MINISTRY OF HUMAN RESOURCES
DEPARTMENT OF OCCUPATIONAL SAFETY AND HEALTH

GUIDELINES ON OCCUPATIONAL SAFETY AND HEALTH FOR WORKING WITH DISPLAY SCREEN EQUIPMENT

2024

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PREFACE

These guidelines may be cited as the Guidelines on Occupational Safety and Health for Working with Display Screen Equipment 2024. These guidelines replace the previous and first version of Guidelines on Occupational Safety and Health for Working with Video Display Units (VDU's) 2003.

The purpose of these guidelines is to provide a systematic plan and an objective approach in identifying ergonomics risk factors and controlling risk associated with work activities and tasks involving Display Screen Equipment (DSE) in the workplace.

The current working environment relies heavily on DSE in daily operations. However, there remains a gap between the application of ergonomics and the widespread usage of DSE.

These guidelines are conceived to function as a reference for employers, safety and health practitioners, designers, manufacturers and employees to help them plan as well as implement effective control measures based on the ergonomics risk factors associated working with DSE.

These guidelines will assist in the prevention of injury and illness in the workplace, leading to the reduction of medical expenses and improvement of business performance and productivity through the provision of safety and health at the workplace.

The Department would like to thank all committee members for their efforts and contributions in the preparation of these guidelines.

Ir. Hj. Mohd Hatta Bin Zakaria
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2024

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ABBREVIATION

AR	Augmented Reality
CVS	Computer Vision Syndrome
CCTV	Closed-Circuit Television
CTS	Carpal Tunnel Syndrome
DOSH	Department of Occupational Safety and Health
DSE	Display Screen Equipment
ERA	Ergonomics Risk Assessment
GPS	Global Positioning System
ISO	International Organization for Standardization
IPD	Interpupillary Distance
MR	Merged Reality
OMSD	Occupational Musculoskeletal Disorders
OSHA 1994	Occupational Safety and Health Act 1994
RSI	Repetitive Strain Injury
SBS	Sick Building Syndrome
SOCSO	Social Security Organisation
TV	Television
TNS	Tension Neck Syndrome
VDU	Visual Display Units
VR	Virtual Reality

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1.0 INTRODUCTION

Prolonged usage of Display Screen Equipment (DSE) can cause weariness, stress and Computer Vision Syndrome (CVS), as well as pain in the arms, shoulders, back or neck. If DSE evaluations are conducted, equipment is properly configured and best practices are followed these problems can be prevented.

The number of confirmed instances of occupational disease is 7,143 according to the National Occupational Accident and Disease Statistics 2022 with Occupational Musculoskeletal Disorders (OMSD) accounting for the second highest number of cases (678) following Occupational Noise Related Hearing Disorders.

1.1 Purpose

The aim of these guidelines is to provide guidance on knowledge, awareness and control of ergonomics risk factors (ERF) associated with DSE at the workplace in order to fulfil one of the general duties prescribed under the Section 15 (1) Occupational Safety and Health Act 1994 (OSHA 1994) [Act 514] which is to ensure that employers provide a safe place of work to their employees and other related persons.

1.2 Objectives and Benefits

The objectives of these guidelines are as follow:

a. Explain the ERF associated working with DSE;

b. Explain the potential of health effects arising from working with DSE; and

c. Highlight the principles of ergonomics for working with DSE workstation and control measures to prevent OMSD and CVS.

The benefits of implementing these guidelines are to:

a. Allow employers to design, implement and monitor preventive interventions;
b. Reduce DSE symptoms caused by exposure to DSE ergonomics risk factors; and
c. Reduced medical expenses and employee absenteeism.

1.3 Scope and Application

The scope of these guidelines covers the issues related to working with DSE which are part of the physical ergonomics domain in the workplace which involve:

a. The use of DSE exceeding one (1) hour continuously throughout the day; or
b. The use of DSE more than four (4) hours cumulatively in a day without taking frequent breaks throughout the day.

These guidelines are applicable to workplace as provided by Occupational Safety and Health Act 1994.

These guidelines should not apply to:

a. DSE attached to any means of transportation (e.g.: GPS on a trailer);
b. DSE which are intended for the use and operation of members of the general public (e.g.: electronic billboards); and
c. DSE on personal devices which are not used for work (e.g. personal smartphones).

2.0 LEGAL REQUIREMENT

2.1 Legal Requirement

The OSHA 1994 aims to secure the safety, health and welfare of persons at work, for protecting others against risks to safety or health in connection with the activities of persons at work. Under the Act employers, employees and self-employed person are required to meet certain standards on safety health and welfare. The general provisions for working with DSE are as follows;

a. Section 15 of the Act describes the duty of every employer to ensure; so far as is practicable, the safety, health and welfare at work of all his employees.

b. Section 17 of the Act describes the general duties of employers and self-employed persons to conduct his undertaking in such a manner as to ensure; so far as is practicable that he and other persons not being his employees, who may be affected thereby are not thereby exposed to risk to their safety and health.

c. Section 20 of the Act describes the duties of a person who designs, manufactures, imports or supplies any article for use at work.

d. Section 24 of the Act describes the duty of every employee while at work.

2.2 International Standards

International standards provide ergonomics guidelines for the use of DSE. Complying with international standards improves safety and health performance in organisations. Examples of International Organization for Standardization (ISO) documents that can be used as a reference for DSE best practices can be found in **Appendix 1.**

3.0 TERMS AND DEFINITIONS

For the purposes of these guidelines, the following terms and definitions apply.

Display Screen Equipment (DSE)	Display screen equipment are devices or equipment with a display screen, including both conventional display screens and those used in emerging technologies. This includes display screen equipment such as but not limited to: • Computers • Laptops • Tablets • Smartphones • Handheld devices (i.e.: meter reading equipment) • TV screens • CCTV screens • Projection screens • Interactive whiteboards
Frequent Break	Taking a break from any DSE (including personal devices). Example: every 20 minutes, spend 20 seconds staring 20 feet away.
Workstation	An area with equipment for the performance of a specialized task usually by a single individual.
Portable Device(s)	A portable device is any device that can easily be carried. It can be divided into two (2) types: a) Handheld devices are asmall form of computing devices that is designed to be held and used in the hands Example of handheld devices includes tablets and smartphones. b) Wearables devices are designed to be used while worn. Example of wearable devices include wearable screens (VR/AR glasses and drone glasses) and smart watches.

Ergonomics Risk Factors	Ergonomics risk factors is any attribute, characteristic or exposure that may cause or contribute to a musculoskeletal injury; the mere present of the risk factor may not in itself result in and injury. In general, two or more risk factors may be present at one time, thereby increasing the risk of injury.
Environmental Risk Factors	Environmental risk factors refer to stressful factors in the environment that effect human comfort, activity and health. This includes thermal environments, illumination, noise, ventilation and extreme atmospheric pressure environments.
Organizational Risk Factors	Organizational aspect of ergonomics risk factors, typically contributed by policy, procedures, work practice and culture of the organisation.
Ergonomics Risk Assessment	Systematic methods to identify potential any attribute, characteristic or exposure that may cause contribute to musculoskeletal injury consider the likelihood of harm due to exposure and enable employers to plan, introduce monitor preventive and corrective measures to ensure that the risks of ergonomics-related injury, diseases or disorders are always adequately controlled.
Carpal Tunnel Syndrome	Carpal tunnel syndrome is a nerve compression syndrome associated with the collected signs and symptoms of compression of the median nerve at the carpal tunnel in the wrist. Carpal tunnel syndrome is an idiopathic syndrome but there are environmental and medical risk factors associated with the condition.
Tendon Neck Syndrome	Tension neck syndrome is characterized by neck pain, shoulder pain, accompanied by muscle stiffness, muscle tenderness and muscle spasms.
Computer Vision Syndrome	Computer vision syndrome also known as digital eye strain is described as a group of eyes and vision related problems that result from prolonged computer, tablet, e-reader and cell phone use.

4.0 ERGONOMICS RISK FACTORS RELATED TO WORKING WITH DISPLAY SCREEN EQUIPMENT

Ergonomics risk factors (ERF) for working with DSE include poor posture, repetitive movements, improper workstation arrangement, insufficient rest breaks, poor lighting and glare, which can lead to OMSD and other health disorders. Understanding these ERF is crucial for creating effective workplace interventions that promote employee well-being.

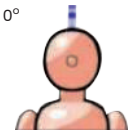
4.1 Ergonomics Risk Factors

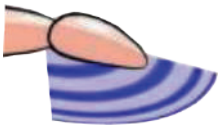
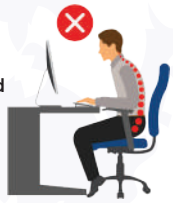
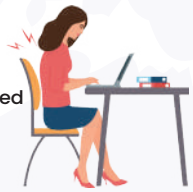
4.1.1 Awkward Posture

Posture refers to the position of variuos body parts. When these various of body parts and joints are in their 'resting' position (simply means the position in which there is the least tension or pressure on nerves, tendons, muscles and joints). This pose is known as neutral postures. Awkward postures occur when the body deviate significantly from its neutral position during work activities.

