

# **ACTU GUIDELINES FOR SCREEN BASED WORK**

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## **CONTENTS**

<b>PREFACE</b>	i
<b>INTRODUCTION</b>	1
<b>HAZARDS ASSOCIATED WITH SCREEN BASED WORK</b>	3
Visual Problems	3
Musculo-Skeletal Difficulties	3
Stress	4
Chemical Exposure	4
Noise Exposure	4
Electrical and Magnetic Fields	5
<b>CONTROLLING THE HAZARDS OF SCREEN BASED WORK</b>	7
<b>HIERARCHY OF CONTROLS</b>	7
<b>ORGANISATIONAL ENVIRONMENT FOR SCREEN BASED WORK</b>	8
Workplace Participation and Consultation	8
Job Design	8
Limiting Exposure to Screen Based Work	9
Training	9
Workload	10

PHYSICAL ENVIRONMENT FOR SCREEN BASED WORK	10
Lighting	10
Air Quality	12
Noise	12
Workstation Specifications	13
Electromagnetic Fields-Basics	16
Health Surveillance	18
<b>POLICY CHECKLIST</b>	<b>19</b>
<b>REFERENCES / BIBLIOGRAPHY</b>	<b>26</b>

## PREFACE

These **ACTU Guidelines for Screen Based Work** have been developed by the ACTU OHS Unit, with the assistance of Grant Odgers of the Union Research Centre on Organisation and Technology. They were endorsed by the ACTU Executive at its May 1998 Meeting. They replace the *Guidelines for Working with Screen-Based Equipment*, originally published in May 1982 by the ACTU-VTHC Occupational Health and Safety Unit, as *Health and Safety Bulletin number 12*.

The guidelines presented in *Health and Safety Bulletin number 12* were the first in a series of guidelines on specific hazards and occupational diseases to be issued by the ACTU-VTHC Occupational Health and Safety Unit. In the years since, the guidelines have formed the basis for policies of the ACTU and affiliated unions.

These **ACTU Guidelines for Screen Based Work** benefit from being developed within the context of a more complete framework of Union policies, and State and Federal legislation and regulation on Occupational Health and Safety, than existed in 1982.

A number of ACTU guidelines and policies are relevant in the context of screen based work, including:

*Occupational Health and Safety Policy (1989)*

*Guidelines on Stress (1998)*

*Guidelines on Shift Work (1998)*

*Guidelines and Policy on Chemical Hazards (1989)*

*Working Conditions Policy (1989)*

*Statement on Workplace Participative Structures (1989)*

Where further detail than that mentioned in these **ACTU Guidelines for Screen Based Work** is required, the full statements, guidelines or policies should be referred to.

Australian Federal and State Occupational Health and Safety legislation is based around the concept of the employer's *Duty of Care*, which requires that employers must provide a healthy and safe workplace, and healthy and safe systems of work. Once appropriately trained, employees are required to work in ways that are safe, and do not compromise their own, or other workers' health and safety.

In these **ACTU Guidelines for Screen Based Work**,

the provisions for the physical environment relate to the provision of a healthy and safe workplace

the provisions for the organisational environment relate to healthy and safe systems of work

the safe work practices relate to workers fulfilling their responsibilities under the various occupational health and safety legislation and regulations.

Various items of state and federal OH&S legislation and regulation are relevant in the context of screen based work. Some model standards and regulations from the National Occupational Health and Safety Commission (NOHSC), and various Federal and State Codes of Practice and Guidelines are also relevant, but with varying status under the law. Some of the more important of these are:

**From National Occupational Health & Safety Commission (Worksafe Australia)**

*National Code of Practice for the Prevention of Occupational Overuse Syndrome*, June 1994

*Guidance Note for the Prevention of Occupational Over-use Syndrome in Keyboard Employment*, 1989.

*Ergonomic Principles and Checklists for the Selection of Office Furniture and Equipment*, 1991

*National Code of Practice for Manual Handling*, 1990

**From Comcare Australia**

*Air Conditioning and Thermal Comfort in Australian Public Service Offices*, 1994.

*Guidelines for Eyesight Testing and Optical Correction for Visually Demanding Tasks*, 14 November 1994.

*Occupational Noise Regulations and Code of Practice*, Oct 1994.

*Officewise: A Guide to Health and Safety in the Office*, 1996.

*Extremely Low Frequency Radiation*, Nov 1995

**From Standards Australia**

(An independent non-government, not-for-profit association)

*Interior Lighting AS 1680 and 1680.2.2 -1994*

*Screen-based workstations, Part 1: Visual Display Units*, AS 3590.1-1990

*Screen-based workstations, Part 2: Workstation Furniture*, AS 3590.2-1990

*Screen-based workstations, Part 3: Input Devices*, AS 3590.3-1990

The legal status of these and other instruments varies between the jurisdictions. A list of relevant legislation and regulations etc. applying in a given jurisdiction should be available from the OHS Officers of the State and Territory Trades and Labour Councils.

## INTRODUCTION

For the purposes of these **ACTU Guidelines**, screen based work is considered to be any work that involves using screen based equipment. As screen based equipment increasingly pervades a wider range of working environments, more workers can be found performing screen based work for at least part of their day in nearly every occupation. The way that screen based work is integrated into the overall job design can be crucial for occupational health and safety. These Guidelines apply equally to intermittent screen based work (updating a stock inventory on consignment of goods, for example), and work where the screen based component occupies a large portion of the day (clerical work, computer aided design and so on).

In the past, efforts to control the risks associated with screen based work focussed on ergonomics and the possibility of radiation hazards. That was essentially a focus on the physical working environment and the interaction between the worker and the screen based equipment.

There is a growing recognition that a number of interrelated factors in the physical and organisational environments for screen based work give rise to OHS hazards. As a result, there is an increasing emphasis on establishing an appropriate organisational environment for screen based work that properly complements safe work practices in the physical working environment.

