

ERGONOMICS AND MANUAL HANDLING

Workstation in an Office Environment

When setting up your workstation, the desk helps determine the placement of nearly all other equipment. This information bulletin will help you to get the most from your desk.

This information bulletin focuses predominantly on clerical workstations, but many points will be relevant to other workplace requirements. Employers have a legal responsibility to ensure that the standard of seating provided does not pose any risk to the health and safety of the worker. This is in accordance with the [Workplace Health and Safety Regulations](#).

Legislation

Regulation 60 of the [Workplace Health and Safety Regulations](#) requires the employer to ensure when designing, arranging and maintaining a workplace, that postural, visual, capacity of the worker in relation to the demand of the work being performed and repetitive work being performed; requirements of workers are taken into account. Incorrect placement and use of desktop equipment can create a host of ergonomic problems. The following is a guidance to assist employers and workers with setting up desktop equipment.

Keyboard

Angle

Tilt the keyboard, using the feet at the back, to suit your level of comfort. The common and preferred setting is where the feet are lowered so the keyboard sits flat on the desk.

Position on the desk

Place the keyboard as close to the front edge of the desk as is comfortable (see Figure 1). Do not place documents between the keyboard and the front edge of the desk while using the keyboard, as this increases the reach distance to the keyboard and may result in excessive bending of the neck to look at the documents. Ensure that there is room to put the keyboard to one side when it is not in use.

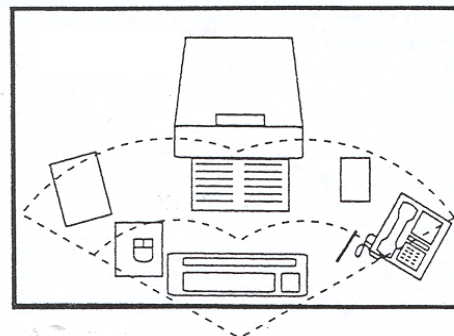


Figure 1

Mouse

Place the mouse mat directly beside the end of the keyboard on your preferred side (see Figure 1). Use the mouse in this position and always aim to keep the mouse on the mat during use. If you frequently use the mouse in your work you may wish to:

- learn to use it with both hands so that you can swap between the right and left sides for improved comfort;
- set the tracking speed of the mouse to a setting that suits you;

- maintain your mouse to keep it in good working order (for example, keeping it clean inside); and
- where possible, try and avoid holding onto the mouse when not in use.

Screen

The screen should be positioned once the chair and desk heights have been established.

Height

The screen should be positioned so that the top of the screen is level with, or slightly lower than, your eyes (see Figure 2). If the screen does not have a raising device such as a monitor stand, place the screen on the hard disk drive or you can use telephone books to raise the screen height on a temporary basis.

Distance from the Eye

First place the screen so that it is approximately an arm's length away from the usual seated position of the user (see Figure 2). Trial this position and if necessary move it further away or closer as required.

Positioning the Screen

The screen should be placed in front of the user to avoid glare or reflections from windows (see Figure 3). It should also be tilted to prevent reflections from overhead lights and windows. The decrease in contrast caused by glare on the screen makes it more difficult to maintain eye focus and coordination and aggravates some sight disorders. Avoidance of glare should be attempted before trying an anti-reflection filter, however if you do choose to use a filter, the glass varieties tend to be better than the mesh varieties.