Awkward postures place excessive force on joints and overload the muscles and tendons around the affected joint. Joints of the body are most efficient when they operate closest to the mid-range motion of the joint. OMSD is increased when joints are worked outside of this mid-range repetitively or for sustained periods of time without adequate recovery time. Awkward postures in DSE usage can be caused both by poorly design workstation or by poor working habit. Examples of awkward posture during DSE operation and possible causes is shown in **Table 4.1.**

Table 4.1 : Awkward postures during DSE operation and possible causes

Body Part	Neutral Posture	Awkward Posture	Possible Causes
Neck & Shoulder	 0°- 10°	in extension  Head bent backward	1. Monitors is too high 2. Sit with wrong posture (leaning forward too much) 3. Using bifocal lenses 4. Poor vision/screen legibility
	 0°- 10°	20°+  Head bent backward	1. Monitor too low 2. Looking at keyboard during typing 3. Reading documents on tables 4. Sit with wrong posture (leaning backward too much) 5. Operating portable DSE
	 0°- 10° 0°	Neck in  Neck twisted (left or right)	1. Screen is not directly in front of employee 2. Keyboard at mouse is not directly in front of employee 3. Work documents are not directly in front of employee
		 Head bent sideways	1. Cradling phone handle during DSE operation 2. Obstructed views
	 0°	 Shrugged/ raised shoulder	1. Table surface is too high 2. Chair height is too low 3. Operating portable DSE 4. Not using arm rest ('Hanging arm')
	 60°- 100°	45°- 90°  Outstretched arms	1. Keyboard and are mouse far away from the body 2. Reaching far equipment repetitively 3. Reaching overhead
		100°+  Bent elbow (more than 100o)	1. Table surface is too high 2. Chair height is too low 3. Trying carrying portable DSE screen too near to eyes

Body Part	Neutral Posture	Awkward Posture	Possible Causes
Neck & Shoulder		 Wrist bent upward	1. Not using wrist rest 2. Keyboard too thick 3. Table surface too low 4. Using keyboard while standing
		 Wrist bent downwards	1. Table surface is too high 2. Chair height is too low
		Wrist bent sideways	1. Not lifting wrist when using typing or moving mouse 2. Holding item in awkward postures
Back & Leg		Unsupported lower back/ slouching 	1. Sit without utilising back rest 2. Chair with inappropriate backrest
		Unsupported back/ leaning forward 	1. Sit only at the front edge of chair seat 2. Chair too high 3. Chair far away from table (due to habit or not enough legroom)
	Back straight and not twisted	 Twisted back	1. Overreaching items/documents 2. Non-rotating chair
		Leaning sideways	1. Reaching low drawer
	Feet firm on the floor or footrest	Hanging leg	1. Chair is too high 2. Seat depth is too long
	Feet firm on the floor or footrest	Bended knee (less than 90°)	1. Chair is too low 2. Poor habit (i.e. tucking leg under seat, cross-legged sitting etc)

4.1.2 Static and Sustained Posture

Static and sustained posture refer to physical exertion in which the same posture or position is held throughout the exertion. Increased loads or forces on the muscles and tendons contribute to fatigue. In addition, the muscles hold the body in a single position for a long period, which can result in circulation problems and cause muscle tension. Sustained exertions are a form of static loading that occurs when force is continuously applied for long periods. Examples include keeping head still while looking at monitor, continuous holding portable DSE, sitting without making any movements for long periods and holding down the shift key on the keyboard.

4.1.3 Repetition Motion

Repetitive motion is commonly associated with the duration of work task, intensity and work or tasks design. Performing same motions repeatedly throughout the day, such as typing on a keyboard. Typing, the act of inputting data into a digital system using a keyboard, constitutes a cyclical activity that engages a limited set of muscle groups in a recurrent pattern. The classifications of typing can be broadly categorized based on several criteria, as shown in **Figure 4.1.**

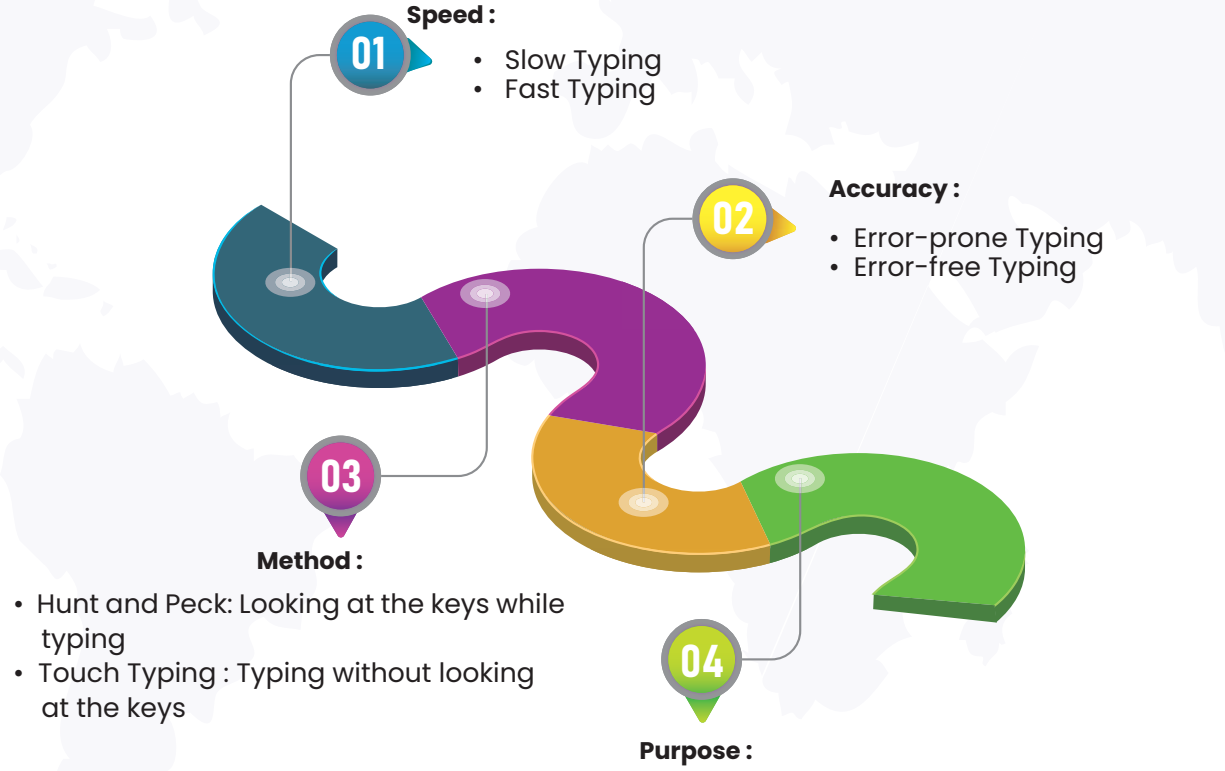


Figure 4.1 : Classifications of typing

The health implications tied to typing activities largely hinge on the intensity and duration of the task alongside individual ergonomics setups. High-intensity typing, especially when executed in ergonomically unfavourable conditions, can precipitate a spectrum of OMSD. In addition, tapping the touchscreen for portable DSE, flipping through documentation, clicking a mouse or using a calculator may cause in trauma to joints and surrounding tissue. These include but are not limited to Carpal Tunnel Syndrome (CTS), Tendonitis and Repetitive Strain Injury (RSI).

4.1.4 Contact Stress

Contact stress is the impingement or injury by hard, sharp objects, equipment or instruments when grasping, balancing or manipulating. Contact stresses are encountered when working with forearms or wrists against the edge of a desk or work counter. The muscles and tendons are impinged when pressed into the sharp edge. The effects of local contact stress can be made worse if the hard object contacts an area without much protective tissue, such as the wrist, palm or fingers and when pressure is applied repeatedly or held for a long time.

4.1.5 Environmental Risk Factors

Work environment surrounding the DSE workstations is very important to ensure work efficiency and comfort of the employee. Improper setting may promote the onset of environment related disorders include but are not limited to CVS, Sick Building Syndrome (SBS), lethargy and mental stress. Some of environmental risk factors related to DSE as shown in **Figure 4.2.**

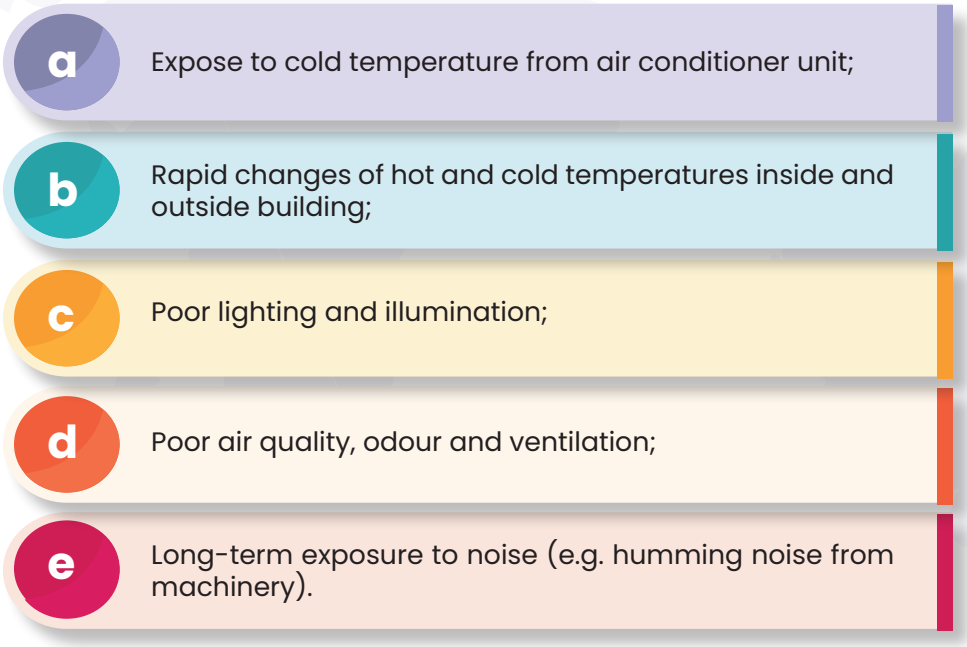


Figure 4.2 : Environmental risk factors related to DSE

An inadequate environment can have a negative impact on concentration and communication therefore impairing work performance or productivity. Extreme temperatures, inadequate air ventilation, inadequate lighting and excessive noise are examples of environmental risk factor which leading to adverse impact on employees while working with DSE.