## SCREEN BASED EQUIPMENT

Any equipment that has a self-illuminating screen for displaying information in alphanumeric, graphical or similar form (for example, electronic video display terminals built around cathode ray tubes, light emitting diodes and other electronic sources and optical technologies) is screen based equipment. Screen based equipment includes microfiche viewers, laptop computers, word processors, notebook computers and so on. It also includes all of the accessories and peripherals that are combined with these items to form work systems.

## SCREEN BASED WORK

Screen based work includes but is not limited to the following types of tasks:

**Data Input:** Data input tasks are mainly tasks where the work activity is transferring data from a source via a keyboard. In general, data input tasks require constant visual reference to a source document. There may be a good deal of head and eye movement between the screen and the document. The task is usually repetitive and monotonous with an emphasis on accuracy and speed. Examples of this work include direct data entry of alpha and numeric transactions

and word-processing of standardised forms and letters.

**Data Access:** Data access tasks involve retrieving information that has previously been entered. There is usually less emphasis on speed in this kind of task, but visual difficulties and stress relating to computer breakdown or poor response times are common.

**Creative:** Creative tasks involve both input and access of data. Often the information is created during the work. These tasks are less routine and there is less emphasis on speed. Examples of such tasks include the creation of a unique documents using word processing or spreadsheet applications, computer aided design (CAD), drafting, etc.

**Combined:** Some business systems combine two or more tasks. Screen based tasks combining data input and data access are found in integrated systems that allow databases to be consulted for information (data access) or updated (data input).

These **ACTU Guidelines for Screen Based Work** give a brief explanation of the hazards associated with screen based work, followed by a set of guidelines for both the organisational and physical environment for screen based work. The guidelines provide an *integrated* approach to addressing the hazards of screen based work.

## HAZARDS ASSOCIATED WITH SCREEN BASED WORK

There has been concern about adverse health effects and various discomforts associated with screen based work for some time. The effects that have been considered include visual problems, musculo-skeletal difficulties, skin disorders, cancer, miscarriages and birth defects.

In addition, the organisational environment for screen based work has been identified as contributing to stress and the physical environment can be a source of exposure to chemicals and to noise. The hazards are briefly described in this section of the Guidelines, and measures for their control are detailed in the next section of the Guidelines.

### VISUAL PROBLEMS

Where screen based work extends beyond two hours per day, or 10 hours per week,

it has been recognised as a visually demanding task, having health and safety implications (Comcare 1994).

**Visual Fatigue:** Visual fatigue from screen based work can be experienced as eyestrain, burning, sore or irritated eyes, blurred vision, changes in colour perception, tiredness or irritability, headaches, migraines and nausea. It is due to the visually demanding nature of screen based work, and is widely considered to be a temporary discomfort with no long-lasting ill effects.

**Discomfort with Contact Lenses:** Discomfort with contact lenses is known to be associated with low humidity levels. Prolonged VDU work has been linked with an accumulation of microscopic growths on the surface of some lenses, leading to severe physical deformation of the lenses (ACTU 1989, p. 29).

### MUSCULO-SKELETAL DIFFICULTIES

**Backache and Muscular Fatigue:** These complaints generally arise from static muscle loads applied over the period of screen based work (from holding muscles and limbs in one position for a long time). Inappropriate postures, encouraged by unsuitable or poorly adjusted furniture, and sustained for too long without adequate rest breaks can lead to unnatural or abnormal muscle use, causing pain and injury.

**Occupational Over-use Syndrome:** There is a well established connection between screen based work and back-, neck- and head- ache, muscular fatigue and Occupational Overuse Syndrome (OOS), or Repetitive Strain Injury (RSI). The common symptoms of Occupational Overuse Syndrome (OOS) are discomfort or persistent pain in muscles, tendons and other soft tissues, especially in the arms, hands and neck. These symptoms result from tasks which involve repetitive or forceful movement or both; and/or from the maintenance of constrained or awkward postures.

## **STRESS**

Studies that have demonstrated a close relationship between screen based work and stress. For example, a study of data entry operators identified that about 18% of the operators surveyed experienced work related stress most of the time, and 66.7% felt stress part of the time (Pickett & Lees 1991). Australian surveys indicate that about one in four workers take time off each year due to stress at work.

Other studies of hormone levels (including adrenalin, nor-adrenalin and cortisol) before, during and after screen based work indicate that the bodily effects that are typically induced by stress are also induced by screen based work (Gao et al. 1990; Schreinicke et al. 1990).

There are a number of workplace organisational and environmental factors that contribute to stress, and workers involved in screen based work encounter them routinely. Electronic monitoring of screen based work (stroke rates or error rates) which is used to pace workers or to assess their performance, and incentive schemes linked to high stroke rates are potentially unhealthy or unsafe practices.

## **CHEMICAL EXPOSURE**

All workplaces can be sources of chemical exposure. In the screen based work environment, laser printers are a common item that can contribute to atmospheric contamination in the working environment. They can emit ozone gas, a highly reactive form of oxygen. Even at very low concentrations (one part per million), ozone can irritate the eyes, nose and throat. In addition, toner powder for laser printers can become airborne and contribute to atmospheric contamination in the working environment, particularly when toner cartridges are being replaced.

As with other chemicals in the workplace, workers should have ready access to Material Safety Data Sheets (MSDS) for laser printer toner, conforming as a minimum standard to the *Worksafe Australia Guidance Note for the Completion of a Material Safety Data Sheet*.

## **NOISE EXPOSURE**

Noise is unwanted sound. Very loud sounds can cause temporary deafness, and long term exposure to excessive sound levels will permanently damage hearing.

