A Health Guide on Working with Display Screen Equipment

This Health Guide is prepared by the Occupational Safety and Health Branch, Labour Department

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Preface

      The Occupational Safety and Health (Display Screen Equipment) Regulation was approved by the Legislative Council on 24 April 2002 and will be brought into operation after a grace period of 12 months. The Regulation aims at protecting the safety and health of employees who use display screen equipment (DSE) at work for prolonged periods of time.

      This booklet is intended to help employers and employees minimize health risks associated with prolonged work with DSE in the office environment. Part I explains the meaning of 'display screen equipment', 'workstation' and 'user' in the context of the Regulation. It also discusses various health issues related to prolonged work with DSE. Part II provides guidance on the requirements in respect of risk assessment of workstations. Part III gives practical guidance on the ergonomic requirements of workstations and measures for reducing risks, safety and health training, as well as users' responsibility. Part IV covers offences under the Regulation.

Occupational Safety and Health Branch
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Part I

《 What is display screen equipment (DSE)? 》

1.1 Under the Occupational Safety and Health (Display Screen Equipment) Regulation (the Regulation), 'display screen equipment' means any display screen which shows letters, numbers, characters or graphics, regardless of the display process involved. It covers conventional display screens, whether based on cathode ray tube displays, flat panels or any other display technology, e.g. ordinary computer displays and microfilm viewers.

《 What is a workstation? 》

1.2 Under the Regulation, 'workstation' means an assembly comprising the DSE, any chair, desk, work surface, printer, document holder or other item peripheral to the DSE, and the immediate working environment around the DSE, e.g. lighting and noise.

《 Who and how are employees affected by the use of DSE? 》

1.3 Employees using DSE only occasionally are unlikely to suffer significant health problems arising from the use of such equipment. However, some employees, by reason of the nature of their work, are required to use DSE for a prolonged period of time almost every day ('user' under the Regulation). Please refer to the Code of Practice for Working with Display Screen Equipment for practical guidance as to whether an employee is a "user" as defined in the Regulation.

1.4　As a result of prolonged DSE work, users could suffer discomfort and other short-term health problems like upper limb pains and discomfort, eyestrain, fatigue and stress. Whilst many of these problems are temporary and may go away after work, they can and should be avoided. If the temporary ailments are ignored, such symptoms can deteriorate into chronic health problems requiring long-term treatment which is expensive to both employers and employees, and ultimately to the health care service at large. Further information on DSE-related health issues is at the Annex.

《 Which workstation is covered by the Regulation? 》

1.5　In any workplace, there may be workstations which are set up for use by different persons for different purposes. For the sake of protecting the safety and health of users, those workstations that fulfil the following conditions fall within the scope of the Regulation:

a)　provided by a person responsible for the workplace (employer or occupier of the workplace, as the case may be) to be used by users for work;

b)　not intended for use by the public; and

c)　normally used or intended to be normally used by users.

1.6　The Regulation, therefore, does not apply to workstations that are normally used by employees who are not users (as defined in the Regulation), nor to workstations that are intended for public operation, e.g. workstations in public libraries and information/directory kiosks.

1.7　Moreover, the following DSE applications that would pose minimal health risks are excluded from regulatory control :

a)　DSE that is used mainly to show pictures, television or films;

b)　drivers' cabs or control cabs for vehicles or machinery;

c)　DSE on board a means of public transport;

d)　portable systems not in prolonged use;

e)　calculators, cash registers or any equipment having a small data or measurement display required for direct use of the equipment; or

f)　window typewriters.

Part II

2.1   Under Section 4 of the Regulation, a person responsible for a workplace should perform a risk assessment of a workstation in the workplace before it is first used by users. Please refer to the "Code of Practice for Working with Display Screen Equipment" for practical guidance on how such a risk assessment should be performed.

2.2   The responsible person should review the risk assessment performed in respect of a workstation whenever there has been a significant change in the workstation or in the conditions of the previous assessment, for example:

  a)   workstation furniture;
  b)   hardware devices particularly the screen, keyboard or other input devices; and
  c)   working environment.

  After completing the review, the responsible person should revise the assessment record accordingly.

2.3   The responsible person should also, so far as reasonably practicable, keep and retain a record of all risk assessments performed by him in respect of a workstation for a period of at least 2 years after the workstation ceases to be used by any user.