4.1.6 Other Risk Factors

Psychosocial risks factors such as excessive workloads, conflicting demands, lack of influence over the way the job is done, job insecurity and lack of management support or colleagues can further aggravate the existing stress and strain which results in fatigue leading to OMSD.

Many of these risk factors are encountered in office work, with or without the use of computers such as in call centre where operators may receive verbal abuse, working in isolation, bullying, etc. In some cases, the impact of computing technologies on how jobs are structured can play a major role such as in using software with glitches, slow system, unfamiliar or relatively new software.

The potential impact of these factors is two-folds. Firstly, they can have a direct impact on the mental and physical health of employees. Secondly, there is a growing body of evidence that they can contribute to (and exacerbate) the risk of musculoskeletal problems. It is important that these risk factors are taken into consideration during risk assessment.

Individual risk factors such as age, body mass index (BMI), physical activity, unhealthy diet, etc. can further contributes to OMSD. As opposed to older individual whose physiological system has worn after years exposures to various ergonomics risk factors, a younger adult has a higher tolerance and flexibility against external stressors. Besides that, being engaged in certain hobbies such as gardening, fishing, knitting, etc. as well as intensive sports activities can further increase strain on the body musculoskeletal system which results in fatigue leading to OMSD and further aggravated by work.

4.1.7 Ergonomics Risk Assessment

Ergonomics risk assessment (ERA) is a systematic and objective approach to identify ERF, assess and control ergonomics risk associated with the work tasks and activities in the workplace. Methods for implementation of ERA at the workplace are described in the relevant guidelines on ergonomics risk assessment published by DOSH.

5.0 HEALTH EFFECTS OF WORKING WITH DISPLAY SCREEN EQUIPMENT

Employees who working with DSE has been shown to be associated with a number of potentially serious health effects such as OMSD, CVS and related health effects.

5.1 Occupational Musculoskeletal Disorders (OMSD)

Prolonged working with DSE has also been associated with musculoskeletal conditions especially around the neck and shoulder, usually provoking existing symptoms. Symptoms of OMSD were also higher among those who spent more time using of DSE at work. Employees often experience varying levels of discomfort which range from the acute strain which often presents itself as muscle fatigue, aches, pain, weakness, tenderness or swelling that recover with proper rest, to more chronic conditions which often impair function and affect daily activities.

OMSD can affect any part of body including the neck and the upper extremity (the shoulder until the fingers). Variety of clinical syndromes such as nerve compression, tendon inflammations and related conditions, muscle inflammations and degenerative joint disease including fibromyalgia myositis and focal dystonia.

The health effect of using DSE include CTS, which involves compression of the median nerve where it passes through the wrists or carpal tunnel producing clinical symptoms including numbness, tingling, pain and eventually loss of muscle function in the thumb and first two and one-half fingers of the hand. Beside CTS, other peripheral nerve compressions may occur in the ulnar tunnel of the wrist, the forearm and the thoracic outlet. Tendon inflammatory conditions (tendinitis, tenosynovitis) or specific point of inflammation such as epicondylitis, shoulder bursitis, tension neck syndrome (TNS) and cervical disorders (cervical degenerative disease or spondylosis).

Oftentimes people who are suffering from these disorders are employees of keyboards that have high workload combined with tight deadlines such as office clerks and accounts personnel. These OMSD are often caused by various factors, which include but not limited to:

a. Awkward posture at the DSE workstation;
b. Sustained and static postures at the DSE workstation;
c. Repetitive use of the DSE; and
d. Excessive muscle fatigue, which often caused by increased muscle tension.

5.2 Computer Vision Syndrome

Computer vision syndrome (CVS) also known as digital eye strain is described as a group of eyes and vision related problems that result from prolonged computer, tablet, e-reader and cell phone use.

CVS is a growing public health issue that is suffered by million people on a global scale, which is mainly due to an increasing amount of time spent behind digital screens. Not only does CVS affect the health of people, but it also causes a reduction in work productivity, increases error rates, negative job satisfaction and causes impairment to their visual abilities.

CVS has a wide variety of symptoms and in general is divided into three (3) major categories:

a. Eye symptoms (e.g. dry eyes, watery eyes, irritated eyes)

b. Vision symptoms (e.g. eye strain, eye fatigue, blurred vision)

c. Posture symptoms (e.g. sore neck, shoulder pain)

Symptoms of CTS include visual and ocular symptoms such as headaches, eye strains, ocular discomfort, dry eyes, diplopia and blurred vision.

Common health effects of prolonged DSE related work or operations are visual problems which include eyestrain, headaches and musculoskeletal injuries. These visual problems often affect the visual performance and work performance of the DSE employees. Employees with existing visual deficits may find that prolonged use of DSE will make the visual deficits more noticeable.

Examples of work conditions that are related to visual problems as shown in **Figure 5.1.**

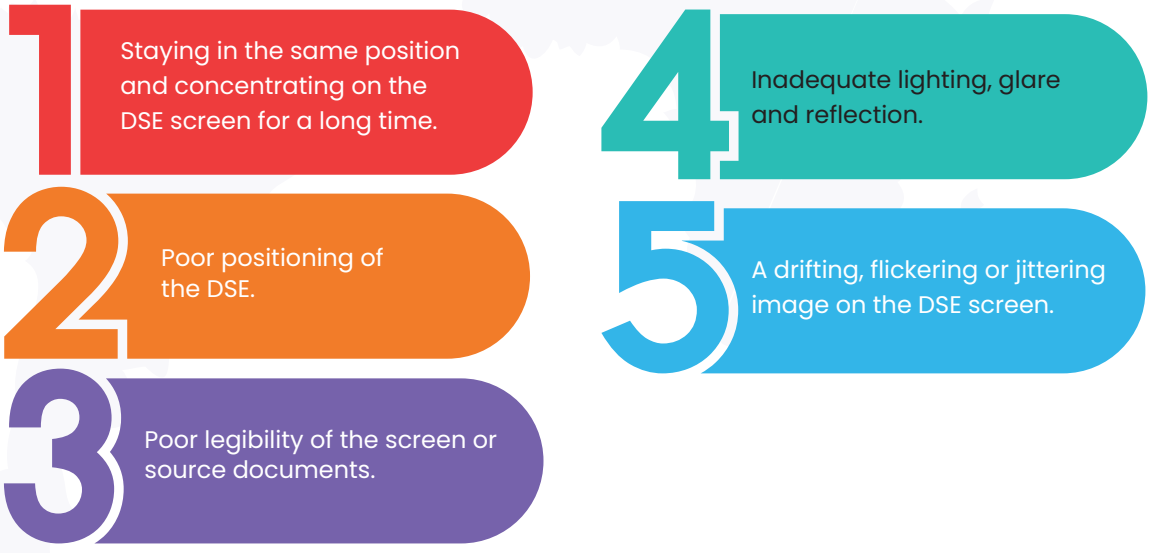


Figure 5.1 : Work conditions related to visual problems

6.0 PRINCIPLES OF ERGONOMICS FOR WORKING WITH DSE

There are four (4) key ergonomic principles for working with DSE: adopt a natural posture, keep tasks and items easily accessible, minimize excessive movements and maintain a comfortable work environment.

6.1 Work in Nature Posture

The principle of "Work in Nature" posture typically refers to the idea of aligning work practices and environments with natural patterns and principles. This principle aims to increase health and productivity by aligning employee's physical posture and ergonomic setup with natural and comfortable positions.

This includes designing workstations and tools that support natural body mechanics, such as ergonomic chairs and desks that encourage proper sitting or standing positions. By applying this principle will be enhancing the comfortability and productivity while working with DSE.

6.2 Keep Task and Item Easy Reach

Keeping tasks and items within easy reach is a practical principle that contributes to efficiency and comfort in a work environment. Easy accessibility minimizes physical strain and fatigue. Employees don't have to stretch or contort their bodies to reach items, reducing the risk of musculoskeletal injuries like strains or repetitive strain injuries.

6.3 Reduce Excessive Motion

Reducing excessive motion is crucial to minimizing ergonomic risks in the workplace. Excessive motion can cause to strain and fatigue in muscles and joints, increasing the risk of musculoskeletal disorders. This, principle may contribute to reduce eye fatigue and strain due to looking to DSE.

6.4 Maintaining a Comfortable Environment

Maintaining a comfortable environment is essential for promoting productivity and well-being in the workplace, as shown in **Figure 6.1.**

By prioritizing a comfortable environment, employers can enhance employee satisfaction, reduce stress and improve overall productivity and well-being in the place of work while working with DSE.