State and federal occupational noise regulations in Australia require that workers are not exposed to excessive noise and that excessive noise is minimised. The noise limit enforced by the regulations is generally referred to as the exposure standard. The noise levels found in good screen based working environments would not reach this exposure standard.

Although impact printers, such as dot matrix and daisy wheel printers, have largely been replaced in traditional workplaces by quieter technologies, they are in widespread use with home computers. The noise can be distracting to the point of being a factor in stress (a stressor). In extreme cases, the noise from printers

could contribute to Noise Induced Hearing Loss (NIHL).

Excessive background noise levels in workplaces where screen based work requires close concentration can be a source of stress.

## **ELECTRICAL AND MAGNETIC FIELDS (EMF)**

Whenever an electric current flows, invisible fields of energy, known as electromagnetic fields (EMF) are produced. The effect of these fields is described as electromagnetic radiation (EMR) in some quarters. There are two interacting components, the electric field and the magnetic field. Electric fields are produced by voltage and increase in strength as the voltage increases. Electric field strength is measured in units of volts per metre (V/m). Magnetic fields are present when there is current flowing through wires or equipment. The strength of the magnetic field increases with increased current flow. The levels of magnetic field strength encountered in the office environment are measured in units of milligauss(mG).

Electric fields will be present whenever equipment is connected to the mains supply, even when the equipment is switched off. Magnetic fields occur only when equipment is switched on. The magnetic field strength will change as the workload on equipment changes. A photocopier for instance, would emit a stronger magnetic field while copying than it would in standby mode.

Electric fields are shielded or weakened by materials that do not conduct electricity e.g. building walls. Magnetic fields are more difficult to shield as they pass through most materials e.g. office partitions, walls etc. Both field types decrease in strength as the distance from the source increases.

### **Frequency**

As VDUs emit EMFs at different frequencies, it is necessary to know a little about frequency to understand and apply exposure standards.

Mains power electricity in Australia alternates 50 times a second and thus has a frequency of 50 cycles per second. Frequency is expressed as hertz (Hz). So mains power has a frequency of 50Hz.

The electronics inside a VDU converts the mains frequency to a range of frequencies. These frequencies are measured in two bands 5Hz to 2000Hz (2KHz), and 2KHz to 400KHz. Therefore it will be necessary in applying the exposure standard to measure mG and V/m at both frequency bands.

The potential for the EMFs emanating from visual display units (VDUs) and from other office equipment to have adverse human health consequences is a concern for unions. There is considerable scientific debate about the effects of exposure to EMFs. Many studies support the view that the EMFs encountered in the office environment are not harmful. However there is also a small number of studies which point to potentially serious risks.

### **The Risks**

According to at least some studies, EMFs could be associated with an increased risk of:

- leukemia especially in children
- brain and nervous system tumours
- breast cancer in both sexes
- miscarriages and birth abnormalities
- malignant melanoma of the skin

The means by which EMFs may adversely effect human health are also the subject of much debate, controversy and scientific study. Current theories include:

- decreasing the production of melatonin, a natural hormone which is thought by some to inhibit the growth of cancer cells, including breast cancer cells.
- interference with the immune system
- disrupting cell division and growth.

### **Other Effects**

Some visual display units build up an electrostatic charge between the operator and the unit. This can have the effect of attracting dust onto the operator. This can cause facial skin rashes in some VDU operators. The recommended exposure standard for VDUs, together with humidity control, should address this issue.

## CONTROLLING THE HAZARDS OF SCREEN BASED WORK

Addressing the discomforts and risks to health that are associated with screen based work requires ensuring both an appropriate physical and organisational environment for screen based work, as well as the implementation of safe work practices. The control of hazards associated with screen based work should be achieved through the implementation of the following hierarchy of control measures.

### HIERARCHY OF CONTROLS

The principles of control methods to reduce the risk of workplace injury and disease are quite simple. They consist of a hierarchy of controls:

**Elimination:** The first option for the control of health and safety hazards is the elimination of the hazard. In relation to screen based work, an example of the elimination of a hazardous process might be where certain work is performed using systems of work other than screen based work.

**Substitution:** Where complete elimination is not possible, the next option for control is substitution with a safer alternative. For screen based work, an example of substitution might be upgrading software packages to more “user friendly” systems, providing easier and better control over the work.

**Isolation:** Where control is inadequate following the best efforts at elimination and substitution, the next option is isolation. An example of isolation might be the placing of noise, chemical or other hazards either at a distance from people performing screen based work, or in a separate room entirely.

**Engineering Controls:** Engineering controls provide a further level of control where a combination of elimination, substitution and isolation controls still do not provide adequate control. In relation to the screen based work environment, engineering controls might be applied to limit the level of 50 hertz electromagnetic fields in the working environment by re-phasing high-voltage transmission lines, or shielding some mains power cabling and electrical switch rooms.

**Safe Work Practices:** Safe work practices are administrative practices which require people to work in safer ways. Limiting the amount of time to be spent per day involved in screen based work could be considered to be a safe work practice.

The following sections of these **ACTU Guidelines for Screen Based Work** provide guidance on safe work practices that need to be implemented in the physical and organisational environment for screen based work.

## **ORGANISATIONAL ENVIRONMENT FOR SCREEN BASED WORK**

An appropriate organisational environment for screen based work is essential for the control of the hazards. The following are some of the factors that can influence the organisational environment for screen based work.

### **Workplace Participation and Consultation**

Workers and their representatives should be consulted about changes to their work, and be empowered to participate in the decision making processes that influence those changes. This is particularly important when new screen based technology is being introduced into the workplace, or when the usage of existing technology is being changed.

### **Job Design**

Job design should be used to limit both the length of continuous periods spent at screen based work, and the total time spent at screen based work. Designing breaks between periods of screen based work allows for periods of recovery following periods of exposure, and limits the total exposure to the hazards of screen based work.

