



## **Manual tasks**

In order to understand the workplace health and safety requirements for manual tasks, and your obligations under the law you must consider and understand relevant legislation and codes of practice

### What law applies

Legal obligations, legislation, codes of practice

### About manual tasks

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## What law applies

In order to understand the workplace health and safety requirements for manual tasks, and your obligations under the law you must consider and understand relevant legislation and codes of practice.

### **General health and safety obligations**

To understand your obligations and safety requirements you must be familiar with the:

*Workplace Health and Safety Act 1995* which imposes obligations on people at workplaces to ensure workplace health and safety. The *Workplace Health and Safety Act 1995* also helps you to meet your workplace health and safety obligations through:

- The *Workplace Health and Safety Regulation 2008* which describes what must be done to prevent or control certain hazards which cause injury, illness or death
- codes of practice, which are designed to give practical advice about ways to manage exposure to common risks. In particular, the *Risk Management Code of Practice 2007* should be read in conjunction with information on PPE.

Every Queensland employer must have **workers' compensation** insurance. Most employers insure with WorkCover Queensland, while a small number of large organisations have their own insurance. This insurance coverage ensures that employees injured at work receive financial support.

### **What you must do**

It is a requirement of the *Workplace Health and Safety Act 1995* that risks must be assessed and control measures then implemented and reviewed to prevent or minimise exposure to the risks.

If the *Workplace Health and Safety Regulation 2008* describes how to prevent or minimise a risk at your workplace you **must** do what the regulation says. If there is a code of practice that describes how to prevent or minimise a risk at your workplace you **must** do what the code says or adopt and follow another way that gives the same level of protection against the risk.

If there is no regulation or code of practice about a risk at your workplace you **must** choose an appropriate way to manage exposure to the risk. People must, where there is no regulation or code of practice about a risk, take reasonable precautions and exercise proper diligence against the risk.

See the *Risk Management Code of Practice 2007* for further information.

## ***Specific regulations for manual handling***

There are two Advisory Standards (now known as Codes of Practice) that describe the main health and safety problems linked to manual tasks and gives practical advice on how to address them:

- *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice)
- *Manual Tasks Involving the Handling of People Advisory Standard 2001* (now known as a Code of Practice)

## **About manual tasks**

### ***What are manual tasks?***

Manual tasks is carried out in most types of work. It includes activities that require someone to exert force in order to grasp, manipulate, strike, throw, carry, move (lift, lower, push, pull), hold or restrain an object, load or body part.

Manual tasks cover a wide range of activities such as stacking shelves, working on a processing line, entering data into a computer, directing traffic and helping a person to shower.

Manual tasks can contribute to injuries affecting all parts of the body, particularly the back, shoulder and wrist. These are commonly called musculoskeletal disorders and account for more than half of the:

- cost of workers' compensation claims
- number of days lost from work
- absences over six months.

Employers are responsible for preventing work related injuries or disorders caused by manual tasks.

### ***How do manual tasks cause injury?***

An injury can be caused by a one-off overload situation, intense or strenuous activity or, more commonly, by ongoing wear and tear to the soft tissue structures of the body (joints, ligaments, muscles and intervertebral discs).

Over time, damage can build up through things such as:

- handling loads - frequent lifting with the back bent and/or twisted, or pushing or pulling loads
- repetitive work - using the hand or arm, or gripping tools or loads tightly
- static work of the whole body - working in a fixed position with the back bent, continuous sitting or standing, or driving vehicles for long periods
- static work of the upper limb - working with the neck, shoulders and arms in a fixed position (such as using tools and handling heavy loads)
- vibration – using tools or coming into contact with vibrating surfaces while undertaking manual tasks (such as sitting on a large machine).

More information on injuries caused by manual tasks is provided in section 1 of the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

More information on injuries caused by people handling is provided in the *Manual Tasks Involving the Handling of People Advisory Standard 2001* (now known as a Code of Practice).

## ***Training for manual tasks***

Training is not the most important method of preventing manual tasks injuries – and you should not rely upon training in the absence of modifying the task or even eliminating manual tasks whenever possible i.e. always consider a design option as your first option for control. However, training is a key element of an employer's legal obligation to provide a healthy and safe workplace.

Training in safe manual tasks should address tasks commonly undertaken in your workplace, and should be based on the injury pattern of both your industry and workplace.

Training in manual tasks should be provided to:

- workers
- supervisors and managers of workers
- workplace health and safety representatives
- officers responsible for the risk management process of manual tasks i.e. identifying, assessing and controlling the risk of injury.

Training should occur when a person is inducted into a job, when new equipment is installed, or when a new manual task is introduced. Ongoing training should be provided regularly; and workers should be supervised to ensure they are competent.

Regularly review and modify training programs (especially as new tools or equipment are purchased). Keep records of all training including dates, training sites, topics and the names and signatures of the trainer and attendees.

The list below identifies competencies workers should have to do their job safely and efficiently.

For personal safety:

- how to do a basic risk assessment
- how to avoid poor working postures
- the need to vary posture occasionally during tasks that involve static body positions for long periods
- typical workplace injuries associated with the manual tasks performed, their causes, early signs of injury and risk factors
- if handling loads:
  - how to handle loads safely
  - when to call for help
  - when to use mechanical aids
- if using tools:
  - recognising risks associated with specific tools and understanding the safety precautions
  - keeping hand grip force to the lowest level possible
  - understanding why tools should be well maintained
- if working with vibrating tools and equipment:
  - how to reduce vibration directed into the hands
  - how to grip tools properly for safe operation
  - the need to keep tools well maintained

- the need to report early symptoms of vibration disease.

For job and workstation operation:

- how to adjust chairs and other adjustable furniture at the workstation, or any other adjustable equipment
- the best ways to carry out more difficult and repetitious tasks in order to minimise muscle strain
- the proper use of mechanical handling devices.