2.4   The responsible person should produce the risk assessment records for inspection by an occupational safety officer upon request. In case he is unable to do so, he should deliver a copy of those records to the occupational safety officer within the period specified in the request in writing sent by the officer.

Part III

《 How to reduce the risks? 》

3.1   Under Section 5 of the Regulation, the person responsible for a workplace is required to reduce any risks identified in a risk assessment of a workstation to the lowest extent as is reasonably practicable. For the information of the users concerned, he should, so far as reasonably practicable, make available to them the record of the findings of the risk assessment and the record of actions he has taken to reduce the risks (Section 6). He should also, so far as reasonably practicable, ensure that workstations in the workplace are suitable with regard to the safety and health of users of those workstations (Section 7). The guidance in the following paragraphs describes the general requirements for setting up such a workstation. The responsible person may need to reduce the risks through modifying the work organization or work practice.

《 General Requirements for a Workstation 》

3.2   A workstation is preferably designed ergonomically such that the safety and health of the user are secured, apart from fulfilling the inherent requirements of the task.* The main features of such a workstation and some suggested precautionary measures are as follows (please also see the diagram) :

*Note: In general, the requirements are fully applicable to a typical office environment. However, there are special situations where some of these requirements may not be applicable because of the inherent characteristics of the task or some practical considerations, for example:

a)   when a user needs to rapidly locate and operate emergency controls, a detachable keyboard may not be suitable;

b)   a user who is on wheelchair normally could not adjust the seat height of the chair;

c)   when the original document is of poor quality, the scanned image on screen may not be clear.

In these special situations, the responsible person may need to make some other arrangements to ensure the safety and health of the worker when the latter performs DSE work.

Diagram : The optimal workstation and working posture
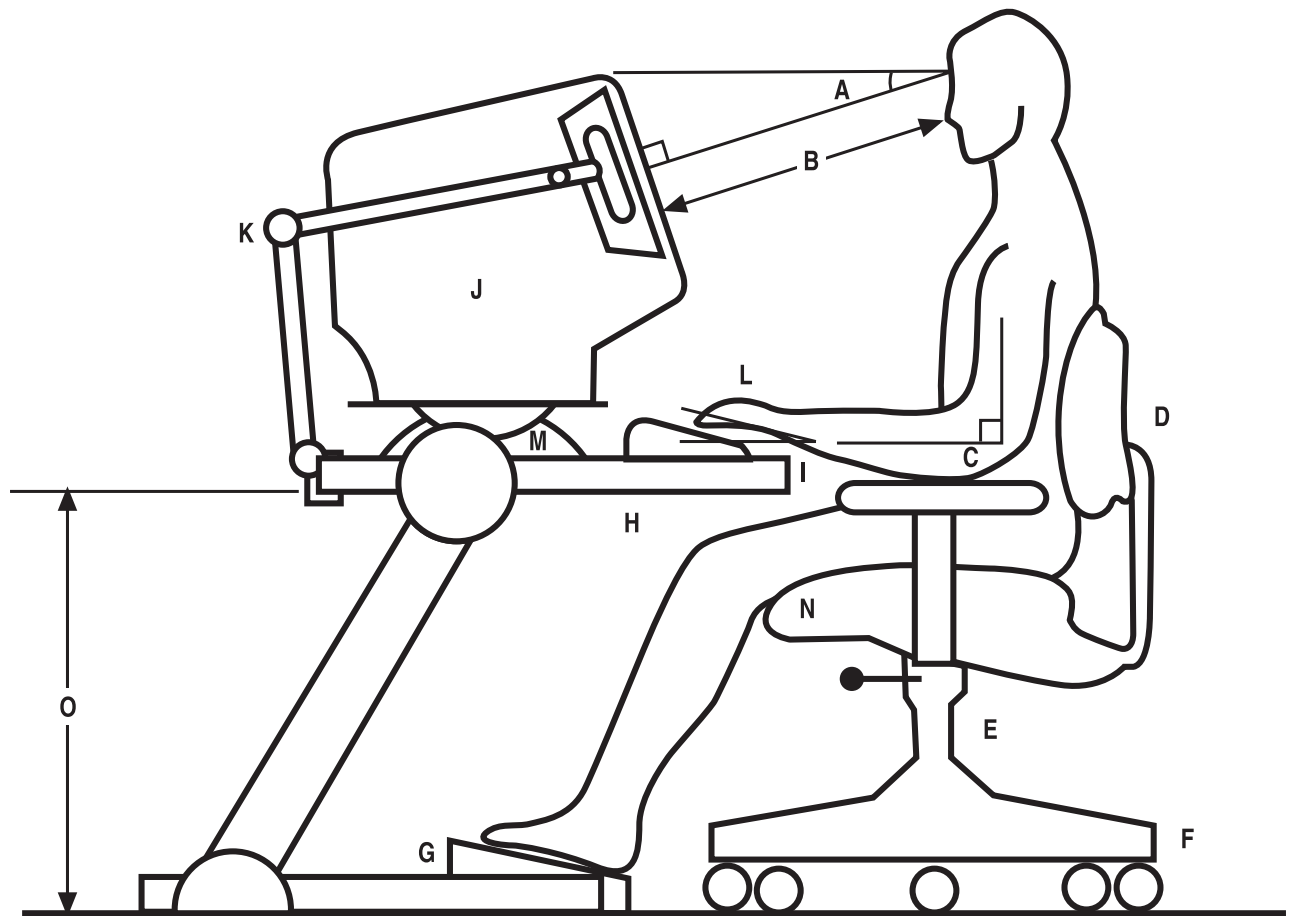
A. First line on screen at about or just below eye level

