

Compliance code

Hazardous manual handling

Edition 2

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This compliance code (**Code**) provides practical guidance for those who have duties or obligations in relation to hazardous manual handling under the *Occupational Health and Safety Act 2004* (**OHS Act**) and Occupational Health and Safety Regulations 2017 (**OHS Regulations**).

The Code was developed by WorkSafe Victoria (**WorkSafe**). Representatives of employers and employees were consulted during its preparation. It was made under the OHS Act and approved by Robin Scott MP, Minister for Finance.

Duty holders under the OHS Act and OHS Regulations should use the Code together with this legislation. This Code replaces the Code of Practice (No. 25) – *Manual Handling* (2000), which is no longer in force and effect.

While the guidance provided in the Code is not mandatory, a duty holder who complies with the Code will – to the extent it deals with their duties or obligations under the OHS Act and OHS Regulations – be taken to have complied with those duties or obligations.

If conditions at the workplace or the way work is done raise different or additional risks not covered by the Code, compliance must be achieved by other means. WorkSafe publishes guidance to assist with this at [worksafe.vic.gov.au](https://www.worksafe.vic.gov.au).

Failure to observe the Code may be used as evidence in proceedings for an offence under the OHS Act or OHS Regulations. However, a duty holder will not fail to meet their legal duty simply because they have not followed the Code.

A WorkSafe inspector may cite the Code in a direction or condition in an improvement notice or prohibition notice as a means of achieving compliance.

A health and safety representative (**HSR**) may cite the Code in a provisional improvement notice when providing directions on how to remedy an alleged contravention of the OHS Act or OHS Regulations.

Approval for the Code may be varied or revoked by the Minister. To confirm the Code is current and in force, go to [worksafe.vic.gov.au](https://www.worksafe.vic.gov.au).

Part 1 – Introduction

Purpose

1. The purpose of this Code is to provide practical guidance to duty holders about how to comply with their duties under the OHS Act and Part 3.1 of the OHS Regulations in relation to managing health and safety risks associated with hazardous manual handling.

Scope

2. This Code provides information for duty holders about meeting their obligations under Part 3.1 of the OHS Regulations as well as providing information about how to identify hazards and control risks associated with hazardous manual handling. This Code also provides information for duty holders about compliance with the OHS Act, where relevant (for example, an employer's duty to consult with employees).
3. It is not possible for this Code to deal with every risk associated with hazardous manual handling a duty holder may encounter at their workplace. The guidance in the Code needs to be considered with regard to the particular characteristics and circumstances of the workplace.

Application

4. This Code applies to employers, employees, designers, manufacturers and suppliers. Additionally, it may be useful for HSRs.

Note: The word **must** indicates a legal requirement that has to be complied with. The words **need(s) to** are used to indicate a recommended course of action in accordance with duties and obligations under Victoria's health and safety legislation. The word **should** is used to indicate a recommended optional course of action.

What is hazardous manual handling?

5. Hazardous manual handling means work requiring the use of force exerted by a person to lift, lower, push, pull, carry or otherwise move, hold or restrain –
 - a thing if the work involves one or more of the following –
 - repetitive or sustained application of force
 - sustained awkward posture
 - repetitive movement
 - application of high force involving a single or repetitive use of force that it would be reasonable to expect that a person in the workforce may have difficulty undertaking
 - exposure to sustained vibration
 - live persons or animals
 - unstable or unbalanced loads or loads that are difficult to grasp or hold.
- OHS Regulations r5

What is a musculoskeletal disorder (MSD)?

6. An MSD is an 'injury, illness or disease that arises in whole or in part from hazardous manual handling, whether occurring suddenly or over a prolonged period'. Injuries can also occur due to a combination of both these mechanisms, for example body tissue that has been weakened by cumulative wear and tear may be vulnerable to sudden damage from a strenuous task. Musculoskeletal disorders (**MSDs**) do not include an injury caused by crushing, entrapment or any cut resulting primarily from the mechanical operation of plant. [OHS Regulations r5](#)

MSDs include:

- sprains and strains of muscles, ligaments and tendons
- back injuries, including damage to the muscles, tendons, ligaments, spinal discs, nerves, joints and bones
- joint and bone injuries, including injuries to the shoulder, elbow, wrist, hip, knee, ankle, hands and feet
- nerve injuries or compression (for example carpal tunnel syndrome)
- muscular and vascular disorders
- chronic musculoskeletal pain
- soft tissue hernias.

Who has duties?

7. **Employers** must provide and maintain, so far as is reasonably practicable, a working environment for their employees that is safe and without risks to health. [OHS Act s21](#) To ensure that employers provide a working environment that is safe and without risks to health, they must eliminate risks to health and safety so far as is reasonably practicable, and if it is not reasonably practicable to eliminate the risks to health and safety, reduce those risks so far as is reasonably practicable. [OHS Act s20](#)

For information about what reasonably practicable means when complying with Part 3 of the OHS Act or the OHS Regulations, see the WorkSafe Position *How WorkSafe applies the law in relation to reasonably practicable* at worksafe.vic.gov.au.

8. Employers must, so far as is reasonably practicable, monitor conditions at any workplace under the employer's management and control. [OHS Act s22\(1\)\(b\)](#)
9. Employers must also, so far as is reasonably practicable, ensure that persons other than employees are not exposed to risks to their health or safety arising from the business activities undertaken by the employer. [OHS Act s23](#)
10. An employer's duties under section 21 and section 35 of the OHS Act extend to independent contractors engaged by the employer and any employees of the independent contractor working at the workplace. However, these extended duties are limited to matters over which the employer has control or would have control if there was not an agreement in place purporting to limit or remove that control. [OHS Act s21\(3\)](#) and [s35\(2\)](#)

Part 1 – Introduction

11. Regulations that set out the way an employer complies with their duties to employees under section 21 and section 35 of the OHS Act also apply in respect to independent contractors engaged by the employer and any employees of the independent contractor in relation to matters over which the employer has control. [OHS Regulation 8\(1\)](#)
12. Employers have a number of specific duties under the OHS Regulations to manage risks associated with hazardous manual handling in the workplace, including the duty to identify hazardous manual handling, control any associated risk of MSD, and review, and if necessary revise, risk control measures.
13. If employers design or modify their workplace, including any tool, machinery or equipment used, they may also take on additional duties under the OHS Act. It is therefore recommended such employers read the part for designers, manufacturers and suppliers (see Part 6 of this Code). [OHS Act s27–30](#)
14. **Employees**, while at work, must take reasonable care for their own health and safety and that of others who may be affected by their acts or omissions in the workplace. Employees must also cooperate with their employer's actions to make the workplace safe (for example, by following any information, instruction or training provided). [OHS Act s25\(1\)](#)
15. **Designers, manufacturers and suppliers of plant to be used at a workplace** have a duty to ensure, so far as is reasonably practicable, that any plant they design, manufacture or supply is without risks to health and safety, including any risk of MSD, if used for a purpose for which it was designed, manufactured or supplied. [OHS Act s27, s29 and s30](#)

Note: The best time to control any risk of MSD is in the design and planning stage, when hazards and risks can be 'designed out' before they are introduced into a workplace.

Part 1 – Introduction

The risk management process

16. Employers must provide and maintain a working environment that is safe and without risks to health, which includes protecting employees and contractors from any risk of MSD associated with hazardous manual handling work. [OHS Regulations r27](#)
17. This Code outlines a **risk management process** (see diagram 1) to help employers comply with their duties under the OHS Act and OHS Regulations. It involves the following steps:
 - **Identifying** hazards associated with hazardous manual handling (see Part 2 of this Code)
 - **Assessing**, where necessary, any risk of MSD associated with hazardous manual handling (if unsure of appropriate risk controls) (see Part 3 of this Code)
 - **Controlling** the risk of MSD associated with hazardous manual handling (see Part 4 of this Code)
 - **Monitoring, reviewing**, and where necessary, **revising** risk controls (see Part 5 of this Code)

Diagram 1 – The risk management process



Note: There are certain circumstances where each step of the risk management process needs to occur. See Part 4 of this Code for further information.

18. Employers must also control any risks to health and safety associated with plant used in the workplace, so far as is reasonably practicable, in accordance with a hierarchy of control under the OHS regulations. [OHS Regulation r98](#) Controlling any risks to health and safety includes controlling risks of MSD associated with plant use.

Consultation

19. Employers must, so far as is reasonably practicable, consult with employees and HSRs, if any, on matters related to health or safety that directly affect, or are likely to directly affect them. This duty to consult also extends to independent contractors (including any employees of the independent contractor) engaged by the employer in relation to matters over which the employer has control. [OHS Act s35](#)

Note: The characteristics of the workplace will have an impact on the way consultation is undertaken. For example, consider:

- the size and structure of the business
- the nature of the work
- work arrangements (such as shift work)
- characteristics of employees (such as language or literacy).

See worksafe.vic.gov.au for more information on consultation.

Part 1 – Introduction

20. An employer has a duty to consult with employees (including HSRs) when identifying or assessing hazards or risks to health and safety at the workplace, making decisions about measures to control such risks and proposing changes that may affect the health or safety of employees at the workplace. [OHS Act s35](#)
21. It is important to consult with your employees as early as possible at each step of the risk management process, including when planning to:
 - introduce new work or change existing work
 - select new plant
 - refurbish, renovate or redesign existing workplaces
 - carry out work in new environments.
22. Employers who are required to consult on a matter must share information about the matter with employees, including relevant contractors and HSRs, give them a reasonable opportunity to express their views, and take those views into account before making a decision. If employees are represented by an HSR, the consultation must involve that HSR (with or without the involvement of the employees directly). If the employer and the employees have agreed to procedures for undertaking consultation, the consultation must be undertaken in accordance with those procedures. [OHS Act s35](#)
23. Employers also need to encourage employees and contractors to report any problems immediately so that risks can be managed before an injury occurs.
24. Employees and contractors may have practical suggestions or potential solutions that can be implemented.

Information, instruction, training and supervision

25. Employers must provide employees with any necessary information, instruction, training or supervision to enable them to perform their work in a way that is safe and without risks to health. This duty also extends to independent contractors (including any employees of the independent contractor) engaged by the employer in relation to matters over which the employer has control. [OHS Act s21\(2\)\(e\)](#)
26. The mix of information, instruction, training and supervision required will depend on the frequency and type of hazards in the workplace, and how much employees already know about the risks and necessary risk control measures.
27. Information, instruction and training needs to cover the nature of the hazardous manual handling, including the need for risk control measures and how to properly use them. For example, ensuring employees understand the hazards associated with hazardous manual handling, including how to follow safety procedures and use risk control measures implemented for their protection.
28. Employers must provide supervision where such supervision is necessary for safe work. [OHS Act s21\(2\)\(e\)](#) For example, employers need to provide supervision to employees when using new mechanical aids, tools or equipment designed to control risk of MSD. This is particularly important with employees who are more vulnerable in their work areas, such as new, inexperienced or young employees.
29. Where the employees undertaking the work are new or inexperienced, such as young workers, it is often necessary to provide additional supervision.

Part 1 – Introduction

30. When providing information, instruction and training to employees and independent contractors to ensure hazardous manual handling work is able to be performed in a manner that is safe and without risks to health, it is important to include information about:
 - the risk management process
 - specific MSD risks and the risk control measures in place to control them
 - how to perform work safely, including the use of mechanical aids, tools, plant or equipment and safe work procedures
 - how and to whom to report a problem or maintenance issue (for example reporting a defective mechanical aid).
31. Training should be provided to:
 - employees required to carry out, supervise or manage work
 - new employees as part of their induction
 - in-house designers, engineers and officers responsible for the selection and maintenance of plant or the design and organisation of the work
 - workplace health and safety committees and HSRs.
32. Training programs should be practical and 'hands on'. The structure, content and delivery of the training needs to take into account any special requirements of the employees and independent contractors being trained (eg specific skills or experience, disability, language, literacy and age).
33. Employers need to review their training program regularly and also when:
 - there is change to work processes, plant or equipment
 - there is an incident
 - new control measures are implemented
 - there is a request by an HSR
 - changes are made to relevant legislation, or
 - if any other issues impact on the way the work is performed.Employers should also keep records of induction and training given to employees.
34. Refresher training needs to be provided as appropriate for a particular workplace. The frequency of refresher training should be determined having regard to the frequency with which employees and independent contractors are required to carry out tasks associated with hazardous manual handling.