For administrative procedures:

- the need to report symptoms early, procedures for reporting, and the designated offer to report to
- how to report problems with the maintenance of tools and equipment.

## How to prevent injury from manual tasks

Employers should undertake a risk management process in order to prevent or minimise the risk of injuries caused by manual tasks.

The process involves conducting a risk assessment on manual tasks carried out in the workplace, working out how to address any problems, choosing and implementing appropriate solutions, and following up to check that the solutions work.

The following is a systems approach to managing the risks associated with manual tasks:

### Develop a risk management strategy

- Know your legal obligations by reading the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).
- Decide what measures will ensure that everyone in the workplace fulfils their legal obligations.
- Make someone responsible for implementing the control measures.
- Monitor the measures to determine if the problem has been solved.
- Make a record of assessments and solutions.

### Design and purchase

- Design workplaces and workstations to ensure safe, efficient movement and to promote correct postures.
- Ensure that work processes and work items (such as tools and equipment) do not pose risks to workers.
- Specify to suppliers that equipment, products, packaging and delivery methods must reduce the risk of injury to workers.
- Brief designers and engineers involved in tasks and equipment about reducing or eliminating risks.
- Purchase mechanical devices to reduce the need for manual tasks.

### Consult

- Consult with workers and workplace health and safety representatives:
  - about the risk management strategy
  - when purchasing new equipment or products
  - when identifying tasks for assessment
  - when evaluating control measures
  - when checking that planned actions have occurred.

### Train

- Train workers in manual tasks in relation to the tasks that they are required to do.
- Train workers in the safe use of tools/equipment.
- Train workers responsible for risk assessment and implementing risk controls.
- Train managers and supervisors in competencies relating to manual tasks.

## Protect contractors

- Inform contractors of manual tasks requirements and check they have conducted risk assessments before carrying out tasks at your site.
- Check that contractors' work does not increase the risks associated with tasks conducted by your workers (or vice versa).

## Identify problems

- Look for problems when you introduce workplace changes or new machines.
- Critically examine tasks if there are indications there may be a problem (for example, workers complain of discomfort).
- Investigate and analyse the factors contributing to manual tasks incidents or near misses – check for patterns such as repeated injuries with one task.

## Assess problems

- Examine the task during normal work conditions.
- Consider seasonal variations and peak work periods.
- Talk to workers doing the task.
- Use checklists to analyse risk factors.
- Consider risk factors such as forceful exertions, awkward postures, repetition and vibration and decide which require solutions.
- Decide which tasks need the most urgent attention.

## Control the risks

- Decide what changes can be made to reduce the risks of injury. If possible, select permanent changes (such as workplace layout, tools and equipment).
- Avoid double handling of items.
- Provide mechanical aids.
- Redesign the task (such as rotating workers and reducing shifts).
- Identify changes that are possible immediately, and those that may take time to implement.
- Document your risk control decisions for each task assessed, and set timelines for changes.
- Trial the changes in consultation with workers before making them permanent.
- Provide training if new equipment is introduced.

## Check effectiveness

- Investigate if risks have been reduced – do workers have fewer complaints of discomfort?
- Monitor worker feedback to see if other risks have arisen.

## Review

- Check that the various control measures have been put in place at the agreed times.
- Review incident reports.

- Consult with workers and workplace health and safety representatives.
- Decide what can be changed or added to make manual tasks less risky.

#### Keep records

- Keep records of specifications of plant and work processes, incident reports and action taken, maintenance records for equipment and tools, and employee training.

More information on preventing injury from manual tasks is provided in the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

More information on preventing injury from people handling is provided in the *Manual Tasks Involving the Handling of People Advisory Standard 2001* (now known as a Code of Practice).

## **How to control specific risk factors – some options**

### Forceful exertions

Pushing and pulling, forceful gripping, controlling forceful exertions hazards

### Working

Awkward postures, fixed or static postures, controlling working posture hazards

### Repetition and static

About repetitive work and static positions, controlling hazards

### Vibration

Damage and effects, risk factors, controlling vibration hazards

### Work area design

Importance of work area design, controlling work area hazards

### Workplace environment

Floors, housekeeping, lighting, heat, humidity, noise, controlling workplace environment hazards

### Hand tools

Risks from hand tools, controlling hand tool hazards

### The nature of loads

Considerations for loads, controlling nature of loads hazards

### Load handling

Different ways to handle loads, controlling load handling hazards

### Individual worker characteristics

Matching people to tasks, controlling hazards

### Work organisation

How work is organised and procedures are administered, controlling work organisation hazards

## ***Forceful exertions***

Forceful muscular exertions place high loads on muscles, tendons, ligaments, joints and discs. Muscles fatigue with increased exertion, and need more time to recover.

If soft tissue does not have time to recover, injury is likely to develop over a period of time. If the exertions are forceful enough, body tissue may be damaged immediately.

The level of muscular effort needed to do a job may be increased by factors such as:

- awkward or fixed working postures
- heavy, bulky or difficult to grip loads
- fast or sudden movements

- working with a grip that does not allow a large area of the hand to contact the handle
- using vibrating tools that need more effort to grip
- wearing gloves (which increase muscular effort involved in using a tool by about 20%)
- the design of hand tools
- the nature of the load (heavy, awkward or unstable)
- characteristics of a person/patient being handled (for example, he/she may make an unpredictable movement)
- the load handling procedure (for example, lifting, pushing, pulling or carrying)
- work organisation (for example, poorly maintained equipment that requires effort to use)
- the individual's strength and capacity to do the manual task.

Often it is a mixture of a number of factors that will increase the risk of injury from forceful exertion.