B. Comfortable viewing distance, e.g. 35 - 60 cm for text of normal font size

C. Forearm at about right angle to arm

D. Backrest adjustable in height and tilt

E. Adjustable seat height : allowing the user to sit with thighs approximately horizontal, lower legs vertical and feet resting firmly on the floor

F. Stable base, with castors if necessary

G. Firm footrest if required

H. Adequate legroom

I. Support for hands

J. Screen at about right angle to line of sight

K. Adjustable document holder if required

L. Wrist kept straight or at most slightly inclined

M. Screen support easily adjustable for rotation and tilting

N. Rounded or scrolled edge seat pad

O. Adjustable table height preferable

Screen

The screen should give a clear, sharp and steady image.

*   Replace aging monitors or repair defective ones.
*   Clean the screen if necessary.
*   When the colour blurs or the image deteriorates, try to relocate the screen away from any source of strong electromagnetic field, e.g. high power speakers, or vice versa.
*   In avoiding image deterioration caused by external electromagnetic fields, a LCD monitor may be chosen.
*   If the software application allows, turn the display to light characters on a dark background to make the flicker less perceptible.
*   Users who are susceptible to the flickering effect should look for other screen models which produce a more stable display

The characters should be of adequate size, with adequate spacing between the characters and the lines.

*   Use a monitor of adequate screen size.
*   Adjust the image size and spacing by software control.
*   Adopt a viewing distance where the image can be comfortably read. A distance of 35 - 60cm would be appropriate for text of normal font size.

The brightness and contrast of the image should be easily adjustable.

* Choose a screen with brightness and contrast controls.
* Always set the brightness and contrast to a comfortable level.

The screen should be swiveled and tilted, if so adjustable, to suit the needs of the user.

* A screen with swivel and tilt adjustment is preferable.
* Adjust the screen to make viewing comfortable.

Keyboard

The keyboard should be tiltable and detachable from the display screen so that the user may adopt a comfortable working posture.

The surfaces of the keyboard and keytops should be non-reflective. The letters and symbols on the key tops should be clear and easily recognizable.

There should be sufficient space in front of the keyboard to provide support for the hands.

* The table edge should preferably be rounded.
* A wrist support pad may be considered if the user finds it more comfortable.
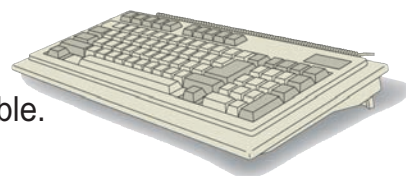
Work Surface

The work surface should be large enough for the screen, keyboard, document and peripheral equipment.