In addition, job design should be used to achieve a reduction in the routine and repetitive tasks that contribute to rigid job structures. For too many workers, screen based work is repetitive and boring. Jobs should be designed to minimise narrowly defined and repetitive tasks. Reducing the degree to which the work is boring and repetitive also decreases the risk of both OOS and stress.

Healthy and safe job design should also provide workers with control over the way their work is organised. Designing jobs that provide workers with opportunities to exercise individual initiative, and to take responsibility for entire pieces of work, can result in a significant decrease in the risk of stress.

The job design for screen based work has implications for occupational health and safety, so employee Health and Safety Representatives should be involved. It is also essential that staff with expertise in occupational health and safety be involved. There is likely to be a more satisfactory work design if all stakeholders have an understanding of the hazards that can be associated with screen based work, and are able to be involved in the design of healthy and safe work.

The ACTU *Statement on Participative Workplace Structures* (1989) calls for Joint Union/ Management Health and Safety Committees to be established in all workplaces. Included among the functions of such committees is the consideration of proposed changes to the workplace or work processes, together with their implications for health and safety. No changes should be carried out until safe operating or handling procedures have been agreed upon.

It is essential that all job design processes identify the changes that will occur, and include provisions for addressing all of the occupational health and safety hazards associated with screen based work.

### **Limiting Exposure to Screen Based Work**

It is recommended that workers should be provided with other work that takes them right away from the screen for at least half their working time.

Job design for screen based work should make provision for regular breaks of at least 15 minutes per hour for concentrated screen based work, and 15 minutes per 2 hours for less strenuous work.

Some workplaces have adopted a standard of 10 minutes break after 50 minutes of screen based work, or 5 minutes break after 25 minutes work.

There is evidence to suggest that more frequent but shorter breaks are more beneficial.

Rest breaks should be recuperative, and take place away from the VDU. Breaks should not involve any visually demanding tasks (ones that require sustained focus at a distance less than 30 cm or between 50 and 150 cm, according to Comcare Australia), nor should they involve repetitive motions. During breaks, the eyes should refocus at a variety of distances, and expansive movements that exercise different muscle groups in the neck, shoulders, arms, hands, and fingers, will help to relieve muscular fatigue.

## **Training**

Training should play a major role in addressing all risks associated with screen based work. The identification of training needs should be a feature of job design from its earliest stages. Steps should be taken to introduce appropriate training prior to, and at the point of, implementation of any change.

Managers and supervisors should be trained in how best to provide a healthy and safe workplace, and healthy and safe systems of screen based work.

Workers should not be expected to perform screen based work without appropriate training. For many kinds of screen based work, touch typing is a basic skill which instils healthy and safe work practices addressing possible musculo-skeletal pain and eye problems.

Workers who are expected to perform screen based work should at least have been provided with training in:

- recognising, identifying and reporting hazards in screen based work environments
- all tasks, functions, and systems applications and the associated safe work practices to be used or performed
- the correct adjustment of ergonomic furniture
- the avoidance of inappropriate postures for screen based work
- the appropriate use of rest breaks

Employee Health and Safety Representatives should have a full grasp of the procedures and processes being adopted as part of the job design process. They should have access to information and training and there should be a shared knowledge and understanding which will foster effective and productive

consultation. Health and Safety Representatives may be involved directly in the job design process, and should be consulted on issues related to present and proposed work processes and practices.

## **Workload**

Workload can be considered to be the product of an interaction between the physical environment and work organisation. In screen based work, effective management of workload is central in the control of a number of OHS hazards.

The screen based workload must be sufficient to ensure that workers can maintain a reasonable level of interest in their work, and must not be so high that excessive demands are placed upon their abilities and skills. Effective management of the workload can be addressed through:

- identifying peaks and troughs in the workload through consultation with workers
- scheduling work to maintain reasonably steady workloads from week to week and month to month
- anticipating unavoidable peaks in workload and scheduling preparatory work during slacker periods to ease the rush
- avoiding piece rate, bonus payment or incentive systems linked to high stroke rates
- avoiding electronic monitoring of stroke rates or error rates
- avoiding excessive overtime

## **PHYSICAL ENVIRONMENT FOR SCREEN BASED WORK**

The physical environment for screen based work can be described in terms of the lighting, air quality, noise, levels of 50 hertz magnetic fields in the working environment, and the ergonomic characteristics of the screen based and associated office equipment. All work environments, including those where screen based work is performed, must comply with all relevant OHS legislation and OHS standards.

### **Lighting**

The lighting environment for screen based work must be conducive to both reading of hard copy and screen based work. Quantity and quality of lighting are both important. Improper lighting can impair the visibility of the display and the operation of the keyboard, as well as reading and writing.

**Quantity of Lighting:** The quantity of light illuminating a surface such as a desk top or work task area is determined by the measure of the illuminance of the area. The unit of illuminance is the lux, or lumens per square metre.

Most workers have no difficulty in carrying out reading and writing tasks with an illuminance level of 300 lux at the task. Levels lower than 400 lux are more comfortable for adjusting the eyes between tasks of screen viewing and hard copy reading.

- for circulation areas in a building, illuminance should be above 100 lux
- for VDU work the illuminance should be between 150 and 300 lux
- for normal reading and writing tasks the illuminance should be between 300 and 500 lux

The intensity of the screen must be adjustable to compensate for visual tasks that are screen based.

Task lights must be made available as necessary for other visual tasks. Lower, rather than higher, powered lamps are preferred for task lights, since excessive levels of task lighting can put strain on the eye muscles in switching between brightly lit paper copy and a self-illuminated VDU screen. Workers should be consulted about their individual lighting requirements.