Part 2 – Hazard identification

35. Employers must identify, so far as reasonably practicable, any work (whether current or proposed), that involves hazardous manual handling. **OHS Regulations r26** Not all manual handling work is hazardous, hazard identification is a way of sorting through work to find out what gives rise to a risk of MSD. This is the first step in the risk management process.
36. Hazardous manual handling is work requiring the use of force exerted by a person to lift, lower, push, pull, carry or otherwise move, hold or restrain:
- a thing if the work involves one or more of the following:
 - repetitive or sustained application of force
 - sustained awkward posture
 - repetitive movement
 - application of high force involving a single or repetitive use of force that it would be reasonable to expect that a person in the workforce may have difficulty undertaking
 - exposure to sustained vibration
 - live persons or animals
 - unstable or unbalanced loads or loads that are difficult to grasp or hold. **OHS Regulations r5**
37. See **Appendix B** for a worksheet to assist with hazard identification.

How to identify hazardous manual handling

Consult your employees and HSRs

38. Employers have a duty to consult, so far as is reasonably practicable, with employees and HSRs, if any, when identifying hazardous manual handling or MSD risks in the workplace. **OHS Act s35** Employees and HSRs can provide information about work that is difficult, tiring, awkward, dangerous, or causes muscular pain or discomfort (the discomfort survey at **Appendix C** may assist).

Review available information

39. Reviewing information can also help identify hazardous manual handling. Employers should look at records of injuries, incidents, investigations, OHS or hazard inspection reports, compensation claims for MSDs, OHS committee meeting minutes, any discomfort surveys and absenteeism data.
40. Additional information about hazardous manual handling relevant to particular work and industries may be available from health and safety regulators, industry associations, unions, technical specialists and safety consultants.

Part 2 – Hazard identification

Look for trends

41. Employers should look for trends or common problems. The above information may indicate certain work is more hazardous. For example, employees in a particular location may report more workplace injuries than employees in other areas, which could indicate a problem with the design and layout of that work area or the way work is carried out there.

Observe work

42. Hazardous manual handling can also be identified by walking through the workplace and observing how employees work. Employers should focus on the postures adopted, movements undertaken and any forces employees are subjected to (Table 1 may assist).
43. Employers should also look for any work involving tools, machinery or equipment that do not operate properly or are difficult to use, and whether employees have improvised how work is carried out to avoid discomfort (for example using stacking mats or flattened cartons to stand on).
44. In some jobs it may be easy to identify hazardous manual handling as the same activities may be repeated all day, such as handling goods at supermarket checkouts. However, in other jobs it may be more difficult as work may be varied, for example, cleaning hotel rooms where an employee may clean the bathroom, vacuum, and make beds. In this instance, all of these activities make up the employee's work. Employers need to look at the activities together or cumulatively to identify any hazardous manual handling.
45. It may be helpful to look at work in stages. For example, putting stationery items away in a storage cabinet may involve:
 - collecting boxes of stationery supplies from the delivery dock may require application of force to carry boxes
 - transporting stationery supplies to the storage area may require application of force to push a trolley
 - unpacking boxes of stationery supplies may require repetitive movement when bending to reach items in boxes
 - placing supplies on storage shelves may require awkward postures or high force to reach high or low shelves.

Part 2 – Hazard identification

Table 1 – Examples of hazardous manual handling

| Work involving | Examples |
|---|---|
| Repetitive or sustained application of force | <p><u>Repetitive force:</u></p> <ul style="list-style-type: none"> ▪ lifting and stacking goods onto a pallet ▪ gripping and handling bricks and a trowel when bricklaying (see Figure 1) ▪ using a nail gun to fix palings to a fence ▪ pressing a pedal or button to operate a power press. <p><u>Sustained force:</u></p> <ul style="list-style-type: none"> ▪ pushing or pulling a trolley around hospital wards (see Figure 2) ▪ holding down a trigger to operate a power tool ▪ supporting a plaster sheet while fixing it to a ceiling ▪ continuing to hold a tool when not using it. |
| Sustained awkward posture | <ul style="list-style-type: none"> ▪ reaching sideways to place goods into a stillage ▪ crouching to service plant or a vehicle ▪ lying underneath a vehicle and reaching upwards to service it ▪ kneeling while trowelling concrete or laying carpet ▪ bending to prune pot plants (see Figure 3) ▪ standing and holding a stop/slow bat during traffic control ▪ bending over to bathe a patient. |



Figure 1 – Bricklaying



Figure 2 – Pushing a trolley



Figure 3 – Pruning

Part 2 – Hazard identification

Work involving Examples

Repetitive movement

- painting
- lifting goods from a conveyor belt and packing them into a carton
- typing and other keyboard tasks (see Figure 4)
- picking orders in warehousing
- assembly work in manufacturing
- boning meat or processing fish
- using a socket and ratchet or spanner to unscrew long bolts.



Figure 4 – Typing

Application of high force

- lifting or carrying a heavy object
- pushing or pulling an object that is hard to move
- operating tools (for example tin snips) with squeeze grips that are too far apart
- throwing or catching objects
- lifting a heavy item from a high shelf
- steadying a patient who has become unsteady walking
- continually picking up heavy boxes (see Figure 5).



Figure 5 – Lifting heavy boxes

Exposure to sustained vibration

Whole-body vibration:

- operating earth moving plant
- driving a tractor, crane or forklift (see Figure 6)
- using ride-on mowers and skid-steer loaders.

Hand-arm vibration:

- using chainsaws and other mechanised saws
- using impact tools, including jackhammers, vibrating plates, chippers and pavement breakers
- using mechanical digging tools, including spade and ditch diggers and small augers
- using powered hand tools, including drills (see Figure 7), pneumatic nut runners, impact wrenches and grinders, lawnmowers and brush cutters.



Figure 6 – Driving a forklift



Figure 7 – Using a powered hand tool

Part 2 – Hazard identification

| Work involving | Examples | |
|--|---|---|
| Live persons or animals | <ul style="list-style-type: none">▪ assisting a mobility-impaired patient▪ treating a panic-stricken animal in a veterinary clinic▪ handling a horse▪ lifting children in and out of cots (see Figure 8)▪ transferring a hospital patient from a bed to a chair. |  A black and white line drawing showing a person in a dark uniform leaning over a metal cot. The person is reaching down to lift a small child who is sitting on the cot. The cot has a mattress and a metal frame with vertical bars. |
| Unstable or unbalanced loads or loads that are difficult to grasp or hold | <ul style="list-style-type: none">▪ lifting a sack of flour▪ carrying an open cooking pot full of soup▪ carrying a large sheet of plasterboard▪ carrying a ladder (see Figure 9), especially if it tilts▪ carrying a laundry bag full of linen▪ carrying products in containers with no handles. |  A black and white line drawing of a person in a dark uniform carrying a long ladder. The person is walking and holding the ladder vertically against their back. The ladder is tilted slightly away from the person's back. |

Figure 8 – Lifting a child out of a cot

Figure 9 – Carrying a ladder

Part 3 – Assessing the risks

46. A risk assessment involves examining work that has been identified as involving hazardous manual handling in more detail to assess whether it is arranged in a way that gives rise to a risk of MSD.
47. An employer must, so far as is reasonably practicable, control risks of MSD associated with hazardous manual handling. **OHS Regulations r27** In order to do this an employer needs to first determine whether particular hazardous manual handling work creates a risk of MSD. This can be done by carrying out an assessment of the work.
48. A formal risk assessment is unnecessary if knowledge and understanding about the risk, and how to control it already exist. For example, an employer who knows there is a risk of MSD associated with carrying an item over a long distance and knows that the risk can be eliminated through use of a height-adjustable four-wheeled trolley, can put the control in place immediately. However, if employers are unsure how to control risk of MSD, a risk assessment can help.

How to determine a risk of MSD

49. Employers must, so far as is reasonably practicable, consult with employees (including any HSRs and independent contractors) when conducting a risk assessment. **OHS Act s35**
50. When examining work, employers should consider:
 - postures, movements and forces
 - duration and frequency
 - environmental conditions (including heat, cold and vibration).
51. Working through the following questions may help employers assess if there is a risk of MSD (the risk assessment and control worksheet at **Appendix D** may be used to record the findings).

Questions to help assess MSD risk

Question one – Does the work involve any repetitive or sustained forces, sustained awkward postures or repetitive movements?

As a general guide, **repetitive** means performed more than twice a minute, and **sustained** means held for more than 30 seconds at a time.

Part 3 – Assessing the risks

Table 2 – Examples of postures, movements and forces that pose a risk if they are repetitive or sustained

Bending or twisting the back forwards or sideways (more than 20°).

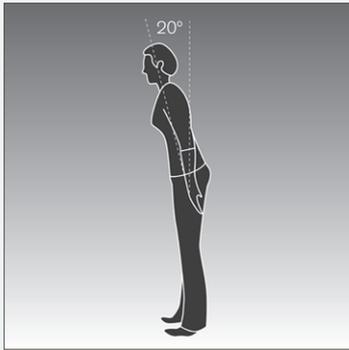


Figure 10

Visibly bending the back backwards (more than 5°).

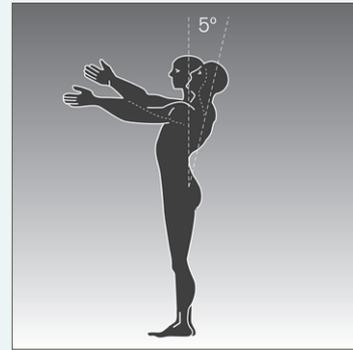


Figure 11

Bending the head forwards or sideways (more than 20°) or twisting the neck (more than 20°).

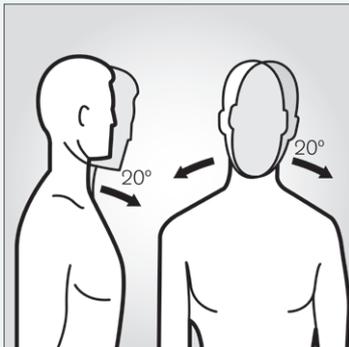


Figure 12

Visibly bending the head backwards (more than 5°).

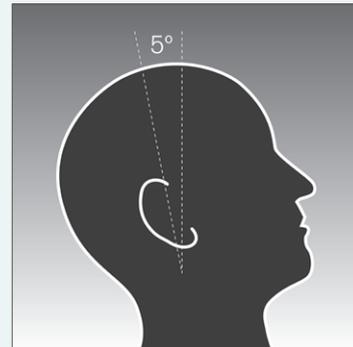


Figure 14

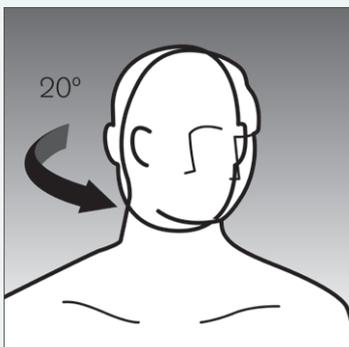


Figure 13

Part 3 – Assessing the risks

Working with one or both hands above shoulder height.



Figure 15

Reaching forward or sideways more than 30cm from the body.



Figure 16

Reaching behind the body.



Figure 17

Excessive bending of the wrist.



