

Occupational Health and Safety Act 1985

Code of Practice for

# Manual Handling

No. 25, 20 April 2000

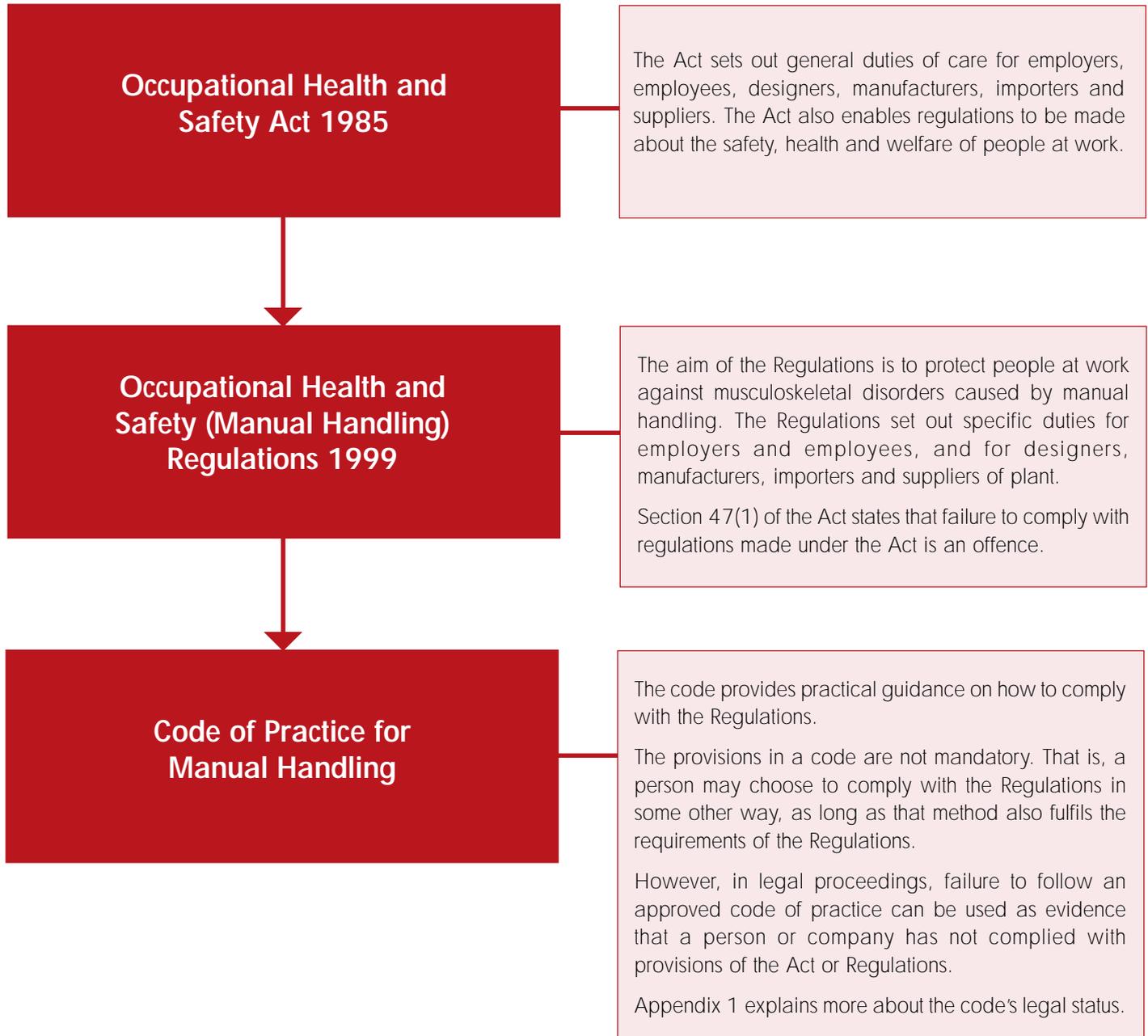
This code of practice is approved under section 55  
of the Occupational Health and Safety Act 1985



## Contents

<b>The Legislative Framework</b>	4
<b>Part 1 Introduction</b>	
1 What is manual handling?	5
2 What kinds of injuries can result from manual handling?	5
3 Who should read this code?	5
<b>Part 2 Duties of Designers, Manufacturers, Importers and Suppliers of Plant</b>	
4 Introduction	6
5 Who is a designer, manufacturer, importer or supplier?	6
6 What is plant?	6
7 What must designers, manufacturers, importers or suppliers of plant do?	7
8 How to control the risk	7
8.1 Design solutions for plant	7
8.2 What information do I need to provide?	7
<b>Part 3 Duties of Employers</b>	
9 Introduction	9
10 Consulting your employees	9
11 Hazard identification	10
11.1 What is hazard identification?	10
11.2 What is hazardous manual handling?	10
11.3 In what circumstances must I identify hazardous manual handling?	14
11.4 Hazard identification for similar tasks	15
12 Risk assessment	16
12.1 What is risk assessment?	16
12.2 How do I carry out a risk assessment?	16
12.3 Why are there no weight limits in this code?	26
12.4 Additional risk assessment methods	27
12.5 Risk assessment for similar tasks	27
12.6 When to review a risk assessment	27
12.7 Keeping records of risk assessments	27
12.8 What if I have already done a risk assessment under the 1988 Regulations?	28
13 Risk control	29
13.1 What is risk control?	30
13.2 What does practicable mean?	30
13.3 Sources of risk	30
13.4 Can the manual handling task be eliminated?	30
13.5 How to control the risk	31
13.6 Putting risk controls in place	42
13.7 Reviewing risk controls	42
<b>Part 4 Duties of Employees</b>	45
<b>Appendices</b>	
Appendix 1 What is a code of practice?	46
Appendix 2 Information, instruction and training	47
Appendix 3 Further advice on risk assessment and risk control	48
Appendix 4 Worked examples	50
Appendix 5 Worksheets	58

## The Legislative Framework



## PART 1 Introduction

### 1. What is manual handling?

Manual handling covers a wide range of activities including lifting, pushing, pulling, holding, throwing and carrying. It includes repetitive tasks such as packing, typing, assembling, cleaning and sorting, using hand-tools, and operating machinery and equipment.

Because most jobs involve some form of manual handling, most workers are at risk of manual handling injury. Of course, not all manual handling tasks are hazardous. But it is significant that around a quarter of all workplace injuries are caused by manual handling.

### 2. What kinds of injuries can result from manual handling?

Unsafe manual handling may cause a variety of injuries and conditions including:

- muscle sprains and strains
- injuries to muscles, ligaments, intervertebral discs and other structures in the back
- injuries to soft tissues such as nerves, ligaments and tendons in the wrists, arms, shoulders, neck or legs
- abdominal hernias
- chronic pain

Some of these conditions are known as repetitive strain injury (RSI), occupational overuse syndrome (OOS), cumulative trauma disorder (CTD) and work-related musculoskeletal disorder (WRMSD).

In the Manual Handling Regulations, all of these conditions are referred to as musculoskeletal disorders (MSD). The Regulations define MSD as an injury, illness or disease that arises in whole or in part from manual handling in the workplace, whether occurring suddenly or over a prolonged period of time.<sup>1</sup>

### 3. Who should read this code?

You should read this code if you are:

- an employer, because it will help you work out which manual handling tasks in your workplace could cause MSD, and show you how to control the risk
- a designer, manufacturer, importer or supplier of plant for use in workplaces, because it will help you ensure that users of your product are not exposed to the risk of MSD
- a health and safety representative, an employee or anyone else interested in reducing MSD caused by manual handling in workplaces

<sup>1</sup> This does not include any injury, illness or disease caused by crushing, entrapment or laceration resulting primarily from the mechanical operation of plant. Such injuries, illnesses and diseases are covered by the *Occupational Health and Safety (Plant) Regulations 1995*.

## PART 2 Duties of Designers, Manufacturers, Importers and Suppliers of Plant

### 4. Introduction

If you design, manufacture, import or supply plant for use in a workplace, you have duties under the Regulations to protect users of your plant from MSD risks.

These duties cover plant that is designed, altered or manufactured on or after 1 July 2000.<sup>2</sup>

Users include anyone who:

- commissions, services, cleans or maintains the plant
- uses or operates the plant
- moves portable plant in and out of storage

### 5. Who is a designer, manufacturer, importer or supplier?

You are a **designer** if you design or alter the design of plant for use in a Victorian workplace. This includes designing plant that is put together from previously manufactured components.

You are a **manufacturer** if you manufacture plant for use in a Victorian workplace. This includes assembling plant from prepared components.

You are an **importer** if you import plant into Victoria for use in a workplace, including your own workplace. This includes importing plant from other states and territories in Australia, as well as from outside Australia.

You are a **supplier** if you supply plant for use in a Victorian workplace, whether you sell, hire, lease or exchange the plant.

### 6. What is plant?

Your duties under the Regulations extend to all plant defined by the Act. Such plant includes any machinery, equipment, appliance, implement or tool. It also includes any component of the plant and anything fitted or connected to the plant.

Examples of plant include:

- hand-operated plant – for example, a trolley or a pair of pliers
- powered plant designed to be hand-held or hand-supported – for example, electric drills, chainsaws, floor polishers, vacuum cleaners, scrubbers, street-sweepers, mowers, nailguns, circular saws, concrete saws, jackhammers, trenchers, augers, nut runners, grinders, chippers or explosive hand-tools
- plant that processes material by:
  - cutting, drilling, punching or grinding
  - pressing, forming, hammering, joining or moulding
  - combining, mixing, sorting, packaging, assembling, knitting or weaving
- plant designed for lifting or moving people or materials – for example, wheelchairs, patient trolleys in hospitals, stretchers, vacuum lifters, pallet lifters, patient handling equipment in hospitals and nursing homes, standing frames or conveyors
- other plant and equipment used in workplaces – for example, furniture, scaffolding, mobile plant, forklifts, steps and ladders

<sup>2</sup> These duties do not cover plant that is manufactured or ordered before 1 July 2000.

## 7. What must designers, manufacturers, importers or suppliers of plant do?

Your primary duty as a designer, manufacturer, importer or supplier of plant is to eliminate any risk of MSD occurring when the plant is used properly. If it's not practicable to eliminate the risk, you must reduce it as far as practicable.<sup>3</sup>

Your duties apply to the extent that you have control over the plant. Your ability to control the risk of MSD will differ, depending on whether you are a designer, manufacturer, importer or supplier. But you must fulfil your duties under the Regulations, regardless of whether someone else is also responsible for the same duties.

If someone else is carrying out tasks on your behalf, you have a responsibility to ensure that the person has the appropriate training, education or experience to carry them out correctly.

It's likely that you also have employees, whose health and safety will need to be protected. If you are an employer, you should also read part 3 of this code.

## 8. How to control the risk

There are many ways of eliminating or reducing the risk of MSD associated with the use of plant.

Some manual handling risks will be easy to control – a simple change might be all that's needed to fix the problem. In other cases, you may need to use a number of different measures to control the risk.

The following sections explain how to "design out" the risk of MSD in plant, and tell you what information you should give users of your plant so that they can use it safely.

### 8.1 Design solutions for plant

The safe design of plant can play a critical role in reducing the risk of MSD for users. When designing plant, consider all phases of its life, including manufacture, cleaning and servicing.

If practicable, trial a prototype of the plant in a range of operating conditions and think about how the plant will be used. Change any aspects of the design that increase the risk of injury.

To control the risk:

- eliminate or reduce the number of repetitive actions, postures and movements required to operate the plant
- reduce the forces required to operate the plant
- provide instructions, signs or symbols to help people use the plant properly
- take into account the range of physical characteristics, such as size and strength, of those who use the plant
- ensure that the plant operates at a speed or rate that would suit most users
- ensure that regular maintenance points are easily accessible

It's a good idea to re-evaluate the design of your plant from time to time. When modifying a design, take into account feedback from purchasers and users of your plant about injuries or any other problems with using the plant.

You need to make sure that any control you put in place does not create another risk or introduce new hazards.

The table on the next page presents some examples of design-related MSD risks for plant, and shows how to control the risks through safe design.

### 8.2 What information do I need to provide?

You must give purchasers and other users of your plant the information they need to use the plant safely.

Inform purchasers and other users about:

- any MSD hazards or risks that could not be designed out of the plant
- using the plant safely, including how to operate, maintain, clean and transport the plant without risking MSD

You could provide this information in user manuals, brochures or on the plant itself. Make sure that all the information you provide is accurate, clear and easy to understand.

Information provided by the designer to the manufacturer should be passed on to the supplier and then to the purchaser. Importers should obtain the information from their suppliers.

If you are an importer or a supplier and you can't get this information from the designer or manufacturer, you should obtain information from other sources or develop it yourself.

<sup>3</sup> Practicable is defined in the Act and is explained on page 30 of this code.

## Design solutions for plant

Type of plant	MSD risk	Possible design solution
Road-making machinery	Repetitive or sustained twisting of the neck and body while reversing. This is caused by the seat being fixed in a forward-facing position.	<ul style="list-style-type: none"> <li>Design a swivel seat-mount together with two sets of controls, or controls that move with seat rotation.</li> </ul>
Forklifts	<p>Sustained exposure to whole-body vibration transferred through the seat.</p> <p>Repetitive or sustained bending of the neck and back to see the work properly (for example, continually looking up to place loads on high shelves).</p>	<ul style="list-style-type: none"> <li>Install damping mechanisms in the seat, cabin and vehicle suspension.</li> <li>Install visual aids such as mirrors or a video camera and screen.</li> </ul>
Wrapping machines on process lines	Strain on the lower back when handling heavy rolls of plastic wrapping in awkward and twisted postures, often above shoulder height. This is caused by inappropriate design and positioning of the roll spindle and by restricted access.	<ul style="list-style-type: none"> <li>Design the spindle to be adjustable. This allows the rolls to be loaded at a suitable height and orientation, and eliminates the need to lift them.</li> <li>Design equipment to help employees load rolls.</li> <li>Locate the spindle in an accessible place on the plant.</li> <li>Provide information about how to install the plant in a way that allows adequate access.</li> </ul>
Power drills	<p>Prolonged use of the forearm muscles and wrist caused by a heavy or poorly balanced drill.</p> <p>Exposure to vibration or impact shock recoil from hammer drills.</p> <p>Excessive force needed to grip and control the tool to counter the effect of vibration and impact shocks.</p>	<ul style="list-style-type: none"> <li>Design drills to be as light as possible.</li> <li>Design drills with the handle under the drill's centre of gravity.</li> <li>Design plant to reduce shock and vibration.</li> <li>Provide a suitable way of holding the tool with both hands.</li> </ul>
Pliers	<p>Pressure to the palm of the hand caused by handles that are too short.</p> <p>Prolonged use of the forearm muscles and compression of the wrist caused by using pliers with straight handles.</p>	<ul style="list-style-type: none"> <li>Design pliers with handles that extend beyond the palm.</li> <li>Design pliers with bent handles so that the user can maintain a straight wrist.</li> </ul>
Crimping, clamping and cutting tools	Excessive force with outstretched fingers required to grip handles that are too wide apart.	<ul style="list-style-type: none"> <li>Design handles with a grip span of 10 cm or less.</li> </ul>
Chainsaws	<p>Excessive vibration.</p> <p>High force required to handle the chainsaw.</p>	<ul style="list-style-type: none"> <li>Design to reduce vibration.</li> <li>Design the chainsaw to be as light as possible, and provide well-placed handles.</li> </ul>
Chairs	Poorly designed chairs that cannot be adjusted provide little back support and cause employees to adopt poor postures and movements.	<ul style="list-style-type: none"> <li>Follow existing design guidelines for chairs, and consider how the chair will be used in the workplace.</li> </ul>
Work-benches, workstations and other work surfaces	Workstations that cannot be adjusted result in unnecessary reaching, bending and exertion of force.	<ul style="list-style-type: none"> <li>Design workstations to be adjustable.</li> <li>Alternatively, dimensions should suit as many employees as possible and the type of work to be undertaken.</li> </ul>
Extrusion moulding machine	Excessive force needed to release and remove heavy dies. The die location may also cause employees to adopt poor postures and movements.	<ul style="list-style-type: none"> <li>Include lifting points and mechanical aids in the design to assist the insertion and removal of dies.</li> </ul>

## PART 3 Duties of Employers

### 9. Introduction

If you are an employer, you have duties under the Regulations to protect your employees from the risk of MSD. These duties extend to any contractors and their employees that you hire to work for you.

The Regulations require you to:

- identify the tasks in your workplace that involve hazardous manual handling
- assess the risk of MSD associated with these tasks
- eliminate the risk of MSD or, if this is not practicable, reduce the risk

If someone else is carrying out tasks on your behalf, you have a responsibility to ensure that the person has the appropriate training, education or experience to carry them out correctly.

This part of the code explains how to fulfill these duties. The diagram below outlines the process of identification, assessment and control:

# 1

#### Identify hazardous manual handling

the tasks that could cause MSD

# 2

#### Assess risk

- postures
- movements
- forces
- duration and frequency
- environmental factors

# 3

#### Control risk

Eliminate or reduce risk by:

- altering the workplace or environmental conditions
- altering the systems of work
- changing the objects used
- using mechanical aids
- providing information, training and instruction (if the above are not practicable)

***Check that controls are working properly***

## CONSULT

health and safety representatives

<sup>4</sup> Refer to the *Code of Practice for Provision of Occupational Health and Safety Information in Languages other than English* for guidance on providing information, instruction and training in multilingual workplaces.

## 11. Hazard identification

# 1

### Identify hazardous manual handling

the tasks that could cause MSD

# 2

### Assess risk

- postures
- movements
- forces
- duration and frequency
- environmental factors

# 3

### Control risk

Eliminate or reduce risk by:

- altering the workplace or environmental conditions
- altering the systems of work
- changing the objects used
- using mechanical aids
- providing information, training and instruction (if the above are not practicable)

**Check that controls are working properly**

## CONSULT

health and safety representatives

### 11.1 What is hazard identification?

Not all manual handling tasks are hazardous. Hazard identification is a way of sifting through tasks to find out which ones have the potential to cause MSD.

The Regulations require you to identify only those tasks that involve "hazardous manual handling". This is the first stage in the identification, assessment and control process.

This section explains how, and in what circumstances, to identify hazardous manual handling. You can record your findings on the hazard identification worksheet provided in appendix 5. If you need further guidance, refer to the worked examples in appendix 4.

