Computing (Office and Classroom) in Australian Workplaces

Introduction

Computer based activities include the use of computers, laptops and notebooks, computer-peripheral equipment and related equipment such as modems, printers, scanners, CD burners etc.

Identified Risk and Hazards

Hazards that may arise in activities involving these items of equipment include:

- incorrect posture leading to repetitive strain injuries,
- carpal tunnel syndrome,
- eye strain,
- neck, shoulder and back strain,
- conjunctivitis and dermatitis etc.
- electrocution from incorrect use or faulty equipment etc.

More about Causes of Discomfort >>>


Consideration should be given to:

- The accessories required to operate the equipment properly
- The layout of equipment on the desk
- The location of furniture in the room

Work surface height

Adjust the height of the work surface and/or the height of the chair so that the work surface allows your elbows to be bent at 90 degrees, forearms parallel with the floor, wrist straight, shoulders relaxed.

Chair

Chairs should:
have an adjustable seat height
have an adjustable backrest to support the small of your back
have an adjustable tilt
swivel
have five wheels for stability
use breathable fabric on the seat

Adjust the seat tilt so that you are comfortable when you are working on the keyboard. Usually, this will be close to horizontal but some people prefer the seat tilted slightly forwards. Your knees should be bent at a comfortable angle and greater than 90 degrees flexion. If this places an uncomfortable strain on the leg muscles or if the feet do not reach the floor then a footrest should be used. Adjust the backrest so that it supports the lower back when you are sitting upright.

**Keyboard placement**

Place the keyboard in a position that allows the forearms to be close to the horizontal and the wrists to be straight. That is, with the hand in line with the forearm. If this causes the elbows to be held far out from the side of the body then re-check the work surface height. Some people prefer to have their wrists supported on a wrist desk or the desk. Be careful not to have the wrist extended or bent in an up position.
Screen placement

Set the eye to screen distance at the distance that permits you to most easily focus on the screen. Usually this will be within an arm's length. Set the height of the monitor so that the top of the screen is below eye level and the bottom of the screen can be read without a marked inclination of the head. Usually this means that the centre of the screen will need to be near shoulder height. Eyes level with the tool bar. People who wear bifocal or multi focal lenses will need to get a balance between where they see out of their lenses and avoid too much neck flexion.

Desktop layout

Place all controls and task materials within a comfortable reach of both hands so that there is no unnecessary twisting of any part of the body. Most people prefer the document holder to be between the keyboard and the monitor. There are many different types of document holders available.

Document holder

A document holder should be used to help avoid awkward neck and eye movements. Place it close to the monitor screen in the position that causes the least twisting or inclination of the head.

Posture and environment
Change posture at frequent intervals to minimise fatigue. Avoid awkward postures at the extremes of the joint range, especially the wrists. Take frequent short rest breaks rather than infrequent longer ones. Avoid sharp increases in work rate.

Changes should be gradual enough to ensure that the workload does not result in excessive fatigue. After prolonged absences from work the overall duration of periods of keyboard work should be increased gradually if conditions permit.

**Lighting**

Place the monitor to the side of the light source/s, not directly underneath. Try to site desks between rows of lights. If the lighting is fluorescent strip lighting, the sides of the desks should be parallel with the lights. Try not to put the screen near a window. If it is unavoidable ensure that neither the screen nor the operator faces the window.

If the monitor is well away from windows, there are no other sources of bright light and prolonged desk-work is the norm, use a low level of service light of 300 lux. If there are strongly contrasting light levels, then a moderate level of lighting of 400 - 500 lux may be desirable.

**Glare and reflection**

It is important to detect the presence of glare and reflection. Determine whether there is glare from overhead lights and whether there are reflections from the desk surface.

A number of ways are available to eliminate or reduce the influence of these reflections:

- Tilt the screen (top part forwards) so that the reflections are directed below eye level.
- Purchase an LCD screen.
- Cover the screen with a light diffusing surface or anti-glare screen.
- Negative contrast screen (dark characters on light background) will reduce the influence of these reflections.

If you experience eye discomfort when using a bright screen you should make the following adjustments:

- Turn the screen brightness down to a comfortable level.
- Look away into the distance in order to rest the eyes for a short while every ten minutes or so.
- Change the text and background colours.
- Recommended are black characters on white or yellow background, or yellow on black, white on black, white on blue and green on white. Avoid red and green and yellow on white.
Using a mouse

A well designed mouse should not cause undue pressure on the wrist and forearm muscles. A large bulky mouse may keep the wrist continuously bent at an uncomfortable angle. Pressure can be reduced by releasing the mouse at frequent intervals, by selecting a slim-line, low-profile mouse. Keep the mouse as close as possible to the keyboard, elbow bent and close to the body.

Mouse Alternatives

Alternatives to the standard mouse are designed to change hand and arm postures and increase efficiency. They include a wide range of operations, including rollers, pens, balls, pads and glide points.

The main difference between a mouse and these devices is that the hand and arm remain stationary while the wrist is at an angle and the fingers or thumb stretch. For long periods of use this way may cause finger, thumb or wrist discomfort. Lifting the hand off the keys while operating the pointing devices is preferable.

VDU equipment and radiation

Computer screens emit visible light which allows the characters on the screen to be seen. Weak electromagnetic fields and very low levels of other radiation, not visible to the human eye, can be detected by sensitive instruments. Similar emissions are produced by television receivers.

