

UNIVERSITY OF TASMANIA

GUIDELINES FOR THE USE OF SCREEN BASED EQUIPMENT

OVERVIEW

The University of Tasmania is committed to continuously improving the management and standards of Occupational Health and Safety. This commitment is extended to ensuring the health and well being of employees when using screen based equipment.

DEFINITIONS

Accountable Person:

An individual, who assumes responsibility for the health or welfare of any other person in a workplace by providing instruction, direction, assistance, advice or service, is deemed an Accountable Person in accordance with the *Workplace Health and Safety Regulations 1998*. All management and supervisory staff (which includes those with responsibility for students) are therefore considered "Accountable Persons".

Employee:

For the purposes of these Guidelines, employee refers to any staff member, student, contractor or visitor.

Occupational Overuse Syndrome (OOS):

Occupational Overuse Syndrome, also known as Repetition Strain Injury (RSI) is a collective term for a range of conditions characterised by discomfort or persistent pain in muscles, tendons and other soft tissues, with or without physical manifestations. It is usually associated with tasks which involve:

- repetitive or forceful movement or both; and/or
- maintenance of constrained or awkward positions

Occupational Overuse Syndrome can affect employees from a wide variety of occupations including keyboard operators, musicians, cleaners and maintenance staff.

Responsible Officer:

Deans, Heads of Division, Heads of School and Administrative Sections have been designated as Responsible Officers under the *Workplace Health and Safety Act 1995*.

Screen Based Equipment (S.B.E.)

Equipment that has a screen of any type which emits an illustrated display. Such machines can be electronic (the screen is a cathode ray tube), or optical when the image is produced by a light source, mirrors, or lenses as in microfiche readers.

RESPONSIBILITIES

Accountable Persons:

Ensure these guidelines are implemented within their area of responsibility and respond quickly to any employee who indicates that they are experiencing problems associated with using screen based equipment.

Employees:

Employees who experience discomfort should raise this immediately with their Accountable Person and request that the checklist (refer Appendix 1) be completed. An Accident and Incident Report Form should also be completed and forwarded to the OH&S Unit.

Responsible Officers:

Provide suitable facilities and resources to ensure the effective implementation of this policy.

PROCEDURE

There are a number of factors that should be considered to ensure that employees using Screen Based Equipment are maximising user comfort whilst minimising the risk of occupational overuse injuries.

The information outlined below and the attached checklist (Appendix 1) should be used as a guideline for the safe use of Screen Based Equipment (S.B.E.) and should further information or assistance be required contact the Occupational Health & Safety Unit on 6324 3275.

Work Posture

The user of S.B.E. must be able to adopt a comfortable work posture to avoid muscular fatigue and discomfort. The design of workplace furniture should incorporate adjustability to comfortably accommodate a large range of body sizes and shapes.



strain on the neck

In a comfortable working posture at the computer:

- the feet are supported on the floor, or a footrest
- the thighs are supported by the chair seat with no pressure caused by the front edge of the seat under the thighs
- the upper body is upright, with the lower back firmly supported by the backrest
- the shoulders are relaxed
- the elbows and upper arms are close to the body
- the forearms are approximately horizontal and the wrists are straight when the fingers are on the keyboard
- the head is upright or inclined slightly forward with minimum

Furniture Design and Dimensions

Chair

A well designed chair is essential for S.B.E. work to provide comfortable support without restricting the arms during the use of the keyboard or mouse. The chair should adjust easily to allow the user to change posture frequently. The adjustments should include seat height, independent adjustment of the position of the backrest and, if provided, seat tilt. Armrests on the chair are not recommended as they are likely to interfere with the ability to move the chair under the work surface and with the freedom of movement of the arms while using the keyboard. Seat tilt is an additional adjustment which allows the hip angle to be varied. Important aspects of chair design include:

- stability (a 5 star base)
- freely moving castors on carpet (or glides on a hard floor surface - castors move too freely on a hard floor surface; tipping over of the chair and falling may result)
- a height range suited to the workstation, ie. able to be adjusted so that the user's thighs just fit under the work surface
- stable backrest
- woven fabric upholstery (except for chemical, biological and radiation laboratories where vinyl is necessary).