* If the mouse is used intensively, the work surface or the keyboard shelf, if provided, should be large enough to hold the mouse as well. This allows the mouse to be within easy reach.
* If the work surface is limited, try to reorganize the surface layout.
  Less frequently used items may be taken away.
* Try to use compact equipment.
* Before new DSE is installed, it is desirable to anticipate the space allocation for the workstations.
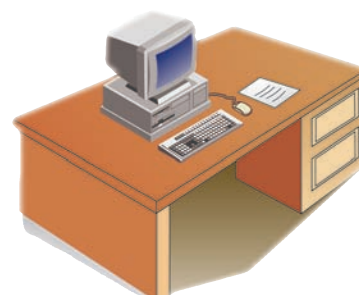
The heights of the work surfaces for the screen and keyboard should be set to suit the needs of the user.

* For optimal screen positioning, place the screen in front of the user. The first line of screen display should preferably be at or slightly below the eye level.
* The screen height may be adjusted simply by placing the monitor on a stable object, e.g. the computer case. Other options like using height adjustable monitor arms can also be considered.
* The keyboard and the mouse should be positioned at a height that allows the user to adopt a natural hand-arm posture, i.e. the upper arms held vertical and the forearms approximately horizontal.
* So far as reasonably practicable, a height adjustable desk should be used to support the keyboard, the mouse or other input devices so that the natural hand-arm posture can be adopted.
* If a desk of fixed height is used and it is too high, an adjustable keyboard shelf can be installed under the desk to keep the keyboard at the right level. Alternatively, one may raise the chair to suit the height of the table and provide a suitable footrest to compensate for the raised seat height.

There should be adequate legroom below the work surface.

* Ensure that the workstation has sufficient legroom so that the user may stretch his legs or change posture.
* Clear any obstructing materials beneath the work surface.

A document holder, if provided, should be stable and preferably be adjustable, and be properly positioned to avoid awkward neck posture and movement.

Chair

The chair should be adjustable in height to suit the body size of the user.

* The chair should be so adjusted that the user can sit with thighs in a horizontal position when the lower legs are vertical and the feet are resting firmly on the floor. In general, the seat height should be adjustable in the range of 40 - 50cm from the floor.
* The seat height control should preferably be operable from the normal sitting position, and excessive force or tools should not be required.

The backrest should be easily adjustable in both height and tilt to provide adequate support to the lower back.

The seat pan should be of appropriate hardness and the front edge should be scrolled.

Armrests, if provided, should not interfere with keyboard operation.

The chair should have a stable base. Smooth castors should be provided at its base to allow easy movement if mobility is required.

* A five-pronged base is generally recommended to prevent the chair from toppling over.
* The type of castor should suit the properties of the floor surface. Castors with low resistance should not be used on a hard floor surface.

Footrest

A stable footrest should be made available to the user if the chair is too high for the feet to rest firmly on the floor.

* The footrest should be stable, should have a non-slip surface and be of sufficient size to allow some freedom of movement. The inclination of the support surface should preferably be adjustable.

Illumination

General lighting or task lighting should be suitably provided in accordance with the nature of the work and the visual demand on the user.

* The wall, ceiling and floor surfaces should be of medium reflectance to avoid gloom or glare.
* When documents are read in conjunction with computer work, it is best to use low lighting for the surrounding and a desk lamp for reading the documents. If task lighting is not provided, the illuminance level of the work area should be 300 - 500 lux.

Reflections and Glare

Reflections and glare should be avoided.

* Re-position the screen and/or control the light sources appropriately to prevent glare and reflections.
* The finishes of walls and furniture located near the workstation should not be highly reflective. Walls can be painted in subdued colours.
* The work area should preferably be located away from windows, and the screen be placed at right angle to windows. Sunlight through windows can be screened by blinds.
* Light fixtures can be equipped with diffusers or louvers to control distribution of light.

* Avoid placing the screen under rows of light fittings to eliminate light images.

* Turn the screen display to dark characters on a light background to make reflections less perceptible.

* Using a screen glare filter is another way of reducing screen reflections. In general, screen glare filters reduce the brightness of the image. Therefore the user should ensure that the image's brightness can be adjusted to an acceptable level if a filter is to be added. Nowadays the screens of some monitors are anti-reflective and do not need filters at all. Using a screen filter is not a substitute for proper lighting, but a supplementary solution only.

Noise

Noise produced by the workstation should be controlled to avoid disturbance to the user.