### **Pushing and pulling**

Pushing and pulling loads that are too heavy and require forceful exertion may strain the neck, back and shoulder. Workplace examples include using a pallet jack, sliding a box across the floor and operating a sliding compactus.

Pushing and pulling involve three phases:

1. starting the load in motion (usually requiring the most exertion)
2. sustaining the motion
3. stopping the load from moving.

### **Forceful gripping**

Gripping by the hand is used in most industrial tasks. We grip tools, containers, equipment and loads using three main types of grip:

- the power grip – where a large surface of the hand is used and muscle force is low
- the hook grip – where fingers curl around an object and the thumb stabilises the load; equal in strength to the power grip strength
- the pinch grip – when the ends of fingers pinch an object; grip strength is only 25% of the power grip strength.

The muscular effort involved in gripping sometimes leads to carpal tunnel syndrome, a painful disorder of the hand and wrist.

### **Ways to control hazards**

- Talk to workers to find out what jobs create problems. Assess the risk of over-exertion and introduce ways to reduce the risk. Consider:
  - the weight of loads being moved
  - frequency of the work
  - length of time workers are involved in certain activities
  - condition of the equipment

- condition of floor surfaces.
- Use aids such as non powered conveyors, air bearings, ball castor tables and monorails.
- Use light hand trucks and trolleys with large wheels or castors that are correctly sized and roll freely. Maintain trolleys regularly.
- Ensure that the trolley height with its load does not obstruct visibility or upset stability. Check that the trolley width allows easy access around the workplace.
- Use trolleys, pallet jacks and other aids correctly. Training should cover the use of aids in congested or confined spaces, how to reverse castors, how to pack a trolley, and sideways movement of trolleys.
- Use handles that are about 1m high. Use vertical handles where possible.
- Treat floor surfaces to reduce friction. Provide a slip resistant surface on ramps, and keep ramp gradients to less than 1:14.
- Push rather than pull a load. It involves less work by the muscles of the lower back, and generally allows better visibility.
- When moving a load, know where it has to stop, and slow down gradually. Choose a route with the best surface conditions, and avoid doors that have to be held open while the load is carried through it.
- Use a 'shake hands' position for maximum grip strength. Choose hand tools suited to the task, and with handles that allow a power grip.
- Use a hook grip for long thin items, not a pinch grip.
- If necessary (such as in cold conditions), wear only well fitted gloves.

More information on forceful exertions is provided in section 10.1 of the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

## **Working postures**

Awkward body postures place joints away from their natural position (such as a bent back, a bent wrist or arms raised above the head). Awkward postures require more muscular effort to do a job, leading to fatigue and potential injury.

Fixed or static postures can also be harmful because they keep part or the whole body in the same position for a long time (such as standing on a process line or bending the back to lay concrete).

Fixed positions quickly fatigue muscles because blood flow is more restricted when the muscle is not contracting and relaxing.

High risk postures are caused by:

- poor work area design (such as low benches)
- the nature of loads (such as obese patients, bulky and large items, or non ergonomic designed hand tools)
- load handling (loads that are lifted, pushed, supported or held for some time)
- individual worker characteristics (such as height and reach ranges).

## **Ways to control hazards**

Reduce standing time with a sit-stand chair e.g. draughtman's chair, or stool to perch on, and/or use a rail at the base of work benches.

Design manual tasks so your workers can walk about occasionally.

Control the work area design and layouts. Alter the nature of loads and how they are handled.

For example:

#### Back

- Place tools and other work items so you don't need to bend forward or reach.
- Use a scissor lift table or a pallet lifter.
- Design suitable work heights and provide adequate knee and foot clearance.
- Avoid bending and /or twisting your back.
- Tilt work surfaces or use spring-loaded surfaces.
- Have enough room to turn your feet when placing a load at a different angle.
- Use swivel chairs and rotating turntables.

#### Neck

- Avoid looking up, bending forward excessively or protruding your neck forward.
- Use an inclined work surface.
- Work with documents or displays directly in front of you.
- Use a jig to reorient the work piece.

#### Arms

- Avoid working with the arms held away from your body.
- Modify equipment or provide a platform so you work at the correct height (and don't need to lift your arms).
- Use arm supports for precision work.
- Design layouts to reduce the need for reaching.

#### Elbow and wrist

- Avoid rotating the forearm and deviating the wrist.
- Select tools that reduce the need to turn your forearm.
- Use jigs to position parts or to turn components. Use tools/levers that allow the wrist to remain straight.

#### Legs and knees

- Reduce the need to kneel. If this is not possible, use a cushioned surface.
- Avoid squatting by working at low levels only when necessary.
- Walk as much as possible during manual tasks instead of standing for long periods.

More information on working postures is provided in the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

## ***Repetition and static positions***

You increase the risk of injury when you continually repeat the same type of movement or you hold one body position for a long time.

You further increase the risk of injury when repetition and a static position combine with forceful muscular effort (such as gripping a hand tool or squeezing a trigger). Accumulated fatigue can lead to muscle and other soft tissue damage.

Static positions include working with the neck bent forward for long periods or the upper arm held too high for too long.

Repetitive work is when:

- the duration of a work cycle is less than 30 seconds **or**
- a fundamental activity is repeated for more than 50% of the work cycle time **and**
- the work is done continuously for a minimum of 60 minutes.

High risk repetitive and prolonged manual tasks are caused by:

- work organisation arrangements that limit rest breaks and other opportunities for rest and recovery
- process and production work with little variety and limited opportunity to rotate to alternative tasks.

Health risks associated with repetitive work include carpal tunnel syndrome, tennis or golf elbow (epicondylitis), shoulder tendonitis, tension neck and lower back pain. Most of these conditions are difficult to reverse and develop over time; so do not ignore early warning signs.