Workstation Design

The design of the workstation should be suitable for the type of S.B.E. equipment to be used and the nature of the tasks to be performed at the workstation.

Workstations with height adjustability of work surface give the user maximum flexibility in adjusting their work posture. The height adjustment mechanism should be safe and easy to operate. An economical method of providing height adjustability of the work surface is to provide height adjustable feet on the workstation. In this instance workstation height without the feet should be 680mm with an additional 40mm being provided by the adjustable feet.

If a fixed height workstation is provided, the height of the work surface should be between 680mm and 720mm. A footrest will be necessary for most people using a fixed height workstation.

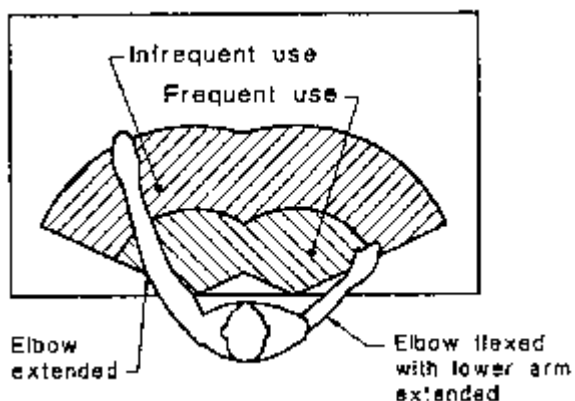
The size of the working surface should be large enough to allow the equipment to be positioned as required by the operator and to provide space for any documents or reference materials used. For sole tasks (keyboard work only) the work surface should have minimum dimensions of 1200mm x 900mm. For mixed tasks (keyboard and clerical work) the work surface should have minimum dimensions of 1500mm x 900mm.

For new workstations it is recommended that the work surface be continuous because of the increased mouse usage.

Other aspects of workstation design to consider include:

- a fixed height work surface of 720mm will accommodate the majority of users
- thickness of the work surface - between 25 - 33mm. Note that this is to include support bars etc. if they are within 550mm of the front edge
- adequate leg space - minimum depth of 550mm and width of 800mm
- a modesty panel
- no sharp edges, corners, protrusions or rough surfaces
- cable management facilities
- total weight of equipment to be placed on the work top (for height adjustable workstations).

Workstation Layout



The arrangement of materials and equipment at workstations can often lead to poor posture and unnecessary reaching and twisting. When setting up the desk layout supervisors and employees should consider the tasks performed at the workstation, their frequency and duration, the visual requirements of the tasks, reach distances and the amount of space on the work surface.

To minimise unnecessary stretching the most frequently used items should be placed within easy reach when the elbow is resting on the desk top (optimum reach). Less frequently used items should be placed within the distance reached by the outstretched arm (maximum reach).

Equipment and Accessories

Computer Screen

The location of the computer screen should take into account the visual needs of the user as well as ensuring a comfortable position of the head and neck. It is recommended that:

- the screen be located approximately an arm's length away from the user
- the centre of the screen be no higher than 400mm above the work surface

- glare and reflections on the screen be eliminated
- swivel, tilt and height adjustability be available for positioning of the screen.

Screens should be regularly cleaned to keep them free from dust and finger marks which can obscure vision and cause focal problems due to unnecessary squinting. For a display which is not tiring to the eyes, it is important that the characters stand out clearly from the screen background.

Laptops

Laptops have the potential to cause major musculoskeletal and visual problems if used for extended periods.

Problems can result from:

- the screen normally cannot be separated from the keyboard, resulting in excessive neck flexion
- the poor quality and size of the visual display
- the small size of the keyboard

To minimise these problems whenever possible, connect the laptop to a normal sized screen and/or normal sized keyboard. If the latter alternative is used, care should be taken to position the laptop at a comfortable viewing distance and height, using a monitor arm or other support.

Mouse

Repeated or sustained use of the mouse may result in muscular fatigue. To minimise fatigue when using the mouse:

- place the mouse on a mouse pad (restricts area of movement for hand and arm)
- ensure the mouse is used with a straight wrist
- the mouse pad should be placed as close as possible to the keyboard

A single continuous work surface is recommended if a mouse is being used. This will minimise strain on the shoulders and eliminate incorrect wrist posture.