* For general computer work, a noise level below 60dB(A) is optimal.

《How to reduce the risks by improving work organization or work practice?》

3.3 Continuous DSE work can be monotonous, while prolonged sitting is tiring. It is advisable that a DSE user performs DSE work and non-DSE work alternately so that posture can be changed and the fatigue arising from prolonged DSE work can be relieved. Where non-DSE work cannot be arranged, appropriate rest breaks are recommended, e.g. a 5 - 10 minute break after 1 - 2 hours continuous DSE work depending on the intensity of the work. Moreover, job enrichment can often give an employee more job satisfaction.

3.4 Heavy workloads and tight deadlines can cause work stress, which if not properly managed, may become excessive and affect health. It is advisable that a supervisor effectively plans and organizes the work of his subordinates so that workloads and deadlines are reasonable. In doing so, the supervisor can discuss with the subordinates in setting deadlines and work priorities.

As an employer, do I need to provide safety and health training to users?

3.5　Safety and health training is essential for helping a user avoid risks associated with DSE work. Under Section 8 of the Regulation, an employer should, so far as reasonably practicable, ensure that users employed by him are provided with necessary safety and health training in the use of workstations. It is recommended that the training should enable the users to recognize and understand:

a)　the risks of the DSE work;

b)　various precautions for avoiding the risks and their importance, for example, a correct working posture, adjusting the equipment and furniture to suit own body features and work comfort, changes of activities at suitable intervals, etc.;

c)　how to report problems and symptoms; and

d)　how to get assistance from the employer.

3.6　The format of training is not restricted to lectures. Other means like video shows, educational leaflets, seminars can also be considered so long as they are effective in meeting the purpose.

As a user, how can I co-operate with the person responsible for the workplace?

3.7　Under Section 9 of the Regulation, a user of a workstation in a workplace should, so far as reasonably practicable, conform to the safe system of work and work practices and comply with any risk reduction measures, that the person responsible for the workplace has established or taken for the safety and health of users at the workstation. A user should co-operate with the responsible person in conducting risk assessments and in the implementation of preventive and remedial measures to reduce identified risks. In the case where serious problems relating to the DSE work arise, a user should immediately notify the responsible person of the matter.

Part IV

4.1   A person responsible for a workplace or an employer who fails to comply with the relevant provisions of the Regulation commits an offence and is liable to a maximum fine of $100,000. These offences are offences of strict liability.

4.2   A user who fails to comply with the relevant provision of the Regulation commits an offence and is liable to a maximum fine of $50,000.

Annex

Health Aspects of Using Display Screen Equipment

Prolonged use of display screen equipment may cause short-term health problems like upper limb pains and discomfort, eyestrain, bodily fatigue and stress.

Upper limb pains and discomfort

The problems of discomfort at hands, arms, shoulders and the neck are common among DSE users. These may range from temporary fatigue or soreness to chronic soft tissue disorders.

Prolonged static posture of the neck, awkward positioning of the hands and wrists, heavy DSE workload combined with tight deadlines are some of the possible causes. These problems are largely preventable by the application of ergonomic principles to the design of workstations and to the organization of work.

Eyestrain

It refers to complaints of eye fatigue and headache. Causes may include poor visual display quality of the screen, poor lighting conditions and heavy workload. However, it is unlikely that DSE work would cause any permanent effect to the eyes or eyesight.

Fatigue and stress

Fatigue and stress can be more common among DSE users as the organization of certain types of DSE work may lead to a higher prevalence of common stress-related factors such as lack of sufficient control of the work by the user, high-speed repetitive work and reduced variety of postures.

Enquiry

If you wish to enquire about this Health Guide or require advice on occupational health and hygiene, please contact the Occupational Safety and Health Branch of the Labour Department through:

Telephone : 2852 4041
Fax : 2581 2049
E-mail : enquiry@labour.gov.hk

Information on the services offered by the Labour Department and on major legislation can also be found by visiting our Home Page in the Internet. Address of our Home Page is http://www.labour.gov.hk.

Information on the services offered by the Occupational Safety and Health Council can be obtained through hotline 2739 9000.

Complaints

If you have any complaint about unsafe workplaces and practices, please call the Labour Department Occupational Safety and Health complaint hotline on 2542 2172. All complaints will be treated in the strictest confidence.