People who are particularly at risk include those who are:

- new to a job
- returning to work after a long break
- not well matched to the work (such as a person with small hands operating tools designed for large hands).

### **Ways to control hazards**

Some repetitious tasks can be eliminated by job redesign, however other repetitious tasks or activities of long duration can only be reduced by altering exposure through work organisation factors.

- Share the load – ask customers or clients to assist if possible.
- Automate the task.
- Change the task order – alternate repetitive tasks with non-repetitive tasks.
- Job rotation a task using different muscles.
- Restructure the job to allow for more variety.
- Allow for adequate recovery e.g. regular rest breaks.

More information on repetition and duration is provided in the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

## ***Vibration***

Vibration through the whole body can damage a person's back. For example, a truck driver is exposed to vibration through the seat, foot pedals and steering wheel.

Vibration sent through the hand or arm from hand tools such as chainsaws and jackhammers affect blood circulation, and may contribute to disorders of the wrist and hand. The most common are Raynaud's syndrome, carpal tunnel syndrome and shoulder tendonitis.

Workers most at risk of **vibration-related injuries to the back** include operators/drivers of:

- compaction or hammering machinery
- construction vehicles
- tractors
- industrial trucks
- agricultural machinery
- road haulage vehicles.

Additional risk factors are:

- poor driving posture and visibility
- difficult-to-operate controls
- poor vehicle suspension
- jobs that require lifting, carrying or driving off-road.

Workers who use rotating or percussive hand-guided tools are most at risk of **vibration-related injuries to the hands or wrists**.

Injuries are more likely when:

- there is a high level of vibration (such as using a tool with vibrating frequencies between 4 and 300 Hz)
- when vibrating tools are used for long periods
- when vibrating tools are used in cold conditions
- if individuals are at greater risk of circulation-related problems (such as smokers).

### **Ways to control hazards**

- Assess the health risks and review the time a person works continuously with vibrating machines or vehicles.
- Modify tools, equipment and work processes to reduce exposure to vibration.

Whole body vibration

- Buy low-vibration vehicles suited to the ground surface. If possible, improve ground surfaces.
- Use the correct tyres inflated to the correct pressure for the ground surface.

- Improve vehicle suspension and use correctly-adjusted operator seats mounted on suspension systems.
- Isolate or damp vibrating work platforms through appropriate suspensions.
- Operate equipment at suggested speeds.
- Limit the time spent working with vibrating surfaces or machines, and take regular breaks.
- Regularly maintain equipment to reduce vibration developing.
- Consult with workers. Train them in the safe use of vibrating machinery.
- Use anti-fatigue mats and wear footwear with vibration absorbing soles.

#### Hand and arm vibration

- Avoid tools with vibration in the range of 4 – 300 Hz for tasks performed repeatedly. Treat any tool as suspicious if it causes tingling or numbness in the fingers after five to 10 minutes of use.
- Consult with workers over their choice of tools. Train in the safe use of hand tools.
- Use tools with speed adjustment, internal damping, vibration-isolated handles or an automatic shutoff ability. Use low vibration tool accessories.
- Use air cushioned cylinders, air shutoff clutches or properly selected isolation mounts.
- Cover tool handles with vibration-insulation rubber. Use a slip-resistant surface on handles to reduce the grip force needed.
- Regularly maintain equipment. Keep cutters and chisels sharp. Lubricate bearings. Rebalance rotating equipment. Replace leaking compressed air valves.
- Use pressure regulators for air powered tools.
- Rotate workers who use vibrating tools
- . Organise work processes so workers can do another type of work for about 10 minutes every hour.
- Use exhaust mufflers or baffles to direct cold air away from workers' hands.
- Use vibration-absorbing gloves that cover only the necessary part of the hand. However, this can reduce the ability to manipulate the tool or object being worked on.
- Keep the hands warm and dry.

More information on vibration is provided in the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

### **Work area design**

A work area may include work benches, conveyors, furniture, equipment and vehicles. The layout of an area where a particular job is based is critical to preventing musculoskeletal injuries and ensuring an efficient job and workplace.

Layouts that do not match the worker and the demands of the manual tasks will cause awkward and static postures. These include work areas where you have to continually reach or bend for items, or a work surface that is too high or low.

## Ways to control hazards

### Design

- Place materials, tools, controls and maintenance items in front of you, and between waist and shoulder height.
- Operate controls at about elbow height without bending or twisting the body.
- Design supply and disposal areas so workers do not have to twist their bodies.

### Working heights and reaches

- Maintain a working height at about elbow height (although it is higher for precision work and lower when force is needed).
- If you must reach frequently, check that you reach no more than 30cm to the front of the body (in a seated position) and no more than 50cm to the front of the body (in a standing position).
- Use height adjustable furniture, trolleys, tables and block raisers.
- Adopt working postures that reduce the need to reach.

### Space

- Provide enough space for equipment and functional movement.
- Design facilities to allow enough room for team handling tasks. Increase functional space using privacy curtains.
- Make doorways and corridors wide enough to accommodate mobile equipment.
- Allow sufficient work space so equipment can be used safely.
- Have consistent floor levels where people and equipment are wheeled, pushed and pulled (this includes lift levels).
- Use lightweight furniture or furnishings with castors so access areas can be easily cleared.

### People handling equipment

- Install locking devices on equipment that may be unstable.
- Use lightweight, well maintained equipment with large low-resistive wheels.
- Provide a storage area for handling equipment that is close to the work area.
- Conveniently locate attachments and aids so people can easily assist themselves if necessary.

### Motor vehicles for people handling

- Use vehicles with:
  - tailgates that accommodate wheelchairs
  - sliding doors for easy access
  - sufficient interior room to manoeuvre and secure people
  - enough headroom for a variety of heights.