### 11.2 What is hazardous manual handling?

Look at the manual handling tasks in your workplace to see whether they involve hazardous manual handling.

Hazardous manual handling means:

- manual handling that involves any of the following:
  - repetitive or sustained application of force
  - repetitive or sustained awkward posture
  - repetitive or sustained movement
  - application of high force
  - exposure to sustained vibration
- manual handling of live people or animals
- manual handling of loads that are unstable, unbalanced or difficult to hold

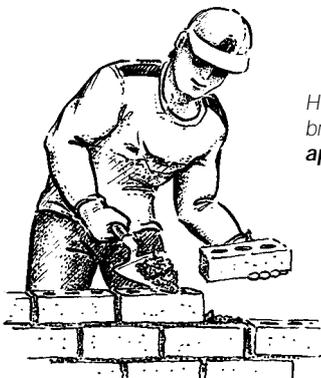
Forces, postures, movements and vibration usually affect each other. For example, more force has to be exerted to pick up a load from the floor while bending over compared with picking it up from a bench at thigh height. A vibrating hand-tool generally requires more force to use than one that doesn't vibrate. And more effort is required to handle an object with the fingers wide apart than when they're closer together.

The features of hazardous manual handling are explained on the following pages.

### Repetitive or sustained application of force

Repetitive application of force means using force repeatedly over a period of time to move or support an object. For example:

- lifting and stacking goods onto a pallet
- gripping and handling bricks when bricklaying
- using a nailgun to fix palings to a fence
- pressing a pedal or button to operate a power press
- typing and other keyboard tasks



Handling bricks and a trowel while bricklaying requires the **repetitive application of force**.



Sawing requires the **repetitive application of force**. Holding the timber steady requires the **sustained application of force**.

Sustained application of force occurs when force is applied continually over a period of time. For example:

- pushing or pulling a trolley around hospital wards
- holding down a trigger to operate a power tool
- supporting a plaster sheet while fixing it to a ceiling
- supporting a patient walking down a corridor
- continuing to hold a tool when not using it

It takes the **repetitive application of force** to chop through this meat. Holding the meat steady requires the **sustained application of force**.



Pushing the wheelbarrow across the plank requires the **sustained application of force**.

**Repetitive or sustained awkward posture**

An awkward posture is one in which any part of the body is in an uncomfortable or unnatural position.

Repetitive awkward postures include:

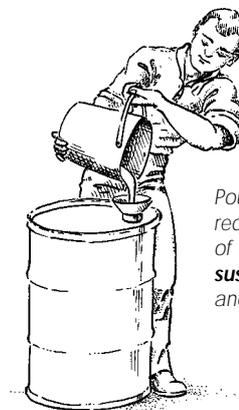
- reaching sideways to pick up goods from a conveyor belt and pack them
- picking up items from a conveyor belt and turning them over for inspection and packing

Sustained awkward postures include:

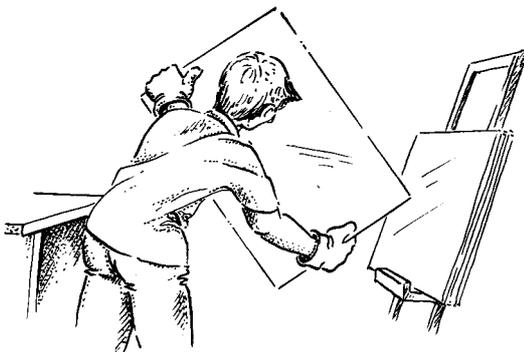
- crouching to service plant or a vehicle
- lying underneath a vehicle and reaching upwards to service it
- kneeling while trowelling concrete or laying carpet
- leaning over a low bath while bathing a patient
- continually standing while operating a power press with foot pedal controls



Pushing and steering this trolley demands **sustained awkward postures** (bending and twisting the back and neck) and the **sustained application of force** (to move the trolley).



Pouring from the bucket into the drum requires a **sustained awkward posture** of the back, neck and arms and the **sustained application of force** (to hold and pour).

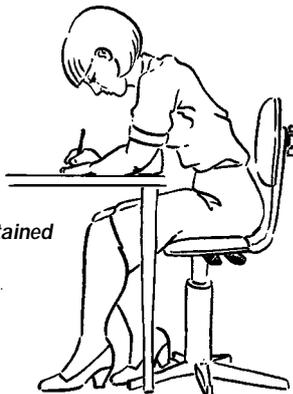


When stacking these sheets, **repetitive and sustained awkward postures** must be adopted (twisting and bending the back, working with the arms outstretched, and bending and twisting the wrists).

The way this computer is set up requires **sustained awkward postures** (bending the back, bending and twisting the neck and bending the wrists).



This writing task requires a **sustained awkward posture** (prolonged bending of the back and neck).



Pruning pot plants can involve a **sustained awkward posture** (bending the back) and the **repetitive application of force** (using shears).

**Repetitive or sustained movement**

Repetitive or sustained movement means using the same parts of the body to repeat similar movements over a period of time.

Examples of tasks involving repetitive or sustained movement include:

- painting
- lifting goods from a conveyor belt and packing them in a carton
- typing and other keyboard tasks
- assembly work in manufacturing
- using a socket and ratchet or spanner to unscrew long bolts

*Repetitive movements of the fingers are required to open these pliers because the tool has no return spring. Repetitive use of pliers often requires **awkward movements and postures** of the hand.*



**Application of high force**

Application of high force occurs in any task that either most people, or the employees likely to do the task, would find difficult because of the effort it requires. For example:

- lifting or carrying a heavy object
- pushing or pulling an object that is hard to move
- operating tools with squeeze grips that are too far apart
- throwing or catching objects
- lifting a heavy item from a high shelf

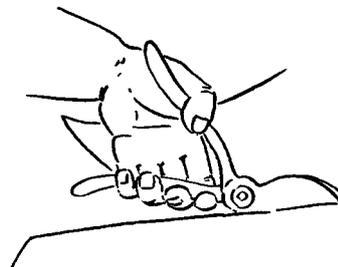
Look out for any tasks that your employees describe as very physically demanding. If an employee needs help to do a particular task, or if you have assigned a stronger person to do the task, this indicates that the task requires the application of high force.



*Using a concrete saw requires the **application of high force** and **sustained awkward postures** of the back and neck.*



*A heavily loaded trolley demands the **application of high force** to move and steer it.*



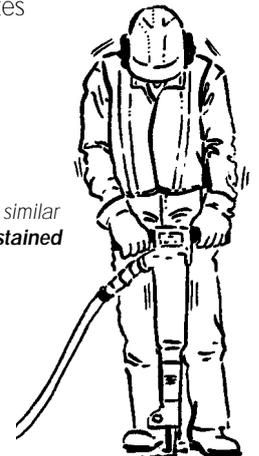
*Using tin snips can require the **application of high force**. A bent wrist and wide grip increase the force that must be exerted.*

**Exposure to sustained vibration**

Vibration transferred from tools or machinery to the operator's body can increase the risk of MSD.

Exposure to sustained vibration occurs in tasks such as:

- using impact wrenches, chainsaws, jackhammers, grinders, drills or vibrating plates
- operating earth-moving plant
- driving a tractor



*The use of jackhammers and similar tools involves exposure to **sustained hand-arm vibration**.*



*Seated operators of mobile plant can be exposed to **sustained whole-body vibration**.*

### Handling of live people or animals

Handling of live people or animals is hazardous because their movements can't always be anticipated. Examples include:

- assisting a rehabilitation patient to walk down a ramp into a swimming pool
- treating a panic-stricken animal in a veterinary clinic

Staff must be prepared for **unexpected movements** when transferring a hospital patient from bed to chair. They must also apply **high force** and adopt **awkward postures**.



Bathing a patient may involve **unexpected movements**, the application of **high force** and the adoption of **awkward postures**.



The **application of high force** may be required if the patient becomes unsteady. Supporting the patient may require the **sustained application of force** and **sustained awkward postures** (twisting of the back and neck).

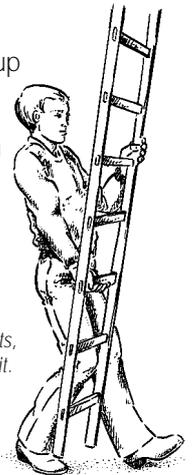
### Handling of loads that are unstable, unbalanced or difficult to hold

Loads that are unstable or unbalanced can move or change shape suddenly, or are uneven and heavier on one side.

Loads that are difficult to hold include loads that are very large, slippery, floppy, sharp, hot, cold, toxic or unpleasant.

For example:

- lifting a sack of flour
- carrying an open cooking pot full of soup
- carrying a large sheet of plasterboard
- carrying a laundry bag full of dirty linen



The ladder is an **unstable load**. If it tilts, **high force** must be exerted to control it.

### 11.3 In what circumstances must I identify hazardous manual handling?

The Regulations require you to identify any task involving hazardous manual handling that your employees do or are going to do. This means you must identify all the existing and proposed tasks in your workplace that involve hazardous manual handling.

You must also identify hazardous manual handling whenever changes occur in the workplace, such as when a new manual handling task is introduced, different tools are used to do an existing manual handling task, the task is relocated or other changes are made to the way the task is done.

In addition, you must identify hazardous manual handling whenever new information or reports of MSD are brought to your attention. This could include when an employee raises concerns about a manual handling task or reports pain or discomfort, or when a health and safety representative reports symptoms on behalf of an employee.

Remember to consult your employees' health and safety representatives, if practicable, when identifying hazardous manual handling in your workplace. It's also a good idea to consult directly with your employees when you are planning any changes to tasks in your workplace.

#### 11.4 Hazard identification for similar tasks

If a number of your employees do very similar tasks, the Regulations allow you to carry out hazard identification for these tasks as a class, instead of doing separate identifications for each task. However, you may only carry out a class identification if:

- all the tasks are sufficiently similar
- doing a class identification does not expose any employee to a different risk than if individual identifications were carried out for each task

Examples of tasks that may be suitable for class identification include:

- packing lines where similar products are packed at the same rate, and employees working on the lines adopt similar postures and movements, and exert similar forces
- checkout work in supermarkets where the checkout stations are of similar design and the work rates are similar
- one or more building sites where the same type of powered tool is used
- a contract cleaning company that uses the same type of vacuum cleaner or floor polisher in similar work areas, such as offices or hospitals

Other examples can be found on page 27 in the risk assessment section.

#### *Case Study: Pushing a trolley of metal components*

##### **Stage 1: Identifying tasks that involve hazardous manual handling**

Bob, Connie and Vinh each work 8 hours a day in the assembly section of a factory that produces metal components. One of their jobs is to push a trolley containing fully assembled components from the assembly area to the packing area 30 metres away. The trolley must be pulled away from the bench, turned through 90 degrees, and then pushed straight ahead to the packing area. They do this every 20 minutes over the whole shift.

Bob has just been diagnosed with MSD of the back. Connie recently told her health and safety representative that she was experiencing constant shoulder and back pain. Vinh, however, is not suffering from any pain or injury. The health and safety rep reported this information to the employer. The employer decided to look at all the tasks that Bob, Connie and Vinh do, to see whether they involved hazardous manual handling.

All three employees use similar strategies to do the task. To move the trolley away from the bench, they grasp the handle of the trolley and pull against it, using their whole body weight. To manoeuvre the trolley through 90 degrees, they push against the side of the handle – an action they agree is difficult, even though the trolley has swivel wheels. They bump their whole body weight into the trolley to start it moving along the passage. To avoid running into other employees and to stop at the packing area, they pull hard backwards, against the momentum of the trolley.

##### **Does the task involve hazardous manual handling?**

The employer and health and safety rep agreed that this task involved the **application of high force** at various times in the task. It also involved **sustained application of force** to move the trolley to the packing area.

*This case study will be used throughout the code to demonstrate how the risk of MSD can be managed using the identification, assessment and control process.*

**You've identified the tasks in your workplace that involve hazardous manual handling. The next stage is risk assessment.**

## 12. Risk assessment

### 1

#### Identify hazardous manual handling

the tasks that could cause MSD

### 2

#### Assess risk

- postures
- movements
- forces
- duration and frequency
- environmental factors

### 3

#### Control risk

Eliminate or reduce risk by:

- altering the workplace or environmental conditions
- altering the systems of work
- changing the objects used
- using mechanical aids
- providing information, training and instruction (if the above are not practicable)

*Check that controls are working properly*

## CONSULT

health and safety representatives

### 12.1 What is risk assessment?

Once you've identified the tasks that involve hazardous manual handling, the next stage is to work out if they are likely to cause MSD. The Regulations call this process risk assessment.

The purpose of risk assessment is to determine which hazardous manual handling tasks in your workplace pose a risk of MSD.

### 12.2 How do I carry out a risk assessment?

To assess whether a task involving hazardous manual handling is likely to cause MSD, you need to examine the following risk factors:

- the postures, movements and forces involved in the task
- the duration and frequency of the task
- environmental factors (heat, cold and vibration) that act directly on the person carrying out the task

The step-by-step guide on the following pages will help you assess these risk factors. Use one of the risk assessment worksheets in appendix 5 to record any risks you find.

When conducting the assessment, think about the sources of any risks that are present in the task. For example, poor postures and movements may be due to the layout of the workplace, high forces may be due to the objects being handled, and the frequency and duration of the task may be due to systems of work, limited staff numbers or increased work pace to meet tight deadlines.

Any possible sources of risk can be noted in the comments section of the worksheet.

You may also wish to refer to the worked examples in appendix 4 to see how risk assessment can be carried out in different workplaces and for different tasks.

Remember to consult your employees' health and safety representatives, if practicable, when conducting a risk assessment in your workplace.

**Step 1a: Does the task involve repetitive or sustained postures, movements or forces?**

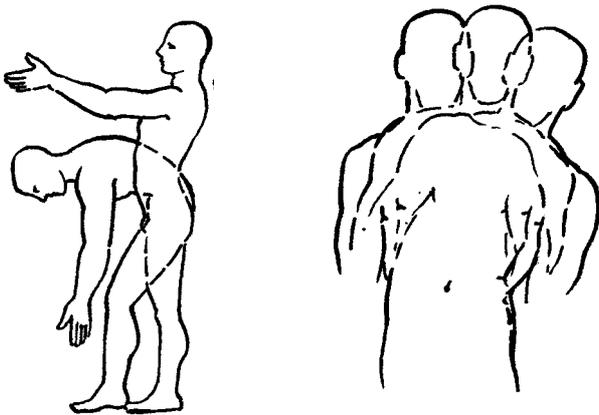
**Repetitive or sustained postures and movements**

Different types of postures and movements can contribute to MSD risks if they are repetitive or sustained. Generally, as the pace of work increases, postures and movements become more repetitive.

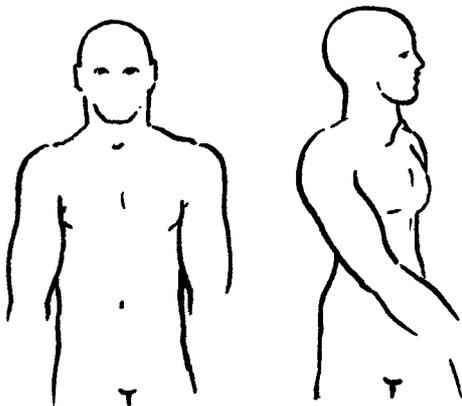
As a general guideline, repetitive means done more than twice a minute, and sustained means held for more than 30 seconds at a time.

**Tick YES on the risk assessment worksheet if the task requires any of the following to be done more than twice a minute or for more than 30 seconds at a time:**

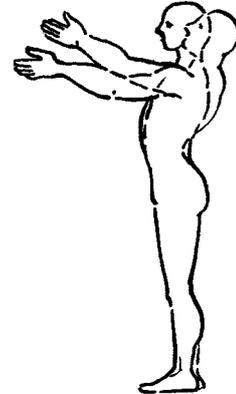
- bending the back forwards or sideways more than 20 degrees



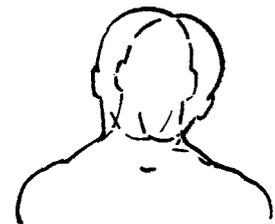
- twisting the back more than 20 degrees



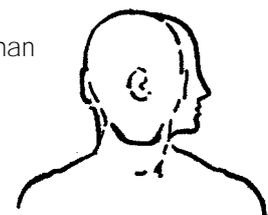
- backward bending of the back more than 5 degrees



- bending the head forwards or sideways more than 20 degrees



- twisting the neck more than 20 degrees



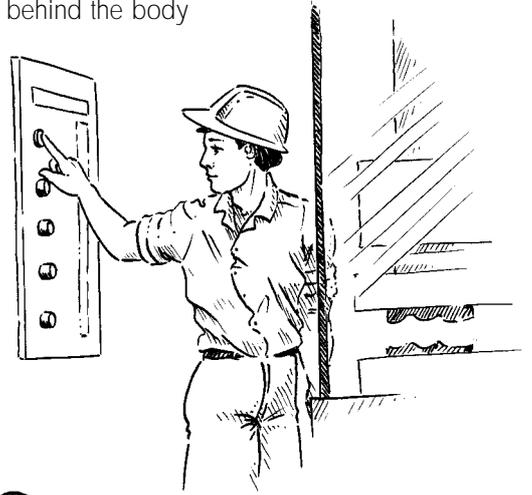
- bending the head backwards more than 5 degrees



- working with one or both hands above shoulder height



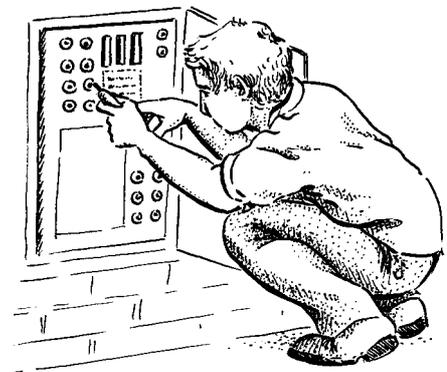
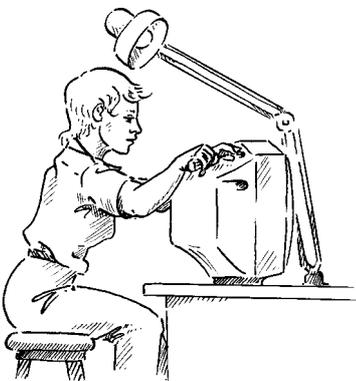
- reaching behind the body



- reaching forwards or sideways more than 30 cm from the body

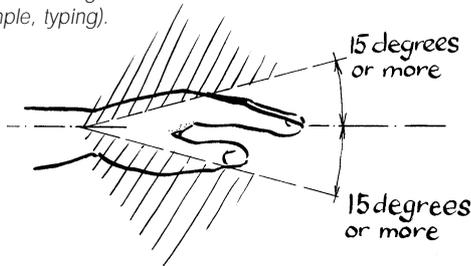


- squatting, kneeling, crawling, lying, semi-lying or jumping

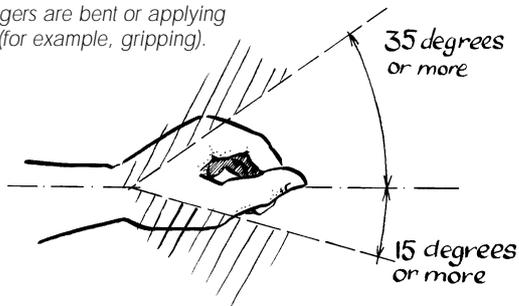


- standing with most of the body's weight on one leg
- twisting, turning, grabbing, picking or wringing actions with the fingers, hands or arms
- working with the fingers close together or wide apart
- very fast movements
- excessive bending of the wrist – in each of the following pictures the shaded area represents excessive bending for different tasks

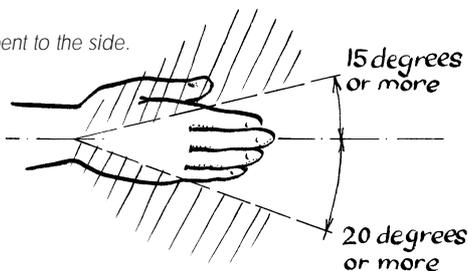
Where the fingers and hands are not applying high forces and the fingers are fairly straight (for example, typing).