Footrest

Footrests should be used where the height of either the chair or desk doesn't enable the user to sit with the correct posture. The height of a footrest varies according to the requirements of the individual and should be wide enough to support the feet and allow for a change of position.

Screen Filters

Screen filters are frequently used to reduce visual discomfort caused by the appearance of disturbing reflections on the screen. Unfortunately some filters may reduce brightness and sharpness of screen characters which is undesirable. Before resorting to a filter, identify the source of the reflections and endeavour to provide a solution to control the problem.

Common solutions are:

- changing the angle or position of the screen
- ensuring appropriate overhead lighting and diffusers
- installing or adjusting curtains or blinds to control natural light

Note that where micromesh filters are used on computer screens, they must be regularly cleaned

Slope Boards/Document Holders

In order to avoid neck pain the recommended position for the document holder is directly between the keyboard and the screen (type 3)

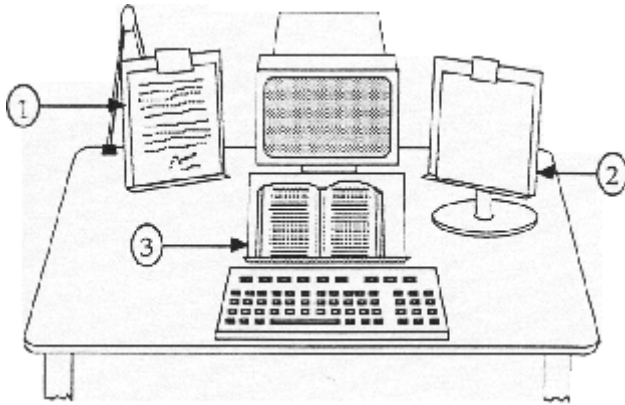


Diagram 1

1. Shows a fixed base (swivel arm) side document holder clamped to the desk;
2. Shows a side document holder on a movable base;
3. Shows a slope board positioned at the base of the computer terminal, between the screen and the keyboard.

Slope Boards/Document holders should be used wherever possible as they may assist in preventing employees from adopting bad posture and can minimise fatigue when set up effectively. Whether a slope board or a document holder is used will depend on the specific task requirements ie. does the document need to be frequently handled or marked, is the writing legible and what is the duration between viewing the screen and looking at the document.

Slope Boards/Document holders should be stable and keep the source document stable. They should also have flexibility so that they can be moved to the most appropriate position.

Monitor Stands and Monitor Arms

Monitor stands and arms can be used to raise the screen to an appropriate height for viewing. Monitor arms provide additional flexibility in allowing the screen to be placed anywhere (within an arc) over the workstation surface. They also free additional space on the workstation and provide a shelf for the keyboard when not in use.

Work Environment

Lighting

A good visual environment is one of the most important aspects of the work environment for S.B.E. users. Careful attention to the lighting design, the elimination of glare sources and the control of natural light will reduce the visual discomfort experienced by many S.B.E. users. Windows should be to the side of the user, not directly behind or in front of the screen

The level of light in the work area must be sufficient to carry out both S.B.E. tasks and non-S.B.E. tasks. Overhead lighting should be fitted with glare reducing diffusers. Task lighting may be used at workstations where extra illumination is needed for reading, but where it is undesirable to raise the general level of illumination. Task lights should be carefully chosen to prevent the light itself becoming a source of glare.

Control of Glare

Eye fatigue is a common complaint of S.B.E. users. It may be caused from glare or reflection of inadequately shielded lights, natural light or reflected light. Overhead lights which are not properly diffused may create reflected images on the computer screen. Natural light may cause direct glare or reflected glare. Other sources of glare include reflective surfaces such as walls, desk tops, keyboards, storage or filing cabinets. Potentially reflective surfaces in the work area should thus have a matt finish. Where glare has been identified as a problem, the source of the glare should be located and eliminated, where possible.

Noise

The noise level of S.B.E. is well below recommended limits. Noise from printers or conversations may be a source of distraction and lead to annoyance and reduced concentration. Where this occurs, it may be necessary to enclose the noise source (acoustic hoods on printers) or to use sound absorbing material within the office area. The use of carpets, window coverings, sound absorbent screens and acoustic tiles on ceilings or walls are normally effective in controlling noise.