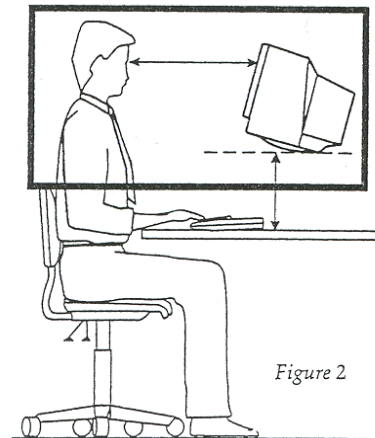


Figure 2

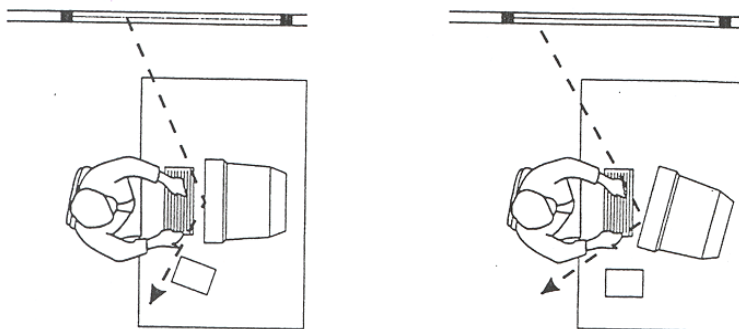


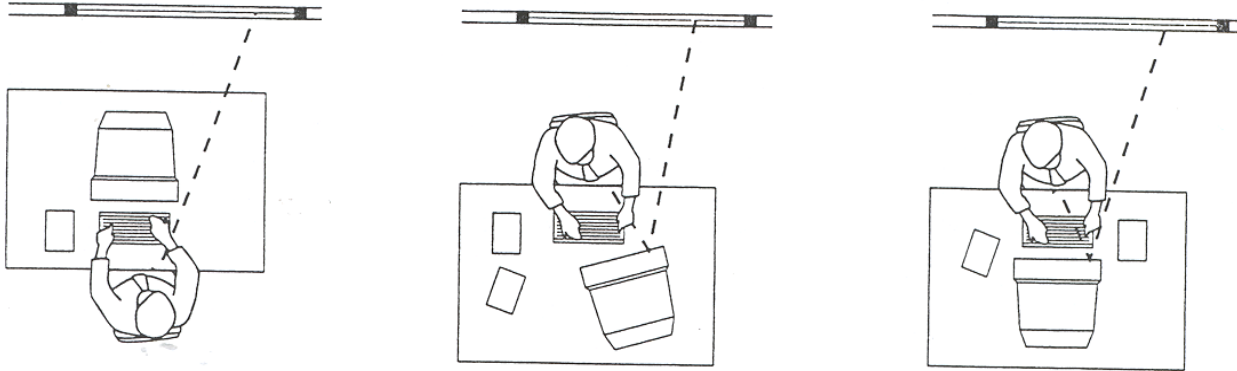
Figure 3

Left

Suitable screen locations in relation to windows

Below

Unsuitable screen locations



For continuous or frequent data entry where the source document is observed more than, or the same amount as the screen:

- place the screen slightly to one side so that the document holder is directly in front of the user (see Figure 4a);

Maintaining the same focal length for long periods can be tiring. Information bulletin 06.01.05 outlines some simple exercises for providing your eyes with a visual rest.

When using computers you look straight ahead and this can bring other lights into your peripheral vision. This can contribute to glare discomfort. Look at your screen and use your hands to shield any bright peripheral light. If you notice an immediate improvement, something should be done about the light. Turning off selected lights, reducing light levels, replacing diffusers to direct light differently, installing curtains and changing the orientation of the workstation are all possible solutions; or place the document holder in a similar position to the screen where it is slightly to one side and the user looks evenly between the two (see Figure 4b).

Regulation 57 of the [Workplace Health and Safety Regulations](#) states that an employer shall ensure that an area at a workplace has a level of lighting that permits the work to be performed without risk to the health and safety of the worker.

For use where the screen is observed more than a source document or a source document is not used at all:

- place the screen directly in front of the user (see Figure 4c).

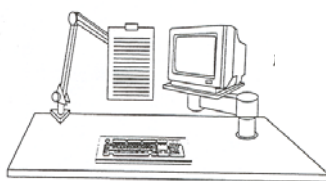


Figure 4a

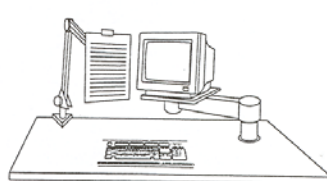


Figure 4b

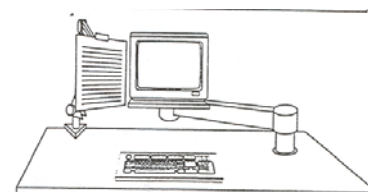


Figure 4c

Document holder

The position of the document holder is dependent upon the needs of the user in viewing and reaching the documents and the type of document holder that is used.

An A-frame style bookrest that sits on top of the desk is the most practical and can be set at different angles. It is usually best placed so that it supports documents on an inclined angle between the keyboard and the screen.