Where the fingers are bent or applying higher forces (for example, gripping).



Where the wrist is bent to the side.



In the comments section of the risk assessment worksheet, note any aspects of the task that are causing repetitive or sustained postures or movements.

**Repetitive or sustained forces**

Forces can contribute to MSD risks if they are repetitive or sustained. Generally, as the pace of work increases, forces become more repetitive.

As a general guideline, repetitive means done more than twice a minute, and sustained means done for more than 30 seconds at a time.

**Tick YES on the risk assessment worksheet if the task requires any of the following to be done more than twice a minute or for more than 30 seconds at a time:**

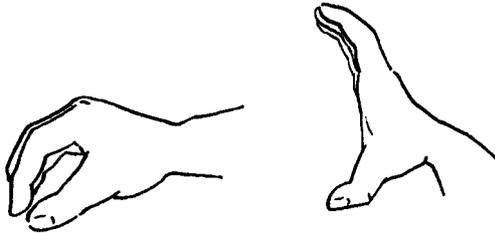
- lifting or lowering
- carrying with one hand or one side of the body
- exerting force with one hand or one side of the body



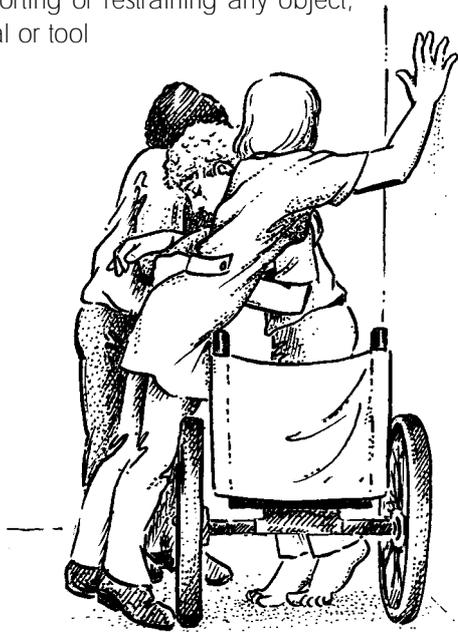
- pushing, pulling or dragging



- gripping with the fingers pinched together or held wide apart



- exerting force while in an awkward posture
- holding, supporting or restraining any object, person, animal or tool



In the comments section of the risk assessment worksheet, note any aspects of the task that are causing repetitive or sustained forces.

### Step 1b: Does the task involve long duration?

You have examined the repetitive or sustained postures, movements and forces that are present in the task. The next step is to look at the duration of the task.

The duration of the task is how long the task is done for over a whole shift or continually at any time during a shift.

**Tick YES on the risk assessment worksheet if the task is done for more than 2 hours over a whole shift or continually for more than 30 minutes at a time.**

In the comments section of the risk assessment worksheet, note any aspects of the task that are causing it to be done for more than 2 hours over a whole shift or continually for more than 30 minutes at a time.

## Step 2: Does the task involve high force?

A manual handling task that involves high force is one that either most people, or the employees likely to do the task, would find difficult because of the effort it requires.

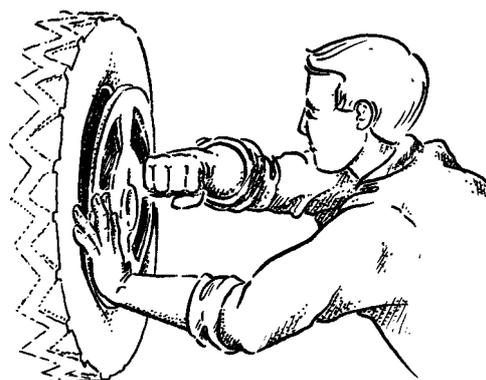
High forces can be MSD risks even if they are not repetitive or sustained. This means that any task involving high force must be assessed as a risk, even if it is only done occasionally or for short periods. The longer and more often high force is applied, the greater the risk.

Some high force tasks involve the whole body – for example, lifting, lowering and carrying heavy weights. Other high force tasks involve only some parts of the body, such as the hands and arms.

**Tick YES on the risk assessment worksheet if the task involves any of the following high force actions:**

- lifting, lowering or carrying heavy loads
- applying uneven, fast or jerky forces during lifting, carrying, pushing or pulling
- applying sudden or unexpected forces (for example, when handling a person or animal)
- pushing or pulling objects that are hard to move or to stop (for example, a trolley)
- using a finger-grip, a pinch-grip or an open-handed grip to handle a heavy or large load
- exerting force at the limit of the grip span
- needing to use two hands to operate a tool designed for one hand

- throwing or catching
- hitting or kicking
- holding, supporting or restraining a person, animal or heavy object
- jumping while holding a load
- exerting force with the non-preferred hand
- two or more people need to be assigned to handle a heavy or bulky load
- during the application of high force, the body is in a bent, twisted or otherwise awkward posture



*The hitting action used to fit the hubcap involves **high force**. The risk is increased because the task is done while in an awkward posture.*

Ask your employees whether they find the task difficult.

**Tick YES on the risk assessment worksheet if any of the following information is reported about the task:**

- pain or significant discomfort during or after the task
- the task can only be done for short periods
- stronger employees are assigned to do the task
- employees think the task should be done by more than one person, or seek help to do the task
- employees say the task is physically very strenuous or difficult to do

In the comments section of the risk assessment worksheet, note any aspects of the task that are causing high force to be exerted.



*These sacks of stock feed are heavy and floppy, making them difficult to handle. **High force** is needed to grip and move them.*

**Step 3: Is there a risk?**

After completing steps 1 and 2, you can now decide whether the task is a risk.

The task involves a risk of MSD if:

- **you ticked yes in both step 1a and step 1b** – the task involves repetitive or sustained postures, movements or forces, and it involves long duration

(Now tick the first box under “Is there a risk?” on the risk assessment worksheet.)

**OR**

- **you ticked yes in step 2** – the task involves high force

(Now tick the second box under “Is there a risk?” on the risk assessment worksheet.)

**Step 4: Are environmental factors increasing the risk?**

If a manual handling task involves a risk of MSD, environmental factors can increase that risk. Environmental factors include vibration, heat and cold.

**Vibration**

Employees can be exposed to two types of vibration: hand-arm and whole-body.

Hand-arm vibration can occur when using vibrating tools or equipment such as:

- chainsaws and other mechanised saws
- impact tools, including jackhammers, vibrating plates, chippers and pavement breakers
- digging tools, including spade and ditch diggers and small augers
- hand-tools, including pneumatic nut runners, impact wrenches and grinders
- lawnmowers and brushcutters

Whole-body vibration occurs when the employee is seated or standing in plant or equipment such as:

- tractors and heavy transport vehicles
- cranes, forklifts and road-making plant
- ride-on mowers and skid-steer loaders

Operating this kind of plant may also expose the employee to hand-arm vibration if the controls of the plant are vibrating as well.

**Tick YES on the risk assessment worksheet if the task involves exposure to either type of vibration.**

### Heat and cold

Your employees will be at greater risk of MSD if they carry out the manual handling task while exposed to:

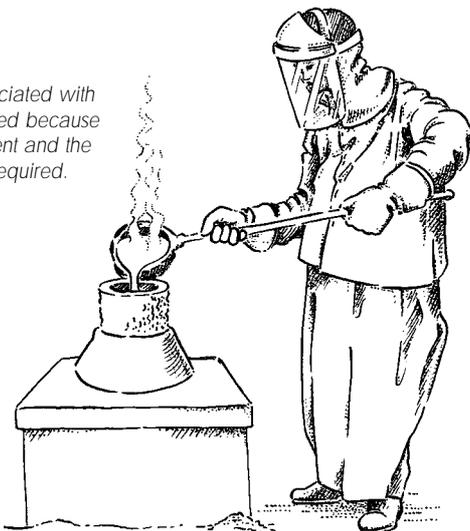
- high air temperatures (for example, in foundries, laundries, bakeries, kitchens, or working in hot weather)
- radiant heat (for example, from the sun or from processes such as smelting or plastics extrusion)
- high humidity caused by processes such as steam cleaning or the weather
- low temperatures (for example, in cool rooms, cold stores, or working outside in cold weather)

Employees may also be at increased risk when:

- wearing heavy protective clothing while working in hot conditions
- wearing thick clothing that restricts movement while working in cold conditions (for example, gloves)
- handling very cold or frozen objects
- working in hot conditions if they are not used to it

**Tick YES on the risk assessment worksheet if the work is done in a hot or cold environment.**

*Any MSD risks associated with this task are increased because of the hot environment and the protective clothing required.*



Generally, the more boxes you tick on the risk assessment worksheet, the greater the risk. Similarly, the more often the task is done, or the longer it is done for, the greater the risk.

Risk is also increased by the presence of environmental factors, as outlined in step 4. In addition, a report of MSD associated with the task usually indicates increased risk.

It's important to bear in mind that the above are general guidelines only. Manual handling occurs in a wide range of tasks and workplace situations, and MSD may be caused by a number of factors. For these reasons, some employees may be at risk of MSD even when working within these guidelines.

You must control any MSD risks that you have found. Section 13 explains how to control the risks in your workplace.

**Risk assessment example 1 – Stacking boxes onto a pallet**

Sue picks up boxes from a conveyor and stacks them onto a pallet on the floor at the rate of 5 boxes every minute. Because of the position of the conveyor and the pallet, Sue has to bend and twist her back more than 20 degrees each time she handles a box. She also has to reach forwards and sideways more than 30 cm from the body to do the task. She does this continually for 50 minutes. The task is done in a large, open warehouse near an outside loading bay.

**Step 1a Does the task involve repetitive or sustained postures, movements or forces?**

Yes. The task involves bending and twisting the back, and reaching forwards or sideways more than 30 cm from the body. The task requires these actions to be done more than twice a minute (that is, 5 times a minute).

**Step 1b Is the task done for more than 2 hours over a whole shift or continually for more than 30 minutes at a time?**

Yes. The task is done continually for 50 minutes at a time.

**Step 2 Does the task involve high force?**

No.

**Step 3 Is there a risk?**

Yes. The task is assessed as a risk because it involves repetitive and sustained postures and movements, and long duration (yes in step 1a and 1b).

**Step 4 Are environmental factors increasing the risk?**

Because the task is done near an outside loading bay, how hot or cold it gets depends on the weather. During hot and cold weather, the risk will increase.

**Risk assessment example 2 – Word processing**

Ahmed's job involves word processing at a computer. The papers he is reading from sit flat on the desk, requiring him to bend and twist his neck more than 20 degrees to read them. Because of reflections in the computer screen and an uncorrected visual problem, Ahmed juts his chin forwards and bends his head backwards more than 5 degrees to read the screen. The height of the keyboard causes him to bend his wrists backwards while typing. He spends about 4 to 5 hours a day word processing and often works continually for more than an hour at a time.

**Step 1a Does the task involve repetitive or sustained postures, movements or forces?**

Yes. The task involves bending and twisting the neck, bending the head backwards, and bending the wrists. All of these actions are done for more than 30 seconds at a time.

**Step 1b Is the task done for more than 2 hours over a whole shift or continually for more than 30 minutes at a time?**

Yes. The task is done for 4 or 5 hours a day, and also for more than 30 minutes at a time.

**Step 2 Does the task involve high force?**

No.

**Step 3 Is there a risk?**

Yes. The task is assessed as a risk because it involves repetitive and sustained postures and movements, and long duration (yes in step 1a and 1b).

**Step 4 Are environmental factors increasing the risk?**

No.

### Risk assessment example 3 – Cleaning rooms in a hotel

Damien cleans 7 to 8 rooms in a hotel during a shift. The task involves vacuuming the room, cleaning the bathroom and making the beds. The beds are heavy, queen-sized beds, and must be pulled across the room for vacuuming.

#### Step 1a Does the task involve repetitive or sustained postures, movements or forces?

Yes. The task of cleaning the rooms requires the postures, movements and forces in the table below to be done more than twice a minute or for more than 30 seconds at a time.

#### Step 1b Is the task done for more than 2 hours over a whole shift or continually for more than 30 minutes at a time?

Yes. Damien cleans rooms for more than 2 hours a day.

#### Step 2 Does the task involve high force?

Yes. Damien has to move each bed away from its position in the room to vacuum under it, and then move the bed back again. Because the beds are hard to move, this task involves high force. Damien also has to bend and twist his back while using high force to move the bed.

#### Step 3 Is there a risk?

Yes. The task is assessed as a risk because it involves repetitive and sustained postures, movements and forces, and long duration (yes in step 1a and 1b). It is also assessed as a risk because it involves high force (yes in step 2).

#### Step 4 Are environmental factors increasing the risk?

No.

Repetitive or sustained postures and movements	Vacuuming	Cleaning the bathroom	Making the beds
Bending the back forwards or sideways more than 20 degrees	✓	✓	✓
Twisting the back more than 20 degrees	✓	✓	✓
Backward bending of the back more than 5 degrees		✓	
Working with one or both hands above shoulder height		✓	
Reaching forwards or sideways more than 30 cm from the body	✓	✓	✓
Squatting, kneeling, crawling, lying, semi-lying or jumping		✓	✓
Twisting, turning, grabbing, picking or wringing actions with the fingers, hands or arms	✓	✓	✓
Excessive bending of the wrist	✓	✓	✓

Repetitive or sustained forces	Vacuuming	Cleaning the bathroom	Making the beds
Exerting force with one hand or one side of the body	✓	✓	
Pushing, pulling or dragging	✓		
Gripping with the fingers pinched together or held wide apart		✓	
Exerting force while in an awkward posture	✓	✓	✓
Holding, supporting or restraining any object, person, animal or tool	✓		

### 12.3 Why are there no weight limits in this code?

The muscular effort required to lift, lower or carry a load depends on more than just the weight of the object. It is also determined by the postures, movements, forces, frequency and duration involved in the task.

This means that even a relatively small weight may be difficult to lift and require the application of high force. Therefore, it is difficult to specify safe maximum weights that would apply to different tasks, or even to similar tasks done under different circumstances.

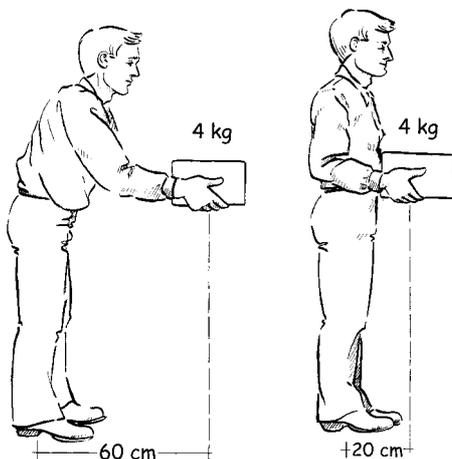
As muscular effort increases, more stress is placed on structures in the body such as muscles, ligaments, joints and intervertebral discs. The greater the effort and stress on the body, the greater the risk of MSD.

To determine whether a particular lifting task involves a risk, use the method set out in section 12.2. This takes into account all the factors that contribute to risk, including weight.

When assessing tasks involving lifting, lowering or carrying, bear in mind that, in general:

- the bigger, heavier or bulkier the load, the greater the effort required to handle it and the greater the risk
- the further the load is from the body, the greater the effort required and the greater the risk
- lifting that requires poor postures (as outlined in step 1a) puts more stress on the body and increases the risk
- the higher the load needs to be lifted, the greater the effort required and the greater the risk
- as frequency and duration increase, so does the risk
- lifting or carrying a load with one hand or to one side of the body puts more stress on the body than handling the load with both hands

It takes about three times the effort to lift a 4 kg load held 60 cm in front of the body than it does to lift the same load 20 cm in front of the body.



### Risk assessment example 4 – Loading a roll of plastic film on a wrapping machine

Jim operates a wrapping machine. Once in each shift, he fits the machine with a new roll of wrapping film. To do this, he must pick up the roll of film, which weighs 22 kg, from the floor, and lift it over a conveyor belt to its position at about head height on the wrapping machine. The only access is from the front of the machine and Jim needs to twist to fit the roll. The diameter of the roll is 70 cm, and the width 30 cm, making it too big to hold close to the body when lifting. Jim finds the task very difficult and has tried to get assistance with the lift, but there is no room for a second person to fit in front of the machine because of the angle of the conveyor.

#### Step 1a Does the task involve repetitive or sustained postures, movements or forces?

No. It's done once a shift and takes less than 30 seconds.

#### Step 1b Is the task done for more than 2 hours over a whole shift or continually for more than 30 minutes at a time?

No.

#### Step 2 Does the task involve high force?

Yes. The roll is heavy and has to be lifted from the floor while bending forward. It must be positioned while in an awkward and twisted posture, with the load at arm's length and head height. Access to the machine is blocked by the conveyor belt.