### Workstations

- Use adjustable workstations to suit different people, or a workstation height to suit tall workers (and raise shorter workers via moveable platforms or benches).
- Make reaching distances suitable for shorter workers.

- Provide knee and leg clearance under work surfaces that suit larger workers.

#### Seating

- Use an adjustable seat with a swivel base.
- Choose seats with a contoured backrest and a lumbar curve (except where the backrest interferes with work).
- Use arm rests (if hand activity is not continuous).
- Use a foot rest (if feet do not reach the floor).

More information on work area design is provided in the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

More information on work area design for people handling is provided in the *Manual Tasks Involving the Handling of People Advisory Standard 2001* (now known as a Code of Practice).

### **Workplace environment**

A work environment may increase the risks associated with manual tasks. For example:

- floors may be slippery and uneven
- there is poor housekeeping
- there are ambient conditions (such as noise, cold and heat)
- work areas are unpredictable (such as private homes).

Work environments should promote safe movement and ease of access. They should not place unnecessary demands on people carrying out manual tasks. For example, high heat and humidity place extra demand on physically demanding work, and increase the risk of injury.

#### **Ways to control hazards**

- Keep floor coverings and surfaces repaired, and use non-slip flooring materials.
- Keep areas clean and tidy, and implement a clean up policy.
- Provide covered walkways. Keep access ways clear.
- Ensure adequate lighting.
- Where possible, minimise extraneous noise or use alternative communication.
- If working outdoors:
  - remove obstacles
  - avoid steep inclines
  - avoid slippery or heavy ground
  - provide footpaths where possible.

More information on the workplace environment for people handling is provided in the *Manual Tasks Involving the Handling of People Advisory Standard 2001* (now known as a Code of Practice).

## **Hand tools**

Using hand tools can injure the wrist, elbow and shoulder.

Tools that cause health problems are not necessarily of non ergonomic design – they may be well designed but used excessively.

Using tools may require awkward or static postures and forceful exertions. For example, working in cold conditions leads to a loss of sensitivity in the fingers and may lead result in a more forceful grip. Alternatively, you may have to bend your wrist to use a tool, or use a very firm grip to hold it steady. Some tools are heavy, or have a wide grip span. Some send shocks to the wrist and hand, while others press into the hand to cause contact stress.

While gloves protect hands and fingers, they increase the muscular effort in using a hand tool by about 20% (or more if the gloves do not fit correctly).

### **Ways to control hazards**

- Assess the risks of using certain hand tools. Consider size, weight, type of handle and the grip needed.
- Buy the right tool for the job. Purpose-made tools should be light and comfortable to use, and should not require excessive force.
- Buy tools that can be used in either hand (this provides for left-handed people).
- When buying heavy tools, choose tools where the heaviest part is not in front of the wrist, and where the weight supported by the worker is as low as possible for the type of tool.
- Alter the use of heavy hand tools. For example, suspend heavy tools that are used repeatedly for the same task in the same place; or use counterbalancing equipment for repetitive work where tools have to be held away from the body.
- Use power tools where possible to reduce the muscular effort needed.
- Choose trigger tools where the trigger is:
  - easy to activate in either hand
  - at least 5cm long (so it can be activated by several fingers)
  - supported by a trigger lock if you need to sustain the trigger grip for more than 30 seconds at a time.
- Choose tools with handles that:
  - are cylindrical (about 4cm in diameter)
  - are well designed and fit the hand
  - have a span between 6 – 9cm
  - allow the wrist to be held straight (in the 'shake hands' position)
  - have a comfortable gripping surface (dimpled)
  - do not have sharp edges or areas that dig into the fingers or palm of the hand
  - are fitted with a guard or stopper (in the case of knives or soldering irons).
- Choose tools with these handle dimensions:
  - The grip length should be about 10cm for precision tools and 12cm for power tools.
  - Cutout handles should be about 12cm long by 6cm wide.
- Choose tools with internal damping, or that limit torque reaction:
  - Use clutch-type tools, shutoff tools, hydraulic pulse tools, and external devices such as torque bars or articulating bars.

- Use as small a tool as possible (such as a 10cm angle grinder, not a 20cm grinder).
- Consult with workers about the problems they encounter.
- Review past incident records for tool-related injuries. Try to identify the action or part of the tool responsible for injuries.
- Regularly maintain hand tools.
- Use a vice, clamp or other aids where appropriate. Keep as close as possible to the work.
- Rotate workers to minimise the repetitive use of hand tools for long periods. Train workers in hand tool safety and the importance of minimising hand grip force.

More information on hand tool use is provided in the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

### ***The nature of loads***

Some loads can be more difficult to handle because of what they are or how they are packaged. When handling a load, consider its weight, bulk, stability and predictability. Also consider if there are handles. People (patients) are particularly high risk loads. Section 5 gives more information about people handling.

The nature of a load can alter the forceful exertions and postures required, and increase the risk of injury.

### **Ways to control hazards**

#### Dimensions

- Try to make loads as light or small as possible (place them in smaller containers or specify smaller loads when purchasing).
- Reduce the number of objects handled at one time.

#### Handles

- Use handles when loads are heavy, moved frequently or difficult to grasp.
- Place handles at the top of the load.
- Use handles that suit the hand e.g. cylindrical handles about 4cm in diameter; handles about 11cm wide by 5cm (or larger if gloves are used).

#### Other forms of grip

- Provide hooks, suction pads or other gripping devices.
- Provide an easily gripped surface (such as a textured surface).
- Check that surfaces are not slippery.

#### Stability

- Avoid sudden movement of the load by anchoring items so they will not move.
- If the load lacks rigidity, use slings or other aids to maintain control during handling.

- In partly filled packages, use baffles, dividers or packing to keep the contents stable.