A lever or swivel arm document holder suspends the document above the desk at eye level. Anchor it to the desk on either the left or right or the screen, according to your preference, and place it directly beside the screen.

Telephone

The telephone should be placed at the limit of the Optimum Reach Sector (see Figure 1). This placement enables the user to operate the telephone without the need to move their trunk to grasp the handset or to operate the numeric and function buttons. Place the telephone on either side according to your preference, comfort and other equipment that is used.

When making a lot of calls, it may be best to place the telephone on the same side as the dominant hand so that this hand can comfortably operate the numeric and function buttons. When mostly receiving calls, it may be more comfortable to place it on the non-dominant side.

Learn and utilise the functions of your phone, such as redial and the storage of commonly used phone numbers, to improve the efficiency of its use. Also, where the phone is used very often or for prolonged periods, consider the use of a headset.

Angled reading and writing surface

An angled board can improve neck comfort where a job involves a lot of reading and handwriting. It should be placed immediately in front of the user on top of the desk – see Figures 5a and 5b.



Figure 5a



Figure 5b

Seating

There is a wide range of seating types and designs on the market which is promoted as being 'ergonomic'. The philosophy of ergonomics is to design the work environment to suit the worker.

When choosing the most suitable chair for the worker and the job the following needs to be considered:

- the physical requirements of the use/s ie. height/s, size/s and any special needs;
- the design, type and features of the chair;

- the purpose/s for which the chair is being used, ie. the task/s being undertaken;
- the workstation/s dimensions (particularly the working height) at which the chair is to be used; and
- the end user should be involved in the selection process and will need to be adequately instructed and trained in the use of the chair to ensure its ergonomic features are fully utilised

The lower back is placed under far greater stress in the seated position than it is in standing. This is because the tendency for the natural inward curve of the back to flatten when poorly seated (fig 6a). Not only does this contribute to back pain and early degeneration of the intervertebral discs, it also affects other parts of the body, eg. when the lumbar curve flattens, the shoulders tend to round and the chin pokes forward. This can contribute to neck and pain and headaches as well.

A good chair combined with an appropriate posture can significantly reduce these and other problems that often occur as a result of prolonged sitting (fig 6b).

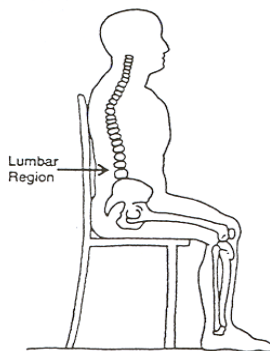


Fig 6a: A flattened lumbar spine

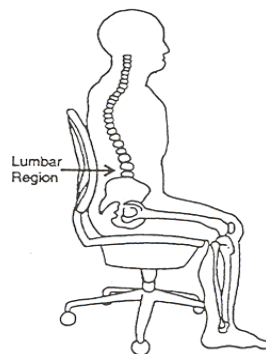


Fig 6b: A supported lumbar spine

What to look for when choosing a chair

The chair needs to:

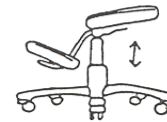
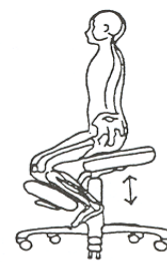
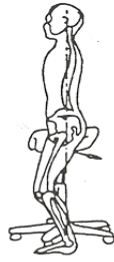
- promote and support a natural and relaxed curvature of the back and a good working posture (ie. it needs some form of adjustable lumbar support);
- minimise muscle fatigue and impedance to circulation (ie. the seat itself should not be so long that it presses on the back of the legs. The front edge should be adequately padded);
- be able to be adjusted easily from the seated position; and
- be stable

Negotiate with sales people, so that the potential user can trial the chair for at least a week where practicable as some features may prove unsuitable.

Which design?

There are three predominant designs of office seating (see diagrams overleaf). The unconventional designs do promote a more upright posture when used correctly; consequently they promote a more natural curvature of the spine as if in standing. People with pre-existing back problems often find these chairs less stressful. The sit-kneel chair, whilst aiding good posture, can cause problems for people with knee complaints, larger people and those using it continuously for prolonged periods. If you are considering the purchase on an unconventional design, insist on a trial period.

- The lumbar support should be easily identifiable and be the firmest part of the backrest.
- The recommended angle of the backrest is between 90 and 110 degrees, therefore the angle of the backrest should be adjustable at the very least between these angles.