Indoor Climate

Maintaining a comfortable climate indoors is essential for both health and comfort, and to ensure that optimum work performance occurs. The factors which most affect comfort are temperature, humidity and air movement. The sensation of comfort is also affected by the level of activity of the individual, the amount of clothing worn, and varies from individual to individual. The aim is to provide a comfortable environment for the maximum number of people. It has been suggested that the most comfortable temperature range for sedentary work is between 18°C - 25°C.

Radiation

Radiation emission levels from computer screens used in Australia have been compared with recommended international exposure limits and found to be less (and in most cases, very much less) than the relevant limit. Spectacles that claim to remove UV radiation and screen filters that claim to remove radiation are not necessary.

- **Ionising Radiation (X-rays)**

Many scientific studies throughout the world have been carried out on X-ray emissions of S.B.E. All of the studies reached the same conclusion: emissions of X-rays were well below accepted occupational and environmental health and safety standards. Frequently the level of ionising radiation from S.B.E. is so low that it cannot even be measured.

- **Non- ionising Radiation**

This includes ultra-violet radiation, visible light, infra-red radiation, radio frequency radiation and microwave radiation. All levels of non-ionising radiation emitted from S.B.E. are greatly below any levels which are known to cause harm to humans. Radio frequency radiation is divided into high, low and very low radio frequencies and is found near most electrical appliances. Emission levels from S.B.E. are all below the relevant recommended limits.

Job Design and Redesign

Job design is a key factor in minimising the potential for Occupational Overuse Syndrome. Whilst job design is also covered in the Prevention of Occupational Overuse Syndrome Policy there are a number of factors in job design specific to users of screen based equipment which should be considered by supervisors.

Keyboard workload

Employees who engage in intensive keyboarding, such as data processing, should not be required to spend more than 50% of their day working at the keyboard. The time at the keyboard should be spread over the working day and appropriate rest breaks should be taken. The remainder of the employee's time should be spent working on alternative duties which should not be visually demanding or of a static sitting nature. This could include tasks such as filing or collecting new material.

Peak Periods

Wherever possible, foreseeable peak demands should be allocated additional resources to prevent employees feeling pressured into engaging in practices such as skipping rest breaks and spending excessive time at the keyboard to meet unrealistic deadlines. A total of 4 hours (not including breaks) of intensive keyboard work per day is regarded as the "safe-working level". This should never be exceeded.

Rest Breaks

When considering work rates, jobs which require intensive keying over prolonged periods should take into account the requirement for rest breaks. It is recommended that employees engaging in intensive keying take a short break every hour (this is not to be accumulated over a number of hours and taken as a longer break). This break should be spent away from the keyboard and can either involve activities which are not of a static nature and or be used to undertake a series of exercises that provide relief from the rigors of intensive keying.

Adjustment Period

Employees newly engaged in keyboard work, or returning from an absence of two weeks or more, need a period of adjustment before they undertake intensive keyboarding. Supervisors need to be aware of this requirement and must ensure that they allocate resources to cope with employees returning to keying at a rate less than their pre-absence status whilst gradually building up their keying strength.

WORKPLACE ASSESSMENTS

A Checklist for Users of Screen Based Equipment is attached (refer Appendix 1). It should be used to assist in the assessment of work areas for new employees and those experiencing discomfort. This assessment should be conducted by both the employee and their supervisor and further assistance can be provided by contacting the Occupational Health & Safety Unit.

REFERENCES

The following documents have been used in the development of the University of Tasmania's Guidelines for the Safe Use of Screen Based Equipment.

- National Code of Practice for the Prevention of Occupational Overuse Syndrome
- The Guidance Note for the Prevention Of Occupational Overuse Syndrome In Keyboard Employment.

FURTHER INFORMATION

These Guidelines should be read in conjunction with the University's policy on the Prevention of Occupational Overuse Syndrome. Additional information is available from the Occupational Health and Safety Unit.

Approved by OH&S Committee : 16th March, 2000

Disclaimer

These Guidelines were designed for use within the University of Tasmania. The University makes no guarantee and assumes no responsibility as to their absolute correctness for all circumstances or for their adaptation outside the University of Tasmania environment.