More information on the nature of loads is provided in the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

## **Load handling**

The way a load is handled can increase the risk of injury. For example, lifting and carrying loads are the biggest causes of back problems.

Lifting and carrying requires awkward postures and very forceful exertions. Pushing or pulling can also cause muscle overload and lower back problems.

Different handling procedures result in different postures, and different levels of muscular effort are needed to perform a task. For example:

- Sliding, pushing and pulling tasks are better than lifting and carrying tasks; however they may require awkward postures and forceful exertions.
- Restraining people can require static working postures and/or increased forceful exertions, particularly if sudden movement occurs.
- Supporting a load or body part (such as holding the arms out away from the body) also require static postures, which increase fatigue.

## **Ways to control hazards**

Manual lifting or carrying heavy loads should be a last resort only. Look for ways to eliminate or minimise manual tasks. As well as reducing health and safety risks, this will make your work more efficient.

### Redesign the task

- Use machines wherever possible.
- Make loads lighter and less bulky.
- Provide handles to make loads easier to grasp.
- Use mobile racks for pallets, containers or trays. Use skids, skates, wheels and slides.
- Keep heavy work items at waist height.
- Push, pull, slide or roll a load (instead of carrying).
- Use packaging that is non slippery with a comfortable temperature for handling.
- Take precautions (for example, secure a load if the contents are likely to move).
- Use non powered conveyors, air bearings, ball castor tables, monorails and other devices to reduce the need for pushing and pulling.
- Use trolleys with large wheels or castors that roll freely, and with handles at about 1m.

### Mechanical aids and assistive devices

- Select the correct aids to suit the load and the work. Check they are light and easy to use.
- Locate handling equipment close to the work area.

- Maintain aids and devices in good working order.
- Train workers in the correct use of aids and devices.

### Storage

- Store loads between thigh and shoulder level. Store only light items close to the floor or above shoulder level.
- Where a load is to be lifted from a low to a high position, provide a surface midway. This allows the load to be rested while the grip position is changed.
- Avoid double handling. Implement “just in time” arrangements to reduce the amount of materials in storage and requiring handling.
- Arrange for the delivery of goods close to where they are needed. Reorganise the work area to reduce the need to carry loads for long distances.
- Implement a procedure so workers can access help with handling loads (particularly if they are working alone or mechanical aids are not practical).
- Match people involved in team handling arrangements. Train workers in safe manual handling techniques.

More information on load handling is provided in the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

### ***Individual worker characteristics***

Problems may occur if a worker is not matched to the job (in skill competency or fitness level), or does not have the right protective equipment to do the job.

A person who has an injury, is physically immature, pregnant, or not used to the type of work can also be affected.

### **Ways to control hazards**

- Assess workers' competency and training needs, and match skills to jobs (particularly where there is heavy or fast work). Supervise.
- Do not allocate physically demanding or fast work to older workers or younger workers (under 18 years).
- Assess jobs for all, but especially people who have suffered a previous back injury.
- Relieve pregnant workers of physically demanding tasks such as lifting or carrying loads (especially in the last three months of pregnancy).
- Give workers returning after holidays or leave plenty of time to work up to full speed. Reduce line or machine speeds, reduce workloads, allow frequent breaks or rotate jobs.
- Wear personal protective equipment (PPE) that does not restrict movement or is not so loose that it might be caught in equipment. Wear stable, non slip footwear and correctly fitting gloves (covering only the part of the hand that needs protection). If kneeling, use knee protectors. Note that abdominal belts are not effective as PPE and do not protect against the risk of back injury.

More information on individual worker characteristics is provided in section 10.9 of the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

More information on the handling procedures for people handling is provided in section 7.5 of the *Manual Tasks Involving the Handling of People Advisory Standard 2001* (now known as a Code of Practice).

## **Work organisation**

The way work is organised or procedures are administered can affect the level of risk to workers. For example:

- there are too few workers for people handling tasks
- people work in isolation, without help or team handling support
- the work lacks variability
- rest breaks are inadequate and don't allow physical recovery
- work days are more than eight hours
- inadequate policies and procedures are in place
- people work too fast and for too long to meet deadlines or to keep up with fast-paced production lines
- equipment and plant is not well maintained, so vibration is excessive and there is a need for forceful exertions.

## **Ways to control hazards**

- Provide adequate rest and recovery time, especially associated with 12 hour shifts, overtime and work arrangements with multiple jobs. Reduce manual tasks for those on shift work.
- Carry out a risk assessment of multiple jobs and manual tasks to determine true exposure time.
- Provide an adequate number of staff to carry out the job.
- Set up procedures for the routine maintenance and servicing of power tools and equipment.
- Alter work arrangements to reduce exposure to risk factors. For example, during slack periods, prepare work for times when deadlines become urgent. Rearrange materials flow to streamline supply and reduce double handling.
- Encourage self-paced work for physically demanding tasks.
- Provide adequate supply of materials to workers on assembly lines. Provide buffers so material can be taken offline. Reduce the speed for abnormal conditions (such as poor quality raw materials or new products).

More information on work organisation is provided in the *Manual Tasks Advisory Standard 2000* (now known as a Code of Practice).

## People handling

People handling relates to workplace activities in which people are physically moved, supported or restrained. People handling requires someone to use force in order to lift, lower, push, pull or slide another person.

All people handling tasks are a potential source of injury, and associated risks should be assessed and managed.

No worker should fully lift a person, other than a small child, without assistance from mechanical aids, devices or another worker.

Consider the health and safety of both the person doing the handling and the person being handled. Also consider that the person being handled may increase the risk of injury to the worker by his/her:

- physical characteristics (weight or size)
- state of arousal (consciousness)
- unpredictable behaviour
- willingness to assist
- ability to communicate and understand
- desire to preserve dignity and privacy.