Figure 18

Twisting, turning, grabbing, picking or wringing actions of the fingers, hands or arms.



Figure 19

Squatting, kneeling, crawling, lying, semi-lying or jumping.



Figure 20

Part 3 – Assessing the risks

Standing with most of the body's weight on one leg.

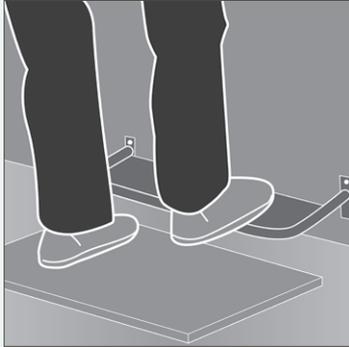


Figure 21

Lifting or lowering.



Figure 22

Carrying with one hand or one side of the body or exerting force with one hand or side of the body.



Figure 23

Pushing, pulling or dragging.



Figure 24

Very fast movement.



Figure 25

Exerting force while in an awkward posture.



Figure 26

Part 3 – Assessing the risks

Gripping with the fingers pinched together or held wide apart.

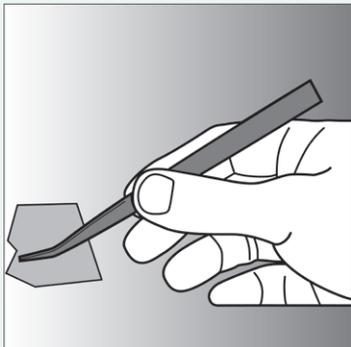


Figure 27

Applying uneven, fast or jerky forces.



Figure 28

Holding, supporting, or restraining a live animal or person.



Figure 29



Figure 30

The risk is greatest when the postures and movements are towards the end of the movement range, particularly when they feel uncomfortable for the employee.

Part 3 – Assessing the risks

Question two – Is the work undertaken for a long duration?

If you have assessed the work as involving postures, movement or forces that are repetitive or sustained, you should also look at the duration of the work.

Consider how long the work is performed over the course of a whole shift or continually at any time during a shift. Work that continues over a long period or is repeated during the work day increases the risk of MSD.

As a general guide, work is undertaken for a **long duration** if it is performed for more than two hours over a whole shift or continually for more than 30 minutes at a time.

If you answered yes to questions one and two, the work involves a risk of MSD and must be controlled.

Question three – Does the work involve high force?

High force means an activity involving a single or repetitive use of force that it would be reasonable to expect that a person in the workforce may have difficulty undertaking. Work involving high force can cause MSD even if it is not repetitive or sustained. This means that any work involving high force may pose a risk, even if only done occasionally or for short periods. The longer and more often force is applied and the higher the force, the greater the risk of MSD.

Some work that requires force involves the whole body (eg lifting, lowering and carrying heavy weights, or pushing a heavy load), while other work involves some parts of the body only, such as the hands and arms (for example operating hand tools with tight squeeze grips). During the application of high force, the body is often in a bent, twisted or otherwise awkward posture.

A small amount of force could be considered high force if the small muscles of the hands are used to perform the work.

The risk in work involving high force is affected by:

- the intensity of the force needed – forceful muscular exertions place high stress on the muscles, tendons, joints, ligaments and vertebral discs
- the speed involved – fast movements (particularly if repeated) can injure muscles, tendons and ligaments
- whether the force is jerky or sudden – forces suddenly applied or stopped can overload the muscles, tendons, joints, ligaments and vertebral discs. This can occur when throwing or catching things, when something moves unexpectedly (for example when pulling up a fence post that suddenly comes free) or when assisting people (for example when assisting and catching a patient who suddenly falls).

High forces are commonly associated with the handling of live persons or animals and loads that are unstable, unbalanced or difficult to hold.

Note: For some complex situations, expert or specialist advice may be useful when determining the risk of MSD.

Part 3 – Assessing the risks

Table 3 – Examples of high force

- lifting, lowering or carrying heavy loads (see Figure 31)
- applying uneven, fast or jerky force
- applying a sudden or unexpected force
- pushing or pulling objects that are hard to move or stop
- 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 (see Figure 32)
- needing to use two hands to operate a tool designed for one hand
- high impact throwing, catching, hitting or kicking (see Figure 33)
- exerting force with the non-preferred hand
- exerting a high force while in a bent, twisted or otherwise awkward posture
- a heavy or bulky load that needs two or more people to lift.



Figure 31 – Lifting a heavy bag of wheat

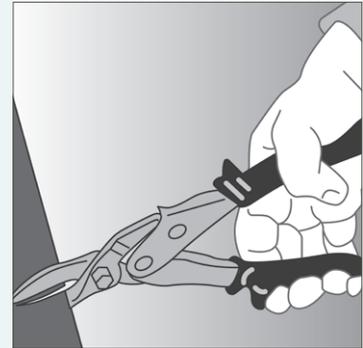


Figure 32 – Using tin snips on sheet metal



Figure 33 – Hitting a hub cap

If you answered yes to question three, the work involves a risk of MSD and must be controlled.

Are environmental conditions increasing the risk?

52. Once it is determined there is a risk of MSD, employers must consider whether environmental conditions (including vibration, heat, humidity, cold and wind, slippery and uneven floor surfaces, obstructions, poor lighting) are increasing the risk of MSD to employees (eg by affecting the functions of muscles, nerves and blood vessels and increasing fatigue). [OHS Regulations r27\(5\)](#)

Vibration – the two most hazardous types of vibration are sustained (for more than 30 seconds) hand-arm vibration and sustained whole-body vibration. The longer an employee is exposed to vibration, the greater the risk of MSD. Whole-body vibration is when vibration is transmitted through the whole body while operating equipment or plant such as a forklift or tractor or driving vehicles over rough and uneven surfaces. Hand-arm vibration is when vibration is transferred through to the hand or arm, usually from a vibrating tool or piece of equipment.

Cold – such as in cool rooms, freezers, cold stores or working outside in cold or wet weather can lower body and hand temperature and make handling and gripping objects more difficult. Increased grip force can also result from reduced sensitivity in cold hands from wearing gloves. Cold can also significantly increase the risk of injury from hand-arm vibration. Working in a cold environment may require thick or heavy protective clothing that restricts movement and can increase the risk of MSD. It can also cause overheating of the body if the clothing does not allow heat or sweat to dissipate and may decrease the blood flow to muscles, increasing fatigue.

Heat – such as in foundries, laundries, bakeries, kitchens, or working in hot weather can make handling and gripping things more difficult. Employees may have trouble grasping things due to perspiration on the hands or there may be sudden or unexpected forces due to loads slipping.

Humidity – caused by processes such as steam cleaning, cooking or the weather can also increase the risk of developing MSD. Handling wet or damp things may require increased force. Humidity may also increase discomfort and fatigue.

Wind – may increase the force required to handle things and reduce control while handling large loads, especially those that are flexible and have a large surface area. Working in low temperatures when it is also windy may lower the body temperature further, due to wind chill.

Slippery and uneven floor surfaces or gradient – may increase the exertion required due to difficulty maintaining stability. Unsuitable floor coverings (for example, carpet) may increase friction when moving objects such as trolleys.

Obstructions – caused by poor housekeeping and cleaning can lead to awkward postures such as reaching or bending over obstacles. Trying to avoid rubble on sites or stepping over deviations in the ground may also lead to MSD injuries.

Lighting – low or high levels of lighting, as well as glare and reflection, may lead to awkward or sustained postures in an attempt to either improve vision or avoid glare.

Part 3 – Assessing the risks

What are the sources of risk?

53. When conducting an MSD risk assessment, think about the sources of any risks that are present in relation to the work undertaken. These are things that you may be able to change to control the risk of MSD. For example, poor postures and movements may be due to the layout of the workplace, high forces may be due to the loads being handled, and the frequency and duration of the work may be due to limited staff numbers or increased work pace to meet tight deadlines.
54. The main sources of risk are:
 - workplace layout (eg workstation design, work space)
 - workplace environment (eg heat, humidity, cold, wind)
 - systems of work (eg workload, pace of work)
 - things used in the hazardous manual handling (eg tools and equipment).
55. Determining the sources of risk, particularly by asking employees questions to help identify what they are, may provide a more complete understanding of how the risk arises and may assist when selecting effective risk control measures (see page 25).

Research shows that organisational (psychosocial) factors can also contribute to the risk of MSD.

Factors may include (but are not limited to):

- work demands including workload and the pace of the work
- low levels of control over work
- poor levels of resourcing and poor levels of support by management, supervisors and colleagues.

Refer to Items 13–16 of **Appendix F** for useful resources for controlling risks associated with organisational factors.

Also see **worksafe.vic.gov.au** for more information on other organisational factors and how to control risks associated with them.

Risk assessments for groups of employees

56. When assessing risk, employers can look at work individually or, where appropriate, for a group of employees. Employers may carry out a group assessment if all work is sufficiently similar and this does not result in any employee being subject to a greater, additional or different risk than if the assessment was carried out separately for each individual. Consider the physical attributes of group members when carrying out group assessments.
57. Examples of work that may be suitable for a group assessment include:
 - packing lines where similar products are packed at the same rate and employees adopt similar postures and movements and exert similar forces
 - point-of-sale work in supermarkets where the checkout stations are of a similar design and work rates are similar
 - one or more building sites where the same type of powered tool is used, and
 - a contract cleaning company that uses the same type of vacuum cleaner or floor polisher in similar work areas such as offices or hospitals.

Part 4 – Risk control measures

58. Employers must, so far as is reasonably practicable, control any risk of MSD associated with hazardous manual handling. **OHS Regulations r27** The ways of controlling risk are ranked from the highest level of protection to the lowest, as shown in Table 4. This ranking is known as the hierarchy of control. Under the hierarchy of control, employers must consider and apply the highest level of control, so far as is reasonably practicable, before considering the level below it. Employers must work their way down the hierarchy of control until the risk of MSD is eliminated or reduced so far as reasonably practicable. Often it will be necessary to use a combination of risk control measures to effectively control the risk of MSD.

Note: When selecting risk control measures, employers should work with the different people in their supply chain (eg designers, manufacturers, suppliers). For example by organising the most suitable ordering size and method of delivery. The employer may also be a designer, manufacturer or supplier of products, in which cases they must ensure their processes and procedures do not introduce hazardous manual handling downstream in the supply chain.

Part 4 – Risk control measures

Table 4 – The hierarchy of control for controlling the risk of MSD associated with hazardous manual handling

| Level | Action | |
|---|--|--|
| <p>1. Eliminate the risk of MSD</p> | <ul style="list-style-type: none"> Remove the action that gives rise to the risk of MSD. For example, use bulk bags or containers of stock that are handled with a mechanical aid to eliminate the requirement to carry them (see Figure 34). |  <p><i>Figure 34 – Forklift moving one tonne bulk bag</i></p> |
| <p>2. Reduce the risk of MSD by making changes to the workplace or work</p> | <ul style="list-style-type: none"> Alter the workplace layout (eg change the height and placement of machinery, equipment and furniture used in the work); position frequently used controls in front of employees to reduce twisting movements and awkward postures. Alter the workplace environment where the work involving hazardous manual handling is undertaken (eg limit exposure to environmental factors such as heat, cold and vibration); provide additional lighting for the work; widen doorways; fix floor surfaces. Alter the systems of work used that involves hazardous manual handling (for example provide buffers to allow materials to be taken off-line); allow employees to control the pace for critical or physically demanding tasks; reorganise pace and flow of work, change shift length. Change the things used in the hazardous manual handling (eg modify the shape or weight of the load being handled, or the tools and equipment used); provide handles or holding points on an object to make it easier to grip. Use mechanical aids (eg use an order picking forklift with a furniture cage when moving furniture to racking); use a vacuum operated lifting device to load products onto pallets; use overhead hoists to transfer patients. | |
| <p>3. Reduce the risk of MSD by providing information, instruction or training</p> | <ul style="list-style-type: none"> Provide employees with information, instruction or training on how to reduce the risk of MSD (eg provide training on effective job rotation or more effective team handling). | |

Part 4 – Risk control measures

Determining risk control measures

59. When deciding on the best way to control the risk of MSD, employers must have regard to:
- postures, movements and forces
 - duration and frequency of the hazardous manual handling
 - environmental conditions (including heat, cold and vibration) that directly affect a person undertaking hazardous manual handling. [OHS Regulations r27\(5\)](#)
60. Employers must, so far as is reasonably practicable, consult with their employees (including any HSRs and independent contractors) when making decisions about how to control risks. [OHS Act s35](#) Consulting with employees is likely to result in better risk control measures because it gives them the opportunity to contribute ideas, participate in trials and mock-ups for new risk control measures, and is likely to improve the uptake of risk control measures when they are implemented. In some instances, discussions with different people in the supply chain (for example suppliers, customers, industry bodies and associations) may also assist.
61. When investigating risk control measure options, employers also need to consider whether a risk control measure will introduce additional risks. For example the introduction of a forklift to move heavy stock may introduce a risk to pedestrians who could be struck by the moving forklift.