**Quality of Lighting:** Glare, brightness distribution and control, uniformity, colour selection, and reflectance are all aspects of the quality of lighting. The major factors that govern light quality are the type of lamp and the type of diffuser used. Diffusers spread and distribute the light towards the task area.

Generally, in a clerical office environment, a 36 watt WHITE fluorescent tube is recommended, as it provides reasonable colour rendering properties with a very good efficiency.

Glare experienced during screen based work causes visual discomfort and difficulty in viewing the screen. Direct discomfort glare from windows or light fittings (luminaires), and reflected glare from screens impairs the performance of visual tasks. Glare in the screen based work environment must be avoided. There should be no glare in the immediate field of vision of workers involved in screen based work.

**Antiglare Filters:** Antiglare filters must not be used as a substitute for inadequate control of glare in the screen based work environment, since they degrade the visibility of the display.

**Lighting Maintenance:** Dirt and dust accumulates on the reflecting and transmitting surfaces of light fittings and other room surfaces, and the illuminance from lamps decreases as they age. To maintain both the quality and quantity of light for screen based work, light fittings and other room surfaces must be cleaned and the lamps must be replaced at frequent intervals. A general illuminance level of not less than 320 lux is required.

## **Air Quality**

Air quality is an important aspect of the physical environment for screen based workers. The air in a screen based workplace must be clean and fresh and at a comfortable temperature and humidity. The screen based work environment must

meet the air temperature and humidity requirements for general office work, as detailed below.

**Air Contaminants:** Ensuring clean air in the screen based workplace means controlling any atmospheric contaminants as required by the Worksafe Australia *National Model Regulations for the Control of Workplace Hazardous Substances*. In any case, the levels of contaminants should not exceed the Exposure Standards endorsed by Worksafe Australia and published as *Exposure Standards for Atmospheric Contaminants in the Occupational Environment*. These requirements have been incorporated into Occupational Health and Safety legislation in most State and Territory jurisdictions. Further advice on dealing with air contaminants can be found in the *ACTU Occupational Health and Safety Policy: Chemical Hazards*.

**Temperature:** For screen based work, the temperature in the working environment should be in a range between 20 C and 24 C in winter and between 23 C and 26 C in summer.

**Humidity:** Humidity is a measure of the amount of moisture in the air. When the air temperature is high, or when the work involves considerable physical activity, the humidity becomes an important aspect of the screen based work environment. There are unlikely to be health risks for normal healthy workers from relative humidity levels expected to be found in air conditioned workplaces. The humidity in screen based work places should be maintained at between 25% and 65% relative humidity.

## Noise

The noise limit enforced by State and federal regulations is generally expressed as an exposure standard in decibels (dB(A)).

Concentrated mental work, and jobs that require the correct interpretations of sounds (eg. understanding speech) are "noise sensitive" occupations. In such work, even low levels of noise can be disturbing. Noise levels in offices may range from 40 - 60 dB(A).

Very quiet, small offices and drawing offices	40-45 dB(A)
Large, quiet offices	46-52 dB(A)
Large, noisy offices	53-60 dB(A)

Noise in the screen based work environment must not generally exceed 60 dB(A).

To minimise discomfort and distraction during screen based work, the noise emitted by a VDU and its associated hardware must not exceed 50 dB(A), measured one metre from the source(s).

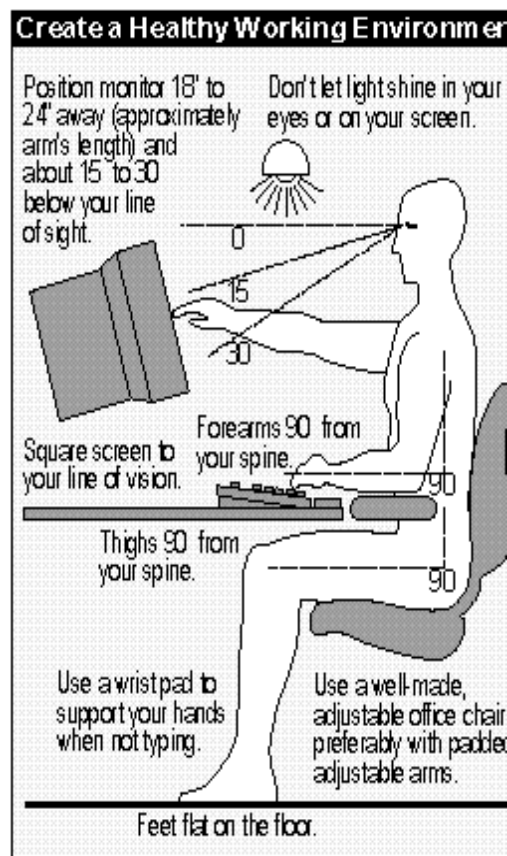
## Workstation Specifications

In these **ACTU Guidelines**, screen based work is considered to be any work that

involves the use of screen based equipment. A workstation consists of the physical equipment (including computer screens and associated equipment) that is located where screen based work is performed. Workstation items include:

- Desk / Counter
- Chair
- Footrest
- Document holder
- Screen raiser / monitor arm
- Visual display unit (VDU)
- Input Devices (keyboard and mouse)

A well designed and correctly adjusted workstation allows safe, healthy and comfortable working postures to be adopted during screen based work. The major aim in selecting workstation furniture must be to promote good working postures.



**Desk:** The work surface for screen based work should be a single, even, unbroken surface. It should be height adjustable through at least 150mm, to cater

for workers of varying heights and builds. As the tasks performed at a screen based workstation usually include tasks other than screen based work, the workstation must be large enough to accommodate the screen, keyboard and associated equipment and also have enough room to accommodate the necessities for the other tasks (eg writing) and the resting of hands and arms. For mixed tasks, the work surface must have minimum dimensions of 1500 mm x 900 mm. The workstation should also be large enough to permit items used regularly to be within easy reach.