### Ways to control hazards

- Use mechanical aids, assistive devices (grab rails and pull ropes) slide sheets or other repositioning aids where possible/appropriate.
- Use grab belts or walking frames (where a person is supported by one hand only).
- If the environment is cramped, move the person to a roomier, more suitable place to perform the task.
- Conduct a mobility assessment, then modify or accommodate the characteristics of the person being handled.
- Where special handling is needed, assess the person's needs and avoid double handling.
- Provide an adequate number of workers where there are difficulties involved in handling a person.
- Plan how to handle a person attached to medical or other equipment.

More information on the handling procedures for people handling is provided in the *Manual Tasks Involving the Handling of People Advisory Standard* (now known as a Code of Practice).

## **Preventing common injuries**

Upper limb injuries are common in keyboard work and processing, production and manufacturing industries.

### ***What are musculoskeletal injuries***

Work Related Musculoskeletal Disorders (WMSD) describes a group of workplace injuries and diseases related to the soft tissue structures of the body including bones, muscles, ligaments, tendons and discs in the spine. WMSD can occur suddenly or they can take long periods to develop and recover. Manual tasks are a common cause of WMSD.

The two main subgroups of WMSD are back injuries and upper limb injuries.

### ***Back injuries***

Low back pain is the most common and costly of work related musculoskeletal disorders. Other back injuries include:

- spinal disc rupture (particularly of the lower lumbar spine)
- nerve compression (the most common is sciatica nerve pain)
- muscle spasm of the back/hip muscles
- aggravation of a pre-existing degenerative condition.

The major causes of back injuries are:

- manual tasks such as lifting, pushing and pulling (by far the major cause at 50%)
- frequent twisting postures
- slipping, tripping and falling
- static sitting or standing for long periods
- sustained fixed postures (even the most comfortable)
- vibration (particularly plant and vehicle seating).

### **Ways to control hazards**

- Redesign the work and the manual tasks to eliminate or minimise the degree of handling required.
- If working with a bent back: take short breaks to straighten your back and stretch.
- If lifting repeatedly: take regular breaks, particularly in hot weather when you fatigue faster.
- If continuously sitting: stand and walk occasionally. Store some work items just out of reach so you have to move).
- If standing for long periods: occasionally sit on a high stool or a sit/stand chair.
- When you need to position a load in another direction: turn with your whole body. Do not twist your trunk.
- Store loads close to where you need them to save double handling.
- Return mechanical aids to where they 'live' so others can locate them easily.
- Alternate heavy jobs with light jobs.

- Use assistance to move heavy or awkward loads.

### ***Upper limb injuries***

Upper limb injuries are common in keyboard work and processing, production and manufacturing industries. They affect nearly all soft tissues of the upper limb (including muscles, tendons, tendon sheaths, nerves and blood vessels) and may affect the lower limb.

Common injuries include tendon disorders (like tendonitis), nerve disorders (like carpal tunnel syndrome) and neurovascular disorders (like Raynaud's Syndrome which affects the circulatory and nervous systems).

Upper limb injuries are caused by:

- repetitive motions (such as packing or sorting)
- static postures or sustained exertions (such as gripping and manipulating a hand tool that is too big)
- forceful exertions (such as lifting a heavy load or cutting with a blunt knife).
- vibration
- compression or contact stress (caused by hard or sharp edges)
- awkward postures
- working in low temperatures
- prolonged duration and frequency of work
- psychosocial stresses.

### **Ways to control hazards**

- Redesign the work and the manual tasks to eliminate or minimise the degree of handling.
- Remove or reduce repetition in the job.
- Modify the workplace layout.
- Modify equipment.
- Maintain equipment.
- Provide task-specific training (given in combination with other control options).

## Common manual tasks issues

### Maximum weight limits

Design (engineering) controls, administrative controls

### Team handling

Ways to control hazards, team handling is not without its hazards

### Handling 40kg cement and other product bags

Most bagged cement sold in Queensland comes in 40kg bags, even though it is available in 20kg bags

## Maximum weight limits

In Queensland there is **no** maximum permissible limit (MPL) for lifting tasks. This is because there is great variability in the nature of the load being lifted, the height at which it is being handled, the location and work environment as well as the individual characteristics of the worker. Sliding a 40 kg load on a flat smooth steel surface will present no problem to most workers, however, lifting a 40 kg load out of a car boot presents a significant hazard to most people. It is therefore essential to assess the risk of manual tasks whenever one or more of the direct risk factors such as forceful exertion, awkward postures, repetition or vibration, are present.

There has been some work done on the lifting capacity of people in the workforce by Mital, Nicholson and Ayoub (A Guide to Manual Handling, published by Taylor and Francis, 1997). For example they got workers to lift a 75cm box with two hands from the floor to a height of 80 centimetres. They found that:

- 10 percent of male workers had the capacity to lift 27kg safely once every 5 minutes, but they could only lift 14.5 kg if asked to do so 16 times per minute.
- 90 percent of male workers were able to lift 14 kg every 5 minutes but could only lift 4.5 kg safely if asked to do so 16 times per minute.

As you can see there is a lot of variation in workers. In general, older male workers will have a lower lifting capacity compared with younger men in their early thirties, Therefore, when designing jobs, you need to design for the majority of workers doing that task.

Rather than relying on administrative controls, which should be seen as an adjunct to controlling the risk of manual tasks, always ask yourself: does this item/object/person have to be manually handled? Always look for a design control as your first option whenever possible, as administrative controls place too much reliance on the behaviour of individuals.

Design (engineering) controls include:

- mechanising the job
- providing mechanical handling equipment
- modifying handling methods and the work area
- redesigning loads and tasks.

Administrative controls include:

- changing the task order
- rotating jobs
- providing rest breaks
- introducing maintenance programs for equipment
- training and supervising workers.