Eliminating the risk

62. The primary duty is to eliminate the risk of MSD completely. For example, if a risk of MSD arises predominantly from repeated back bending risk, eliminate the back bending by using a height adjustable trolley

or table (see Figure 35). Employers must consider whether it is reasonably practicable to do the work in another way that does not involve hazardous manual handling. [OHS Regulations r27\(1\)](#)



Figure 35 – Scissor pallet jack open pallet

Reducing the risk by making changes to the workplace or work

63. Sometimes it is not reasonably practicable to eliminate the risk of MSD associated with hazardous manual handling. For example, if the risk of MSD arises from repeated back bending due to the need to bend down to lift items from a pallet, it may be possible to use a pallet lifter to remove some of the back bending. However, some back bending may remain due to the need to bend down and reach items in the middle of the pallet. If it is not reasonably practicable to eliminate the risk of MSD, employers must reduce the risk of MSD, so far as is reasonably practicable, by making changes to the workplace or work, as set out in paragraphs 64–107. [OHS Regulations r27\(2\)](#)

Part 4 – Risk control measures

Altering the workplace layout

64. The physical features of the workplace can affect the way employees work and can increase the risk of MSD. A well-designed work area will assist an employer to eliminate or reduce the degree of reaching, twisting or bending.

Workstation or work area design

65. Workstations and work areas should be designed to allow employees to work in an upright position with their shoulders in a natural position (not raised). Their upper arms should be close to the body most of the time and large reaches should not be required to perform the work. Work surfaces should be easily adjustable to suit a range of employees and the work they perform. The working height and objects used in the work should be roughly level with the employee's elbows, whether the work is done sitting or standing.

See worksafe.vic.gov.au for more information on health and safety in the office.

66. Where it is not possible to provide adjustable workstations or work areas, consider altering the design so that:
 - the workstation or work area height suits the widest range of physical characteristics of employees
 - reaching distances suit different employees
 - knee and leg clearances suit employees of different sizes.

Note: In some workplaces a 'workstation' or 'work area' may not be a standard office or production line set-up, for example it could be a bed or car.

Working heights

67. Work with high visual demands should be performed above elbow height and work surfaces may need to be tilted. For example work involving delicate or precise manipulation.
68. Work involving a narrow range of hand movements where hands can rest on the work surface should be performed at, or just above, elbow height. A sloping surface may reduce requirement to bend the neck forward to perform desk-based work, such as drafting (see Figure 36).



Figure 36 – Sloping drafting desk

69. Light manipulative work or work involving the use of a keyboard should be performed at just below elbow height.
70. Work incorporating a range of arm movements using the shoulder should be performed between hip and shoulder height. For example, taking items from a stack and placing them on a conveyor.
71. Work requiring considerable muscular effort or use of the body for leverage should be performed at hip height. For example, drilling at a workbench.

Part 4 – Risk control measures

72. Where possible, place work items so they are:
- in front of the employee
 - between waist and shoulder height
 - towards the middle of the body and facing the employee
 - on the employee's preferred side
 - positioned within comfortable reaching distance
 - positioned to avoid double handling and to avoid moving loads over long distances.
73. Displays and operator controls should be positioned to encourage comfortable head and neck postures, comfortable hand and arm reach and efficient use. Employers should:
- place frequently used displays and operator controls, including keyboards and other input devices, directly in front of the employee
 - position operator controls at comfortable elbow height
 - select electronic or foot controls rather than hand controls if high force is required
 - place pedals so that employees can operate them from a comfortable seated position.

Working position

74. Employees should not remain in a seated, standing or otherwise static posture for prolonged periods. Design the workplace to provide opportunities for employees performing seated or standing work to vary their postures and movements (see Figure 37).



Figure 37 – Sit to stand desks

75. For seated tasks, seating should have the following features:
- adjustable seat height and angle (see Figure 38)
 - a contoured backrest with a lumbar curve, except where the backrest would interfere with the actions to be performed
 - a swivel action to prevent the employee from twisting to reach workstation components
 - rounded seat edges
 - a five-point base with castors to allow movement on carpet and gliders fitted to the base for low-resistance flooring (where access to work items located beyond the normal reach is required)
 - a footrest or foot ring fitted on drafting or higher chairs to support the feet.

Part 4 – Risk control measures



Figure 38 – Fully adjustable office chair

76. A seated work position is best for:
- work that requires fine manipulation, accurate control or placement of small objects
 - close visual work that requires prolonged attention
 - work that involves operating a foot pedal.
77. Employees carrying out work that requires standing should be provided with:
- a chair, stool or support so that the employee can alternate between sitting and standing
 - a footrest (large enough for the whole foot) to allow the employee to stand with either foot raised
 - suitable floor covering to cushion concrete and other hard floors
 - suitable footwear with appropriate cushioning.
78. A standing work position is best when:
- large, heavy or bulky loads are handled
 - forceful movements are required
 - reaching is required
 - movements away from the working position are frequent
 - there is no knee room
 - there is limited space.
- ### Work space
79. Work areas need to have enough space to accommodate the number of employees and other people involved in the work, any equipment that might be required and space to operate the equipment safely.
80. There should be enough space or clearance to:
- walk around loads, items stored in the workplace, or other employees
 - access or store equipment or materials
 - use equipment or materials needed to do the work
 - move and turn, particularly when handling loads
 - sit or stand close to the work surface with clear space under the work surface for the feet or legs.
- For example, when employees of an aged care facility are required to assist an infirm person to bathe, the bathroom may need to accommodate two employees, the client and a mobile hoist with space to manoeuvre a person in the hoist over the toilet and bath or into a shower area.
81. See **worksafe.vic.gov.au** for more information on designing workplaces for the safer handling of people.

Part 4 – Risk control measures

Altering the workplace environment

82. Environmental conditions include vibration, heat or cold, humidity, wind, flooring, surfaces and lighting. Altering these conditions can help control MSD risks.

Vibration

83. *Whole-body vibration* – the design of vibration damped equipment and engine mountings are the most effective methods of controlling vibration exposure. Other strategies to reduce exposure include:
- improving vehicle suspension and installation of operator seats mounted on suspension systems which incorporate spring and damper elements
 - ensuring that equipment implemented to reduce vibration is well maintained
 - ensuring employees adjust their seats appropriately and equipment is operated within the speed suggested by the manufacturer or to a speed that reduces vibration levels
 - training employees about the risk control measures that have been implemented and how they should be used.
84. *Hand-arm vibration* – change manufacturing and construction methods or processes to eliminate the need for vibrating equipment. Where this is not reasonably practicable, the best strategy is to purchase tools and equipment that produce less vibration.

Cold conditions

85. To control exposure to cold conditions (eg cool rooms, freezers, working outside in cold or wet weather):
- consider whether work can be done in an alternative environment
 - ensure employees take regular rest breaks in a warm place

- ensure employees wear non-slip footwear and clothing that is fitted and not too bulky or restrictive
- provide personal protective equipment suitable for the work (for example gloves to provide protection from the cold and also allow a good grip of the objects being handled).

Heat and humidity

86. For employees working in hot and humid conditions (eg laundries, foundries, kitchens), or working outside in hot weather consider:
- whether work can be relocated away from sources of heat
 - providing fans or air conditioning
 - using screens, awnings and clothing to shield employees from radiant heat sources such as ovens, furnaces and the sun
 - enclosing hot processes and increasing ventilation
 - altering work schedules so that work is done at cooler times or when the product is cooled
 - providing a cool, well ventilated area where employees can take regular rest breaks
 - ensuring employees work at a sensible pace
 - providing a supply of cool drinking water.

Windy conditions

87. Consider reducing the risk of exposure to windy conditions by:
- planning the route of work through protected pathways
 - using vehicles to transport items
 - co-ordinating work during low wind conditions.

Part 4 – Risk control measures

Floors and surfaces

88. Keeping work areas and sites clean, tidy and free of clutter, rubble or obstacles prevents employees from adopting awkward postures and reduces the level of exertion that may be required to reach over or around obstacles. Clean, smooth and flat surfaces can also reduce forces required to push and pull objects and prevent slips, trips and falls.

Lighting

89. Select lighting to suit the work performed. To prevent awkward or sustained postures that may arise from low or excessive levels of lighting, glare or reflection:
- provide additional lighting, such as a lamp on a movable arm, where required
 - 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 the orientation or position of the item 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
 - control natural light sources (particularly bright sunlight) on work pieces, screens and work surfaces by orientation and placement at 90 degrees to the source or by providing screening and louvres.

Altering the systems of work

Workload and pace of work

90. The workload and pace should accommodate the demands of the work. Where reasonably practicable, work should be organised to improve the flow of work by:
- having raw materials delivered, located or transferred mechanically to the location or work area where they will be used (for example building supplies can be delivered by truck or crane to the on-site location where they will be used or to the external lift, rather than being delivered to the front gate)
 - delivering materials, tools and items on mobile systems (for example, on wheeled cages)
 - processing and packaging items in the same location or on the same workbench
 - locating storage areas close to distribution areas
 - changing the distribution of work across the work day or week to avoid high peak workloads
 - where the distribution of work is unable to be changed, ensuring that there are adequate staff to accommodate the peak workloads
 - using systems that minimise the need for storage and multiple handling
 - asking suppliers to deliver products, items or tools in a way that allows them to be used without the need for additional handling (for example flat packs delivered on a vertical frame or table tops facing the right way up for use).

Part 4 – Risk control measures

91. Employees should not have to work at a rate that is at the limit of their ability. Before establishing a work rate, consult with the employees affected and their HSRs. Set realistic work rates by:
- allowing employees to control the pace for critical or physically demanding work
 - providing adjustability in the line speed (for example reduce the speed when conditions are altered, such as when new products are introduced or poor quality materials are used)
 - providing buffers to allow material to be taken off-line, for example, 'holding' bins or benches off the main processing conveyor (see Figure 39).



Figure 39 – Turntable for buffering products

92. Provide transition arrangements for employees undertaking unaccustomed work by:
- reducing the pace of work or workloads
 - providing more frequent breaks
 - job rotation.

Resources and support

93. When introducing risk control measures that involve plant, tools or equipment, consider whether:
- it is the right equipment for the work
 - there is sufficient equipment available
 - plant, tools and equipment are checked and maintained on a regular basis
 - time is allowed for operation and use
 - they do not introduce other hazards.
94. To allow for adequate recovery time and to reduce exposure to risks of MSD, arrange to have the right staffing levels, skill mix and shift arrangements. Consider:
- shift lengths
 - the levels of overtime
 - placement of rostered days off
 - the numbers of employees during peak periods.
95. Communicate and consult with employees about the way work is organised and allow employees to seek assistance from another person when necessary.