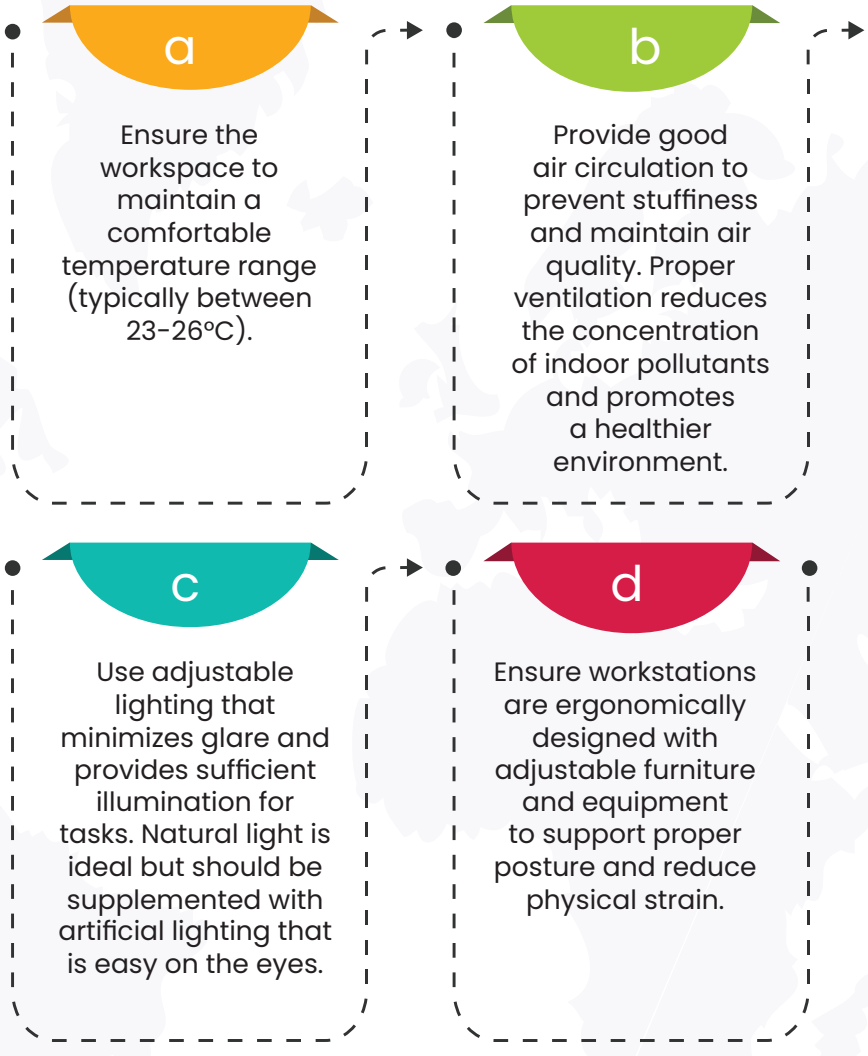


Figure 6.1 : Maintaining a comfortable environment

7.0 CONTROL MEASURE

7.1 Design Recommendations

The design of the workstation should consider any constraints imposed by the body dimensions of those likely to work in it together with any clothing or other necessary items. This consideration from the employer should be not limited to the types of furniture, work surfaces, physical safety, cable and wire arrangements and any equipment related to DSE.

The frequency, speed, direction and range of body or limb movements should be within anatomical or physiological limits. The need for extremely precise motions shouldn't demand a significant amount of muscular strength.

7.1.1 Furniture

The employer should ensure the furniture be selected as shown in **Figure 7.1.**

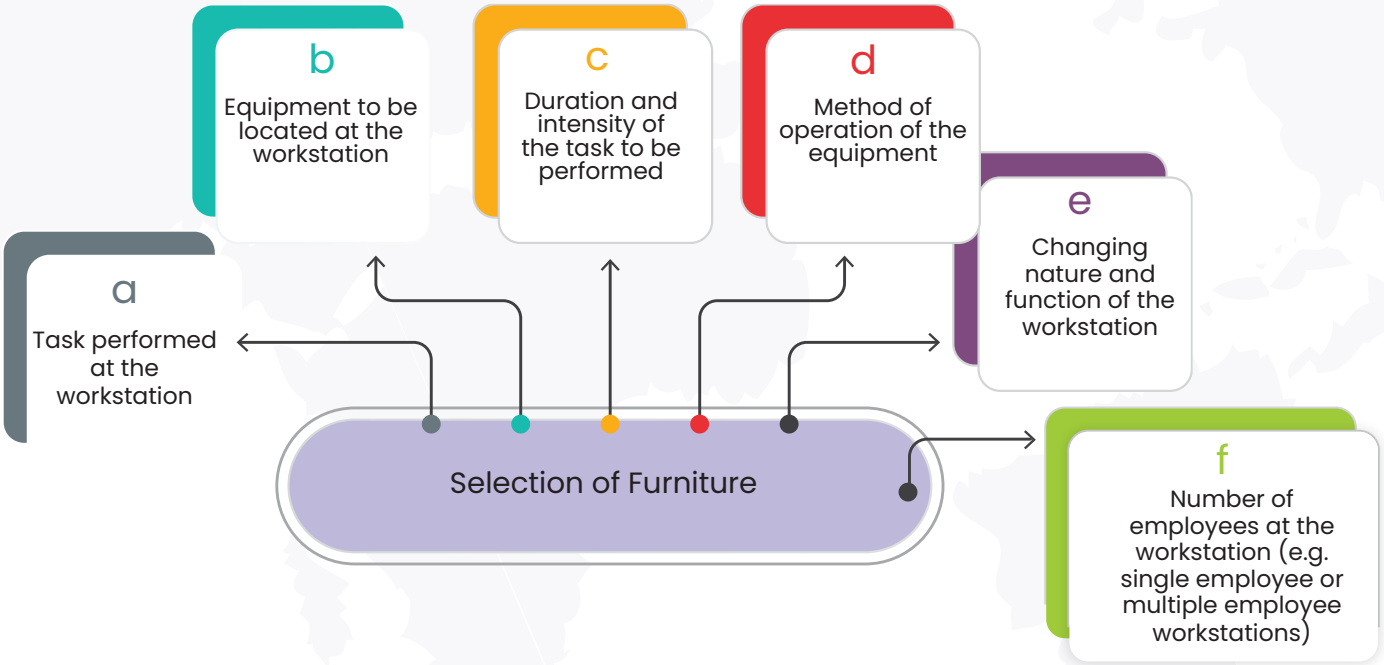


Figure 7.1 : Selection of furniture

7.1.2 Work Surfaces

The employer should ensure the work surfaces or work desk be considered by the following criteria as shown in **Figure 7.2.**

01

Size

The desk or work surface should be large enough to allow a flexible arrangement of the screen, keyboard, documents and related equipment. There should be adequate space for employees to find a comfortable position.

02

Physical Safety

Work desk or work surface, particularly the underside of the work surface, should not have any sharp edges, corners, protrusion or rough surfaces likely to cause injury to employees or damage to their clothing.

03

Cable or Wire Arrangement

Facilities should be incorporated within the work desk or work surface design to accommodate the cables required for power, data transmission and telephone demands of the workstation and to stow any excess cable. Switches that are used regularly should be readily accessible. Provision should be incorporated for cable maintenance.

04

Finishing on Work Surface

The work surface at least a neutral colour such as light brown and have a satin or matte finish. The work surface should also be easy to clean and finished so that it is possible to write on a single sheet of paper with no backing.

05

Workstation Design

The workstation should be rigid and stable. There should be enough space provided under the work surface to allow free leg movement without obstruction.

06

Modesty Panel

The workstation should have a modesty panel to provide operator privacy under the work surface. The modesty panel should not interfere with work surface height adjustment.

Figure 7.2 : Consideration of work surfaces

7.1.3 Chairs

The selection of chairs for sitting at place of work should be referred to the Guidelines on Occupational Safety and Health for Seating at Work 2024.

7.2 Document Holders

The employer should consider the document holders based on the task performed. Examples of document holders can be found in **Figure 7.3** and **Figure 7.4** respectively.

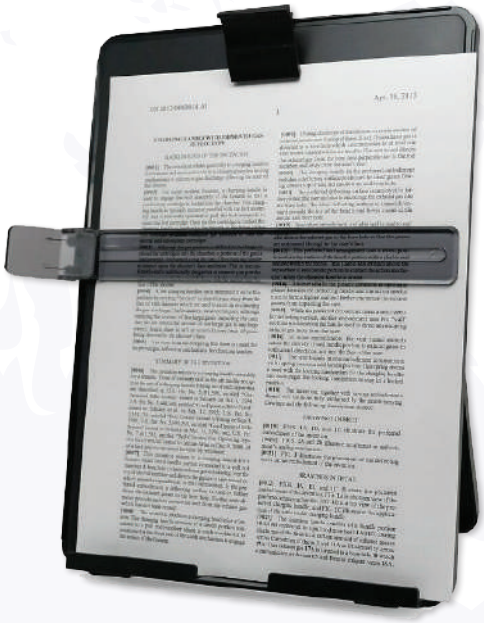


Figure 7.3 : Single page document holder

Figure 7.4 : Under-monitor document holder

Document holders are important to reduce visual and neck muscle fatigue. Working with documents flat on the work surface can cause eyestrain due to the text being angled too far away from the eyes. Awkward postures such as twisted or bent posture in the neck can create unnecessary muscle activity in the muscles of the back and neck causing muscle fatigue and discomfort.

The recommendation for document holder should be considered for the location as following:

a. Place the device at the same distance as the monitor;

b. Angled towards the eyes;

c. Placed in front of the monitor or as close to the side as possible;

d. Placed within at eyes level; and

e. Placed on the side of the dominant eye.

7.3 Monitors

7.3.1 Single Monitors

i. Positioning of the monitor

The depth and height of the monitor probably are the most commonly misunderstood variables. **Figure 7.5** shows that using thin displays provides for greater flexibility and ease of adjustment, despite the fact that the recommendations remain unchanged.