All employees who have performed this task find it very difficult and strenuous.

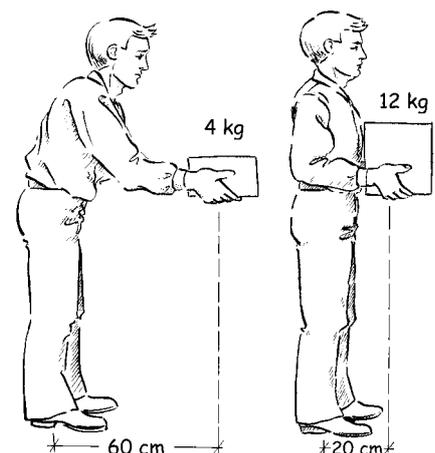
#### Step 3 Is there a risk?

Yes. The task is a risk because it involves high force.

#### Step 4 Are environmental factors increasing the risk?

No.

Lifting a 4 kg load held 60 cm in front of the body requires about the same effort as lifting a 12 kg load held 20 cm in front of the body.



## 12.4 Additional risk assessment methods

In most work situations, the risk assessment method in section 12.2 will be sufficient to assess the risks of hazardous manual handling. But in some circumstances, further assessment may be required.

Appendix 3 explains when further assessment may be needed and provides advice on additional risk assessment methods.

## 12.5 Risk assessment for similar tasks

If a number of your employees do very similar tasks that involve hazardous manual handling, the Regulations allow you to assess these tasks together as a class, instead of assessing each task individually. However, you may only do a class assessment if:

- all the tasks are sufficiently similar
- doing a class assessment does not expose any employee to a different risk than if individual assessments were carried out for each task

### How do I know when to do a class assessment?

To be suitable for class assessment, tasks must involve similar:

- postures and movements
- forces
- duration and frequency
- environmental conditions

Consult your employees' health and safety representatives, if practicable, when deciding whether particular tasks are suitable for class assessment. It's also a good idea to talk to the employees who do the tasks, as they will be able to tell you how the tasks are similar or different.

Examples of tasks that may be suitable for class assessment are:

- daily cleaning and servicing of rooms in a hotel that are the same, and employees clean the same number of rooms each day
- a telephone call centre where the same work is done by a number of employees working similar shifts
- employees picking the same fruit in an orchard or fruit farm
- a shearing shed where similar animals are being shorn with the same equipment

Other examples can be found on page 15 in the hazard identification section.

Tasks such as stocking shelves in a warehouse may appear to be suitable for class assessment. But the postures, movements and forces required may differ significantly between work areas because of differences in the layout of the workplace or the objects being handled. In such cases, you would need to assess the tasks in each work area separately.

If employees are very different in size and strength, a class assessment would not be suitable, or these differences would need to be taken into account in the class assessment. Differences in size and strength can mean that employees adopt different postures and movements to perform the same task and can determine whether or not high force is involved.

If you're not sure whether a group of tasks can be covered by a class assessment, you should carry out individual assessments for each task.

## 12.6 When to review a risk assessment

A risk assessment previously carried out for a task involving hazardous manual handling may no longer adequately assess the risk of MSD. This may be because:

- the task has changed in some way
- new information about the task or the assessment may have come to your attention
- a report of MSD associated with the task may have been made

In these circumstances, the risk assessment should be reviewed and, if necessary, revised. If the revised assessment shows a different level of risk than that originally assessed, you will need to review the original risk controls and alter them if necessary.

## 12.7 Keeping records of risk assessments

If the risk assessment indicates a risk of MSD, you must keep a record of the method used to assess the risk and the results of the assessment.

A risk assessment record helps you to:

- select and maintain appropriate risk controls
- evaluate the effectiveness of these risk controls in subsequent risk assessments
- avoid introducing tasks that may result in MSD
- avoid unnecessarily assessing a task more than once

Appendix 5 contains sample worksheets that you can use to record your assessment. You don't have to use that format – an alternative method may be used, so long as that method fulfils the requirements of the Regulations.

## 12.8 What if I have already done a risk assessment under the 1988 Regulations?

If you have already done any risk assessments for particular tasks under the 1988 Regulations, you are considered to have complied with the identification and assessment requirements of the current Regulations.

However, this is only the case if you:

- assessed the risk of MSD occurring
- performed the risk assessment in consultation with health and safety representatives
- took account of all the risk factors required by regulation 6 of the 1988 Regulations

This only applies to assessments of individual tasks, as there was no provision under the 1988 Regulations for class identifications or assessments. To check whether an assessment done under the 1988 Regulations can be used as a class identification or assessment, refer to sections 11.4 and 12.5.

### Risk controls set in place under the 1988 Regulations

You are considered to have complied with the current Regulations if you have set in place risk controls in accordance with regulation 8 of the 1988 Regulations.

Although the control of MSD risks was not a stated objective of the 1988 Regulations, risk controls implemented in accordance with those Regulations should eliminate or reduce, as far as practicable, the risk of MSD occurring in your workplace.

### Recording of risk assessments under the 1988 Regulations

Under the current Regulations, you are required to record any risk assessment done under the 1988 Regulations.

You must record the assessment to the extent reasonably possible. For practical purposes, this means that you should:

- keep any existing records of assessments done under the previous Regulations
- if records don't exist, document previous risk assessments if it is possible to do so (ordinarily, this would be if a risk assessment had been carried out just before the current Regulations came into operation)
- use other records (for example, health and safety committee minutes or other reports) to help you if records of the assessments are not available

### *Case Study: Pushing a trolley of metal components*

#### **Stage 2: Assessing the risk of MSD**

After identifying the hazardous manual handling involved in the task (see page 15), the employer and health and safety representative assessed the risk. They followed the steps in section 12.2 of the code, and recorded the process on the risk assessment worksheet.

The duration of the task was timed: Bob, Connie and Vinh each took about 45 seconds to push the trolley from the assembly area to the packing area. Because the task was done only once every 20 minutes, the duration of the task did not pose a risk.

Since the task involved pushing an object that was hard to move and stop, requiring the use of the whole body weight, the task was assessed as a risk because it involved high force.

#### **Is there a risk?**

The employer and health and safety rep agreed that the task posed a risk because of the **high force** involved. The fact that two employees had reported symptoms and MSD also indicated an increased risk.

**You've worked out which manual handling tasks in your workplace are likely to cause MSD. The next stage is risk control.**

## 13. Risk control

# 1

### Identify hazardous manual handling

the tasks that could cause MSD

# 2

### Assess risk

- postures
- movements
- forces
- duration and frequency
- environmental factors

# 3

### Control risk

Eliminate or reduce risk by:

- altering the workplace or environmental conditions
- altering the systems of work
- changing the objects used
- using mechanical aids
- providing information, training and instruction (if the above are not practicable)

***Check that controls are working properly***

**CONSULT**

health and safety representatives

### 13.1 What is risk control?

Risk control means implementing effective measures to eliminate or reduce the risk of MSD. Under the Regulations, your primary duty is to eliminate any risk of MSD in your workplace. Where it is not practicable to eliminate the risk, you must reduce it as far as practicable.

When controlling risks, make sure that you consult your employees' health and safety representatives, if practicable. If there is no health and safety representative, you should discuss risk control directly with your employees. Your employees are likely to know which tasks could cause problems and may have some good ideas about how to improve the situation.

### 13.2 What does practicable mean?

Practicable does not just mean the cost in dollar terms. To determine what is practicable, you must take into account:

- **the severity of the hazard or risk**

How likely is it that the manual handling task will result in MSD? How serious is the MSD likely to be, and how many people could be affected?

- **the state of knowledge about that hazard or risk and any ways of removing or mitigating that hazard or risk**

What is known about the hazards or MSD risks associated with the task, and ways to control the risks? What do designers, manufacturers, importers or suppliers of plant used in the task know about MSD risks and risk controls? What do workplaces dealing with similar hazards do to control the risk? What information can occupational health and safety professionals, industry organisations, unions and government bodies provide?

- **the availability and suitability of ways to remove or mitigate that hazard or risk**

Are the risk controls that you have identified readily available? Are they suitable for the workplace, the task and the employees involved?

- **the cost of removing or mitigating that hazard or risk**

What are the costs of controlling the hazard or risk, now and in the future?

### 13.3 Sources of risk

To eliminate or reduce risks, you need to find the sources of risk for each of the risk factors assessed in section 12, and alter these sources of risk.

In finding the sources of risk, it may be helpful to refer to any sketches, photographs or comments about the task that you added to the risk assessment worksheet.

Ask yourself, your employees and health and safety representatives questions such as:

- What is causing employees to use awkward postures or movements? (for example, the layout of the workplace, a workstation that cannot be adjusted, the position and type of objects being handled, poor housekeeping or bad lighting)
- Why does such high force need to be used? (for example, the heavy weight of the object being handled, or a tool with grips that are too large for most hands)
- Why do employees have to do the task so often, or for so long? (for example, the work pace is too fast due to tight deadlines, or staff numbers are limited)
- What is causing exposure to heat, cold or vibration? (for example, a task is done too close to a furnace while wearing protective clothing, or using a poorly maintained tool or plant with inadequate vibration damping mechanisms)

The following sections explain more about sources of risk and how to alter them to eliminate or reduce the risk of MSD.

### 13.4 Can the manual handling task be eliminated?

Eliminating the manual handling task that creates the risk is the most effective way of protecting the safety of your employees.

When thinking about how to control the risk of MSD, your first step should be to ask whether the manual handling is really necessary. Is there another way of doing the job that doesn't involve manual handling? Examples of elimination include:

- implementing a "no lift" policy in the health and aged care sector
- using pallet containers to dispense ingredients in food manufacturing; this eliminates the need to manually lift heavy bags of ingredients, such as flour
- outsourcing a task that you do manually to a company that has the equipment to do the task mechanically (for example, washing and sterilising returnable bottles to be refilled with wine or soft drink)

### 13.5 How to control the risk

The Regulations set out a ranking of risk controls. First, you must use one or more of the following risk controls to eliminate or reduce the risk of MSD:

- alter your workplace, or the environmental conditions, where the manual handling task is carried out
- alter the systems of work used to carry out the manual handling task
- change the objects used in the manual handling task
- use mechanical aids

Second, if none of these controls are practicable, you can use information, training or instruction in manual handling techniques to control the risk.

You must not rely solely or primarily on information, training or instruction to control the risk, unless you can demonstrate that the other risk controls are not practicable.

However, those risk controls may need to be supplemented by information, training and instruction about the changes made to the tasks. For some tasks, you may need to use several risk controls to eliminate or reduce the risk of MSD.

The following pages explain these risk controls in more detail. A risk control worksheet can be found in appendix 5. You may also wish to refer to the worked examples in appendix 4 to see how risk controls can be developed for particular tasks in different industries.

#### **Alter the workplace**

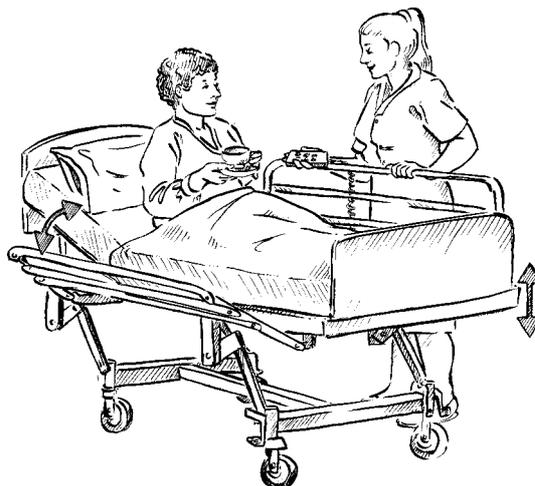
The physical features of the workplace can affect the way your employees work, and can increase the risk of MSD. Altering the workplace – including workplace layout, workstation design and the working position of employees – can eliminate or greatly reduce the risk.

#### **Workplace layout**

Altering the workplace layout means changing the height and placement of plant, equipment, furniture and objects used in the task, so as to eliminate or reduce the risk of MSD. Look at the layout of your workplace. What changes can be made to improve any postures, movements and forces that you identified in your risk assessment?

To eliminate or reduce bending movements and postures:

- change the work height by installing lift tables, self-adjusting work dispensers or similar mechanical aids
- make sure there's enough space for the task to be done in an upright posture with objects close to the body
- provide adjustable work levels
- lower the position of the employee, while leaving the work level unchanged
- keep the objects and materials used in the task at work level – don't lower objects that will need to be lifted later
- align the object being worked on with normal wrist posture
- design handles on objects, tools and controls to allow normal wrist postures



*The electronically operated adjustment on this bed eliminates the need to bend the back. Adjusting the height and angle of the bed reduces the need to adopt bent and twisted postures when attending to the patient.*

To eliminate or reduce twisting movements and postures:

- position all frequently used controls, equipment, materials and tools in front of the employee
- provide sufficient work space for the employee's whole body to move and turn
- allow clearance for the employee's legs and feet
- provide adjustable swivel chairs for seated tasks
- make sure there's enough room for the employee and any protective clothing, tools, objects and mechanical aids that he or she needs for the job

To eliminate or reduce reaching movements and postures:

- place the objects used in the task closer to the person
- lower any items that are higher than the appropriate work level
- store items below shoulder height
- raise the employee closer to any objects that are out of comfortable reach
- allow enough room for the employee to walk around the load or object
- remove any barriers which prevent the object being handled close to the body

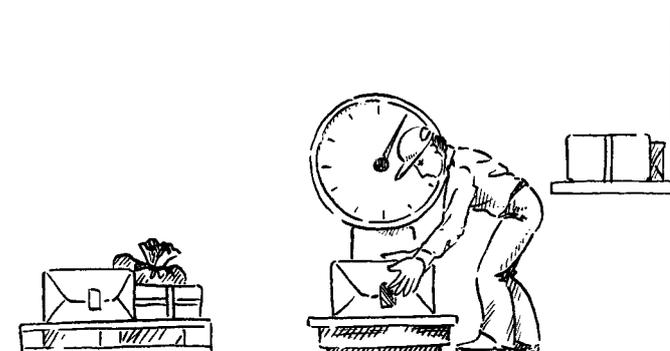
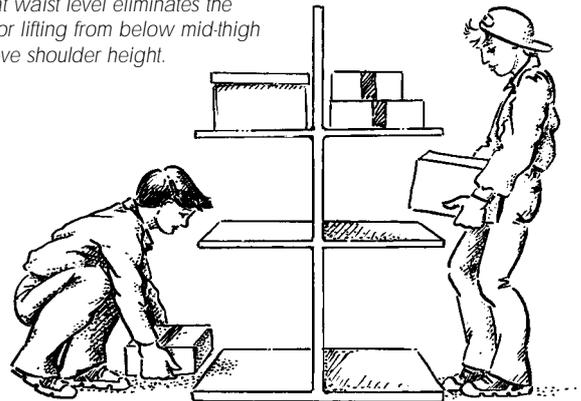
To eliminate or reduce pushing, pulling, holding and carrying movements and forces:

- relocate stores or stockpiles closer to where the items are required
- locate the parts of the process closer together
- use powered conveyors, slides, chutes or rollers to move objects
- keep the work area free of obstacles
- provide clear, direct pathways for trolleys and other mobile equipment, to minimise turning and sudden stops
- make sure that objects don't need to be pushed, pulled or carried up steps or ramps
- ensure that floor surfaces are clean and smooth

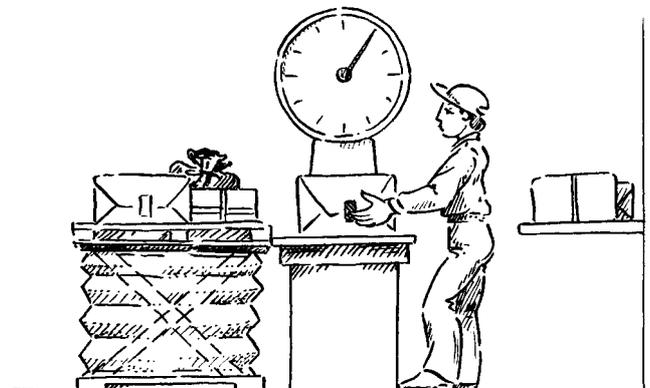
A self-adjusting base in the laundry tubs reduces the need for bending, twisting and reaching during unloading.



Storing heavier and frequently used items at waist level eliminates the need for lifting from below mid-thigh or above shoulder height.



**Before:** The poor design and layout of this workplace required employees to stoop when lifting boxes from the bench to the scale, and again when lifting them from the scale to the pallet.



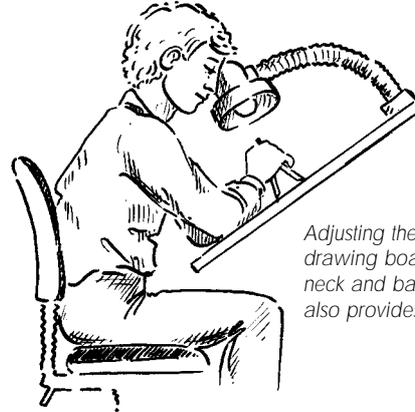
**After:** Raising the height of the scale and using a self-adjusting pallet lifter eliminates the need for stooping and bending, and reduces the forces required to move the boxes.

**Workstation design**

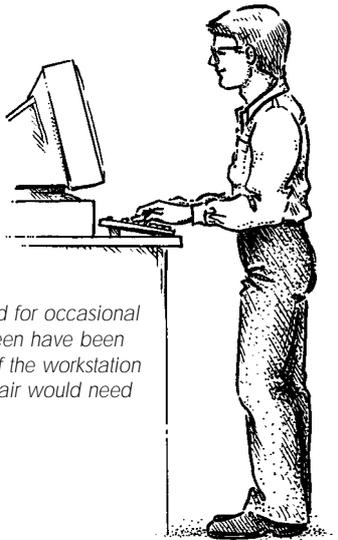
Design workstations so that employees can do most of their work in an upright position with shoulders lowered and upper arms close to the body. The working height and objects used in the task should be roughly level with the employee's elbows, whether the work is done sitting or standing.

If the task involves close visual work or fine movements, the work level may need to be higher. Arm support should be provided if the arms must be kept raised when performing the task.