**Counter:** Workstations can be located in counters in some workplaces, providing a physical and psychological barrier between screen based workers and the people that they deal with. The human factors associated with this situation are complex as the worker's attention is alternately focussed on the client, the counter work and screen based work. To design and construct a counter and its surroundings appropriately, consideration must be given to task analysis (eg. services performed, tasks performed, reach requirements, security requirements) and work organisation.

**Chair:** Chairs must provide efficient body support, allow relaxed and non-restricted muscle function and changes in body posture, and leave the arms free for unsupported keyboard function to minimise fatigue. It should be possible to easily and independently adjust the height of the chair and the position of the backrest while seated on the chair.

**Footrest:** The range of heights that adjustable chairs and desks are designed to cover does not generally cater for the tallest and shortest workers in the population, so footrests must be provided wherever desk and chair height cannot be adjusted through a sufficient range to suit individual requirements, or whenever requested by the employee.

**Document Holder:** Document holders are necessary to encourage the adoption of good working postures and to minimise fatigue. Documents holders should be appropriate to the physical size, shape and weight of the source material, and be stable and adjustable to different positions, heights and angles.

**Visual Display Units:** VDUs must comply with Australian standards for electric shock, fire, heat, mechanical, radiation or chemical hazards. The equipment must be mechanically stable and structurally sound, with no sharp edges. Dangerous parts must be adequately guarded.

The VDU should be positioned at an appropriate height and angle for a comfortable working posture. The VDU must be separate from the keyboard, be adjustable for height above the desk and be adjustable for forward and backward tilt and swivel.

Each worker has an individual requirement for choice of screen colours and colour combinations in screen based work. For example, some colours and colour combinations are not suitable for workers who are colour blind. As a result, no recommendations are made in these **ACTU Guidelines for Screen Based Work** on individual screen colours or colour combinations. Because of the individual needs of each worker, software design should include the ability for each worker to choose the colours and colour combinations for screen based work appropriate to their needs.

Increasing numbers of tasks, such as desk top publishing, require large screens to minimise demands on users' concentration.

**Keyboard and Mouse:** Keyboards and mouse units must comply with Australian design standards.

As many as 20 per cent of workers in Australian workplaces are left handed. A percentage of these workers experience physical difficulties using right-handed keyboards (numeric keypad fixed at the right hand side). Where workers involved in screen based work require left handed keyboards, they must be supplied. Similarly, where workers require left handed mouse units, they must be supplied.

**Screen Raiser / Monitor Arm:** Screen raisers / monitor arms can be provided so that the VDU screen can be optimally positioned to ensure a relaxed head and neck posture. The height of the VDU should not be above the horizontal eye height of the operator and the centre of the VDU screen should not be higher than 400 mm above the work surface. Where provided, monitor arms must be easily adjusted.

**Portable Computers:** Screen based work involving portable computers must provide the same level of overall health and safety protection as workstation based computers. These machines are likely to be used in working environments that differ substantially from the regular workstation environment, and can have some characteristics that might compromise good ergonomic practice (for example, smaller, non-detachable keyboards). As a result, before portable computers are introduced, an assessment must be made of their suitability for the work. The assessment should focus particularly on the likely duration of portable screen based work, and the likely physical and organisational environment in which that work is to be done.

## **ELECTROMAGNETIC FIELDS**

Since the research evidence remains inconclusive, the appropriate OHS strategy for dealing with EMF in screen based work environments is a policy of prudent avoidance, taking a preventative approach by control of exposure at source.

The ACTU has decided to adopt such a policy of prudent avoidance and recommend the EMF exposure standards set out below. There are many EMF sources within an office environment (printers, copiers, internal and external power cables and transformers etc). Therefore, the exposure standard should apply to the whole office.

This policy recognises that even if the risk is small it will increase with growing use of electronic means of communication and administration.

### **Exposure Standard**

The EMF standard adopted by the ACTU cannot be guaranteed to have no adverse health effects. It is recommended on the basis that:

- no studies to date have shown adverse health effects below the recommended exposure levels
- the limits should be reasonably achievable with current technology or by

altering work practices, workstation and/or equipment location.

### **Visual Display Units**

Electric field:

- 5Hz to 2kHz, less than 10 V/m, measured at 50cm around the VDU and at 30cm in front of it.
- 2kHz to 400 kHz, less than 1.0 V/m, measured at 50cm around the VDU and at 30cm in front of it.

Magnetic field:

- 5Hz to 2kHz, less than 2mG at 50cm around the VDU and at 30cm in front of it.
- 2kHz to 400kHz, less than 0.25mG at 50cm around the VDU.

Electrostatic potential:

- The surface of the VDU shall have a low electrostatic potential, to prevent dust particles moving from the screen to the user due to differences in potential.

### **Laptop Computers**

Tests on several laptop computers have shown zero magnetic field emissions with two exceptions:

- A peak of up to 10 mG for up to five seconds during the programme loading
- A 0.1 to 1.6 mG fluctuating field at 30 cm, emanating from the computer transformer.

While relatively small, these fields could be projected into the body or legs if the laptop computer is in fact operated on the user's lap. This exposure should be avoided by using laptop computers on desks or other solid surfaces.

### **Surrounding Environment.**

The average exposure for individual workers over an eight hour day should be less than 2mG. This should be achieved primarily by controlling EMFs at source by:

- purchasing improved equipment or shielding equipment
- ensuring that VDUs and other equipment are adequately spaced so that combined fields do not exceed the standard
- rerouting or shielding cables

Where these measures are impracticable, other options may include:

- limiting time worked in areas where the exposure standard is exceeded
- locating workers outside high exposure areas. In these circumstances warning placards should set out the practices that should be observed in relation to the particular area or equipment

- switching off equipment which is not in use.