A conventional chair

A saddle seat

A sit – kneel chair

unconventional designs

Conventional chair – recommended features

Backrest

- The backrest height should be adjustable enough to allow the lumbar support to rest in the small of the back for the shortest and the tallest users

Seat

- Padding should be thick and firm enough to prevent large people from ‘bottoming out’.
- The width of the chair should also accommodate the larger person whereas the depth of the chair should accommodate the shortest user (to provide clearance to the calf and reduce thigh pressure).
- Seats should slope forward a minimum of 15 degrees and tilt to a maximum of 5 degrees backwards. A slight degree of forward tilt is the best compromise in a chair with no tilt adjustment.
- The upholstery should breathe eg. cloth covering is superior to vinyl.

Base

- A 5 star base support with castors or glides depending on the surface on which it is used eg. castors for carpet.

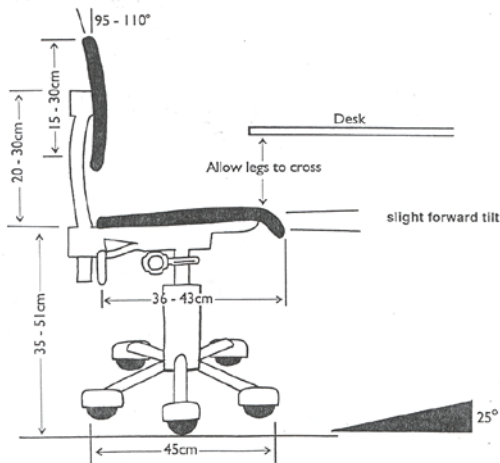
Armrests

- For clerical tasks, armrests should be height adjustable or not be used at all as they can impede the movements of the arms and compromise good working postures.

- Armrests on desk chairs should not impede the user's movement or positioning under the desk.

Adjustment Controls

- The height, seat and backrest adjusters need to be easy to reach and to use from the seated position.
- The chair needs to have sufficient adjustment to suit the required number of working heights.



Features of a conventional ergonomic office chair in relation to a workstation

A fully adjustable chair is a key element in good workstation design.

This following information describes the best method for adjusting your chair and will help you to get the most from its functions.

Adjusting the chair

When adjusting your chair please refer to any instructions that are provided with the chair or have someone show you how to adjust it and use the controls. If there is no one available to assist you, work through this checklist with another person and observe each other's postures and position of the body. Also, remember to try and avoid sitting for long periods of time. Some form of break from sitting every 30 minutes is helpful. Even getting up for 20 to 30 seconds to go to a printer or standing while talking on the telephone will provide some relief.

Seat Height

Adjust chair height so the feet are comfortably flat on the floor, the thighs are approximately horizontal and the lower legs approximately vertical. Low heeled shoes will improve comfort of the legs with the chair at this height. See Figure 7a (overleaf).

Tilt (if available)

Set to horizontal initially, although you may wish to adjust the tilt slightly forward to suit your comfort.

Back support - Height

Start by raising the backrest to its maximum height. Then sit in the chair and check the fit of the backrest to the curve of the lower back. If not comfortable, lower the height by several centimetres and try this position. See Figure 7b.

Repeat this adjustment and try each new position until the most comfortable fit is found. Remember to get out of the chair to make this adjustment and ensure that the backrest supports the lower back and is not placed too low.

