ways of reducing the muscle fatigue which can lead to injury.
- ✓ Ensuring that there are enough workers for the task will result in a smoother work flow and reduce the risk by decreasing the workload for those who are working.
- ✓ Use personal protective equipment as recommended.

When milking is finished

- ✓ Maintenance and prompt repair of machinery, yards, lighting and floors will reduce the risk of injury from vibration, noise, dust, awkward positions, slips and falls.

5. Personal protective equipment and clothing

- Where noise in the dairy is excessive (if you have to raise your voice in order to have a conversation with someone), hearing protection is necessary.
- Industrial rubber mats to work on in the dairy will reduce fatigue and the risk of slipping.
- Appropriate footwear will be well-padded, reinforced at the toe, waterproof and have a non-slip sole.
- Clothing needs to be loose enough so that it doesn't restrict manual handling tasks and yet not so loose that it is inclined to get hooked on gates and machinery.

RELEVANT LEGISLATION AND STANDARDS

- National Code of Practice for Manual Handling [NOHSC:1001(1990)]
- Standards Australia publish a range of standards covering the design and use of mechanical handling devices, including conveyors (AS 1755-1986), industrial trucks (AS 2359 -1985) and lifting equipment / components. See below for contact details.
- Each State has specific requirements for the licensing and certification of forklift, crane and mobile plant operators. Contact the Occupational Health & Safety organisation in your State or Territory for further information.

USEFUL REFERENCES

1. National Standard & Code of Practice for Manual Handling. Australian Government Printing Service. Canberra 1990.
2. Kelsey, J. L. & Golden, A. L. Occupational and Workplace Factors Associated with Low Back Pain. Occupational Medicine: State of the Art Reviews, Vol. 3. No 1. 1988
3. Video: Physio Backcare Program Part 1-2. Medical Communication Unit. Royal Newcastle Hospital. Available from Australian Agricultural Health Unit.
4. Video: Think Back. Farmsafe NSW and New South Wales WorkCover Authority. 1995

CONTACTS

State/Territory Occupational Health & Safety Organisations as listed.



- * WorkCover New South Wales: Ph: 131 050
- * Victorian WorkCover Authority: Ph: (03) 9628 8188
- * Queensland Division of Workplace Health & Safety:
Ph (1800) 177 717 or (07) 3247 4711
- * South Australian WorkCover Corporation Ph (08) 8226 3120
- * WorkSafe Western Australia: Ph (08) 9327 8777
- * Tasmanian Workplace Standards Authority: Ph (03) 6233 7657
- * Northern Territory Work Health Authority: Ph (08) 8999 5010
- * Australian Capital Territory WorkCover: Ph (02) 6205 0200

Australian Physiotherapy Association

112 Majors Bay Road
Concord NSW 2137
Telephone: (02) 97361122
Facsimile: (02) 97362152



Standards Australia

PO Box 1055
Strathfield NSW 2135
Telephone. (02) 9746 4700
Facsimile. (02) 9746 8450

Australian Agricultural Health Unit

PO Box 256
Moree NSW 2400
Telephone. (02) 6752 8210
Facsimile. (02) 6752 6639



AGHEALTH

Copyright: Australian Centre for Agricultural Health and Safety

**This Project has been funded by the
Rural Industry Development Corporation**