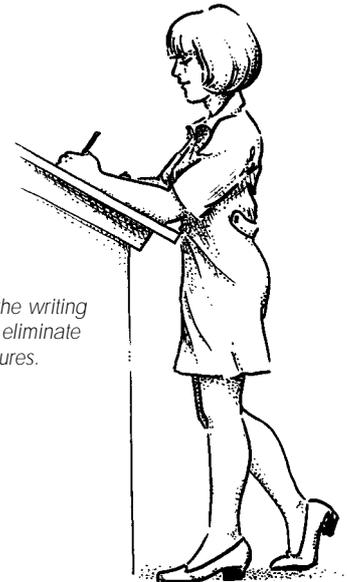
Different employees require different working heights. So it's best to use adjustable workstations to make the work height suitable for the person and the task. If the workstation must be shared regularly by different employees, ensure that its height can be adjusted quickly and easily. You can also use fixed work tables at different heights to cater for different employees and different tasks.



Adjusting the height and angle of the drawing board reduces bending of the neck and back and forward reaching. It also provides support for the arms.



At this workstation designed for occasional use, the keyboard and screen have been set up to avoid stooping. (If the workstation was used more often, a chair would need to be provided.)



The height and slope of the writing surface have been set to eliminate bent back and neck postures.



**Before:** A fixed work bench forces the taller employee to bend his back. The shorter employee has to work with his arms raised.

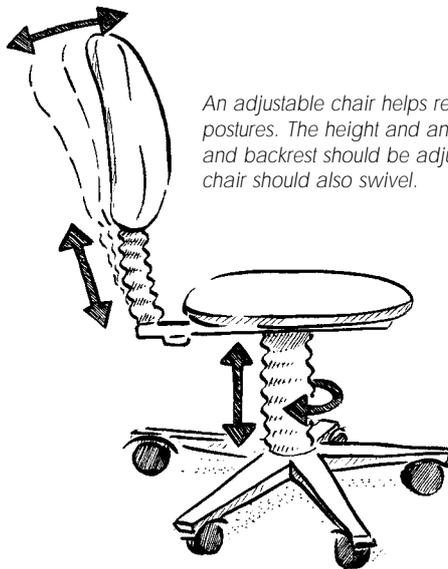


**After:** Adjustable work heights allow the butchers to set the bench to suit their height and task. Bending is reduced for the taller employee, and the need to work with raised arms is minimised for the shorter employee.

### Working position

For seated tasks:

- the height and angle of the seat should be adjustable
- the chair should swivel
- the backrest should be shaped to support the spine, and the height and angle of the backrest should be adjustable
- the seat width and depth should accommodate a wide range of users
- all edges should be rounded and the edge of the seat should not press into the thighs
- padding should be thick enough to provide comfortable support
- the seat covering should allow air to circulate
- the chair must not tip or slip – a five-point base is the most stable; castors should be used on carpet and glides should be used on other surfaces
- provide a footrest to enable the employee to sit with the feet supported



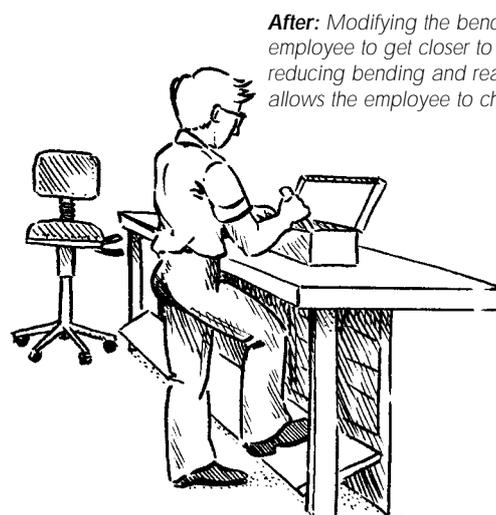
*An adjustable chair helps reduce awkward postures. The height and angle of the seat and backrest should be adjustable. The chair should also swivel.*

For standing tasks:

- provide a chair, stool or support so that the employee can alternate between sitting and standing
- provide a footrest (large enough for the whole foot) to allow the employee to stand with either foot raised
- where possible, provide a suitable floor covering to cushion concrete and other hard floors



**Before:** *The employee can't get close to the work on the bench without bending and reaching forward.*



**After:** *Modifying the bench allows the employee to get closer to the work, reducing bending and reaching. A footrest allows the employee to change posture.*

To determine the most appropriate working position for particular tasks, see the job design section on page 36.

### **Alter the environmental conditions**

Environmental conditions include vibration, heat and cold, and other factors such as lighting and housekeeping. Altering these conditions can help eliminate or reduce MSD risks.

#### **Vibration**

To eliminate or reduce exposure to vibration:

- adjust any existing vibration damping mechanisms in mobile plant and vehicles
- install a vibration isolating seat in plant such as cranes or tractors
- replace or modify powered hand-tools that expose employees to hand-arm vibration
- when purchasing plant such as mobile powered plant or power tools, choose plant that operates with minimum vibration
- make sure that plant and tools are serviced regularly
- provide gloves to keep hands warm and dry if the work is done in cold, wet conditions (this will help reduce the risk of vibration-induced MSD, which increases in cold, wet conditions, but will not protect against vibration as such)

If the vibration itself can't be eliminated or reduced, minimise your employees' exposure to it by decreasing the time they spend using vibrating plant and tools. Use job rotation, or do the task in a different way that reduces vibration exposure. If exposure can't be reduced, it's better if it occurs intermittently during a shift rather than in one continual block.

#### **Working in heat and cold**

For employees working in hot conditions:

- reduce temperature and humidity where possible, by providing fans or air conditioning
- use screens, awnings, and appropriate clothing to shield employees from radiant heat sources such as ovens, furnaces and the sun
- relocate work away from sources of heat
- enclose hot processes and increase ventilation to get rid of steam and hot air
- alter work schedules so that work is done at cooler times
- provide opportunities for employees who are not used to working in hot conditions to acclimatise
- provide a cool, well-ventilated area where employees can take rest breaks
- ensure that employees work at a sensible pace
- provide a supply of cool drinking water and encourage employees to drink some regularly

For employees working in cold conditions:

- make sure that employees take regular rest breaks in a warm place
- ensure that employees wear appropriate clothing that's not too bulky or restrictive
- ensure that employees wear appropriate personal protective equipment (for example, gloves should provide adequate protection from the cold and allow a good grip of the objects being handled)
- ensure that employees wear non-slip footwear
- ensure that floors aren't slippery

#### **Lighting**

Poor lighting can make employees adopt awkward postures and movements in order to do their work. For example, to see scratches and other imperfections on painted panels, an employee must bend down and twist his or her head to look at the panels side-on.

To improve lighting and visibility:

- provide additional lighting, such as a lamp on a movable arm
- improve the layout of existing lights by lowering or raising them or changing their position in the work area
- increase or decrease the number of lights
- change the diffusers or reflectors on existing lights
- change the lights to improve light levels or improve colour perception
- change what is being looked at – for example, bring it closer to the eye, or change its orientation or position to avoid shadows, glare or reflections
- clean lights and light fittings regularly
- use screens, visors, shields, hoods, curtains, blinds or external louvres to reduce reflections, shadows and glare

The eyesight of employees also needs to be considered. It's important that employees wear glasses if they need to, and that they have the right glasses for their work.

#### **Housekeeping**

Keeping work areas clean, tidy and free of clutter and obstacles can prevent unnecessary manual handling and help avoid awkward postures and movements.

### **Alter the systems of work**

Systems of work include job design, the pace and flow of the work, and shift length.

#### **Job design**

##### *Working position*

Determine the most appropriate working position by considering the tasks to be performed, the frequency and duration of the tasks, and the objects, equipment and tools required.

A seated position is best for:

- work that requires fine manipulation or accurate control or placement of small objects
- prolonged work in the same position
- light manual work
- close visual work that requires prolonged attention – for example, prolonged keyboard work, screen and display monitoring, or electronic assembly
- work that involves operating a foot pedal

A standing position is best when:

- heavy or bulky loads are handled
- forceful movements are used
- the task involves reaching
- movements away from the working position are frequent
- there is no knee room
- there is limited space

Make sure that your employees perform tasks that allow a variety of postures and movements, including a mixture of sitting and standing tasks. Provide regular opportunities for employees performing seated or standing tasks to vary their postures and movements.

##### *Team handling*

Team handling is manual handling of a load by two or more employees. It can reduce the forces required and improve the postures and movements adopted by employees.

However, team handling should not require employees to adopt awkward postures or movements as they attempt to take account of the other people in the lift.

If tasks in your workplace involve team handling, ensure that:

- there are enough people in the team
- one member is appointed to coordinate the task
- the team members are of similar size and strength
- appropriate training is provided
- team members have been trained together, wherever possible

Team handling should be used if more effective methods of reducing the forces needed to perform the task (such as mechanical aids) are not available. But be aware that team lifting may still involve MSD risks.

##### *How much can a team lift?*

The capacity of the team in a team lift is less than the sum of the individual capacities of the members of the team.

In most circumstances, the capacity of a team during a lift is reduced by between 10 and 20 per cent for a two-person lift and by more than that for a team of three or more.

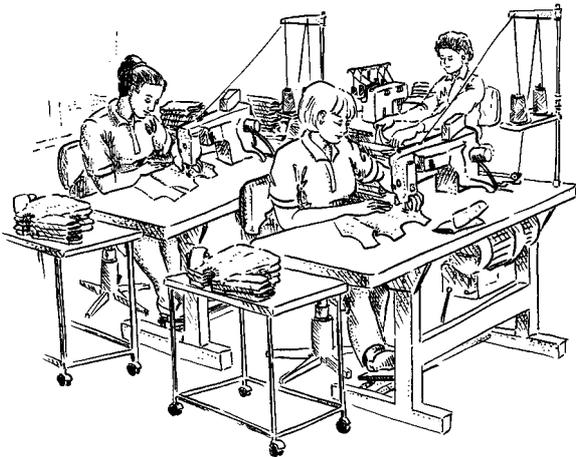
## Pace and flow of the work

### *Setting work rates*

Set realistic work rates: allow for the physical demands of the task and for differences between employees and variation over time. Employees should not have to work at a rate that is at the limit of their capacity.

Allow enough time for new employees or employees returning from a period of absence to build up to the required work rate. This is particularly important where the pace of work is beyond the employee's control.

Incentive and bonus schemes have the potential to create risks by increasing the frequency and duration of manual handling tasks. Employees may need to work faster and for longer periods without breaks in order to meet targets. Alter the work rate to reduce how often or for how long a task is done and control the risk.



*The work rate for high-volume production and processing should not extend employees to their physical limits.*

### *Organising the work flow*

Try to organise the flow of work so that overload during peak periods is avoided. Where possible, use alternatives to machine pacing, such as buffer systems. Examples of buffer systems include:

- diverting items from a production line that is moving faster than the employee's comfortable rate, for the employee to process later
- locating items near the employee, to be processed when the production has slowed or stopped

If machine-paced work can't be avoided, provide your employees with adequate breaks or other tasks that allow for a change of pace and posture.

### *Job rotation*

Job rotation is a good way of avoiding prolonged exposure to monotonous or repetitive work and reducing the risk of MSD. Give your employees a range of tasks, each requiring different postures, movements and forces. The frequency and duration of the postures, movements and forces should also vary.

### **Shift length**

Shift rosters should take into account the physical demands of manual handling tasks. Make sure your employees take adequate breaks during shifts, and adequate time between shifts, to rest and recuperate. Where employees work shifts longer than 8 hours, the pace and duration of repetitive work or sustained effort should be reviewed, and reduced where necessary.

### ***Change the objects used in the task***

Objects used in a manual handling task may include:

- the load being handled (such as packages, containers, animals or people)
- tools and equipment used to do the task (such as hand-tools)
- plant used to carry out the task (such as mechanical aids)

When controlling MSD risks, you need to think about the shape, size and weight of objects used in the task.

Talk to your suppliers about modifying the objects they supply to your workplace. Many of the changes outlined in this section may be able to be made by the supplier in response to customer requests. These changes can have many benefits and often cost little to introduce.

### **Modify the load being handled**

To eliminate or reduce forces and awkward postures and movements:

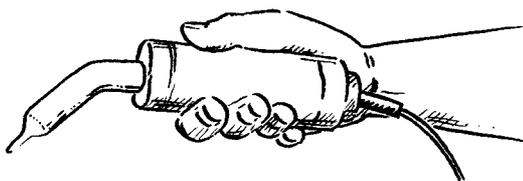
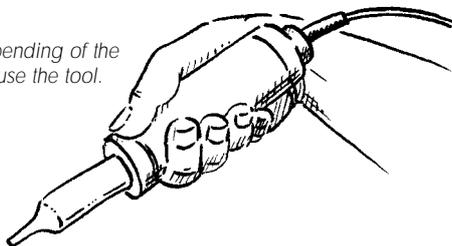
- reduce the weight of the object
- make the object less bulky or buy it in a smaller size, so that its centre of gravity is closer to the person handling it
- change the shape or surface texture of the object to make it easier to grip
- provide handles or other holding points on the object to help with gripping and to indicate the best way to lift it
- make the surface of the object cleaner or cooler, make the edges less sharp, or insulate the object so that it can be held against the body
- ask your supplier about the weight of the package and how to handle it safely
- tell the supplier how you want the object packaged
- design the object or package so that its contents won't shift unexpectedly while it is being moved, and the weight is distributed as evenly as possible
- increase the weight of the object so that it can't be handled manually, and ensure that mechanical aids are available

### Modify the tools and equipment used

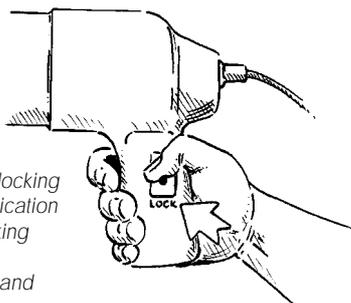
To eliminate or reduce forces required to grip and operate hand tools, make sure that tools:

- have grips that are suitable for the type of force and precision required, provide adequate friction in the grip and distribute gripping force evenly over the hand to avoid concentrated pressure from sharp edges
- can be used with either hand and will fit different-sized hands
- minimise awkward postures of the hand, wrist and arm
- have trigger forces that are as low as possible
- do not require constant trigger operation, but have an ON/OFF function
- minimise vibration transmitted to hands or other points of contact with the body
- are as light as possible
- are well balanced so that they don't exert additional forces on the hand, arm or wrist

**Before:** Excessive bending of the wrist is required to use the tool.



**After:** Modifying the tool eliminates the awkward wrist posture.



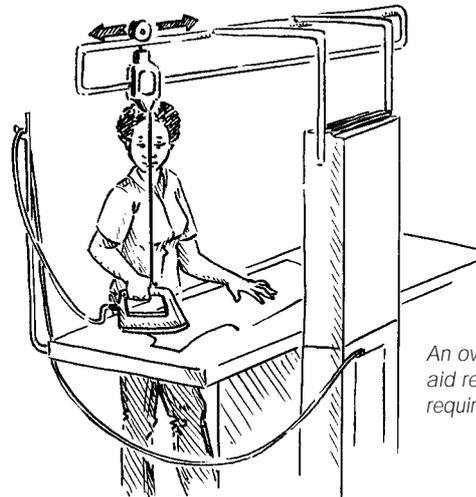
Powered hand tools with no locking switch require sustained application of force on the trigger. A locking switch eliminates the need to maintain force on the trigger and allows a better grip.

### Balancers and other tool supports

Tools can be suspended from balancers or tool supports to reduce both the force needed to use them and the fatigue resulting from their repetitive and sustained use.

Well-designed balancers and tool supports counteract the effect of gravity, reduce the effort of holding or supporting the tool, and minimise sudden twisting forces on the hand and arm from the action of the tool. They also reduce the length of time the tool needs to be held.

Mounting the tool – for example, in a drill stand – will eliminate or reduce the need to hold the tool for long periods.



An overhead suspension aid reduces the forces required to use the iron.

### Maintenance

Regular maintenance and service of equipment and tools, in accordance with the manufacturer's specifications, can reduce the force required to operate them. Mechanical aids and equipment introduced as a component of risk control are more likely to be used for the task if they work properly.

Keep tool grips in good condition so that gripping forces are reduced and damaged grips do not concentrate pressure on one part of the hand. Maintenance also includes sharpening cutting tools such as saws, chisels and butchers' knives.

### Provide mechanical aids

Mechanical aids can control the risk of MSD by reducing the forces needed to perform manual handling tasks and improving the postures and movements required to do these tasks.

In most cases, mechanical handling equipment supports the object completely and eliminates the need to hold or carry it. Some equipment carries most of the weight but requires the employee to balance the object. Other aids only support part of the object's weight.

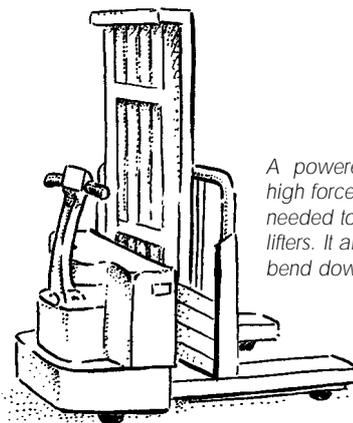
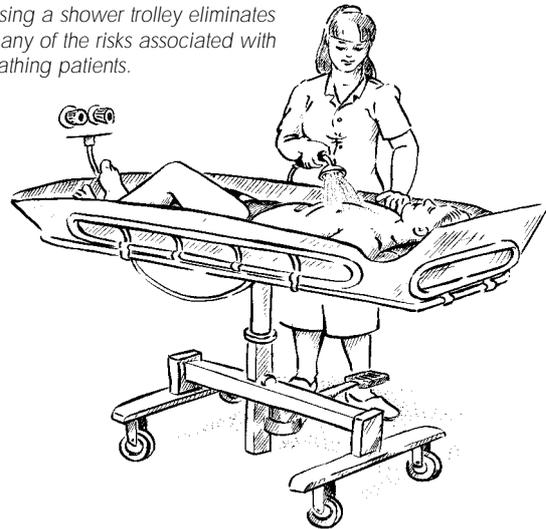
To be effective, mechanical aids must:

- be easy to use and not obstruct employees' work
- be designed to suit the load and the task
- have adequate space for use and storage when not in use
- be readily available when required
- be used by employees who have been trained in how to use them
- not create a risk of MSD through their use
- be used in accordance with manufacturers' instructions
- be well maintained and serviced regularly

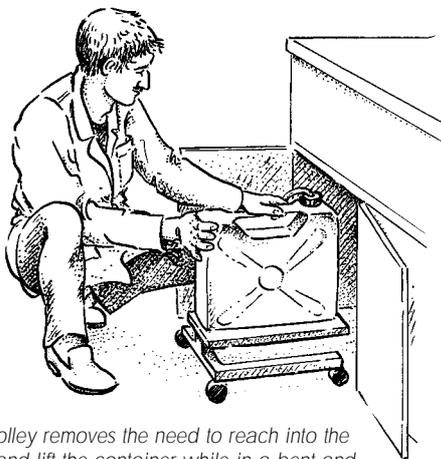
The design, installation and use of some mechanical aids is subject to the *Occupational Health and Safety (Plant) Regulations 1995* and the *Occupational Health and Safety (Certification of Plant Users and Operators) Regulations 1995*.