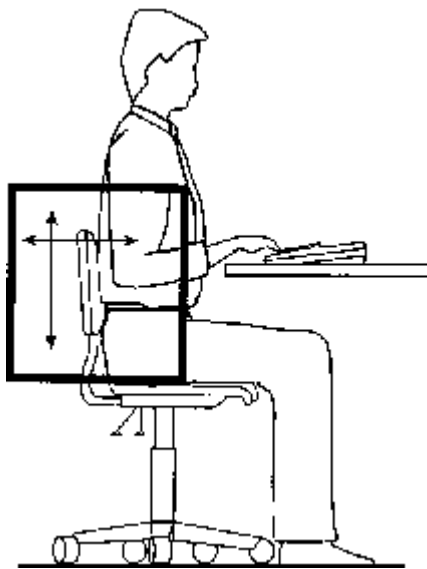


Figure 7a: Align seat to thigh and lower leg positions

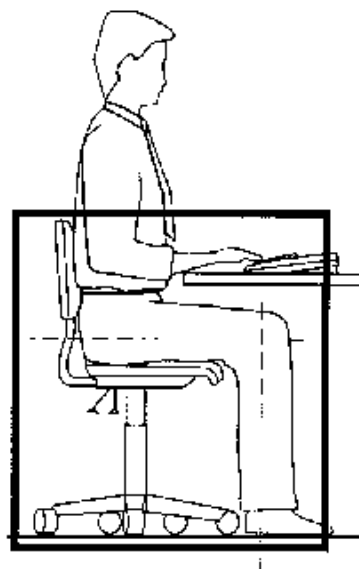


Figure 7b: Adjust the height forward/backward back rest tilt position

Back support - Forward/backward position

Adjust the position of the backrest until a comfortable pressure is exerted on the low back area while seated in the usual working posture at the desk. See Figure 7b.

The backrest position should not feel as though it pushes you out of the seat or that you have to lean back too far to reach it. There should be a two-finger clearance between the front of the chair and the back of the knee. Trial a number of different positions until the best fit is achieved.

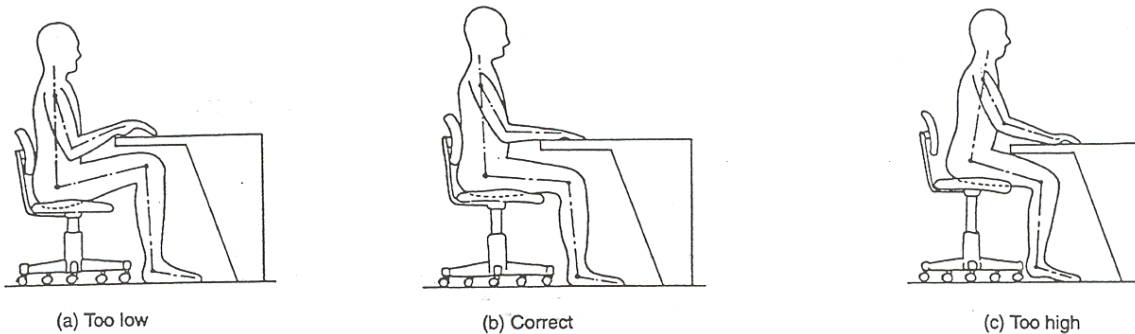
A good office chair can make a real difference not only to the comfort and well-being of the desk worker but can also increase their productivity. How effective the chair will be is dependent on its correct usage. NT WorkSafe has an information bulletin on back care (06.02.03) and a workstation assessment checklist (06.01.08) that provides additional information on these matters.

Footrests

A footrest may be required by shorter employees or when the work surface is higher than normal and can not be adjusted. It should be big enough to comfortably fit both feet and feature a non-slip surface. Using a footrest should never increase the bending at the hips past 90 degrees as this can flatten lumbar spine. To test whether you require a footrest use a phone book as a substitute for a trial period. An angle of 25 degrees is recommended for footrests but most that are currently available are adjustable.

Sloping desktops

Sloping desktops are recommended for use when working for prolonged periods. They reduce strain on the shoulders, neck and back by reinforcing correct posture and allowing the backrest to be used effectively.



Recommended seated posture in relation to working height

If you have a height-adjustable desk

Having first adjusted your chair to suit your body size, adjust the desk so the top surface is just below elbow height. See Figure 8a. To determine your elbow height, relax your shoulders and bend your elbows to about 90 degrees and check the elbow height against the desk height. See Figure 8b.

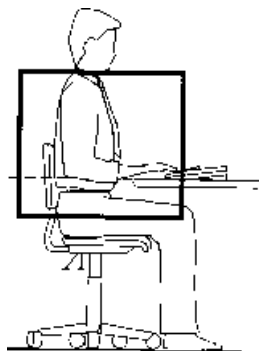


Figure 8a

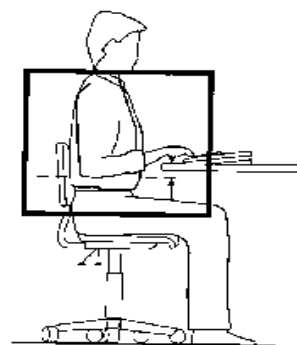


Figure 8b

If you don't have a height-adjustable desk

If the chair has been adjusted and the desk is higher or lower than the elbow, other forms of adjustment will be required. Start by measuring the height difference between the desk and your elbow.