To properly position a monitor, below step should be considered:

a. Place the monitor directly in front of the employees;

b. Ensure the monitor is at arm's length from the employees (45 cm to 70 cm);

c. Position the top useable line of the monitor at a height where neck is straight; and

d. Place the monitor at eye height for those wear glasses or contacts or who have single prescription lenses and below eye height for those wear bi-focal, tri-focal or progressive lenses.

The purpose of these suggestions is to keep the neck in a neutral posture, reduce eye strain and maintain good visibility. This is especially important for employees who spend long hours looking at the computer screen.

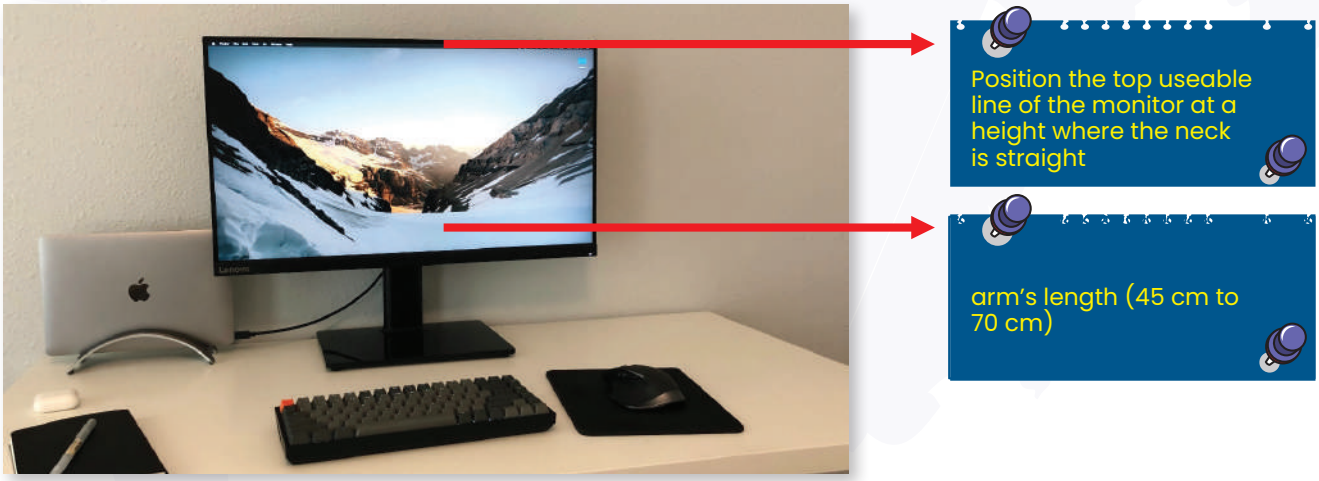


Figure 7.5 : Example of single monitor set-up

ii. Frequent Breaks

Prolonged usage of DSE such as computer monitors may cause health effects to the employees and reduced productivity. Health effects related to prolonged usage include eyestrain, leading to irritation, itchiness and headaches. Frequent breaks should be provided to reduce the effect of prolonged usage. Frequent breaks which also known as the 20/20/20 rule consist of the following:

a. Look away from the monitor every 20 minutes;

b. Focus on something at least 20 feet away; and

c. Do this for at least 20 seconds.

The purpose of this exercise is to change the focus of the eyes, allowing the muscles in the eyes to rest and change from the otherwise constant focus.

7.3.2 Dual Monitors

Dual monitors may result in challenges when trying to look at another monitor or frequently switching between monitors for work. The setup for dual monitors is dependent on three key factors:

a. The percentage of usage for each monitor;

b. The type of work being performed; and

c. The employee's dominant eye.

When using a larger monitor (17", 19" or larger) or one that is oriented to the "portrait" position. The employer shall ensure that the top of the screen is not at a level higher than the employee's eye as shown in **Figure 7.6.**

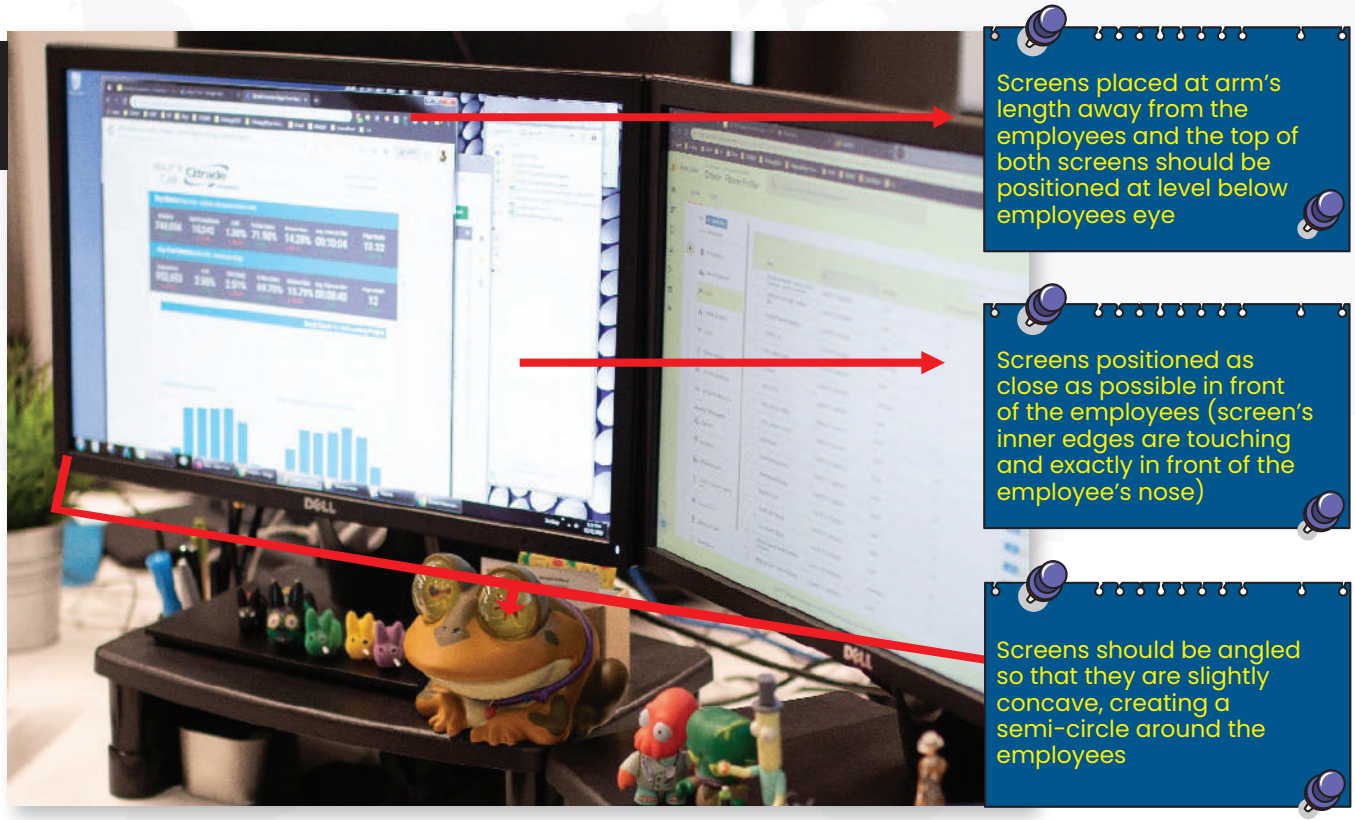


Figure 7.6 : Example of two monitor set up (side by side set up)

i. Both monitors are used equally (50%)

For monitors which are being used equally, frequent movement is inevitable to change viewpoints between the monitors. The following are recommendations to reduce the onset of issues related to DSE usage:

a. Screens should be positioned as close as possible in front of the employees so that the screen's inner edges are touching and exactly in front of the employee's nose;

b. Screens should be angled so that they are slightly concave, creating a semi-circle around the employees to ensure a constant focal distance between the employees and the monitors;

c. Screens should be placed at arm's length away from the employees;

d. The top of both screens should be positioned so that the employee's neck is straight; and

e. The 20/20/20 rule should be applied to minimize visual fatigue.

Additionally, if a single monitor is used in a multi-monitor set-up, a swivel chair should be used to physically turn to face the monitor to reduce neck twisting. To perform a single-monitor work, position the keyboard and mouse directly in front of the monitor being used.

ii. One monitor is used primarily (>80%)

Proper placement of the primary monitor (the one being used the most) should be done as if it was a single-monitor workstation.

The secondary monitor shall be placed beside the primary monitor on the side of the dominant eye at the same height and distance (concave around the employees).

7.3.3 More than Two Monitors

The following are recommendations for use of more than two monitors as shown in **Figure 7. 7**

a. Monitors should be positioned so that the top of each screen is at eye level (this is likely to require elevating the monitor above desk level);

b. If different size monitors are used the centre of each screen should be positioned at the same height;

c. It is preferable to have larger screens at the centre of any configuration;

d. Monitors should be positioned so that each monitor is at arm's length distance;

e. Monitors should be positioned so that a slight arc is formed with the monitors to ensure the 'arm's length' distance is present across the span of monitors;

f. Any gap should be minimised between monitors;

g. For a setup of four monitors, with two monitors on top and two monitors below; the top monitors should be tilted down by approximately 15° while the bottom monitors should be tilted up by 15°;

h. Employees should ensure that comparable levels of brightness, contrast and font size exist with each monitor;

i. The employee's is centrally positioned between both monitors with body, chair and keyboard;

j. Employees should continue to follow all other 'work setup checklist' guidance;

k. Employees should stop and rest if there is any sign and symptom of neck strain;

l. Employees should ensure that the placement of the monitors is close together to minimize head movement.