Altering the things used in the hazardous manual handling

96. When controlling MSD risk, employers need to think about the nature, shape, size, weight and number of the things used in the work. This may include the characteristics of the loads handled, tools and equipment used and the condition of the tools and equipment.

Part 4 – Risk control measures

Tools and equipment

97. Hand tools should be designed and selected to:
- be held in a neutral wrist or handshake position (see Figure 40)
 - allow the hand to retain a comfortable grip span
 - be light and well-balanced (the heaviest part of the tool needs to be behind the wrist)
 - be suitable for use by either hand
 - provide a good grip surface
 - prevent an employee from adopting a pinch grip with high force or for prolonged periods.

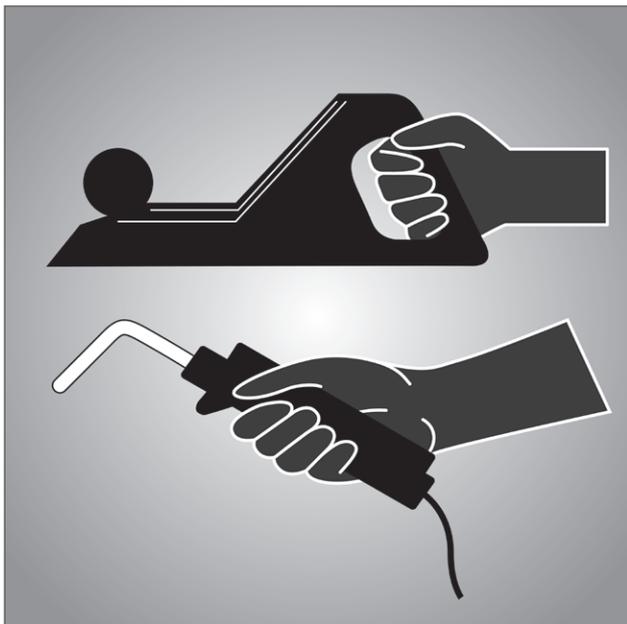


Figure 40 – Using tools with neutral wrist postures

98. Employers should minimise the level of muscular effort, particularly of the shoulder and wrist, needed to use hand tools by:
- using power tools where possible
 - suspending or supporting heavy tools where they are used repetitively and in the same place (see Figure 41)
 - counterbalancing heavy tools that are used repetitively and need to be kept away from the body
 - using trigger locks where the grip has to be sustained for more than 30 seconds
 - holding the work piece in place with either jigs or fixtures
 - selecting tools that produce the least amount of vibration
 - reducing impact shocks
 - limiting torque or 'kick back' reactions
 - providing adequate recovery times following prolonged use.

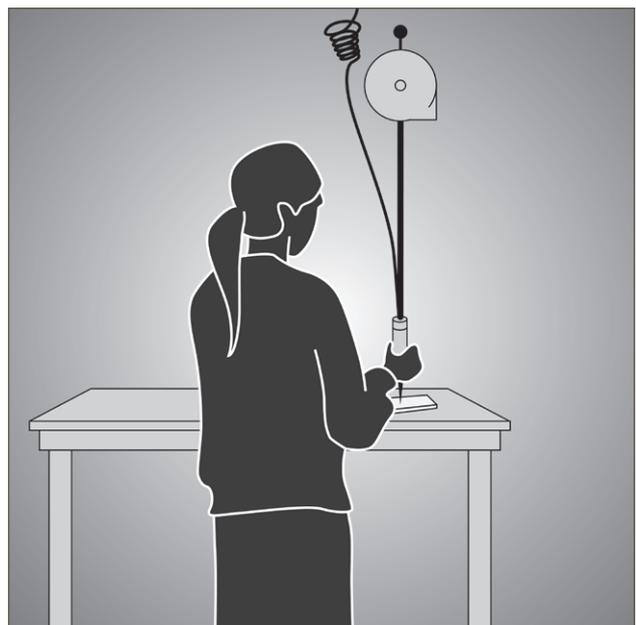


Figure 41 – Tool balancer supporting hand tool

Part 4 – Risk control measures

Maintenance

99. Tools and equipment need to be well maintained by carrying out regular inspections and servicing in accordance with the manufacturer's specifications. Poorly maintained or irregularly serviced tools and equipment may increase the effort needed to use them. For example, an unsharpened knife will increase the force required to bone and slice meat.

Handling loads

100. Examples of risk control measures that should be considered when handling loads include:

- purchasing products in smaller loads for manual handling or shifting larger loads mechanically
- reducing the size or capacity of containers
- using handles or suction pads to move loads such as sheet materials
- using grip devices adapted to the particular object to be carried.

Pushing and pulling loads

101. Pushing loads is preferable to pulling because it involves less work by the muscles of the lower back and allows maximum use of body weight. It also requires a less awkward posture and allows employees to adopt a forward-facing posture, which provides better vision in the direction of travel.

102. Employers should reduce the effort required to start the load in motion by:

- using motorised push/pull equipment such as tugs, bed movers or electric pallet jacks
- using a hovermatt or slide sheets to reduce friction when moving patients
- positioning trolleys with wheels in the direction of travel

- encouraging employees to use leg muscles and whole body momentum to initiate the push or pull of a load.

103. Employers should reduce the effort to keep the load moving by:

- using motorised hand trucks and trolleys that are as lightly constructed as possible and have large wheels or castors that are sized correctly and roll freely
- using hand trucks or trolleys that have vertical handles, or handles at a height of approximately one metre
- ensuring that hand trucks and trolleys are well maintained
- treating surfaces to reduce resistance when sliding loads
- for pushing, ensuring handles allow the hands to be positioned just above waist height and with elbows bent close to the body
- for pulling, ensuring handles allow the hands to be positioned just below waist height allowing employees to adopt a standing position rather than being seated so the whole body can be used.

104. Employers should reduce the effort needed to stop a load by:

- indicating the place where loads are delivered
- planning the flow of work
- encouraging employees to slow the load down gradually
- fitting brakes and speed limiters so speed can be controlled, particularly if it is necessary to stop quickly to avoid other traffic.

Part 4 – Risk control measures

Weight Limits

This Code does not prescribe weight limits because whether work involves hazardous manual handling does not depend solely on the weight of the load. It also depends on the postures, movements and forces involved in the work (which may be affected by the weight of the load) and the frequency and duration of the work. For more information to assist in assessing posture, movements and forces associated with manual handling work, see **Appendix F**.

While lifting a heavy object is generally more likely to require high force, even a relatively small weight may be difficult to lift and require the application of high force depending on the circumstance. This is illustrated by the examples below.

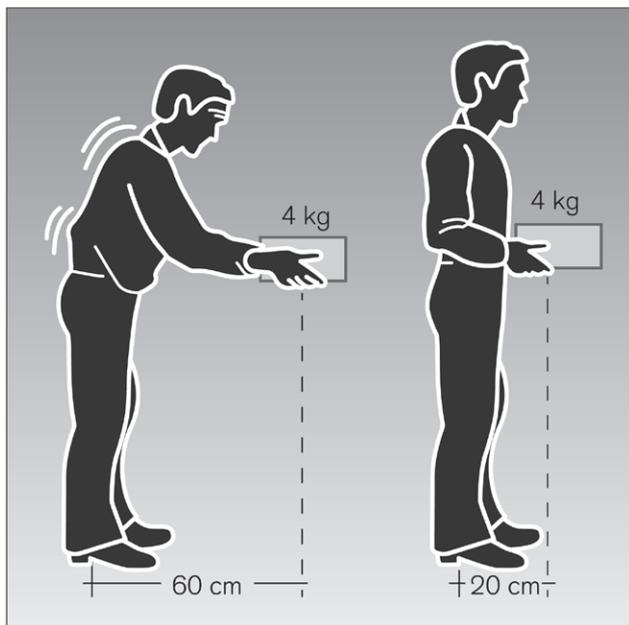


Figure 42 – Handling a load away from the body requires more effort

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

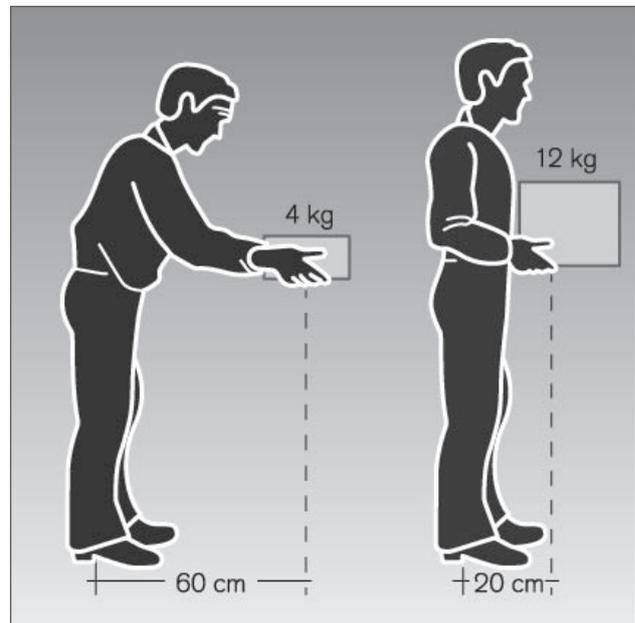


Figure 43 – Handling these loads of different weights requires similar effort

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

Note: When identifying work that involves lifting, lowering or carrying heavy loads, as a general rule the bigger, heavier and bulkier the load, the greater the effort required to handle it and the greater the risk. In addition, risk is increased by the distance the load is held away from the body, the distance the load is lifted or lowered and the frequency and duration of these activities. Lifting or carrying a load with one hand or to one side also puts more stress on the body than handling the load with both hands.

Part 4 – Risk control measures

Using mechanical aids

105. Mechanical equipment can help control the risk of MSDs in relation to, for example, lifting carrying or supporting items, animals or people. A wide range of mechanical aids are available for various industries, including:

- conveyors such as roller conveyors, elevating conveyors, belt conveyors, screw conveyors, chutes, monorails or trolley conveyors
- cranes such as overhead travelling cranes, gantry cranes or jib cranes, stacker cranes, industrial manipulators and articulating arms
- overhead tracking/ceiling hoists
- lifting hoists (see Figure 44)
- loading dock levellers
- turntables
- springs or gas struts, mechanical devices such as hand winches, hydraulic pumps, and battery powered motors
- forklifts, platform trucks, tractor-trailer trains, tugs and pallet trucks
- lift tables, mechanical and hand stackers, lift trolleys, two-wheel elevating hand trucks, and vacuum or magnet assisted lifters (see Figure 45)
- glass panel, duct and plaster lifters.



Figure 44 – A mobile hoist reduces the forces required to transfer a patient



Figure 45 – A vacuum lifter reduces the need to bend and lift when palletising

Part 4 – Risk control measures



Figure 46 – A self-adjusting base in the laundry tub reduces the need for bending and twisting during unloading

106. Mechanical aids should be:

- designed to suit the load and the work being done
- as light as their function will allow
- adjustable to accommodate the work being done (see Figure 46)
- easy to use
- suited to the environment in which the work is performed
- located close to the work area so they are readily available but do not cause an obstruction
- supported by a maintenance program to ensure they are safe and that the required effort to use them is kept at the lowest possible level
- introduced with suitable instruction and training in their use.

107. When a mechanical aid is introduced into the workplace, employers must provide employees with any necessary information, instruction, training and supervision to enable them to perform their work in a way that is safe and without risks to health. For example, employers must control any risks to health and safety introduced by a mechanical aid, such as a forklift operated in the same workspace used by other employees. OHS Act s21

Using information, instruction or training

108. If it is not reasonably practicable to eliminate or reduce the risk of MSD by making changes to the workplace or work, or a risk still remains after implementing control measures so far as is reasonably practicable, employers must reduce the risk by providing employees with information, instruction or training. OHS Regulations r27(3) For example, an employer may reduce the risk by training employees on how to carry out team handling safely or by providing employees with information on job rotation.