## Team handling

Team handling involves two or more people who work as a team to lift, lower or carry loads. Team handling is best used when there is no option but to manually handle a load, a load is heavy or unwieldy, or mechanical aids are not practical.

While it is better for a team rather than an individual to work in such situations, team handling is not without its hazards. There is a greater risk of injury if:

- members of the team are inexperienced in lifting
- workers don't exert force simultaneously
- individuals lose coordination
- there is an unexpected load increase or change in balance
- loads must be carried on a slope or stairs (placing most of the weight on workers at the lowest point of the load).

To meet their legal obligations, employees should:

- redesign tasks involving handling heavy or unstable loads
- assess the risks in a team handling situation and control possible risks
- provide the correct equipment and training.

### Ways to control hazards

- Mechanise tasks where possible. Do not use team handling as a permanent solution for handling heavy loads.
- Provide aids such as slings, straps, lifting bars/tongs, trolleys and hoists.
- Carefully plan the lift. Be conservative when estimating how much weight a team can handle. Make sure you have:
  - an adequate number of people for the lift
  - team members of similar size (if possible)
  - one person responsible for planning and controlling the team handling
  - enough space for manoeuvres
  - responsibilities allocated to each team member.
- Be trained in effective team handling:
  - Assess the manual task.
  - Decide on the number of people needed and their positions.
  - Clear the area of potential hazards.
  - Discuss the lift with team members.
  - Use a countdown to start the lift, and call all actions.
  - Use lifting aids.
  - Review the practical team lifting exercise afterwards.

## ***Handling 40kg cement and other product bags***

Most bagged cement sold in Queensland comes in 40kg bags, even though it is available in 20kg bags.

Studies have shown that even in ideal situations, most people cannot safely handle bags of 40kg. Lifting bags of this weight may cause strains and sprains – and these type of injuries (especially strains and sprains of the back) account for half of all injuries lodged each year with WorkCover.

A risk assessment conducted on the manual handling of 40kg cement bags within an industrial workplace found that this activity exposed workers to an unacceptable risk of musculoskeletal injury. As such, an employer should implement controls to safeguard workers' health and safety where people are required to handle bags of 40kg.

### **Ways to control hazards**

- Introduce new purchasing policies. Buy only 20kg bags of cement or buy lighter bags when the work is to be carried out by one person.
- Mechanise the task. Use trucks, trolleys, wheelbarrows and other aids to move heavy bags. Regularly maintain these aids.
- Redesign the task. For example, replace frequently bagged products with a bulk purchasing and handling system.
- Locate heavy bagged product close to where it will be used. Store heavier bags at waist or near-waist height.
- Keep the work area clear so there is open access to bags and no need to twist, reach or bend.
- Be trained in the correct use of mechanical aids, lifting techniques and team lifting.
- Introduce administrative controls if you cannot redesign the task. For example:
  - Break up heavy handling tasks with lighter work.
  - Rotate jobs so heavy load handling is not left up to just a few.
  - Take regular rest breaks, especially micro breaks of a minute or two.

## Ergonomic workstations for keyboard operators

Prolonged work at a computer can strain your arms, neck, hands and back. In most cases, health problems occur because of a poorly designed or setup workstation.

A well designed workstation considers your chair, lighting, noise, and the position of the screen, keyboard and documents.

### Ways to control hazards

- Assess work methods and workplace setup, and implement ergonomic workstations for keyboard operators.
- Use an ergonomically designed chair with:
  - a height adjustment (from the floor)
  - an adjustable back rest (in height, angle and depth)
  - a curved seat edge
  - cloth covered seat and back
  - a five-star castor base.
- Adjust the seat so your feet rest firmly on the floor. Take your weight through your feet.
- Adjust the back rest of the chair so you sit in a position where your thighs are fully supported, except for a two-finger width space behind the knee.
- Maintain a relaxed posture, especially in your shoulders and neck:
  - Keep elbows by your side.
  - Keep forearms and hands parallel to the ground (with about 90 degree angle at the elbow).
  - Do not bend or cock your wrists when typing.
  - Sit at a comfortable distance from the keys (the length of your forearm away).
- There is no single height of a monitor which is suitable for all users. Some people find looking down slightly more comfortable than having the top of the screen at eye level. The height and angle of the monitor affects the gaze angle and inclination of the head. With the newer thinner LCD monitors it is now possible to have a monitor that is about arm's length away. The best advice is to avoid extremes of head and neck bending, avoid having to look up at a screen (as this requires the head to be tilted backwards and places pressure on the neck ) and arrange you monitor so that you feel comfortable.
- Position documents and the screen about the same distance from your eyes. Use a document holder to place the documents:
  - in a level position beside the screen (when the keyboard is in a central position) or
  - directly below the screen, just above the keyboard.
- Position the screen directly in front of the keyboard if you spend most of the time looking at it. If you spend most of the time looking at a document, place the document directly in front of the keyboard.
- Place the screen at right angles to a window. Alter the angle of the screen to avoid glare and reflection, or use blinds, curtains or screens to block glare.
- Ideally, place screens parallel to overhead fluorescent lights (to avoid rebound reflection).
- Adjust the contrast of text and background on the screen to a moderate level.
- Rest your eyes occasionally. Look out a window or at a wall poster.

- When typing, take short breaks of 30 - 60 seconds. Relax your hands in your lap or on the desk. Change the activity to relieve fatigue. Stand or walk about. Vary your posture as much as possible.
- Remove or control distracting noises. Use acoustic hoods over printers, remove noisy equipment from the work area or use quiet air conditioners.
- Provide adequate ventilation to the work area to counter the heat generated by computers and associated equipment.

Like all electrical equipment, computers emit electromagnetic radiation, however the low level is not considered a health risk.