### **Measuring EMFS**

Many modern VDUs meet these standards, though there may be excessive EMFs from other sources. Therefore it is necessary to check the whole office not just the VDUs. Other EMF sources can include copiers, internal and external power cables and electric transformers. Remember to check at points all round the equipment. VDUs emit more EMFs from the back and sides than from the front. Also remember magnetic fields pass through walls, partitions, floors and ceilings.

Because of possible associations of EMFs with birth defects and miscarriage, consideration should be given to providing workers who are contemplating pregnancy in their families with the option of moving to duties other than screen based work.

Children may be more sensitive to EMFs than adults, so more stringent measurements and precautions should be taken if there is child care in the workplace. School computer rooms, which may use old equipment in crowded conditions, should also receive rigorous attention.

Testing equipment can be rented from the Australian Radiation Laboratories. Consider getting management to purchase measuring equipment from a major laboratory supplier. The meters must be capable of measuring milligauss and volts per meter at the two frequency bands mentioned above.

## **HEALTH SURVEILLANCE**

### **Eye Testing**

An initial vision and eye assessment for workers required to perform screen based work should be carried out by an optometrist or ophthalmologist who is acceptable to both the unions and management. Additional vision and eye assessments should be carried out whenever screen based workers experience discomfort or ill-health that might be associated with their screen based work, and at intervals not exceeding two years.

Eye tests should include a slit lamp biomicroscope examination of the lens to check for incipient or congenital cataracts. Vision tests should include, as a minimum, tests for distance visual acuity, near visual acuity and oculomotor co-ordination. Workers whose vision needs correction to perform screen based work should be provided with corrective devices appropriate for their work.

The costs of tests, professional consultants, and corrective eyewear should be borne by the employer, but the choice of physician should rest with the employee.

### **Medical Reports and Records**

Reports from the ophthalmologist or optometrist must be made available in the first instance to the worker concerned, and individuals must always be given access to their own medical records. Under no circumstances should the client/doctor relationship and confidentiality be breached. Medical records must

be held as confidential and their contents must not be revealed to management or unions without the explicit consent of the individual concerned.

Under no circumstances should the results of these tests alone be used as criteria for employment. Reports must be limited to a statement as to the suitability of the worker for screen based work and any optical correction required.

### **Alternative work**

Where screen based equipment is introduced, workers with pre-existing medical conditions (eg photosensitive epilepsy) which may preclude them from performing screen based work, should be provided with alternative work without loss of pay, conditions or career opportunities.

## **POLICY CHECKLIST**

This checklist is designed to assist you in ensuring that you have addressed all hazards which may be associated with screen based work in your workplace.

For the purposes of this **ACTU Occupational Health And Safety Policy: Screen Based Work**, screen based work is considered to be any work that involves working with screen based equipment.

Any equipment that has a self-illuminating screen for displaying information in alphanumeric, graphical or similar is screen based equipment, as are all of the accessories and peripherals that are combined with these items to form work systems.

This **ACTU Occupational Health And Safety Policy: Screen Based Work** applies equally to intermittent screen based work, and to work where the screen based component occupies a large portion of the day.

### **Duty of Care**

- Employers must identify, assess and control the hazards of screen based work.
- Employers must provide a healthy and safe screen based workplace by providing an appropriate physical and organisational environment for screen based work.
- Employers must provide healthy and safe systems of screen based work by implementing safe work practices.

### **Hierarchy of Controls**

The hazards associated with screen based work must be controlled according to the hierarchy of controls.

## Consultation

Where changes to the screen based workplace or work processes are planned, there should be full consultation and employee participation in the decision making processes that influence changes in their work.

Where changes are necessary to achieve a safe and healthy screen based work design, they should involve employee health and safety representatives, or joint union/management health and safety committees where applicable.

No changes should be implemented until safe operating or handling procedures have been agreed upon.

Consultation should ensure that *all* aspects of this **ACTU Occupational Health and Safety Policy: Screen Based Work** are satisfied *before* workers are required to undertake new or different screen based work.

## Healthy and Safe Job Design

- Screen based job design should limit the total time spent at screen based work, and the length of continuous periods spent at screen based work.
- Screen based work should be organised so that employees are not required to spend more than half of their ordinary hours of work on any day performing screen based work.
- Workers should be provided with other work that takes them right away from the screen for at least half their working time.
- Jobs should be designed to achieve a reduction in repetitive tasks.
- Jobs should be designed to provide workers with control over the way their work is organised.
- Jobs should be designed to provide workers with opportunities to exercise individual initiative.
- Jobs should be designed to ensure that workers can take responsibility for entire pieces of work.
- The screen based workload should be effectively managed.
- The screen based workload should be sufficient to ensure that workers can maintain a reasonable level of interest in their work.
- The screen based workload should not be so high that excessive demands are placed upon workers abilities and skills.
- All job design processes should identify all the changes that will occur.
- All job design processes should include provisions for addressing all of the occupational health and safety hazards associated with screen based work.

## Pacing and Incentive Schemes

Electronic monitoring of screen based work (for example, stroke rates or error

rates) should not be used to pace workers or to assess their performance.

Incentive schemes linked to potentially unhealthy or unsafe practices (for example, high stroke rates) should be emphatically rejected.

## **Rest Breaks**

Screen based job design should make provision for recuperative rest breaks.

- Recuperative rest breaks are to be taken at the worker's discretion.
- For concentrated screen based work, there should be regular breaks of at least 15 minutes per hour.
- For less strenuous screen based work, there should be regular rest breaks of at least 15 minutes every two hours.
- Recuperative rest breaks are over and above regular meal and health breaks.
- The employer should provide congenial rest areas, convenient to, but separate from the screen based workstation.