Note: This section relates to information, instruction and training required by the OHS Regulations. It is provided in addition to the information in Part 1 (see page 7) on information, instruction, training and supervision required by the OHS Act.

109. Often information, instruction and training is used by employers to supplement higher level risk control measures. However, an employer can only rely solely on providing information, instruction or training to control a risk of MSD associated with hazardous manual handling if higher level risk control measures are not reasonably practicable (see Table 4 on page 24). OHS Regulations r27(4)

Part 4 – Risk control measures

Team handling

110. Team handling is manual handling of a load by two or more employees. Team handling brings its own risks and requires coordination. It may be used as a risk control measure to support higher order risk control measures or as an interim risk control. It should not be used as the sole or primary means to control the risk of MSD where higher level controls are reasonably practicable.
111. Whenever team handling is used, it is essential to match employees, taking into consideration height and physical strength, and coordinate and carefully plan the lift. Employers need to ensure that:
- the number of employees in the team is in proportion to the weight of the load and the difficulty of the lift
 - one person is appointed to plan and take charge of the operation
 - enough space is available for the handlers to manoeuvre as a group
 - team members are of similar height and capability, where possible
 - team members know their responsibilities during the lift
 - training in team lifting has been provided and the lift rehearsed
 - aids to assist with handling (eg stretcher, slings, straps, lifting bars, lifting tongs, trolleys, hoists) are used where possible and training is provided in their use.

Job rotation

112. Job rotation involves moving employees for set periods of time through a variety of work that requires different postures, movements and forces. Job rotation requires the work to be sufficiently different to ensure that different muscle groups are used in different ways so that they have a chance to recover.

While it can reduce exposure time, it does not address the source of the risk.

113. Job rotation should only be used as an interim measure while implementing other risk control measures, or when trialling other control measures. See worksafe.vic.gov.au for more information about job rotation and its limitations.

Applying the hierarchy of control

114. As outlined in paragraph 58, employers must work their way down the hierarchy of control until the risk of MSD is eliminated or reduced, so far as is reasonably practicable. The examples provided in paragraphs 118 and 119 list risk control measures, from the highest to lowest level of controls, that employers may use to control the risk of MSD associated with handling people or live animals.

Handling people

115. Employers need to ensure employees do not fully lift a person (other than a small infant) unaided (eg without assistance from mechanical aids, assistive devices or another employee). All people handling activities are a potential source of injury and the risks associated with this hazardous manual handling must be eliminated or reduced so far as is reasonably practicable. [OHS Regulations r27](#)
116. With people handling, the person being handled also needs to be considered. Employers must ensure the person is not exposed to any risk to their health and safety because of the way the lifting activity is undertaken. [OHS Act s23](#) The physical condition of the person being handled as well as their non-physical characteristics (eg their ability to understand and communicate, and their behaviour) may affect how the people handling activity is undertaken and the risks involved.

Part 4 – Risk control measures

117. Where people handling is required, the requirements of the work need to be assessed as well as the patient's ability to assist (for example, mobility risk assessment) and planned in a way that reduces the risk associated with hazardous manual handling (eg personnel needed).

118. When people are being handled, the controls selected should take into account all of the sources of risk. Controls may include the following:

- using mechanical aids (for example, overhead tracking hoists) and assistive devices (for example, air assisted slide sheets).

See [worksafe.vic.gov.au](https://www.worksafe.vic.gov.au) for more information on the safe handling of people

- moving the person to a place that does not constrain the movement of the employee performing the work (for example, using a shower trolley to bathe a patient)
- ensuring the location and storage of mechanical aids and assistive devices allows easy access
- ensuring the floor surface is flat and the work space is free from clutter
- providing adequate staffing and resources when using a hoist (minimum two people) to eliminate the risk of employees being under time pressure and attempting the work on their own
- planning how to handle a person attached to medical or other equipment
- providing training for the safe use of mechanical aids and assistive devices.

Handling live animals

119. Supporting or restraining animals should only be carried out by employees with the necessary skills and experience. Controls may include the following:

- using mechanical devices or other restraining aids for lifting, transporting or restraining animals
- moving the animal to a place that constrains or minimises the movement of the animal before commencing the work
- where handling is required, assessing the needs of the work including the specific type of mechanical aids and personnel, and planning it in a manner that avoids double-handling
- where the use of a mechanical aid or assistive device requires two or more people, providing adequate resources so that an employee under time pressure does not try to complete the work on their own.

Part 4 – Risk control measures

Implementing risk control measures

120. To implement the most effective risk control measures, employers should:
- allow employees to trial solutions before the solutions become permanent and set clear timeframes for implementation
 - review risk control measures after the trial period, to determine whether modifications are required
 - develop work procedures to ensure that controls are understood and responsibilities are clear
 - communicate the reasons for the change to employees
 - provide training to ensure employees can competently implement the risk control measures
 - ensure that any equipment used is properly maintained.
121. Risk control may initially involve using short term, interim measures while a long term solution is developed (eg temporarily raise the bench until it can be replaced or altered permanently, or rotate employees through a production line to reduce the time spent working at a low bench until it can be changed).

Maintaining risk control measures

122. Employers must provide and maintain safe systems of work, so far as is reasonably practicable. **OHS Act s21(2)(a)** This includes ensuring that risk control measures are properly installed (if applicable), used and maintained. **OHS Regulations r18** The purpose of maintaining control measures is to ensure that they perform as originally intended and continue to prevent or adequately control the risk of MSDs. Maintenance of risk control measures should include:
- frequent inspections
 - visual checks to ensure that they are being properly applied by employees (including contractors)
 - testing of equipment
 - preventative maintenance of engineering controls
 - any necessary remedial work to ensure physical controls continue to work effectively.
123. Sometimes it may be necessary to improve, extend or replace existing risk control measures to ensure they continue to adequately control risks.
124. Employers should have a maintenance procedure in place to ensure that any defects in risk control measures are detected as early as possible.

❖ Part 5 – Review and revision of risk control measures

125. It is important to monitor risk control measures to ensure they remain effective. Employers must review the measures, and revise them if necessary, in the following circumstances:

- **before any alteration** is made to any thing used in a workplace or system of work involving hazardous manual handling, including a change in the place where the hazardous manual handling is undertaken (eg reducing the size of bags of flour from 25kg bags to 12.5kg bags, which will double the frequency of handling)
- **if new or additional information about hazardous manual handling becomes available** to the employer, such as new guidance material or industry standards, or an improvement notice issued to a person at another location of the employer results in the implementation of more effective and reasonably practicable risk control measures
- **if an occurrence of an MSD at a workplace is reported** by or on behalf of an employee
- **after a notifiable incident** that involves hazardous manual handling (eg a spinal injury or injury requiring immediate inpatient treatment)
- if, for any other reason, **the risk control measures do not adequately control the risks** (for example, job rotation)
- **after receiving a request for review from an HSR**. An HSR may make a request if they believe, on reasonable grounds, that:
 - any of the circumstances listed above exist
 - the employer has failed to properly review the risk control measures, or
 - in conducting a review of, or revising, the risk control measures, the employer has failed to take into account any of the circumstances listed above, for example the HSR believes the employer failed to consider a recent injury associated with a hazardous manual handling task during the employer's review of risk control measures. [OHS Regulations r28](#)

See [worksafe.vic.gov.au](https://www.worksafe.vic.gov.au) for more information about incident notification and the duty to report notifiable incidents.

How to review risk control measures

Employers must, so far as is reasonably practicable, consult with employees and HSRs, if any, on matters related to health or safety that directly affect, or are likely to directly affect them. The duty to consult applies, for example, when making decisions about risk control measures and proposing changes that may affect the health or safety of employees at the workplace. [OHS Act s35](#)
See pages 6–7.

a) List risk control measures in place

126. Employers should list the risk control measures in place and consider all of the elements of the control (eg type of equipment used, plus access to and availability of that equipment). HSRs, if any, and employees who do the work should be involved in listing control measures in place.

Part 5 – Review and revision of risk control measures

127. Employers should consider and consult with employees and HSRs on the following:
- Can someone still get injured? Does any risk remain?
 - If MSDs have been reported, what did not work or go to plan? Why? When? How? Under what circumstances?
 - What systems are in place to ensure the risk control measures work and are reliable – how are these working? Are there any barriers to systems working as planned?

b) Review risk control measures against state of knowledge

128. Employers need to review their risk control measures against the current state of knowledge, including what are known to be the most effective measures available to control risk.
129. Employers should consider all known sources of information in relation to hazardous manual handling, including:
- OHS Act and OHS Regulations
 - material published by other health and safety regulators (eg interstate and international regulators)
 - relevant reputable technical standards (for example, Australian Standards)
 - industry practice
 - associations (industry, employer, employee, professional and trade unions)
 - industry publications, including trade journals
 - supplier or trade shows
 - relevant scientific and technical literature
 - OHS professionals
 - WorkSafe agents or insurers
 - other workplaces which perform the same or similar work.

c) Review against hierarchy of control

130. Employers need to review risk control measures (existing or newly proposed) using the hierarchy of control to determine what is most effective (use Table 4 on page 24 to assist).
131. For any proposed revisions, employers should ask the following questions:
- Do the proposed risk control measures eliminate the hazard or risk at the source?
 - Do they give employees the highest level of protection?
 - Are there any unintended consequences?
 - Are trials and mock-ups required?

Implement risk control measures

132. Employers need to revise and implement the revised risk control measures. This may include new or modified risk control measures. If a permanent solution is taking longer to implement, employers should use interim measures in the short term. Timeframes should be set for implementation and training provided to ensure employees can competently use the new risk control measures. Once implemented, employers need to ensure risk control measures are working as intended and that they provide the highest level of protection, so far as is reasonably practicable.

❖ Part 6 – Designers, manufacturers and suppliers

Designers of buildings and structures

133. A designer of a building or structure that is to be used as a workplace must ensure that it is designed, so far as is reasonably practicable, to be safe and without risks to the health of the people using it as a workplace for a purpose for which it was designed. **OHS Act s28** For example, this general duty requires a designer of a building or structure to ensure that the design does not expose the people using that building or structure as a workplace to a risk of MSD. Designers should therefore implement established ergonomic principles in the design process that are consistent with the purpose of the building or structure being designed, so far as is reasonable practicable.
134. A building or structure that is used as a workplace can be permanent, temporary or occasional in nature and may include fixtures (eg inbuilt shelving and racking).
135. Wherever possible, designers should consult with the eventual occupier of the building or structure being designed to determine what it will be used for and how to best design out any MSD risks associated with hazardous manual handling. For example, design:
- spaces large enough to accommodate or incorporate mechanical devices (for example, doors are of adequate width for mechanical devices)
 - minimal distances for pushing, pulling, lifting or carrying loads
 - materials handling devices into the building, such as lifts and chutes

- floor surfaces that enable manually wheeled equipment to be pushed or pulled easily
 - buildings that enable the elimination of unnecessary double handling so goods delivered can be unloaded and transported using mechanical aids
 - structures that are able to accommodate load bearing plant (for example, where overhead hoists may be required)
 - racking with a low first beam so this allows picking above floor level and improves access for cleaning.
136. Some types of workplaces, such as hospitals, nursing homes, warehouses and distribution centres that carry out a high level of manual work may have particular design requirements for controlling the risk of MSD.

Employer note: Employers who, for example, will occupy a building that is being designed and are involved in the design planning process should select a design that best controls any potential risk of MSD. Once the employer occupies the building and it becomes a workplace, the general duty to provide and maintain a safe working environment to employees will apply.

See [worksafe.vic.gov.au](https://www.worksafe.vic.gov.au) for more information on designing workplaces for the safer handling of people.