The levels of most radiations and electromagnetic fields emitted from computers are much less than those from natural sources, such as the sun or even the human body and are well below levels considered to be harmful by responsible expert bodies such as the International Radiation Protection Association (IRPA).

Keyboard and telephone operations

Avoid cradling the phone between your head and shoulder when answering calls. If needing to access the computer at the same time a headset is recommended. Handsfree/speaker phone is another option if the
environment is suitable.

**Posture During Keying**

Good posture is essential for all users of computers. It comprises of a natural and relaxed position, providing opportunity for movement, and from which the operator can assume a number of alternative positions.

Click here for Good Posture Poster ▶️

**Typing technique**

Typing is a physical activity, and using a keyboard requires skill, hence the need to learn correct typing technique.

Unskilled (‘hunt and peck’) typists are particularly at risk of Occupational Overuse Injury because they:

- often use only one or two fingers which may overload the finger tendons;
- are constantly looking from keyboard to screen to keyboard, which may strain neck muscles;
- often adopt a tense posture (wrists bent back and fingers ‘poised to strike’).

**Speed of keying**

The efficiency and speed of modern computers makes it possible for a skilled operator to type extremely quickly. This capability, reinforced by workload pressures means the potential exists for operators to key at speeds which may cause or contribute to Occupational Overuse Syndrome.

![Typing on keyboard](image)

**Length of time on the keyboard**

The maintenance of a fixed posture for long periods is tiring and increases the likelihood of muscular aches and pains. In addition, long periods of repetitive movement and sustained visual attention can also give rise to fatigue-related complaints.

It is recommended that operators avoid spending more than five hours a day on keyboard duties and no longer than 50 minutes per hour without a postural/stretching break.

Supervisors should ensure that workload controls are exercised using the following strategies:

- planning ahead to avoid peaks, and rushed jobs
- delegating fairly to all staff not just the best workers
- considering the total workload of the individual (often comes from a number of sources)
- clearly defining each operator’s workload
- implementing systems of prioritisation e.g. work request forms, waiting lists
- using relief staff
- applying strict tests to the use of 'urgent' labels
- discouraging 'endless' drafts
- discouraging the use of typed internal minutes and memoranda
- encouraging authors to have realistic expectations
- teaching authors keyboard skills
- teaching operators how to be assertive, and how to prioritise
- supporting operators when authors impose unrealistic expectations
- refusing illegible drafts

**Notebook and Laptop computers**

Notebook computers offer a choice of environments and locations where a person can use their computer. However, their design does not allow for some basic ergonomic adjustments to be made.

The risk of physical strain injuries to the neck, shoulders, arms and eyes is generally higher with notebook computers than it is with desktop computers. This is due to the inability to separate the keyboard and the screen and the variety of environments in which a notebook is used.

**Potential hazards**

The lack of adjustment in notebook computers means the operator's posture is compromised. If the screen is at the optimal height for the operator, then the keyboard is too high. If the keyboard is at the optimal height, then the screen is too low. Each position may result in muscle discomfort or strain.

Injuries that may occur include:

- Occupational Overuse syndrome (OOS) also known as repetition strain injury (RSI) through use of unnatural postures or prolonged tension on muscles and tendons and other soft tissues.
- Muscular discomfort from maintaining prolonged poor posture.
- Eye strain through use in environments where there is poor lighting, glare or reflections. Also as a result of straining to view details on small screens.
- Manual handling strain through carrying notebooks for extended periods and/or lifting out of awkward spaces. Strain may be the aggravation of an existing injury.

Tripping hazards can also be created when the notebook has external lines
attached such as mains power cords or telephone lines.

**Minimising the risk of strain or injury.**

Although the design of notebook computers prevents the risks of strain being eliminated there are a number of ways that the risks can be minimised.

If a laptop is to be used for extended periods (i.e. more than 2 hours in any one session) an external monitor and/or keyboard and mouse should be used. Ideally the notebook should be attached to a docking station.

There are several other ways to reduce the risk of strain or injury:

- Whenever possible sit in a comfortable chair at a desk;
- Take frequent rest breaks (at least every 20 minutes but more often if the set up is not optimal) to allow eyes and muscles to recuperate;
- Do not use for extended periods (maximum of 2 hours in any session);
- Use an external mouse, keyboard and monitor where possible;
- Set the screen at an angle that reduces the need to bend your neck, and minimises reflections; and
- Consider using a trolley or backpack to carry the notebook computer.

**Preventing manual handling injuries**

Notebook computers are often carried as an addition to all the usual personal belongings. They are also lifted in and out of cars or other awkward spaces thus increasing the risk of a muscular strain injury.

Manual handling risks can be reduced through:

- Minimising the need to carry the notebook.
- Minimise the load you are carrying (make two trips to carry your belongings)
- Alternate sides of the body that you are placing the load on
- Use a trolley or backpack
- Use lifting techniques that minimise strain to the spine. (e.g. maintain the natural curves in your spine by bending your knees and keep the load close to your body)
- Plan your day so you can minimise the need to carry the notebook.
Transporting your laptop

The portable nature of your laptop makes it likely that you will carry and handle the laptop and associated accessories more often.

Use some simple principles to reduce back, shoulder and neck strain;

- Reduce the weight of the bag by removing any unnecessary items
- Try to pick up and put down the bag with smooth movements, rather than jerky and sudden actions
- If possible, use a backpack design with padded shoulder straps – carry over both shoulders.

Bad habits using computers - Poster
This online program was based on the award-winning Virtual Kitchen. It is designed to provide an effective and easy means of educating young workers about managing hazards in the office environment.