## **Training**

Managers and supervisors should be trained in how best to provide healthy and safe systems of screen based work.

Where workers are expected to perform screen based work, they should at least have been provided with training in:

- recognising, identifying and reporting hazards in screen based work environments
- all tasks, functions, and systems applications and the associated safe work practices to be used or performed
- the correct adjustment of ergonomic furniture
- the avoidance of inappropriate postures for screen based work
- the appropriate use of rest breaks.

Employee health and safety representatives should have access to information and training in job design.

## **Screen Based Working Environment**

All work environments, including those where screen based work is performed, must comply with all relevant OHS legislation and standards.

## **Lighting**

The lighting environment for screen based work must be conducive to both reading of hard copy and screen based work.

- For normal reading and writing tasks the illuminance must be between 300 and 500 lux, and for VDU work the illuminance must be between 150 and 300 lux.
- Task lights must be made available as necessary for visual tasks other than screen based work.
- Glare in the screen based work environment must be avoided.
- There must be no glare in the immediate field of vision of workers involved in screen based work.
- Antiglare filters must not be used as a substitute for inadequate control of glare in the screen based work environment
- Light fittings and other room surfaces in the screen based working environment must be cleaned at frequent intervals.
- Lamps in the screen based working environment must be replaced at frequent intervals.
- A general level of not less than 320 lux must be maintained in the screen based working environment.

## **Air Quality**

The air in a screen based workplace must be clean and fresh and at a comfortable temperature and humidity.

The levels of contaminants should not exceed the Exposure Standards endorsed by Worksafe Australia and published as *Exposure Standards for Atmospheric Contaminants in the Occupational Environment*

The screen based work environment must meet the air temperature and humidity requirements for general office work.

The dry bulb air temperature must be maintained within a range between 21 C and 24 C in winter and between 23 C and 26 C in summer.

When temperatures go beyond this range, corrective action must be taken if workers are to remain in the workplace for other than short periods of time.

The humidity in screen based work places must be maintained at between 25% and 65% relative humidity.

## **Noise**

Noise in the screen based working environment must not exceed 60 dB(A).

The noise emitted by a VDU and its associated hardware must not exceed 50 dB(A), measured one metre from the source(s).

Continuous sounds in the screen based working environment must be minimised.

## **Workstation**

- The workstation must be large enough to accommodate the screen, keyboard and associated equipment.
- The workstation must have enough room to accommodate the necessities for all other tasks undertaken.
- The workstation must have enough room to accommodate the resting of hands and arms.
- The workstation must be large enough to permit items used regularly to be within easy reach.

## **Work Surface**

The work surface for screen based work must be a single, even, unbroken surface.

The work surface area must be adequate for the tasks to be performed at the workstation.

For mixed tasks (keyboard and clerical work), the work surface must have minimum dimensions of 1500 mm x 900 mm.

Work surfaces must be:

- easy to clean;
- of a neutral colour;
- of satin or matt finish; and,
- finished so that it is possible to write on a single sheet of paper with no backing.

The work surface must be height adjustable through at least 150 mm.

## **Chair**

Chairs must provide efficient body support, allow relaxed and non-restricted muscle function and changes in body posture, and leave the arms free for unsupported keyboard function.

It must be possible to easily and independently adjust the height of the chair and the position of the backrest while seated on the chair.

## **Footrest**

Footrests must be provided wherever desk and chair height cannot be adjusted through a sufficient range to suit individual requirements, or when requested by an

employee.

## **Visual Display Unit**

Workers must have ready access to the technical specifications for the VDU screens that they work with.

VDUs must comply with Australian design standards for electric shock, fire, heat, mechanical, radiation or chemical hazards. The equipment must be mechanically stable and structurally sound, with no sharp edges. Dangerous parts must be adequately guarded.

The VDU must be separate from the keyboard, be adjustable for height above the desk and be adjustable for forward and backward tilt and swivel.

Where monitor arms are provided, they must be easily adjusted from the seated position.

## **Input Devices**

Keyboards and mouse units must comply with Australian design standards.

Where workers involved in screen based work require left handed keyboards, they must be supplied.

Where workers require left handed mouse units, they must be supplied.

## **Portable Computers**

Before portable computers are introduced, an assessment must be made of their suitability for the work.

Screen based work involving portable computers must provide the same level of overall health and safety protection as workstation based computers.

## **Electrical and Magnetic Fields (EMFs)**

Exposure to EMFs within the office environment should average less than 2 milligauss over an eight hour shift.

People considering parenting should be given the option of moving to duties away from sources of electromagnetic fields where the EMF exposure standard in this policy is exceeded.

Any such move should not financially or vocationally disadvantage the worker (no loss of pay, seniority or career opportunity).

## **Eye Testing**

An initial vision and eye assessment for workers required to perform screen based work should be carried out by an optometrist or ophthalmologist who is acceptable to both employees and management.

Additional vision and eye assessments should be carried out whenever screen based workers experience discomfort or ill-health that might be associated with their screen based work.

Additional vision and eye assessments should be carried out at intervals not exceeding two years.

Workers whose vision needs correction to perform screen based work should be provided with corrective devices appropriate for their work.

The costs of tests, professional consultants, and corrective eyewear should be borne by the employer.

### **Medical Reports and Records**

Medical records must be held as confidential.

Individuals must always be given access to their own medical records.

The contents of medical records must not be revealed to management or unions without the explicit consent of the individual concerned.

Under no circumstances should the results of these tests alone be used as criteria for employment.

Such reports must be limited to a statement as to the suitability of the worker for screen based work and any optical correction required.

### **Alternative work**

Where screen based equipment is introduced, workers with pre-existing medical conditions (eg photosensitive epilepsy) which may preclude them from performing screen based work, should be provided with alternative work without loss of pay, conditions or career opportunities.

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