Appendix 1

CHECKLIST FOR USERS OF SCREEN BASED EQUIPMENT

Task Analysis

Name:	Contact No:
Position:	
School/Section:	
Date:	
Accountable Person:	Contact No:

1. How many hours per day on average is the computer used? _____
2. Does the work involve mainly continuous or intermittent keying? _____
3. Does the work involve frequent use of the mouse? _____
4. What other equipment is used? Eg: printer, fax, telephone, dictaphone etc. _____

5. Is the computer/workstation used regularly by one person or multiple users? _____
6. What are the storage requirements? _____
7. What type of documents are used at the computer? _____
8. What other tasks are performed (other than using the computer)? _____

9. How much work space for clerical tasks is needed at the workstation? _____
10. Is face to face interaction with other people required at the workstation?
not at all? infrequently? frequently?
11. Are there any disabilities or individual needs which should be taken into consideration in the design of the work environment? _____

12. Other relevant information:

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Work Posture

Workstation user(s)

YES NO

1	Are the feet unobstructed and supported on the floor or on a footrest?		
2	Are the thighs supported by the chair seat (no pressure caused by the front edge of the seat under the thighs)?		
3	Are the shoulders relaxed?		
4	Are the elbows and upper arms close to the body?		
5	Is the upper body upright with the lower back supported by the backrest?		
6	Are the forearms about horizontal and the wrists straight when the fingers are on the keyboard?		
7	Is the head upright or inclined slightly (minimum strain on the neck)?		

Summary of work posture:

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Workplace and Equipment

YES NO

Chair			
1	Does the chair have a 5 star base?		
2	Is it easily adjusted from the seated position?		
3	Does the chair move freely (castors on carpet or glides on a hard floor surface)?		
4	Is the user able to adjust the seat height so that the thighs just fit under the work surface?		
5	Is the backrest stable?		
6	Does the backrest provide good support in the small of the back?		
7	Is the upholstery a woven fabric (or vinyl in a chemical or biological laboratory)?		
Workstation		Yes	No

8	Is the size of the work surface adequate for the user's tasks? (As a guide: minimum of 1200mm x 900mm for sole tasks; 1500mm x 900mm for mixed tasks).		
9	Is there adequate leg space? (depth 550mm; width 800mm).		
10	Is the work surface smooth with rounded corners, no rough edges, matt finish, and easy to clean?		
11	Are all cables accessible and stowed out of the way?		
12	Is the thickness of the work surface between 25 - 33mm?		
13	Is the minimum working area depth approximately 600mm?		
14	Is the work surface a single continuous surface?		
15	Is the non adjustable workstation between 680mm - 720mm in height? (measured to the top of the work surface).		
16	Is a footrest available?		
Layout			
17	Are the most frequently used items within easy reach from the seated work position?		
18	Is the circulation space adequate?		
19	Is appropriate storage available (stationery shelves, mobile drawers)?		
Computer Equipment			
Screen			
20	Is the screen located approximately an arm's length away from the viewer's eyes?		
21	Is the computer screen at right angles to the windows and between rows of overhead lights?		
22	Is the screen located no higher than 400mm above the work surface?		
23	Has glare and reflection been eliminated?		
24	Are the characters sharp (no fuzzy edges), standing out clearly against the background?		
25	Is there no perceptible flicker or distortion?		
26	Is a monitor stand or arm provided?		
Keyboard			
27	Is the keyboard separate from the screen?		
Mouse			
28	Is there a mouse pad available?		
29	Is the mouse able to be used at approximately the same height as the keyboard?		
Printers			
30	Is the noise level from the printer acceptable?		
Footrest (if used)			
31	Is the footrest high enough to allow the user to adopt a good work posture at the keyboard?		
32	Is the surface area approximately 350mm x 450mm?		
Document Holder			
33	Does it support all source documents adequately?		
34	Are the documents on the holder easy to read and to manipulate?		
Environment			
35	Is the lighting satisfactory? (consider glare, reflections and ability to read documents)		
36	Is the noise level appropriate to the level of concentration needed for the task?		

37	Is the temperature, humidity and air flow in the room comfortable?		
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Checklist Assessment

Assessor:..... Date:.....

Problems Identified:

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