When using a larger monitor (17", 19" or larger) or one that is oriented to the "portrait" position the employees should ensure that the top of the screen is not at a level higher than the eye.

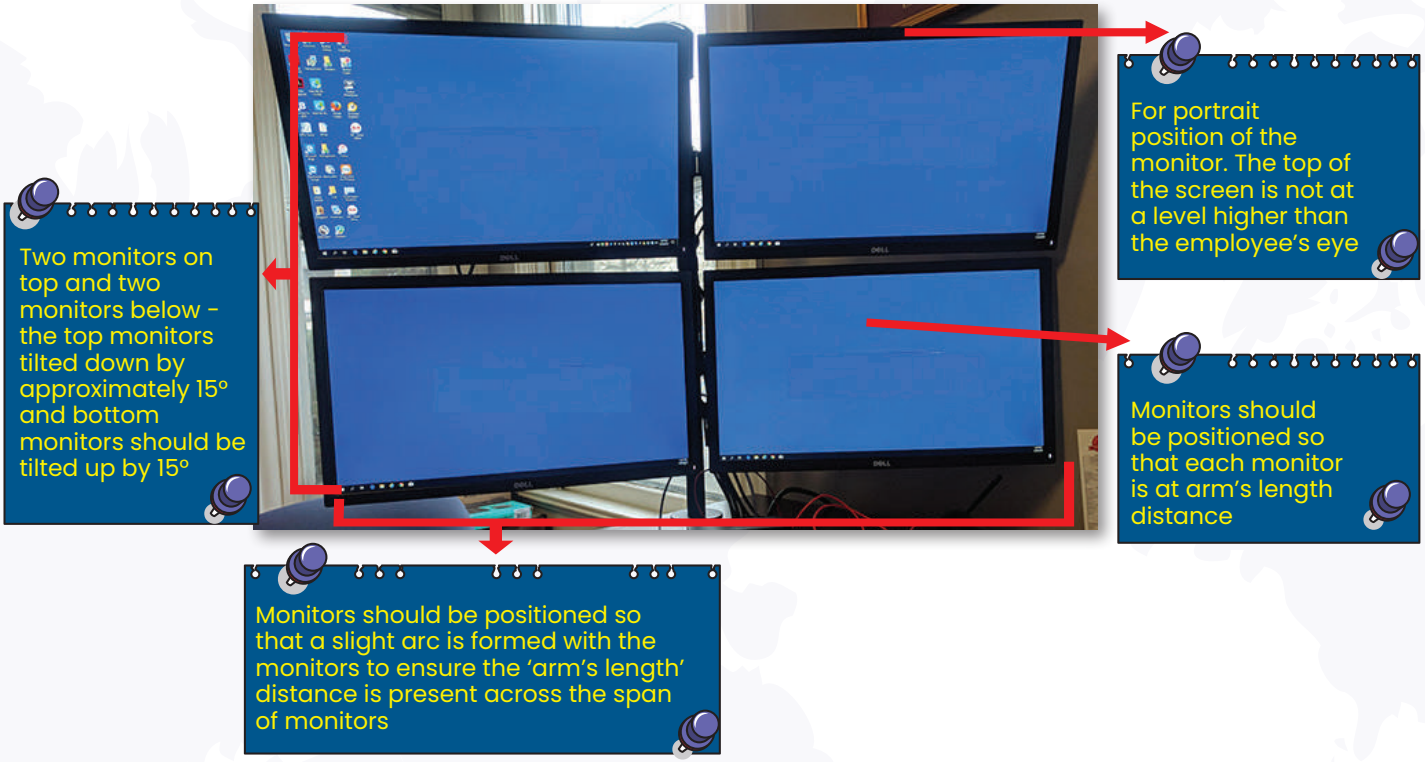


Figure 7.7 : Example of four-monitor set-up

7.4 Monitor Screen Tilt

Monitor screen tilt is crucial for work involving a long duration of screen viewings, which includes control room operators and security personal performing CCTV monitoring.

The optimal tilt angle varies with the relationship between eye and screen height. When the heights are equal, an approximate 1.5° forward tilt was found to be the optimum tilt angle. When the screen centre height is 30cm lower than the eye height at a 3H(three times the height of the screen) viewing distance, the optimum angle is 8° backward tilt. Conversely, when the screen centre height is 30 cm above the eye level at a 3H viewing distance, the optimal angle is 8° forward tilt. This is illustrated in **Figure 7.8.**

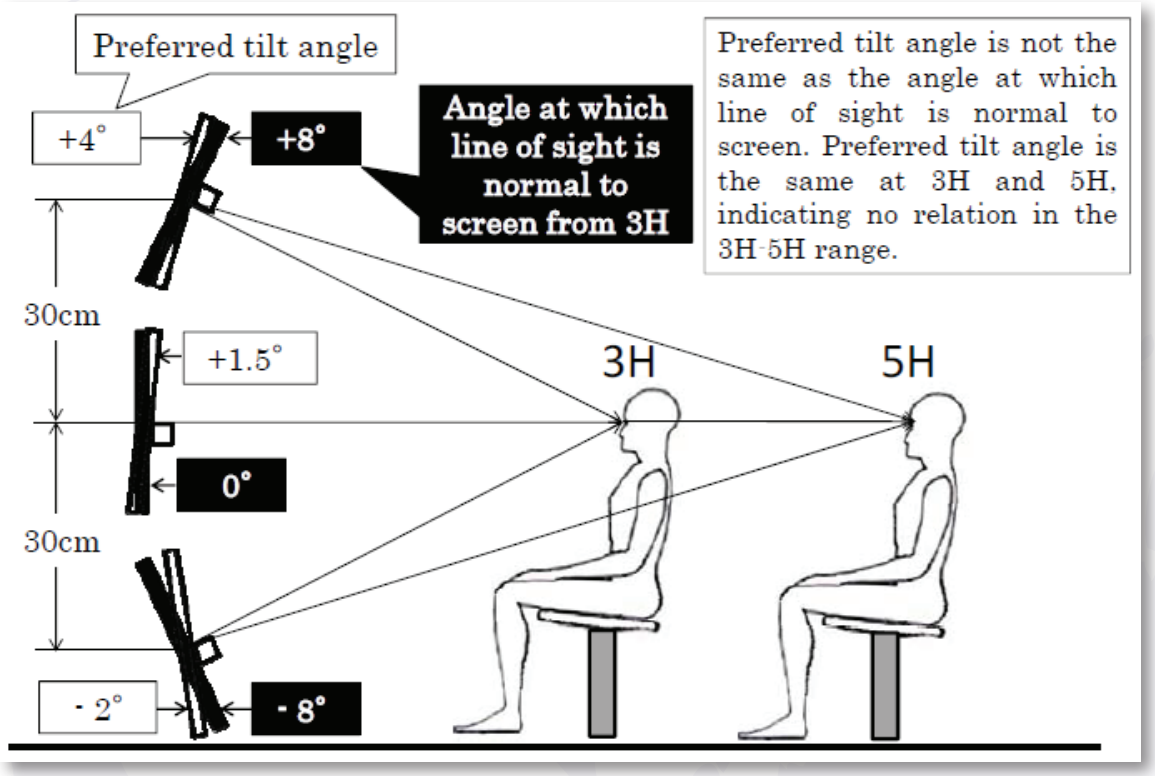


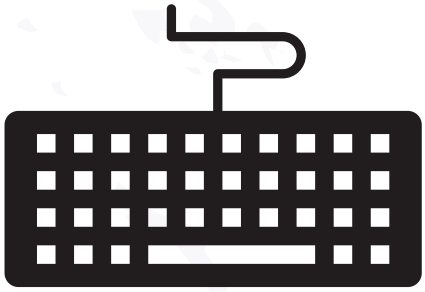
Figure 7.8 : Screen height and screen optimum tilt angle

7.5 Keyboards

Keyboards should be tiltable and separated from the screen to allow the employees to have a comfortable working position to prevent fatigue in the arms or hands. Keyboards should be stable and should not slip, tip or rock during normal keying activities. Keys arrangement using "QWERTY" arrangement should be used. Each of the shape of the keys should have maximum touching surface area to reduce the possibility of slips during the operation as shown in **Figure 7.9.**

Figure 7.9 : Example of ergonomics keyboard well-for sparing arms and wrists when typing

Keyboard case should have the following characteristics:



A. Neutral matt finish;

B. Reflection free;

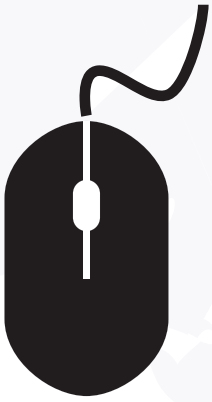
C. Resistance to dirt, dust, moisture; and

D. No sharp edges.

The space in front of the keyboard should be wide enough to provide support for the hands and arms of the operator.

7.6 Mouse

The design of the mouse should provide optimal control and avoid excessive static muscle use. Considerations should be made to:



A. Accommodate natural hand posture;

B. Allow the wrist to rest on the work surface; and

C. Allow finger(s) to rest on push buttons without injured.

Mouse with non-traditional designs such as angled or vertical mouse as shown in **Figure 7.10** exist in the market which is shown to be able to improve wrist posture and reduce perceived fatigue.

Figure 7.10 : Vertical mouse

7.7 Portable and Handheld Devices

Portable and handheld devices are typically designed for intermittent use in a non traditional environment. These devices are beneficial due to their small size and light weight, making them highly portable. Types of portable and handheld device include PDAs, smartphones and tablet computers.