If the desk is too high

Raise the chair by the measured difference and use a foot rest.

Set the foot rest platform so that it is the same as the measured difference. See Figure 8c.

Or

Lower the desk by cutting the legs down by the measured difference. Do this only if you are the sole user.

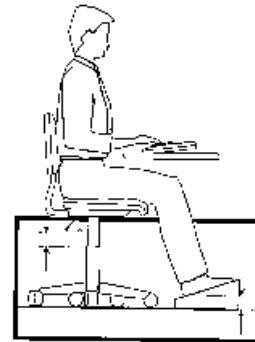


Figure 8c

If the desk is too low

Raise the height of the desk by extending the leg length or sitting it on wooden blocks or something similar. Remember to ensure that any such changes are secure and stable.

Clearance under the desk

General items, such as computer hard disc drives, boxes of documents or files, rubbish bins and mobile drawers should not be stored under desks where they will decrease or interfere with the space required for the legs. This may force the person to adopt a twisted or awkward posture of the spine. See Figures 9a and 9b.

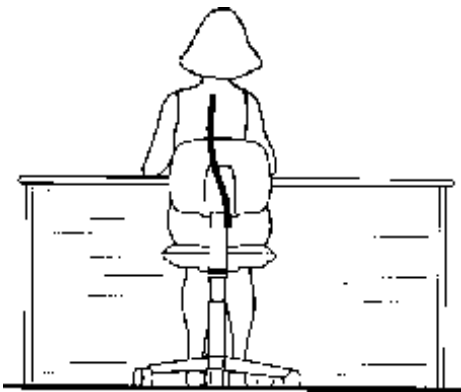


Figure 9a

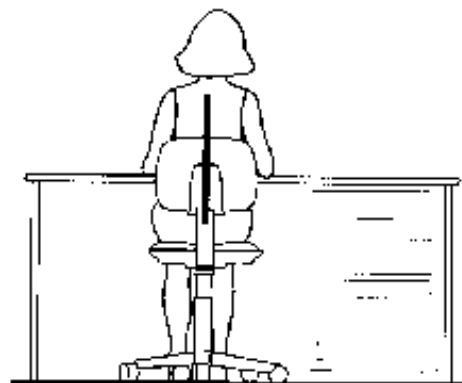


Figure 9b

Drawers

Most commonly used items should be placed in the top desk drawer to improve access and reduce reaching and bending movements. Where drawers are fitted to the desk, equipment such as the keyboard and computer screen should be arranged on the desk so that the operator can sit comfortably in the leg-well space.

General storage on the desk

Place in-trays at the outer reach sector. See Figure 10. In-trays should not be located above shoulder level. A variety of containers are available for mixed stationery items. These should also be stored at outer reach sector (see Figure 10) or in the top desk drawer.

Reference books and folders

Large or heavy references such as telephone directories and manuals should either be stored within close reach of the seated user or in a nearby position where the user has to stand to access them. Handling of these items should not be conducted at the limit of a person's reach capacity while sitting as this can result in undue strain on the back, shoulder and arm muscles.

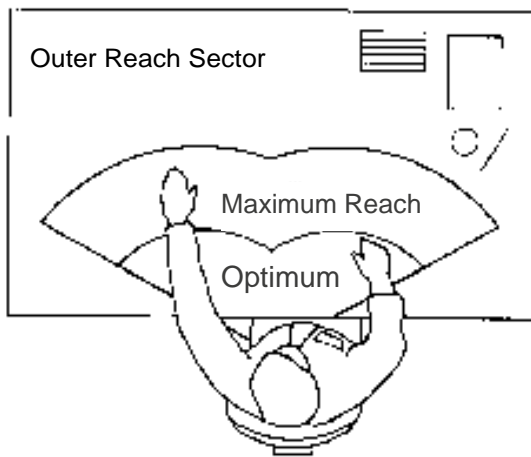


Figure 10: Showing outer reach sector, maximum reach sector and optimum reach sector

NT WorkSafe acknowledges the assistance of the Ergonomics Unit of the Health and Safety Organisation of Victoria. This document forms part of their Officewise publication.

For further information please contact NT Worksafe on 1800 019 115 or go to worksafe.nt.gov.au