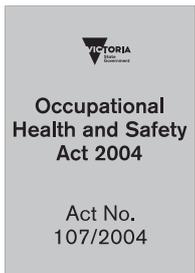
Part 6 – Designers, manufacturers and suppliers

Designers, manufacturers and suppliers of plant

137. Designers and manufacturers of plant used at a workplace must ensure the plant is designed or manufactured, so far as is reasonably practicable, to be safe and without risks to the health of the people using it. They must also carry out or arrange for any testing and examination necessary to determine the plant's safety.
138. Designers of plant must give each person who is provided with the design, and manufacturers must give each person who is provided with the plant, adequate information about:
- the purpose for which the plant was designed or manufactured
 - the results of any testing or examination (arranged or carried out) by the designer or manufacturer to determine the safety of the plant, and
 - any conditions necessary to ensure the plant is safe and without risks to health if used for the purpose for which it was designed or manufactured. [OHS Act s27](#)
139. On request, designers and manufacturers must also pass on the information above to a person who either uses or will use the plant. [OHS Act s27, s29](#)
140. Suppliers of plant have the same duties as designers and manufacturers of plant but are not required to test or examine plant to determine its safety. [OHS Act s29, 30](#)
141. The safe design of plant can play a key role in controlling the risk of MSD to employees. When designing plant, designers should consider all phases of its life, including manufacture, cleaning and servicing. If reasonably practicable, trial a prototype in a range of operating conditions.
142. Change any aspect of the design that could contribute to a risk of MSD, for example by:
- controlling the number of repetitive actions, postures and movements required to operate the plant
 - designing handles on tools and controls to allow normal wrist postures
 - reducing the forces required to operate the plant
 - providing instructions, signs or symbols to help people use the plant properly
 - taking into account the potentially wide range of physical characteristics of users, such as their varying size and strength
 - ensuring the plant operates at a speed or rate that would suit most users, and
 - ensuring regular maintenance points are easily accessible.
143. Designers need to, from time to time, re-evaluate the design of their plant, considering any feedback from purchasers and users of plant about injuries or any other problems. Any risk control measures put in place following an evaluation should not introduce other risks or introduce new hazards.
- See **Appendix E** for examples of design-related MSD risks for plant and ways to control these risks through design.

Employer note: When purchasing plant for the workplace, employers should consider how the plant will be used, maintained, cleaned and serviced. Select plant that is designed so that all these functions can be performed safely. For example, check that maintenance access points are located so that employees can maintain the plant with minimal MSD risk.

Appendix A – The Compliance Framework



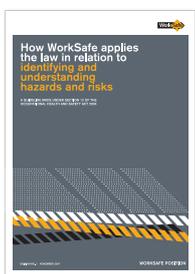
The Occupational Health and Safety Act 2004 (OHS Act) sets out the key principles, duties and rights in relation to occupational health and safety.



The Occupational Health and Safety Regulations 2017 (OHS Regulations) specify the way in which a duty imposed by the OHS Act must be performed, or prescribe procedural or administrative matters to support the OHS Act (eg requiring licences for specific activities, the keeping of records or giving notice).



Compliance codes provide practical guidance to duty holders. If a person complies with a provision of a compliance code, they are deemed to comply with the OHS legislative duty covered by the code provision. However, compliance codes are not mandatory, and a duty holder may choose to use some other way to achieve compliance.



WorkSafe positions are guidelines made under section 12 of the OHS Act that state how WorkSafe will apply the OHS Act or OHS Regulations or exercise discretion under a provision of the OHS Act or OHS Regulations. WorkSafe positions are intended to provide certainty to duty holders and other affected parties.



Non-statutory guidance includes information published by WorkSafe aimed at building people's knowledge and awareness of OHS issues, risks to health and safety, and the disciplines and techniques that can be applied to manage and control risks. Non-statutory guidance is not mandatory, nor does it provide any *deemed to comply* outcomes for duty holders. This guidance does, however, form part of the *state of knowledge* about OHS.

Appendix B – Hazardous manual handling identification sheet

Work area: _____

Management representative: _____

Health and safety representative and employee(s) taking part: _____

Date: _____

Complete the table to identify whether the work involves hazardous manual handling.

| Work | Repetitive or sustained application of force | Sustained awkward posture | Repetitive movement | Application of high force | Exposure to sustained vibration | Handling of live people or animals | Unstable or unbalanced loads or loads that are difficult to grasp or hold | For known risks are suitable control measures available now? | If yes, provide details |
|------|--|---------------------------|--------------------------|---------------------------|---------------------------------|------------------------------------|---|--|-------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | YES/ NO | |
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | YES/ NO | |
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | YES/ NO | |
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | YES/ NO | |
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | YES/ NO | |
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | YES/ NO | |

If you ticked any of the boxes, the work involves hazardous manual handling. You should do a risk assessment for any hazardous manual handling, unless you are already aware of the MSD risk(s) and known risk control measures available and suitable for your workplace. If there is a suitable risk control measure available now, it can be implemented straight away.

Appendix C – Discomfort survey

A discomfort survey can help identify work involving hazardous manual handling and work that may require risk control measures, or a review of existing control measures.

This survey sheet may help employers identify and record instances where employees experience discomfort that persists, re-occurs the next day, or persists after rostered days off.

Name (optional): _____

Date: _____

Job work location: _____

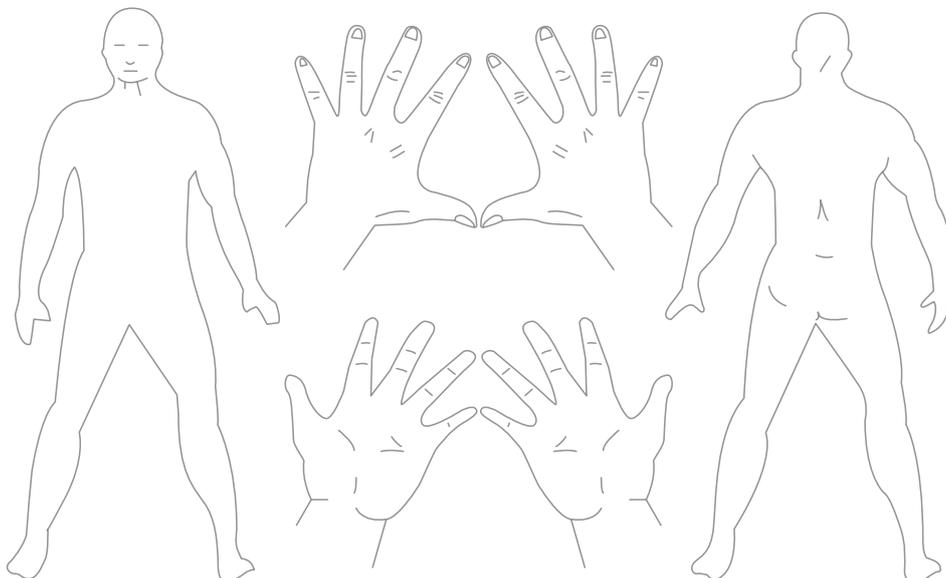
Manual work involved: _____

Time on this job: Less than 3 months 3 months to 1 year 1 to 5 years

Supervisor: _____

1. Do you suffer from swelling, numbness, tingling, 'pins and needles', stiffness or aches or pains in any part of the body?

Indicate on the diagrams where the problem occurs.



Appendix C – Discomfort survey

2. Rate the level of discomfort/pain on a scale of 1 to 5

1 2 3 4 5
Just noticeable / Moderate / Unbearable

3. During the last week, how often did you experience discomfort or pain?

1 2 3 4 5
Never 1–2 times 3–4 times 4–5 times Several times per day

4. What do you think caused the problem?

5. Proposed control/idea? *(optional)*

Appendix D – Risk assessment and control worksheet

Location of work: _____

Description of work involving hazardous manual handling: _____

Date of assessment: _____

Management rep: _____

Health and safety rep (taking part): _____

Employee rep (taking part): _____

Others (consultants etc): _____

Reason for assessment

Existing Task

New Task

Appendix D – Risk assessment and control worksheet

Step 1 – Does the work involve any repetitive or sustained forces, sustained awkward postures or repetitive movements?

As a guide:

- repetitive means the movement or force is performed more than twice a minute, and
- sustained means the posture or force is held for more than 30 seconds at a time

| Postures/movements/forces | Yes | When? | Why? (sources of risk) <small>(eg workplace layout, workplace environment, systems of work, things used)</small> | If any boxes are ticked, what are possible risk control measures? |
|--|--------------------------|-------|--|---|
| Back | | | | |
| Bending or twisting the back forwards or sideways (more than 20°) | <input type="checkbox"/> | | | |
| Visibly bending the back backwards (more than 5°) | <input type="checkbox"/> | | | |
| Head/Neck | | | | |
| Bending the head forwards or sideways (more than 20°) or twisting the neck (more than 20°) | <input type="checkbox"/> | | | |
| Visibly bending the head backwards (more than 5°) | <input type="checkbox"/> | | | |
| Arms/Hands | | | | |
| Working with one or both hands above shoulder height | <input type="checkbox"/> | | | |
| Reaching forwards or sideways more than 30cm from the body | <input type="checkbox"/> | | | |
| Reaching behind the body | <input type="checkbox"/> | | | |
| Excessive bending of the wrist | <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 far apart | <input type="checkbox"/> | | | |

Appendix D – Risk assessment and control worksheet

Step 1 (cont.) – Does the work involve any repetitive or sustained forces, sustained awkward postures or repetitive movements?

| Postures/movements/forces | Yes | When? | Why? (sources of risk) <small>(eg workplace layout, workplace environment, systems of work, things used)</small> | If any boxes are ticked, what are possible risk control measures? |
|---|--------------------------|-------|--|---|
| Legs | | | | |
| 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"/> | | | |
| Forces | | | | |
| 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"/> | | | |
| Very fast movements | <input type="checkbox"/> | | | |
| Applying uneven, fast or jerky forces | <input type="checkbox"/> | | | |
| Holding, supporting or restraining any object, live person/animal or tool | <input type="checkbox"/> | | | |
| Exerting force while in an awkward posture | <input type="checkbox"/> | | | |

Step 2 – Does the work involve long duration?

| Duration | Yes | Comments |
|--|--------------------------|----------|
| More than two hours over the whole shift | <input type="checkbox"/> | |
| Continually for more than 30 minutes at a time | <input type="checkbox"/> | |

Appendix D – Risk assessment and control worksheet

Step 3 – Does the work involve high force?

| High force | Yes | When? | Why? (eg workplace layout, workplace environment, systems of work, things used) | If any boxes are ticked, what are possible risk control measures? |
|---|--------------------------|-------|--|---|
| Lifting, lowering or carrying heavy loads | <input type="checkbox"/> | | | |
| Potentially applying a sudden or unexpected force including: <ul style="list-style-type: none"> ▪ handling a live person or animal <input type="checkbox"/> ▪ applying uneven, fast or jerky forces during lifting, carrying, pushing or pulling, or <input type="checkbox"/> ▪ pushing or pulling objects that are hard to move or stop (for example, a trolley) <input type="checkbox"/> | | | | |
| Exerting high force while in a bent, twisted or awkward posture including: <ul style="list-style-type: none"> ▪ supporting items with hands above shoulder height <input type="checkbox"/> ▪ moving items when legs are in an awkward posture, working with fingers pinched together or held wide apart, or <input type="checkbox"/> ▪ using a finger grip, pinch grip or an open handed grip or 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"/> | | | |
| Exerting force at the limit of the grip span | <input type="checkbox"/> | | | |
| Exerting force with the non-preferred hand | <input type="checkbox"/> | | | |

Appendix D – Risk assessment and control worksheet

Step 3 (cont.) – Does the work involve high force?