Portable and handheld devices can lead to ergonomic problems if used for repetitive tasks as most are not designed for prolonged usage.

General guidelines for portable and handheld devices include the following:

a. Handheld equipment should not require attachment to an electrical outlet;

b. The equipment should be equipped with a means such as a string, strap or clip as shown in **Figure 7.11** to attach the device to the employees's body or clothing when not in use so that the equipment does not interfere with the accomplishment of other tasks when not in use;

c. The equipment should have a non-slip surface and be shaped to prevent it from slipping out of the employee's hand;

d. Handheld equipment should be used for performing tasks at locations not practical for normal-sized equipment;

e. Handheld equipment should be small, lightweight and conveniently shaped;

f. The display should accommodate expected operational lighting conditions, both high and low illumination;

g. Portable equipment should have rounded corners and edges;

h. Portable equipment should weigh less than 2.3 kg and should be capable of being held and operated with the same hand; and

i. Portable equipment should be smaller than 100 mm high x 255 mm long x 125 mm wide.

Figure 7.11 : Example of hand-held devices with a different type of arm-strap and bodystrap

7.8 Wearable devices

Wearable devices present new frontiers in occupational ergonomics and human machine interaction as shown in **Figure 7.12**. As these devices become increasingly integrated into workplace environments, it is imperative to establish comprehensive ergonomic guidelines that safeguard employee's health and optimize performance. These guidelines are not only preventative measures but also serve to enhance employee experience and productivity.

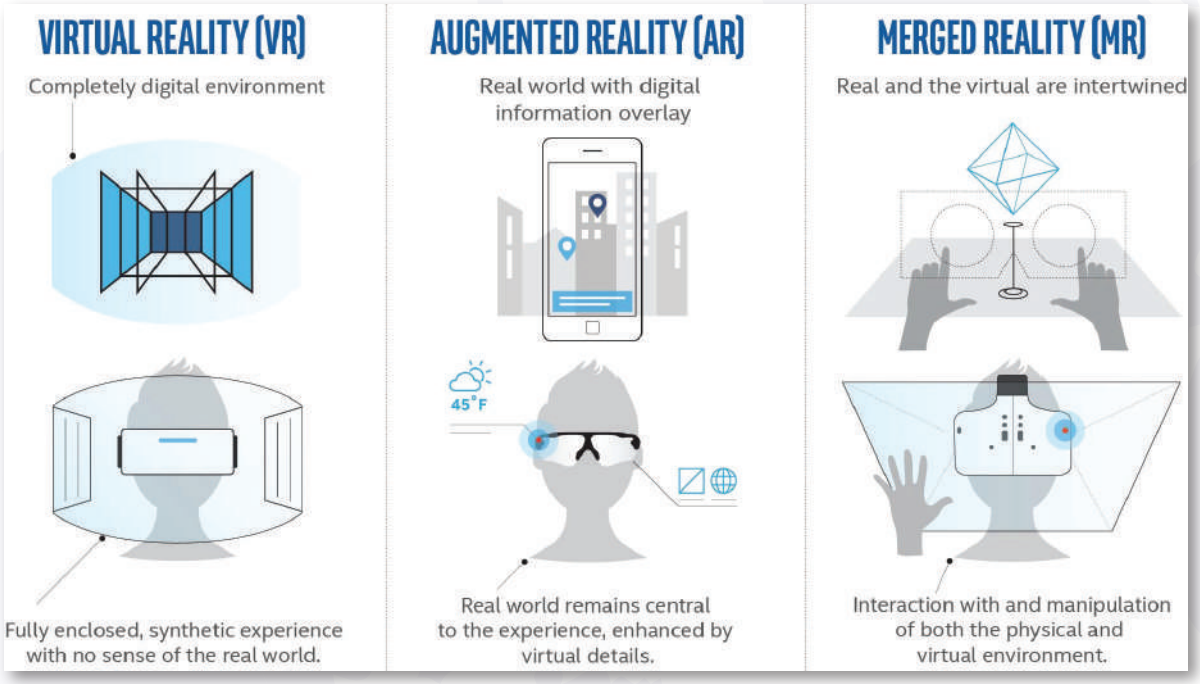


Figure 7.12 : Examples of wearable devices screen technologies include virtual reality (VR), augmented reality (AR) and merged reality (MR)

The following points elucidate key considerations for the ergonomic use of wearable devices and to address potential physical and cognitive demands placed on employees:

a. **Visual Display Quality :** The wearable devices screen should have high definition displays with a refresh rate of at least 90 Hz to reduce the risk of visual discomfort and motion sickness. Lower refresh rates can cause flicker, leading to eye strain and headaches.

b. **Adjustability :** The wearable devices headsets should include adjustable straps and padding to fit various head shapes comfortably. The interpupillary distance (IPD) should be adjustable to match the distance between the employees pupils and ensuring the 3D effect is optimized without causing visual strain.

c. **Protocols :** To mitigate visual and mental fatigue, employees should adhere to break protocols such as taking a 10 minute break every hour. Eye exercises are encouraged during these breaks.

d **Training:** Prior to using wearable devices, employees should attend training that covers the safe handling of equipment, navigation within the virtual environment and recognition of symptoms of discomfort that should prompt a break or discontinuation of use.

e **Content Design:** Wearable devices content should avoid rapid or extreme movements and flashing lights that can cause dizziness, disorientation or photosensitive epileptic seizures. The content should promote natural and intuitive interaction to reduce the cognitive burden.

f **Physical Environment:** The physical layout where wearable device is used should be free of obstacles, with a dedicated space for employees to move safely. Cables should be managed to prevent tripping hazards and the area should be sufficiently lit to ensure safety when entering or exiting virtual sessions.

g **Hygiene and Cleanliness:** Implement a protocol for cleaning wearable devices, especially if shared among multiple employees. Use non-abrasive, anti-bacterial wipes to clean surfaces that come into contact with skin and ensure the device is dry before the next use to prevent skin irritation.

h **Task Duration:** Continuous use of wearable devices should be limited, with recommendations for the maximum duration of sessions. Prolonged exposure without breaks can lead to cybersickness, characterized by symptoms similar to motion sickness.

i **Ergonomic Positioning:** Encourage employees to maintain a neutral posture while using wearable devices. Design virtual environments that do not require awkward movements or positions that can lead to musculoskeletal issues over time.

j **Monitoring and Reporting:** Establish a system for employees to report symptoms or concerns related to wearable devices usage. Regularly review these reports to identify common issues and adjust guidelines accordingly. This feedback loop is crucial for the continuous improvement of the ergonomic standards in wearable devices applications.

7.9 Laptops and Other Portable Computers

General guidelines for laptops and other portable computers include the following:

a. Laptops and portable computers should be designed with screen / keyboard separation and screen height adjustability. If this is not possible, employees shall not use the equipment for more than five hours in a single workday or more than ten hours per week.

b. Laptops and portable computers should be selected with ergonomic features in mind. A list of important features is listed in **Table 7.1.**

c. Employees should minimise the use of track point as input devices. Employees should use an external mouse as an input device.

d. Guidance should be provided for the setting up and using of a docking station and advice should be provided if a docking station is not available for use.

e. Laptop and portable computers should be used only when out of the office or when a docking station is not available for use.

f. Facilities such as external keyboards, mouse and monitors (or a "full" docking station) at workstations should be provided when laptops or portable computers are in prolonged usage.

g. Employees shall minimise the use of laptops and portable computers in non ideal locations such as public transport and motor vehicles.

Table 7.1 List of important features for laptop and portable computers

No.	Important Features
1	As low weight as possible (e.g. 3 kg or less) for the laptop or portable computer and its accessories
2	As large and clear a screen as possible (e.g. 14-inch screen or more)
3	Detachable or height-adjustable screen
4	Touch pad or external mouse rather than a "nipple" track point device
5	Wrist pad between keyboard and front edge of laptop or portable computer
6	Lightweight carrying case with handle and shoulder straps
7	Tilt-adjustable keyboards
8	Facility for attaching external mouse and numeric keypad
9	Friction pads underneath to prevent computer from sliding across surfaces

7.10 Display Screen Equipment Arrangement

i. Layout Of DSE Arrangement

DSE workstations should be ergonomically designed with maximum possible flexibility so that they can be adapted to each individual employees. Display arrangements at the workplace which involves the positioning of tables, chairs, keyboard, mouse, monitor(s) and other equipment play a very important role in how much fatigue a person will feel at the end of the workday.

Typical arrangements of workstations are shown in the **Figure 7.13**. For both configurations, the commonly used items must be within reach of the employees. This includes the keyboard and the mouse.