Mechanical aids and equipment may be simple (for example, levers, winches or trolleys) or more complex (for example, cranes, hoists or vacuum lifts).

Using a shower trolley eliminates many of the risks associated with bathing patients.

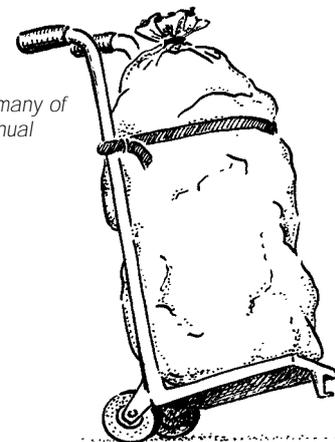


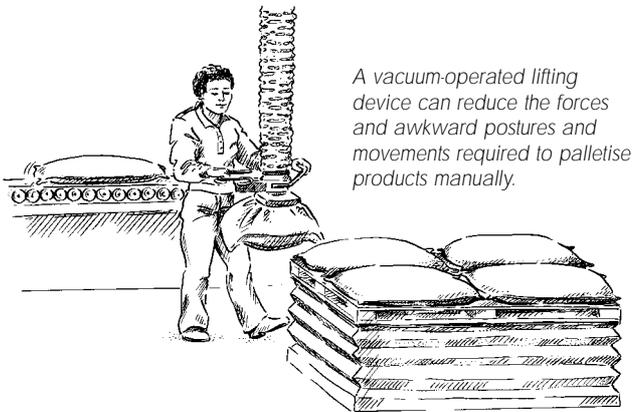
A powered pallet-lifter eliminates the high forces and awkward postures needed to move unpowered pallet-lifters. It also eliminates the need to bend down to lift stock.



A simple trolley removes the need to reach into the cupboard and lift the container while in a bent and awkward posture.

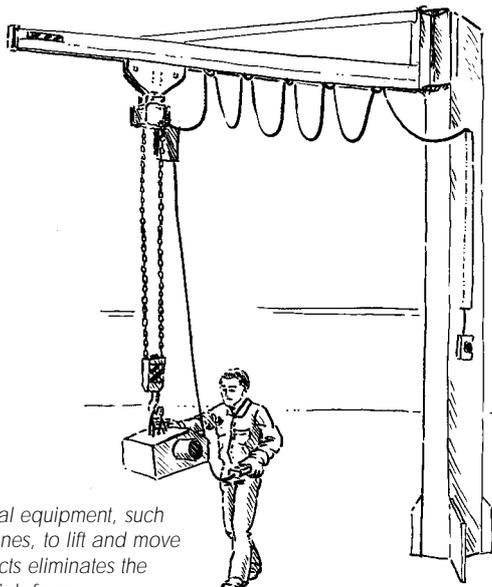
A trolley can eliminate many of the risks involved in manual handling.





Mechanical aids also include devices such as:

- slings and straps used in furniture removal to transfer some of the load from the arms to the trunk and legs and to enable the load to be brought closer to the body
- arm slings and other body supports for tasks such as electronic assembly or shearing
- back harnesses for carrying vacuum cleaners
- backpacks for carrying loads, which bring the load closer to the body and transfer the load from the hands and arms to the trunk
- tool belts, which reduce the need for bending and reaching to pick up tools, and eliminate the need to hold tools when they're not being used

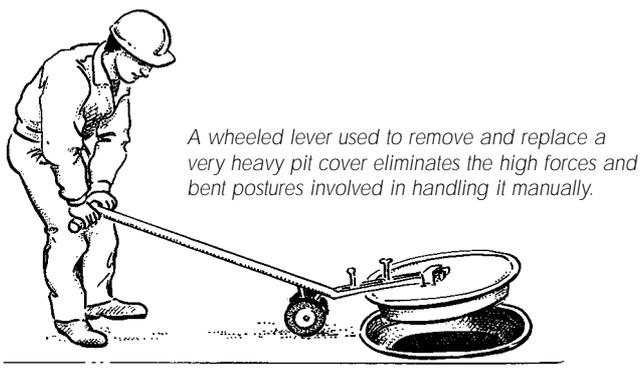


#### *Can back braces and back belts help control the risk of MSD?*

Many people believe that devices such as back braces or back belts can prevent MSD. Sometimes these devices are used by health professionals as a rehabilitation aid for patients recovering from back injuries or similar problems.

However, scientific studies have been unable to confirm whether these devices can eliminate or reduce risks and prevent MSD.

For this reason, back belts and similar devices are not considered to be mechanical aids, and are not a valid risk control.



### **Provide information, training or instruction in manual handling techniques**

Information, training and instruction of employees in manual handling techniques must not be used as the sole or primary means to control the risk of MSD.

You can only use information, training and instruction as the main way to control risk if you can show that it's not practicable to control the risk by altering your workplace, the systems of work or the objects used in the task, or by providing mechanical aids.

Adopting good workplace and job design is the most effective way to control MSD risks. But training in manual handling techniques, or how to perform a task properly, can be an important way to help reduce risk.

The technique must be specific, designed for the task and the workplace where it will be used. When training an employee in a specific manual handling technique, make sure that he or she:

- understands the reasons for doing the task in a particular way
- can recognise the risks and decide the best way to do the task
- can do the task properly and can practise the technique before being required to use it
- is properly supervised when the task is being carried out

You should assess the techniques that your employees are using, and provide refresher training as required. This is particularly important for tasks that are not done very often.

Training in specific lifting techniques is often used to address the danger of lifting heavy objects. But repetitive lifting may pose a risk, irrespective of which technique is used. This is why training alone is not an effective risk control. Rather than relying on safe worker behaviour, it is far better to make the workplace safer by reducing the risk of the task itself.

See appendix 2 for more about information, training and instruction.

### **13.6 Putting risk controls in place**

You must now decide which of the risk controls you have considered are practicable. (Practicable is defined in the Act and is explained on page 30 of this code.)

You may need to use several measures to control the risk of MSD in your workplace. Consult your employees' health and safety representatives, if practicable, in making these decisions. It's also a good idea to consult other employees.

Some changes can be made straight away, such as altering rosters to increase staffing levels for a task, or raising objects by using more pallets. Other changes, such as ordering new stock in smaller containers, trialling and purchasing an appropriate mechanical aid, or designing and installing a conveyor system, may take longer to put in place.

If risk controls can't be implemented immediately, train your employees in specific manual handling techniques to reduce the risk until you can make these changes.

It's advisable to record your risk control decisions and the agreed times by which actions are to be completed. Make sure that all relevant people know who will be responsible for implementing the change. You can use the worksheet in appendix 5 to document your risk controls.

It may be necessary to trial risk controls before making them permanent. Some ideas for risk control may look promising, but don't work so well in practice. Consult your employees' health and safety representatives, if practicable, about the effectiveness of risk controls.

### **13.7 Reviewing risk controls**

Once risk controls have been put in place, check that they have been implemented correctly and monitor their effectiveness. Have your risk controls eliminated or reduced the risk of MSD, without creating other risks?

Provide your employees with information, training and instruction on working with the new risk controls, on the reasons they were introduced, and on any hazards or risks not yet controlled.

Make sure that any equipment or aids used in manual handling, whether existing or introduced as a component of risk control, are properly maintained.

### *Case Study: Pushing a trolley of metal components*

#### **Stage 3: Selecting risk controls**

The risk assessment showed that the task involved a risk due to the high force needed to move the trolley (see page 28). The employer now has to decide how to eliminate or reduce the risk as far as practicable.

Using the notes and sketch on the risk assessment worksheet, the employer and the health and safety rep identified a number of sources of risk:

#### **Workplace layout:**

- the long distance between the assembly area and the packing area (30 metres)
- the trolley is positioned next to the bench in a way that requires it to be turned when fully loaded
- other employees also use the corridor where the trolley needs to be pushed
- some rough floor surfaces

#### **Systems of work:**

- the same employee does this task throughout the shift

#### **Nature of the object:**

- trolley is heavy and fully loaded, carrying a total load of 264 kg
- the trolley has no brakes and must be stopped manually

The employer and the health and safety rep then considered a number of risk controls, thinking about how to eliminate or reduce the risk:

#### **Alter the workplace:**

- change the workplace layout so that the assembly area is closer to the packing area (reduce)

#### **Alter the environmental conditions:**

- improve floor surfaces (reduce)

#### **Alter the systems of work:**

- rotate the trolley-pushing task between a number of employees on each shift, to reduce the frequency of pushing for Bob, Connie and Vinh (reduces cumulative risk for Bob, Connie and Vinh, but not for the employee carrying out the task each time)
- make another person available to help Bob, Connie and Vinh push the trolley (reduce)
- redesign the task so that the trolley does not have to be turned through 90 degrees at the start of the push (reduce)

#### **Change the objects used in the manual handling task:**

- install brakes on the trolley to reduce the force needed to stop it (reduce)
- reduce the weight of the trolley by halving the number of components placed on the trolley (reduce)
- increase the diameter of the wheels on the trolley to reduce the force needed to push it (reduce)

#### **Use mechanical aids:**

- install a conveyor between the assembly area and the packing area (eliminates pushing, as well as the need to lift components off the conveyor where the trolley is loaded and to unload the trolley at the packing area)
- use an electric tug, pedestrian forklift or other powered device to move the trolley from the assembly area to the packing area (reduce)

Then, risk controls were selected by applying the practicability test:

#### **Severity of the hazard or risk:**

Because the task involves the application of high force, any employee assigned to this task is very likely to develop an MSD. Bob has already been diagnosed with MSD, and Connie's report of ongoing pain indicates that she may also be suffering from MSD of the back.

**State of knowledge:**

The employer contacted a competitor and found that she had introduced a conveyor because employees performing a similar task were reporting similar symptoms. As a result of the use of trolleys, the company has had two expensive WorkCover claims. (On average, MSD of the back is more severe and costly than other types of MSD.)

**Availability and suitability of ways of eliminating or reducing the hazard or risk:**

Altering the workplace by installing a conveyor is the most effective way to control the risk. A conveyor has the added benefit of eliminating the need to load and unload the trolley – tasks that are also likely to involve MSD risks.

However, the employer had been told by other employers in the same industry that the plant had to be ordered from overseas and took 3 to 4 months to arrive. He spoke to the available suppliers, who confirmed that the conveyor would not be available immediately.

Changing the workplace layout, including smoothing the concrete floor, together with changing the systems of work would reduce the risk substantially but would not eliminate it. The employer found that both of these changes were available and were used in the industry, but each would take some time to set in place fully in this workplace.

In the meantime, the systems of work could be altered to reduce the force needed to turn, steer and brake the trolley. The position of the trolley at the assembly area could be changed, and the load reduced. Cracks in the floor surface could be filled to further reduce the force required to push the trolley. The task could also be shared by two employees pushing together, so that each has to exert less force. These intermediate solutions could be implemented quickly and easily.

**Cost of eliminating or reducing the hazard or risk:**

The costs of installing the conveyor are substantial, but the benefits would be high, as the task of pushing the trolley (and therefore the risks associated with it) would be eliminated. In addition, installing a conveyor would eliminate the risks involved in loading and unloading the trolley, and relieve congestion in the corridor. The floor would not have to be altered.

The costs of changing the workplace layout are also considerable, though less than installing a conveyor. The risk would not be reduced substantially – even though the trolley would not have to be pushed as far, high forces would still be needed to start and stop it. The trolley would still need to be loaded and unloaded, and these tasks are likely to pose a risk of MSD. Changes to the floor and staff rotation would still need to be made. So the cost would be reduced, but so would the benefits.

Changes to the systems of work, including changes to work practices, could also reduce the risk. Changing rotation rosters would reduce the overall risk for the three employees involved; however, other employees would also be at risk. Assistance with pushing would result in reduced force, but would interrupt other work. The direct cost is negligible and such changes could be implemented immediately until the structural changes are made.

**The risk controls chosen:**

The employer and the health and safety rep agreed that the best solution was to modify the conveyor and extend it to the packing line, since this will also control a number of other risks. Implementing this risk control will take 3 to 4 months.

Until the conveyor can be set in place, interim risk controls will be used. These can be introduced immediately, and include allocating another employee to assist Bob, Connie and Vinh, halving the loads and redesigning the job so that the trolley doesn't need to be turned when fully loaded.

## **PART 4 Duties of Employees**

As an employee, you have a responsibility to work safely. To ensure that you do, the Regulations require you to cooperate with your employer's actions to identify tasks involving hazardous manual handling and to assess and control the risk of MSD in your workplace.

You have a duty to:

- participate in hazard identification, risk assessment and risk control if your employer asks you to
- follow any information, training and instruction you have received
- use the risk controls that have been provided by your employer

You should also help make your workplace safe by participating in the consultation process between your health and safety representative and your employer.

If you have any concerns about your work, let your health and safety representative or your employer know.

## Appendix 1 What is a code of practice?

The *Occupational Health and Safety Act 1985* (the Act) empowers the Minister to approve codes of practice.

### What are they?

An approved code of practice gives practical guidance on how to comply with a general duty under the Act or a specific duty under the Regulations. Compliance with the provisions of an approved code of practice, where relevant, may constitute compliance with the provisions of the Act or Regulations on which the code is giving practical guidance.

Generally, an approved code of practice contains various courses of action which are designed to achieve health and safety standards required by the Act or Regulations. Codes usually contain a number of options for meeting standards.

### Who do they apply to?

Codes of practice may be written to provide practical guidance for any person placed under obligation by the Act or its Regulations, for example, employers, manufacturers and employees.

Each approved code of practice will state the persons for whom the guidance is intended.

### What is their legal status?

The provisions in a code are not mandatory. That is, a person may choose to comply with the relevant provision of the Act or Regulations in some other way, provided that the method used also fulfils the requirements of the Act or Regulations. A person or company cannot be prosecuted simply for failing to comply with an approved code of practice.

However, in legal proceedings, failure to observe a relevant approved code of practice can be used as evidence that a person or company has contravened or failed to comply with the provisions of the Act or Regulations. If a person has not adopted the method described in the code, it is up to that person to show that the legal requirement has been met by an alternative method. Therefore, an approved code of practice should be followed, unless there is an alternative course of action that would also fulfil the requirements of the Act or Regulations.

A WorkCover inspector may cite an approved code of practice as a means of remedying alleged non-compliance when issuing an improvement notice or a prohibition notice. Similarly, a health and safety representative may cite an approved code of practice in a provisional improvement notice when providing directions as to how to remedy an alleged non-compliance.

## Appendix 2 Information, instruction and training

### Why are information, instruction and training necessary?

Section 21(2)(e) of the *Occupational Health and Safety Act 1985* requires employers to provide sufficient information, instruction and training to their employees to enable them to work safely and without risking their health.

Information, instruction and training are necessary to ensure that employees know how to do their jobs safely and can follow health and safety procedures. It should help them to understand the nature of hazardous manual handling, the risks associated with tasks involving hazardous manual handling, and the reasons why risk controls have been set in place and how to use them.

### Who should receive information, instruction and training?

Employees who require information, instruction and training include those who:

- carry out manual handling tasks, as well as their health and safety representatives, managers and supervisors
- select and purchase tools and equipment to be used in manual handling tasks
- design manual handling tasks or systems of work, or the layout of a workplace where manual handling is carried out
- are involved in identifying hazardous manual handling, and the assessment and control of MSD risks

### What type of information, instruction and training needs to be provided?

The type of information, instruction and training required will depend on the manual handling tasks being considered, and the hazards and risks associated with those tasks. It will also depend on the way the work is done, the measures required to control the risk and how much employees already know about manual handling and MSD risks.

Training should help employees to understand:

- what sort of manual handling is hazardous
- how hazardous manual handling affects the body and what factors can increase the risk of MSD
- how MSD can be prevented
- the measures in place to control the risk of MSD
- how to select and use appropriate manual handling techniques
- how to use risk controls such as mechanical aids and safe systems of work

Those responsible for selecting and purchasing tools or equipment or for designing or organising manual handling tasks should be given additional information and training. This training should outline the design of safe tools and equipment and explain how to set up manual handling tasks in a way that controls the risk of MSD.

## Appendix 3 Further advice on risk assessment and risk control

In some situations, further advice and guidance on assessment of manual handling risks and risk control may be helpful.

These may be situations such as:

- there is disagreement about the results of a risk assessment
- significant costs may be involved in controlling risks
- more information is needed to prioritise risks
- more information is needed to choose between risk controls
- there is a need to assess the extent to which risks will be controlled by risk controls
- there is a need to assess the extent to which risks will be altered by workplace changes
- designing and setting up new jobs and tasks
- setting up new workstations and work areas

In these situations, advice and guidance may help resolve the situation.

In addition, other methods for assessing risks and helping to determine risk controls may be helpful. Some of these methods are described in the table on the next page.