| High force | Yes | When? | Why? (eg workplace layout, workplace environment, systems of work, things used) | If any boxes are ticked, what are possible risk control measures? |
|--|--------------------------|-------|--|---|
| Using a finger-grip, pinch-grip or open-handed grip to handle a heavy or large load | <input type="checkbox"/> | | | |
| It can only be done for short periods of time because of the physical effort required | <input type="checkbox"/> | | | |
| It is physically very strenuous, or difficult to do because of the physical effort required | <input type="checkbox"/> | | | |
| Pain or significant discomfort occurs during or after it because of the physical effort required | <input type="checkbox"/> | | | |
| Two or more people are assigned to do it because of the physical effort required | <input type="checkbox"/> | | | |
| Prolonged lifting or carrying of heavy loads | <input type="checkbox"/> | | | |
| Using high grip forces or awkward postures when using power tools | <input type="checkbox"/> | | | |

Appendix D – Risk assessment and control worksheet

Step 4 – Are environmental factors increasing the risk?

| Environmental factor | Yes | If any boxes are ticked, what are possible risk control measures? |
|--|--------------------------|---|
| Frequent use of powered hand tools or use for long periods | <input type="checkbox"/> | |
| Driving for long periods | <input type="checkbox"/> | |
| Driving on rough roads | <input type="checkbox"/> | |
| Use of machines or tools where the manufacturer's handbook warns of vibration (eg tools should be selected with the least amount of vibration) | <input type="checkbox"/> | |
| Being jolted or continuously shaken | <input type="checkbox"/> | |
| Use of a vehicle or tool not suitable for the environment or task | <input type="checkbox"/> | |
| Cold (eg cool rooms, freezers) | <input type="checkbox"/> | |
| Heat (eg radiant heat, foundries, kitchens) | <input type="checkbox"/> | |
| Humidity | <input type="checkbox"/> | |
| Weather (eg rain, wind, high temperatures) | <input type="checkbox"/> | |
| Slippery and uneven floor surfaces/gradient | <input type="checkbox"/> | |
| Obstructions | <input type="checkbox"/> | |
| Poor lighting | <input type="checkbox"/> | |
| Wearing protective clothing while working in hot conditions | <input type="checkbox"/> | |
| Wearing thick clothing while working in cold conditions (eg gloves) | <input type="checkbox"/> | |
| Handling very cold or frozen objects | <input type="checkbox"/> | |
| Organisational factors (see breakout box below paragraph 55 on page 22) | <input type="checkbox"/> | |

Step 5 – Is there a risk of MSD associated with the hazardous manual handling?

Did you answer yes in steps 1 and 2? There is a risk of MSD, risk control measures are required.

Did you answer yes in step 3? There is a risk of MSD, risk control measures are required (note this is regardless of whether you also answered yes to step one and two).

Did you answer yes in step 4? There may be a risk of MSD or an existing risk may increase, investigate further.

Appendix D – Risk assessment and control worksheet

Step 6 – Identifying risk control measure options and investigating risk control measures

| Hierarchy of control | Risk control measure option | Investigation into risk control measures | Risk control measure to be implemented |
|--|-----------------------------|--|--|
| Eliminate the risk so far as reasonably practicable | | | |
| Reduce the risk so far as reasonably practicable by: <ul style="list-style-type: none"> ▪ altering the workplace layout ▪ altering the environmental conditions ▪ altering the systems of work ▪ changing the things used in the hazardous manual handling ▪ using mechanical aids ▪ any combination of the above. | | | |
| Reduce the risk so far as is reasonably practicable by providing information, instruction or training. | | | |

Step 7 – Implementing risk control measures

Work:

Date prepared:

Refer:

When will these controls be implemented?:

Short-term (immediately to within a few weeks)

| Action required | Person responsible | Completion date | Review date | Completed date |
|-----------------|--------------------|-----------------|-------------|----------------|
| | | | | |

Medium-term (within a few weeks to a couple of months)

| Action required | Person responsible | Completion date | Review date | Completed date |
|-----------------|--------------------|-----------------|-------------|----------------|
| | | | | |

Long-term (within several months)

| Action required | Person responsible | Completion date | Review date | Completed date |
|-----------------|--------------------|-----------------|-------------|----------------|
| | | | | |

Appendix E – Controlling MSD risk through design

This table lists some examples of design related MSD risks for plant, and suggests ways to control the risks through safe design.

| 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. | Design a swivel seat-mount together with two sets of controls, or controls that move with seat rotation. |
| Forklifts | Sustained exposure to whole-body vibration transferred through the seat. 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). | Install damping mechanisms in the seat, cabin and vehicle suspension. Install visual aids such as mirrors or a fork arm mounted video camera. |
| 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. | 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. Design equipment to help workers load rolls. Locate the spindle in an accessible place on the plant. Note: Provide information about how to install the plant in a way that allows adequate access. |
| Hand-held power drills | Prolonged use of the forearm muscles and wrist caused by a heavy or poorly balanced drill. Exposure to vibration or impact shock recoil from hammer drills. Excessive force needed to grip and control the tool to counter the effect of vibration and impact shocks. | Design drills to be as light as possible. Design drills with the handle under the drill's centre of gravity. Design plant to reduce shock and vibration. Provide a suitable way of holding the tool with both hands. |

Appendix E – Controlling MSD risk through design

| Type of plant | MSD risk | Possible design solution |
|---|---|---|
| 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> | Design pliers with handles that extend beyond the palm. |
| Crimping, clamping and cutting tools | Excessive force with outstretched fingers required to grip handles that are too wide apart. | Design handles with a grip span of 10cm or less. |
| Chainsaws | <p>Excessive vibration.</p> <p>High force required to handle the chainsaw.</p> | <p>Design to reduce vibration.</p> <p>Design the chainsaw to be as light as possible, and provide well-placed handles.</p> |
| Office/workstation chairs | Poorly designed chairs that cannot be adjusted provide little back support and cause employees to adopt poor postures and movements. | Follow existing design guidelines for chairs having regard to how the chair will be used in the workplace. |
| Work-benches, workstations and other work surfaces | Workstations that cannot be adjusted result in unnecessary reaching, bending and exertion of force. | Design workstations to be adjustable. Alternatively, dimensions should suit as many employees as possible. |
| Extrusion moulding machine | <p>Excessive force needed to release and remove heavy dies.</p> <p>The die location may also cause employees to adopt poor postures and movements.</p> | Include lifting points and mechanical aids in the design to assist the insertion and removal of dies. |
| Patient handling hoists | <p>Strain from reaching to attach slings to hoist.</p> <p>Awkward postures to apply patient slings and stabilise patients during lift.</p> <p>High force needed to manoeuvre mobile hoists into tight areas or over different floor surfaces.</p> | <p>Design hoist to be easily moved over patient so that reaching to attach slings can be minimised.</p> <p>Design slings so they can be applied without adopting awkward postures.</p> <p>Design hoist (powered lifting) to allow patient to be stabilised with minimum force.</p> <p>Design overhead tracking to enable access into tight areas. Design powered mobile hoist with large diameter wheels and adjustable leg width for movement around furniture and fittings.</p> |

Appendix F – Useful resources for controlling the risk of MSD

In some situations, further advice and guidance on assessing the risk of MSD associated with hazardous manual handling, and on appropriate risk controls 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 effectiveness of the risk controls and which risks they will apply to
- there is a need to assess the extent to which risks will be altered by workplace changes
- designing and setting up new work
- setting up new workstations and work areas.

These are just some of the situations where further advice and guidance may be useful. However, in these types of 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 Part 3 should be done before using any of the methods described in this appendix
- each method is limited in the types of hazardous manual handling and risks of MSD it can assess
- most methods require the involvement of a competent person in their use or in the interpretation of their results
- some methods require specialist equipment
- the method should be appropriate to the work 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 hazardous 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.

Note: Risk assessment is not a mandatory requirement. These resources may be useful however if you are unsure whether work involving hazardous manual handling is giving rise to a risk of MSD.

Appendix F – Useful resources for controlling the risk of MSD

| Method | Description | More information |
|--|--|--|
| 1. OWAS (Ovako Working Posture Analysing System) | OWAS is a method for the evaluation of postural load during work. | www.iea.cc |
| 2. Rapid Upper Limb Assessment (RULA) | RULA is a postural targeting method for estimating the risks of work-related upper limb disorders. | www.ergo.human.cornell.edu |
| 3. Revised NIOSH lifting equation (RNLE) | The RNLE is a risk assessment tool to assess the manual handling risks associated with lifting and lowering. | The equation applications manual is available here: <ul style="list-style-type: none"> ▪ www.cdc.gov Online/spreadsheet calculations of the equation (LI, CLI and VLI) are available here: <ul style="list-style-type: none"> ▪ http://health.usf.edu ▪ www.epmresearch.org |
| 4. Revised Strain Index | The Strain Index estimates biomechanical risk for distal upper extremity disorders (eg hand, wrist, forearm and elbow). | www.iea.cc |
| 5. Occupational Repetitive Actions (OCRA) | The OCRA method estimates risk to the upper extremities for repetitive work, and includes the biomechanical factors of frequency, excessive use of force, awkward upper limb movements and postures, insufficient recovery periods, and net duration of the repetitive work. | Online/spreadsheet calculations of the OCRA checklist and OCRA index are available here: <ul style="list-style-type: none"> ▪ www.epmresearch.org |
| 6. Quick Exposure Check (QEC) | QEC assesses biomechanical exposures to four body regions and allows physical work activities to be assessed in collaboration with the worker. | www.hse.gov.uk |
| 7. Manual Handling Assessment Charts (UK) | The Manual Handling Assessment Charts (MAC) were designed to help health and safety inspectors to assess the most common risk factors in lifting, lowering, transporting and handling heavy loads. | www.hse.gov.uk |
| 8. 3D Static Strength Prediction Program™ (3DSSP) | 3D SSPP software predicts static strength requirements for tasks such as lifts, presses, pushes, and pulls. | https://c4e.engin.umich.edu |

Appendix F – Useful resources for controlling the risk of MSD

| Method | Description | More information |
|--|--|---|
| 9. ManTRA | ManTRA is a risk assessment tool that was developed to assist WHS Inspectors auditing workplaces in relation to hazardous manual handling. | www.worksafe.qld.gov.au |
| 10. Psychophysical tables (Snook and Cirello tables) | The Snook and Cirello tables give acceptable values for men and women performing four types of activities: Lifting/lowering, Pull/Push, Carrying of Loads | https://libertymmhtables.libertymutual.com |
| 11. ISO Standard: ISO/TR 12295:2014 | ISO TR 12295:2014 is an application document that guides users of the ISO 11228 series of International Standards, which address manual handling and ISO 11266, which deals with static working postures. | www.iso.org |
| 12. Safe Work Australia | Safe Work Australia has developed a series of guidance on how to manage risks associated with vibrating plant in the workplace and the measurement and assessment of workplace vibration exposures from vibrating plant. | www.safeworkaustralia.gov.au |
| 13. Work Organization Assessment Questionnaire (WOAQ) | The Work Organisation Assessment Questionnaire (WOAQ) was developed as part of a risk assessment tool for the manufacturing setting. | www.workorganisation.org.uk |
| 14. Copenhagen Psychosocial Questionnaire (COPSOQ) | COPSOQ was developed to provide work environment professionals and researchers with a standardised and validated questionnaire to assess a variety of psychosocial factors. | www.cdc.gov |
| 15. Karasek Job Content Questionnaire | This questionnaire is designed to measure scales assessing psychological demands, decision latitude, social support, physical demands and job insecurity. | www.jcqccenter.org |
| 16. Preventing and managing work-related stress | WorkSafe has developed a guide based on the UK Health and Safety Executive Management Standards designed to assist in controlling risk arising from organisational factors. | www.worksafe.vic.gov.au |



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