When thinking about using any of these methods, it is important to note that:

- the assessment method described in section 12.2 should be done **before** using any of the methods described in this appendix
- each method is limited in the types of manual handling tasks and risks it can assess
- most methods require the involvement of an appropriately competent person in their use or in the interpretation of their results
- some methods require specialist equipment
- the method should be appropriate to the task and provide the information required
- any costs of using the method (such as time, equipment, consultants' fees, interruption to work processes) should be outweighed by the benefits of the information obtained
- as the state of knowledge about manual handling and MSD is continually developing, along with methods to identify hazards and assess risks, in the future the methods in the table may be altered or superseded by improved methods

### For further advice and guidance, contact:

- health and safety consultants – see under “Occupational Health and Safety” in the Yellow Pages or access the WorkCover External Consultants Directory by contacting your local WorkCover office or the WorkCover Advisory Service (numbers are listed at the back of this code)
- industry groups, employer associations or unions
- WorkCover field officers – contact your local WorkCover office
- your WorkCover agent
- email WorkCover on – [manual\\_handling@workcover.vic.gov.au](mailto:manual_handling@workcover.vic.gov.au)
- visit the WorkCover website at – [www.workcover.vic.gov.au](http://www.workcover.vic.gov.au)

## Further risk assessment methods

Method	Uses and applications	Limitations, equipment and skill requirements	More information
University of Michigan 3 Dimensional Static Strength Prediction Computer Software OR University of Michigan 2 Dimensional Static Strength Prediction Computer Software	Assessment of force: pushing, pulling, lifting, lowering, turning.  Design and modification of tasks, workstations and objects being handled.  Can be used to predict the effects of risk controls.	Requires: <ul style="list-style-type: none"> <li>photos or videos of work postures, measurement of forces and weights</li> <li>a computer with the capacity to run the software</li> <li>competency in occupational biomechanics</li> </ul>	The Regents of the University of Michigan, Ann Arbor, MI 48109 USA Tel: 1 734 764 1817 www.umich.edu
1991 NIOSH Lifting Equation (National Institute of Occupational Safety and Health – USA)	Assesses lifting and lowering tasks.  Predicts maximum acceptable weight for lifting and lowering tasks.  Predicts the effects of risk controls.	Requires: <ul style="list-style-type: none"> <li>basic task measurements and information such as weights, distances, frequency, duration</li> <li>no special equipment</li> <li>training in use and interpretation of results</li> </ul> Only applicable to specific lifting and lowering tasks.	<ul style="list-style-type: none"> <li>WorkCover Guidance Note – 1991 NIOSH Lifting Equation (GN3/98)</li> <li>USA National Institute of Occupational Safety and Health www.cdc.gov/niosh/homepage.html Lifting Equation: www.cdc.gov/niosh/94.110.html Tel: 1 513 533 8328 Tel: 1 513 533 8471</li> </ul>
Snook and Ciriello's Tables of Maximum Acceptable Weights and Forces	Similar to 1991 NIOSH Lifting Equation but also assesses pushing, pulling and carrying tasks.  Predicts the effects of risk controls.	Requires: <ul style="list-style-type: none"> <li>measurement of weights, distances, pushing and pulling forces, frequency and duration of task</li> <li>training in use and interpretation</li> </ul>	Snook and Ciriello, "The design of manual handling tasks: revised tables of maximum acceptable weights and forces", in <i>Ergonomics</i> , 1991, vol. 34, no. 9, pp. 1197–1213
OWAS (Ovako Working posture Analysing System)	Assesses postures, forces and task duration.  Applicable to a wide range of manual handling tasks involving the whole body.	Requires: <ul style="list-style-type: none"> <li>direct observation or video of task</li> <li>training in use and interpretation</li> </ul>	<ul style="list-style-type: none"> <li>Karhu et al., "Observing working postures in industry: examples of OWAS application", <i>Applied Ergonomics</i>, 1981, vol. 12, no. 1, pp. 13–17</li> <li>OWAS Assist, WorkSafe Australia GPO Box 58, Sydney</li> </ul>
RULA (Rapid Upper Limb Assessment)	Used to assess repetitive tasks mainly involving the upper body: neck, back, wrists, arms. Looks at postures, frequency, duration and forces.  Similar to OWAS.	Requires: <ul style="list-style-type: none"> <li>direct observation or video of task</li> <li>training in use and interpretation</li> </ul>	<ul style="list-style-type: none"> <li>McAtamney and Corlett, "RULA: a survey method for the investigation of work-related upper limb disorders", <i>Applied Ergonomics</i>, 1993, vol. 24 no. 2, pp. 91–99.</li> </ul>
FWAP (Fine-detailed Work Action and Posture)	Used to assess repetitive tasks involving the upper body.  Looks at postures, forces, actions, holding and control, frequency and duration.	Requires: <ul style="list-style-type: none"> <li>direct observation of task (plus video – optional)</li> <li>training in use and interpretation</li> </ul> Suited to operations engineers, occupational health professionals or those working with them.	<ul style="list-style-type: none"> <li>Farrell, "Selectively detailed analysis of work actions and posture", <i>Work</i>, 1992, vol. 2, no. 3, pp 50–63</li> <li>FWAP for Windows Pioneer Development and Research PO Box 1470, Box Hill, Victoria 3128 Ph/Fax 9803 7487</li> </ul>

## Appendix 4 Worked examples

The worked examples in this appendix show how hazard identification, risk assessment and risk control can be applied to manual handling tasks in a range of industries.

### Example 1 – Health industry

#### Handling of non-ambulatory residents in a nursing home for the elderly

##### Hazard identification

At a meeting of the nursing home's health and safety committee, a health and safety representative raises the issue of manual handling. The health and safety rep is particularly concerned about tasks that involve the handling of non-ambulatory residents.

The committee agrees that these tasks involve hazardous manual handling because they require:

- repetitive or sustained application of force
- repetitive or sustained awkward postures
- repetitive or sustained movements
- application of high force
- handling of live people

As no risk assessment of these handling tasks has been done before, the committee agrees to do a risk assessment of the tasks.

##### Risk assessment

A manual handling risk assessment team is formed, comprising an employer representative (a charge nurse) and two health and safety representatives (a nurse and a patient services assistant). The team gets together at various times over the next two weeks and observes a range of resident handling tasks, following the guidance in the risk assessment section of the code.

Although they don't examine every handling situation that can take place, they use their knowledge and experience to ensure they cover the full range of handling tasks that are done in the nursing home. The handling tasks they examine include:

- bathing and toileting
- turning residents in bed
- dressing and undressing
- assisting residents to sit up and lie down in bed
- transferring residents from the bed to a chair or wheelchair and back again

In order to have a record of their assessment, they complete the risk assessment worksheet for each handling task they examine.

Using the worksheet, the team finds a number of repetitive and sustained postures, movements and forces present in the tasks. How often these occur and how long they are sustained for varies considerably between different tasks and different employees.

They also determine that high force is common to most tasks.

This means that there are MSD risks involved in most tasks and risk control is required. For tasks involving high forces, the risk of a staff member incurring MSD will increase as the number of tasks they are required to do increases.

On each risk assessment worksheet, the team also comments on possible sources of risk. These include:

- the weight of the resident
- the resident's ability to cooperate with staff during a handling task
- the availability of mechanical aids (some areas don't have aids at all, some aids are not used because they don't work very well, and some aids are kept well away from where handling occurs and staff find it inefficient to get the aid and return it later because of time pressures)
- the layout and set-up of some of the rooms (some bathrooms and toilets are too small to use aids in, and some doorways into residents' rooms are too small for the aid to pass through)
- the fact that the nursing home employs a lot of casual agency staff (who may be unaware of existing resident handling procedures, may not know how to use lifting aids and may not be aware of some resident care plans and so don't know what level of cooperation they can expect from a resident during a handling task)

## Risk control

From their notes, the team identifies those features of the task that are the sources of risk:

- the inherent nature of the task
- the layout of the work area sometimes forces staff into awkward postures
- the different sizes, shapes, weights and conditions of the residents
- poor wheelchair design – the sides can't be removed or the resident needs to be lifted over the wheel
- the height of some beds can't be adjusted
- the different sizes and physical strengths of staff members
- the time taken to carry out the transfer can depend on the skills of staff members
- the different lifting techniques that are used
- time pressures on staff prevent proper set-up for the lift, such as adjusting the bed height or getting extra assistance
- poor work organisation and inadequate staffing levels increase the number of transfers each staff member has to do in a shift, and restrict the number of staff available to perform a transfer

Risk controls need to reduce or eliminate the risk factors identified in the risk assessment by modifying the sources of risk. Keeping this in mind, the team then develop the following risk control options:

### *Alter the workplace or environmental conditions*

- ensure clear access around the bed for staff members and wheelchairs

### *Alter the systems of work*

- ensure that enough staff are available for transfers
- change the transfer to a sliding transfer rather than a lift
- institute a "no lift" program
- use mobility charts to assess patients, and display the charts properly

### *Alter the objects used in the task*

- use wheelchairs with removable sides, and wheels and a back that do not obstruct the lift; make sure the wheelchair can be easily and securely braked during the transfer
- make sure the height of the beds is easily adjustable

### *Provide mechanical aids*

- make sure a hoist or other suitable aids are used for transfers

### *Provide information, training or instruction in manual handling techniques*

- provide additional training on appropriate handling techniques and the use of mobility charts

The team reports back to the health and safety committee, who then considers the practicability of the options, and decides what controls will be implemented and when. The committee works out a risk control plan using the risk control worksheet.

## Example 2 – Local government

### Using a jackhammer to break up pavement

#### Hazard identification

Joe uses a jackhammer to break up pavement, working for around 8 hours each day.

Using the hazard identification worksheet, the works supervisor and health and safety representative agree that the task involves hazardous manual handling because Joe:

- is exposed to sustained vibration
- repeatedly uses sustained force to operate the jackhammer
- applies high force to reposition the jackhammer when it becomes stuck, and to lift the jackhammer onto and off the truck
- handles an unbalanced load, because the weight of the jackhammer is unevenly distributed

#### Risk assessment

Joe's supervisor and health and safety rep have a closer look at the task, following the guidance in the risk assessment section of the code. They find the following risk factors and record them on the risk assessment worksheet:

#### *Repetitive or sustained postures, movements and forces*

- bending the back forwards more than 20 degrees
- bending the head forwards more than 20 degrees
- bending the wrist when operating the jackhammer
- supporting the tool while it is hammering
- exerting force while in an awkward posture

#### *Long duration*

- the task is done for up to 5 minutes at a time with short breaks for a minute or two – this work cycle can continue for 20 or 30 minutes at a time
- the total time Joe spends jackhammering is about two and a half hours a day

#### *High force*

- Lifting, lowering and carrying a heavy load (when lifting the jackhammer onto and off the truck, and when carrying it and repositioning it)
- applying uneven, fast or jerky forces during lifting, carrying, pushing or pulling

- applying unexpected forces when the jackhammer breaks through concrete
- supporting a heavy object
- exerting high force while in an awkward posture (the jackhammer is heavy, and needs to be lifted off the truck tray at arm's length)

Joe tells his supervisor that he experiences some pain when jackhammering, that he can only do the job for short periods at a time, and that he sometimes gets another employee to help him lift the jackhammer onto the truck.

The supervisor and health and safety rep agree that the task involves risks and that risk controls are needed.

#### *Environmental factors*

- Joe is subjected to prolonged hand-arm vibration
- because the task is done outdoors, Joe is sometimes exposed to hot, humid, wet or cold conditions
- Joe needs to wear heavy protective clothing while working in hot or cold conditions

The supervisor and health and safety rep agree that these factors increase the risk.

#### Risk control

Using the risk control section of the code and the risk control worksheet, the supervisor and health and safety rep decide what features of the task are the sources of risk:

- features of the tool (including vibration, and its heavy and unbalanced weight)
- the task is performed outdoors in all weather
- the truck is often parked a fair way from where the jackhammering is done, so Joe needs to carry the tool to the work area
- because of the way the work is organised, one employee does the job for prolonged periods
- the height of the jackhammer is determined by the length of the chisel attached, and this is not changed according to the user's height – this results in some users adopting awkward postures
- the jackhammer is not serviced regularly, nor is the chisel sharpened

Risk controls were selected by applying the practicability test:

### **Severity of the hazard**

Joe risks incurring an MSD, particularly in the back, hands, arms and shoulders. The severity and cost of these disorders can be significant.

There is also the risk of a vibration-induced MSD, which increases with the duration of the task and when working in cold, wet conditions.

### **State of knowledge**

The employer contacted several organisations that maintain roads for local councils. One reported that they had recently bought a new model of jackhammer, which was lighter and had improved damping mechanisms. This had reduced the risks of both lifting and using the tool.

They had also restricted the amount of time that individual employees spent doing the work on any given day, to further reduce the risk. In addition, they had trained their employees in team lifting the equipment onto and off the truck.

Another company had used backhoes with a pavement-breaker attachment wherever access allowed. They had also modified the backhoe with suitable vibration damping to minimise the operator's exposure to whole-body vibration.

### **Availability and suitability of ways to remove or reduce the hazard**

Service of the existing jackhammer can be arranged immediately. The supplier confirms that they could supply the new model and extra chisels within a few days.

The rotation of workers on the task can be arranged immediately. This will reduce Joe's exposure to vibration and unexpected forces. Team lifting will also reduce the handling risk.

Use of a backhoe with a pavement-breaker attachment should not create further risk by exposing the operator to vibration and other risk factors. This solution will not be useful where access is a problem.

A cradle for the jackhammer can be manufactured in the workshop and attached to the truck's tray in an easily accessible position. This will reduce the risk of lifting the heavy tool at arm's length off the truck.

### **Cost**

- the new jackhammer costs about \$2,000 and extra chisels cost \$50 each
- there is minimal cost involved in making the cradle, since it can be done in the council's workshop
- changes to work procedures will cost nothing, but training other workers in how to handle and use the jackhammer will take several hours
- servicing the existing and new jackhammer is a routine task that should take place anyway and will not involve any additional cost
- the use of the backhoe needs to be assessed to ensure that it does not introduce other risks, and this will require staff time; the pavement-breaker attachment will need to be leased as required and attached to the backhoe

The following risk controls were set in place:

- reduce the distance that the jackhammer needs to be carried by parking the truck as close as possible to the work area
- provide adequate job rotation to reduce each worker's exposure to the task
- order the new jackhammer and chisels; show workers how to select chisels that are suitable for their height and the job
- design, fabricate and mount a cradle on the truck for holding the jackhammer
- develop a maintenance schedule for the existing jackhammer and new jackhammer in line with the manufacturer's specifications
- provide gloves
- organise training on the risks associated with the task and appropriate handling techniques

## Example 3 – Retail

### Restocking shelves in a supermarket

A supermarket chain initiates a program to comply with the Regulations and the code. Each supermarket forms a two-person team (store manager and health and safety rep) to identify hazards and assess risks involved in manual handling tasks, and to develop and implement any necessary risk controls.

One of the tasks they look at is the restocking of shelves and cabinets. The shelves and cabinets are set up as follows:

- the shelving is about 2 metres high and contains 5 or more shelves, depending on the type and size of product
- freezer cabinets are similar, but do not have shelves close to the floor level
- dairy cabinets do not have the lowest shelves, but are deep, and employees must lean over the wide lower section to reach the back of the shelves
- boxes of stock are placed on the floor, or on another box, in front of the shelf that employees are stacking

Employees have complained, particularly about the heavier products such as large bottles of detergent, juice and soft drink and large cans of dog food, and about stacking high shelves. There is a high turnover of staff in the stacking team.

### Hazard identification

Because of the employees' concerns, the store manager and health and safety rep examine the task and decide it involves the following hazardous manual handling:

- repetitive application of force (to lift stock and place it onto the shelves)
- repetitive awkward posture (bending down sideways to pick up stock from the boxes, and lifting the arms and raising the shoulders to stack higher shelves)
- sustained awkward posture (bending the neck, head and back when stacking the lower shelves)
- application of high force (when handling heavy objects with one hand, including large cans and bottles)

### Risk assessment

The store manager and health and safety rep assessed the task using the code and found the following:

#### *Repetitive or sustained postures and movements*

- bending the back forwards or sideways more than 20 degrees
- twisting the back more than 20 degrees
- bending the head forwards or sideways and twisting the neck more than 20 degrees
- leaning backwards and reaching upwards when stocking the upper shelves
- reaching forwards more than 30 cm (when placing items on shelves, particularly the low and high shelves and the dairy cabinets)
- working with both hands above shoulder height when stacking higher shelves (about one-third of the time)
- squatting or kneeling to stack the lower shelves (about half the time)
- bending the wrist when taking items from boxes and when placing them on the high and low shelves
- grabbing actions with the fingers and hands
- working and gripping with the fingers wide apart for large items
- very fast movements at peak times such as night-fill

#### *Repetitive or sustained forces*

- lifting and lowering
- gripping objects with fingers held wide apart
- exerting force while in an awkward posture (lifting and placing stock when crouched down or when reaching upwards)

#### *Long duration*

Most restocking is done at night, but some restocking of the dairy cases and freezers occurs during the day. Employees stack shelves for more than 2 hours over the night shift, and for more than 30 minutes at a time during the day.

**High force**

- lifting and lowering heavy loads (when stacking heavy items such as bottles of drink and detergent, large packets of sugar and flour, large cans of fruit and dog food, and gardening products)
- exerting force at the limit of the grip span (using an open-handed grip to pick up large items with one hand)
- exerting force with the non-preferred hand
- throwing half-filled boxes up to employees standing on a ladder to store on top of the shelves

Employees have reported:

- pain and discomfort in wrists, arms, shoulders, back and knees during and after stacking
- that stacking of high shelves can only be done for short periods at a time

The team agrees that the task poses a risk because it involves:

- repetitive and sustained postures, movements and forces, and long duration
- high forces

**Environmental factors**

- restocking the dairy case and freezer involves standing in a cold or very cold environment
- restocking the freezer requires handling very cold objects

Because restocking the freezers and dairy cabinets is done in a cold environment, this increases the risk associated with these tasks.

**Risk control**

Using the risk control section of the code and the risk control worksheet, the store manager and health and safety rep decide what features of the task are the sources of risk:

- the work has to be done within a set time, leading to fast, repetitive actions, movements and forces
- rotating the stock on the shelves requires twisting and reaching
- because they don't have a stool to sit on, employees have to kneel or crouch to reach the lowest shelves
- there aren't enough sets of steps to go around, so some employees can't reach the high shelves comfortably
- all boxes are placed on the floor, and the few trolleys available are used for distributing boxes, not as platforms on which to place boxes to stack from
- due to the way the work is organised, employees who stack shelves do it for long periods, and don't do any other tasks during that time
- employees who restock the dairy cases and freezers don't wear any protective clothing to prevent the effects of working in a cold environment

The store manager and health and safety rep discussed various options for risk control, including:

- ensuring that enough employees are rostered on each shift to reduce the frequency of postures, movements and forces
- stacking shelves with items left in their cartons with the front removed – this would eliminate the need to stack items individually and reduce bending, gripping, reaching and twisting (as long as stacking these cartons would not require the application of high force)
- ensuring that boxes of stock for the higher shelves are placed on trolleys to minimise repetitive bending
- providing adjustable height trolleys or portable roller conveyors to lift the height of the boxes to the appropriate level
- providing steps to raise the employees closer to the high shelves
- providing low steps or stools for employees to sit on while stacking the lowest shelves
- rotating staff to other tasks such as clearing cardboard, and breaking down pallets onto trolleys, to reduce the length of time spent stacking shelves
- providing suitable warm clothing for freezer and dairy work

Longer term solutions discussed included:

- designing the dairy cabinets differently, so that employees wouldn't have to reach as far to the shelves (this is also better for customers)
- reducing the height of shelves where possible, particularly for popular or heavier items (this is also better for customers who find it difficult to reach the high shelves)

Risk controls were selected by applying the practicability test:

#### **Severity of the hazard**

- employees who stack shelves risk developing MSD, particularly in the back, hands, arms and shoulders
- the cost and severity of these disorders can be significant
- there are a number of employees in the store whose only work is stacking shelves
- employees have reported some symptoms and difficulties in carrying out the tasks, indicating that the risk is high

#### **State of knowledge**

Discussing the task with other store managers, the team found that most stores had MSD claims and reports of pain associated with shelf stacking. Some employees with back and shoulder problems took a long time to get back to their usual duties.

Throughout the industry, low, wide steps and higher mobile steps with standing platforms are used to access high shelves. The team found that a number of other stores had provided enough sets of steps to allow all employees to fill high shelves at a comfortable height. The employees sat on the steps to fill low shelves without having to kneel or crouch.

Some stores had also used flat, waist-high trolleys and shopping trolleys modified with a working shelf to place boxes within easy reach, to minimise bending.

Several stores introduced other tasks to break up the time spent stacking, including breaking up empty boxes and cleaning shelves and dairy cabinets. They also moved employees between aisles so that the time spent lifting large, heavy items was reduced or broken up with time lifting smaller, lighter items.

In addition, they found that training employees in manual handling techniques improved the employees' movements during stacking.

#### **Availability and suitability of ways to remove or reduce the hazard**

Most solutions would be readily available, suitable for the workplace and easy to put in place:

- changes to staffing numbers and the way the tasks are done could be made within a few days
- extra steps and stools could be easily obtained from the store's current suppliers
- gloves and other protective clothing for working in cold conditions are readily available from safety suppliers
- a local carpenter can manufacture wooden shelves to fit on trolleys within a few days
- training of employees in manual handling techniques could be arranged through a specialist training provider

#### **Cost**

Changes in the way the work is organised will cost little, apart from the time required to brief the team at the beginning of the shift.

Employing more staff will cost the usual rate, but the stacking shift may finish faster.

The low steps are plastic and cost about \$150 each. The mobile steps are made of steel, range in size and price from three-step (\$600) to four or more steps with a top platform (several thousand dollars).

There was also the cost of training employees in manual handling techniques.

The following risk controls were set in place:

- the workplace was altered by providing more sets of mobile steps and low steps
- shelves for shopping trolleys were made and provided for shelf stackers; employees distributing boxes were told to place all stock for shelves of waist height and above on these trolleys
- employees restocking the dairy cases and freezers were given padded jackets, overpants and gloves
- the store trialled an adjustable height trolley for the boxes, with a view to purchasing some in the future
- the store manager asked head office to review future dairy case and shelving design, as well as stock location, in light of the risk assessment

## Example 4 – Manufacturing

### Deburring metal components

In a manufacturing plant, metal components are finished by hand using a deburring tool and a finishing cloth. At a meeting of the workgroup, the supervisor raised concerns about the quality of the finished components and the high product reject rate.

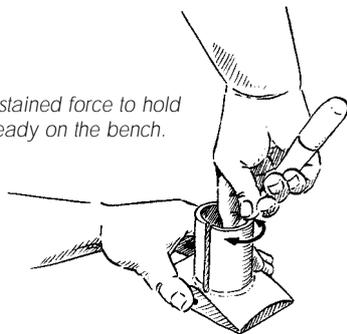
The workgroup's health and safety representative also commented that employees had reported pain and discomfort when deburring, and that most of the time one or two employees were on workers' compensation for work-related MSD. The plant's WorkCover premium was well above the industry rate.

#### Hazard identification

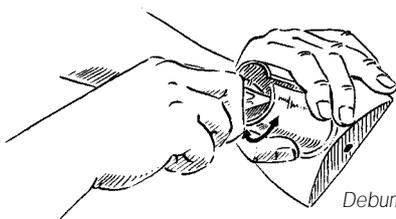
The supervisor and health and safety rep examined the deburring task and found that it involved the following hazardous manual handling:

- employees held the component on a bench, usually with the left hand – holding the part steady required the sustained application of force and sustained awkward postures of the hand, wrist and arm

*Employees use sustained force to hold the component steady on the bench.*



- the deburring performed with the right hand required the repetitive application of force and repetitive awkward postures and movements of the hand, wrist and arm



*Deburring requires repetitive fast movements and forces.*

- employees also had to apply high forces with the hands

The supervisor and health and safety rep agreed that because the task involved hazardous manual handling, it was necessary to do a risk assessment.

#### Risk assessment

Using the risk assessment section of the code as a guide, they completed the risk assessment worksheet:

##### *Repetitive or sustained postures and movements*

- excessive bending of the wrists
- twisting and turning actions with the fingers and hands
- working with the fingers close together
- very fast movements

##### *Repetitive or sustained forces*

- gripping with the fingers pinched together
- holding an object and a tool
- exerting force while in an awkward posture

##### *Long duration*

Employees usually did this task continually for at least half a shift, and sometimes up to a whole shift if a batch had been rejected by the customer and a new batch had to be prepared very quickly.

So the task is performed for more than 2 hours over a whole shift and continually for more than 30 minutes at a time.

##### *High force*

- exerting force at the limit of the grip span
- exerting force with the non-preferred hand

Employees have reported:

- pain in their wrists, forearms and shoulders during and after the task
- that the task can only be done for short periods without a break
- that the task is physically very strenuous or difficult to do

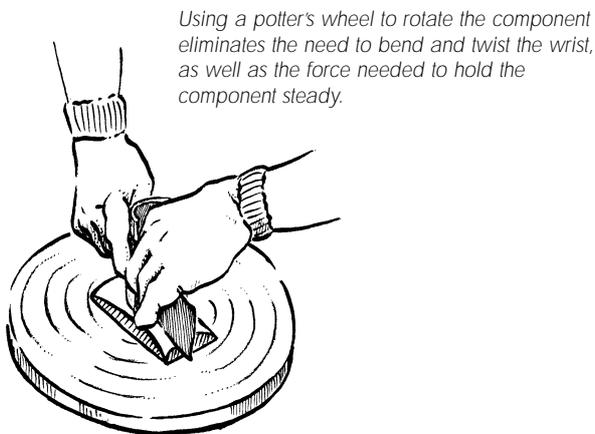
The supervisor and health and safety rep agreed that deburring was a risk because it involved:

- repetitive or sustained postures, movements and forces, and long duration
- high force

### Risk control

At the next workgroup meeting the group discussed the problem and brainstormed possible solutions.

One employee suggested using a potter's wheel to do the task – the component could be mounted on the wheel, eliminating the need to hold it with the left hand, and the turning of the wheel would rotate the component, eliminating the twisting and turning actions of the right hand.



The employee's suggestion was trialled in collaboration with other staff and plant engineers, and proved successful. The engineers then developed special deburring tools that were easier to use and more efficient, and suited to this way of doing the job.

The risk controls eliminated most of the risk factors and reduced the rest. The employees no longer suffered pain or discomfort, and there were no more reports of MSD.

The new method was easier, faster and more effective, resulting in better quality products. There were immediate benefits of higher productivity and increased quality and hence a reduced batch rejection rate. The payback period on the changes made was less than one month.

The employer chose not to increase the work output requirements, as this may have reduced some of the gains from the new method.

*This example was adapted from Maurice Oxenburgh (1991) Increasing Productivity and Profit Through Health and Safety, Sydney, CCH.*

## Appendix 5 Worksheets

On the following pages you will find sample worksheets that will assist you to:

- identify tasks involving hazardous manual handling
- assess the risk of MSD for a given manual handling task
- develop appropriate risk controls

### Hazard identification worksheet

Management rep: \_\_\_\_\_

Health and safety rep: \_\_\_\_\_

Date: \_\_\_\_\_

Does the task involve hazardous manual handling? (tick any of the following that apply to the task)

Task	Repetitive or sustained application of force	Repetitive or sustained awkward posture	Repetitive or sustained movement	Application of high force	Exposure to sustained vibration	Handling live people or animals	Handling loads that are unstable, unbalanced or difficult to move
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**If you ticked one or more boxes for a particular task, you must do a risk assessment of that task.**

Hazardous manual handling must be identified for all existing and proposed tasks in your workplace. You must also identify hazardous manual handling whenever changes occur in the workplace, or new information or reports of MSD are brought to your attention (see section 17).

### Risk assessment worksheet – long version

Task: \_\_\_\_\_ Date: \_\_\_\_\_

Management rep: \_\_\_\_\_ Health and safety rep: \_\_\_\_\_

#### Step 1a – Does the task involve repetitive or sustained postures, movements or forces?

Tick yes if the task requires any of the following actions to be done more than twice a minute or for more than 30 seconds at a time (see section 12)

	Yes	Comments
Bending the back forwards or sideways more than 20 degrees	<input type="checkbox"/>	_____
Twisting the back more than 20 degrees	<input type="checkbox"/>	_____
Backward bending of the back more than 5 degrees	<input type="checkbox"/>	_____
Bending the head forwards or sideways more than 20 degrees	<input type="checkbox"/>	_____
Twisting the neck more than 20 degrees	<input type="checkbox"/>	_____
Bending the head backwards more than 5 degrees	<input type="checkbox"/>	_____
Working with one or both hands above shoulder height	<input type="checkbox"/>	_____
Reaching forwards or sideways more than 30 cm from the body	<input type="checkbox"/>	_____
Reaching behind the body	<input type="checkbox"/>	_____
Squatting, kneeling, crawling, lying, semi-lying or jumping	<input type="checkbox"/>	_____
Standing with most of the body's weight on one leg	<input type="checkbox"/>	_____
Twisting, turning, grabbing, picking or wringing actions with the fingers, hands or arms	<input type="checkbox"/>	_____
Working with the fingers close together or wide apart	<input type="checkbox"/>	_____
Very fast movements	<input type="checkbox"/>	_____
Excessive bending of the wrist	<input type="checkbox"/>	_____
Lifting or lowering	<input type="checkbox"/>	_____
Carrying with one hand or one side of the body	<input type="checkbox"/>	_____
Exerting force with one hand or one side of the body	<input type="checkbox"/>	_____
Pushing, pulling or dragging	<input type="checkbox"/>	_____
Gripping with the fingers pinched together or held wide apart	<input type="checkbox"/>	_____
Exerting force while in an awkward posture	<input type="checkbox"/>	_____
Holding, supporting or restraining any object, person, animal or tool	<input type="checkbox"/>	_____

#### Step 1b – Does the task involve long duration?

Tick yes if the task is done for more than 2 hours over a whole shift or continually for more than 30 minutes at a time (see section 12)

Yes	Comments
<input type="checkbox"/>	_____
	_____
	_____

**Step 2 – Does the task involve high force?**

Tick yes if the task involves any of the following high force actions (see section 12)

	Yes	Comments
Lifting, lowering or carrying heavy loads	<input type="checkbox"/>	_____
Applying uneven, fast or jerky forces during lifting, carrying, pushing or pulling	<input type="checkbox"/>	_____
Applying sudden or unexpected forces (e.g. when handling a person or animal)	<input type="checkbox"/>	_____
Pushing or pulling objects that are hard to move or to stop (e.g. a trolley)	<input type="checkbox"/>	_____
Using a finger-grip, a pinch-grip or an open-handed grip to handle a heavy or large load	<input type="checkbox"/>	_____
Exerting force at the limit of the grip span	<input type="checkbox"/>	_____
Needing to use two hands to operate a tool designed for one hand	<input type="checkbox"/>	_____
Throwing or catching	<input type="checkbox"/>	_____
Hitting or kicking	<input type="checkbox"/>	_____
Holding, supporting or restraining a person, animal or heavy object	<input type="checkbox"/>	_____
Jumping while holding a load	<input type="checkbox"/>	_____
Exerting force with the non-preferred hand	<input type="checkbox"/>	_____
Two or more people need to be assigned to handle a heavy or bulky load	<input type="checkbox"/>	_____
Exerting high force while in an awkward posture	<input type="checkbox"/>	_____

Tick yes if your employees report any of the following about the task (see section 12)

	Yes	Comments
Pain or significant discomfort during or after the task	<input type="checkbox"/>	_____
The task can only be done for short periods	<input type="checkbox"/>	_____
Stronger employees are assigned to do the task	<input type="checkbox"/>	_____
Employees think the task should be done by more than one person, or seek help to do the task	<input type="checkbox"/>	_____
Employees say the task is physically very strenuous or difficult to do	<input type="checkbox"/>	_____

**Step 3 – Is there a risk?** *(see section 12)*

	Yes	Comments
Does the task involve repetitive or sustained postures, movements or forces, and long duration? (Did you tick yes in step 1a and step 1b?) <b>If yes, the task is a risk. Risk control is required.</b>	<input type="checkbox"/>	_____
Does the task involve high force? (Did you tick yes in step 2?) <b>If yes, the task is a risk. Risk control is required.</b>	<input type="checkbox"/>	_____
		_____

**Step 4 – Are environmental factors increasing the risk?**

Tick yes if any of the following environmental factors are present in the task *(see section 12)*

	Yes	Comments
Vibration (hand-arm or whole-body)	<input type="checkbox"/>	_____
High temperatures	<input type="checkbox"/>	_____
Radiant heat	<input type="checkbox"/>	_____
High humidity	<input type="checkbox"/>	_____
Low temperatures	<input type="checkbox"/>	_____
Wearing protective clothing while working in hot conditions	<input type="checkbox"/>	_____
Wearing thick clothing while working in cold conditions (e.g. gloves)	<input type="checkbox"/>	_____
Handling very cold or frozen objects	<input type="checkbox"/>	_____
Employees are working in hot conditions and are not used to it	<input type="checkbox"/>	_____

**Sketch the task or attach a photograph, if helpful**

*You must record your risk assessment if it shows a risk of MSD. This worksheet is one way of recording a risk assessment. You don't have to use this format – you can create your own worksheet to suit the jobs in your workplace. But you must make sure that whatever method you use fulfills the requirements of the Regulations.*

### Risk assessment worksheet – short version

Task: \_\_\_\_\_ Date: \_\_\_\_\_

Management rep: \_\_\_\_\_ Health and safety rep: \_\_\_\_\_

#### Step 1a – Does the task involve repetitive or sustained postures, movements or forces?

	Yes	Comments
for example, bending or twisting the body, neck, arms or wrists, reaching, lifting, pushing, pulling, carrying, very fast movements, or exerting force while in an awkward posture (see section 12)	<input type="checkbox"/>	_____
		_____
		_____
		_____

#### Step 1b – Does the task involve long duration?

	Yes	Comments
Is the task done for more than 2 hours over a whole shift or continually for more than 30 minutes at a time? (see section 12)	<input type="checkbox"/>	_____
		_____
		_____
		_____

#### Step 2 – Does the task involve high force?

	Yes	Comments
for example, lifting, lowering or carrying heavy loads, sudden or unexpected forces, pushing or pulling objects that are hard to move, exerting force at the limit of the grip span, or the task is difficult to do (see section 12)	<input type="checkbox"/>	_____
		_____
		_____
		_____

#### Step 3 – Is there a risk?

	Yes	Comments
Did you answer yes in step 1a and step 1b? (see section 12) <b>The task is a risk. Risk control is required.</b>	<input type="checkbox"/>	_____
Did you answer yes in step 2? (see section 12) <b>The task is a risk. Risk control is required.</b>	<input type="checkbox"/>	_____
		_____
		_____

**Step 4 – Are environmental factors increasing the risk?**

Yes

Comments

for example, vibration, heat, cold or humidity, or thick protective clothing  
(see section 12)

---

---

**Any other comments?**

---

---

---

---

---

---

---

---

---

---

**Sketch the task or attach a photograph, if helpful**

*You must record your risk assessment if it shows a risk of MSD. This worksheet is one way of recording a risk assessment. You don't have to use this format – you can create your own worksheet to suit the jobs in your workplace. But you must make sure that whatever method you use fulfills the requirements of the Regulations.*

### Risk control worksheet

Task: \_\_\_\_\_ Date: \_\_\_\_\_

Management rep: \_\_\_\_\_ Health and safety rep: \_\_\_\_\_

What are the sources of risk? (see section 13.3) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**How?**

**Can you eliminate the task?**  
(see section 13.4)

Yes → \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**How?**

**No**

**Is it practicable to eliminate or reduce the risk by:**

- *altering the workplace*
- *altering the environmental conditions*
- *altering the systems of work*
- *changing the objects used in the task, or*
- *using mechanical aids?*

(see section 13.5)

Yes → \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**No**

How can you reduce the risk with information, instruction and training? (see section 13.5) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**When will these controls be implemented?** (see section 13.6)

Short-term \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Medium-term \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Long-term \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Who is responsible for making sure that it happens?** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**How do you know the risk controls work?** (see section 13.7) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Notes

## More information

Victorian WorkCover Authority  
Level 24, 222 Exhibition Street  
Melbourne, Vic 3000

GPO Box 4306  
Melbourne, Vic 3001

Tel 9641 1555  
Fax 9641 1222  
Toll-free 1800 136 089

World Trade Centre  
Corner Flinders and Spencer Streets  
Melbourne, Vic 3005  
Tel 9628 8115

### Publications

Tel 9641 1333  
Fax 9641 1330

### Website

[www.workcover.vic.gov.au](http://www.workcover.vic.gov.au)

### Email

[info@workcover.vic.gov.au](mailto:info@workcover.vic.gov.au)

### Local WorkCover offices

Ballarat	5337 1400
Bendigo	5443 8866
Geelong	5223 2300
Melbourne	9628 8115
Mildura	5021 4001
Mulgrave	9565 9444
Preston	9485 4555
Shepparton	5831 8260
Traralgon	5174 8900
Wangaratta	5721 8588
Warrnambool	5562 5600

### WorkCover Advisory Service

Level 24, 222 Exhibition Street  
Melbourne, Vic 3000

Tel 9641 1444  
Fax 9641 1353  
Toll-free 1800 136 089

Acts, regulations and codes of practice are available from:

### Information Victoria

356 Collins Street,  
Melbourne, Vic 3000

Tel 1300 366 356