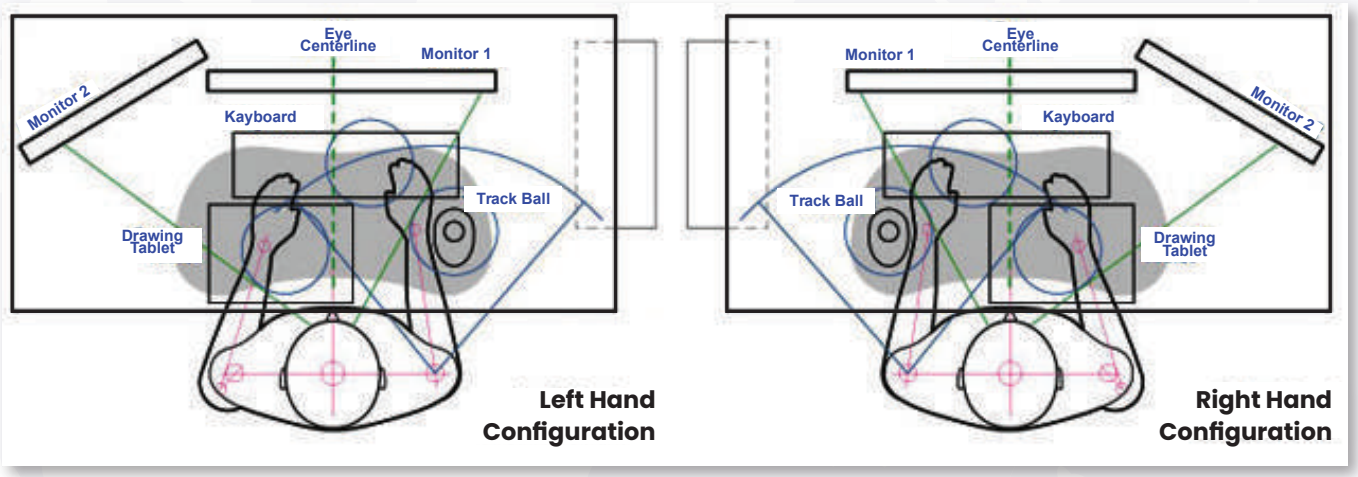


Figure 7.13 : Example of layout of DSE Arrangement

ii. Mistakes and Good Practice for DSE Workstation

The first two examples as shown in **Figure 7.14** show common mistakes in seating posture at the workstation.

a. The first posture, also known as the "slump" puts tremendous strain on the lower back as the spine carries all the weight of the upper torso. This is further aggravated by tucking the feet under the chair.

b. The second posture, known as a reclining posture, puts strain on the neck and lower back especially if the chair does not have proper lumbar support. Both postures will give a poor viewing angle of the monitor and have a health effect on the arm and wrist due to the position of the limbs in relation to the desk and keyboard.

c. The last posture shows the proper alignment between the head, torso, legs and arms. The upper body is in perfect vertical alignment and the forearms should be as horizontal as possible to avoid wrist strain. Additionally, it is advisable to be looking directly at the monitor to reduce side glare from the reflective surface of the screen.

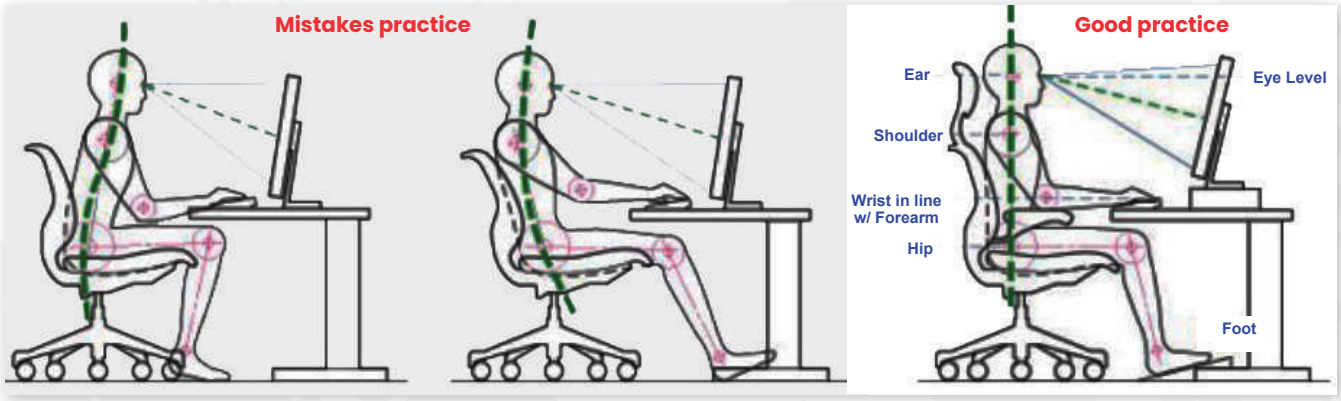


Figure 7.14 : Example of mistakes and good practice for DSE workstation

7.11 Flickering

Flickering screens take a toll on the health of the employee's eyes and causes irritation and discomfort. Employees who are using DSE which more longer duration may notice flickering due to a low refresh rate. The refresh rate is the number of times per second the DSE display a new image. A refresh rate that is lagging can look like flickers when in reality the DSE has slow video processing.

The following are recommendations to reduce flickering when using DSE:

a. Reinstalling or update the latest drivers; and

b. Modifying the refresh rate to the higher value is recommended.

7.12 Display Luminance

DSE settings related to display luminance are important to reduce visual discomfort, visual fatigue and energy consumption. The optimal luminance depends on several factors such as ambient luminance, angular screen size and DSE employee's age.

It is recommended that the DSE level of luminance should be adjustable to allow for viewing in low illumination or dark environments.

7.13 Contrast

		Background								
		Red	Orange	Yellow	Green	Blue	Violet	Black	White	Grey
Foreground	Red	Poor	Poor	Good	Poor	Poor	Poor	Good	Good	Poor
	Orange	Poor	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor
	Yellow	Good	Good		Poor	Good	Poor	Good	Poor	Good
	Green	Poor	Poor	Poor	Poor	Good	Poor	Good	Poor	Good
	Blue	Poor	Poor	Good	Good	Poor	Poor	Poor	Good	Poor
	Violet	Poor	Poor	Good	Poor	Poor	Poor	Good	Good	Poor
	Black	Poor	Good	Good	Good	Poor	Good		Good	Poor
	White	Good	Good	Poor	Poor	Good	Good	Good		Good
	Grey	Poor	Poor	Good	Good	Poor	Poor	Poor	Good	Poor

Figure 7.15 : Recommended for colour and contrast in DSE usage

The following are recommendation for colours and contrast in DSE usage: Visual presentation of text and images of text should have a contrast ratio of 4.5:1 except for the following as shown in **Figure 7.15.**

a **Large text**
Large scale text and images of large-scale text may have a contrast ratio of at least 3:1;

b **Incidental**
Text or images of text that area part of an inactive component or purely for decoration, that are not visible to anyone or that are a part of a picture that contains significant other visual content, have no contrast requirement; and

c **Logo types**
Text that is part of a logo or brand name has no minimum contrast requirement.

The contrast ratio can range from 1 to 21 (commonly written 1:1 to 21:1) and can be calculated using the formula:

$$\frac{(L1 + 0.05)}{(L2 + 0.05)}$$

Where:
L1 is the relative luminance of the lighter of the colours
L2 is the relative luminance of the darker of colours

7.14 Glare

Sharp luminance contrast between the DSE and the surrounding environment should be avoided. A combination of approaches should be implemented to reduce or eliminate reflections and glare. The recommended approaches are as follows:

a. Position DSE workstation at right angles to the windows;

b. Light fixtures should not be installed directly above the workstation and should be installed on either side of the DSE workstation;

c. Lighting sources should be covered with a diffuser to prevent any direct lighting to the DSE;

d. DSE screens should be installed with an anti-glare coating or anti-reflecting device to minimize reflected glare;

e. Windows should be installed with adjustable blinds or curtains to prevent excessive illuminance and reflected glare;

f. Walls should be painted in a neutral tone, surrounding equipment and furniture should be a matt or darkened tone to avoid reflection;

g. Shiny decorations and high reflective surfaces should be avoided in the workstation; and

h. Positioning the screen or adjusting the lighting to avoid reflections and install screen hoods to shield the DSE completely or partially from reflection.

7.15 Font

7.15.1 Recommended Presentation Slides Font Sizes

i. Presentation on 4:3 Ratio Screens

Recommendation for presentation slides on a 4:3 ratio screen such as projectors or older monitors. Comfortable viewing distance for presentation on 4:3 ratio screens as shown in **Table 7.2**

Table 7.2 Comfortable viewing distance for presentation on 4:3 ratio screens

		Font size (in points)						
		18	**24**	**28**	**32**	**3.6**	**40**	**44**
Screen Width (inches)	**36**	5.7	8.2	9.4	10.4	11.6	12.8	14
	48	7.6	10.9	12.5	14	15.5	17.1	18.6
	60	9.7	13.4	15.5	17.4	19.5	21.3	23.2
	72	11.6	16.2	18.6	21	23.2	25.6	28
	84	13.4	18.9	21.6	24.4	27.1	29.9	32.6
	96	15.5	21.6	24.7	28	31.1	34.1	37.2
	120	19.5	27.1	31	34.7	38.7	42.7	46.6

To use the table:

a. Locate the row that corresponds to the width of the screen that is being used;

b. Locate the column corresponding to the smallest font used for text; and

c. The intersection of the row and column is the maximum distance (in meters) from the screen that a person should be seated to easily read the text.

For example: for a 60-inch screen width with a 32-font size on the presentation material, the maximum distance that employee should be seated is 17.4 meters from the screen.

ii. Presentation on 16:9 Ratio Screen

Recommendation for presentation slides on a 16:9 ratio screen such as widescreen TV, monitors or projectors as shown in **Table 7.3**

Table 7.3 Comfortable viewing distance for presentation on 16:9 ratio screens

		Font size (in points)						
		18	**24**	**28**	**32**	**3.6**	**40**	**44**
Diagonal screen size (in inches)	**15**	1.5	2.1	2.4	2.7	3.0	3.4	3.7
	19	2.1	2.7	3.4	3.7	4.0	4.3	4.9
	22	2.4	3.4	3.7	4.3	4.6	5.2	5.5
	27	2.7	4.0	4.6	5.2	5.8	6.4	6.7
	32	3.4	4.6	5.5	6.1	6.7	7.3	8.2
	36	3.7	5.2	6.1	6.7	7.6	8.2	9.1
	42	4.6	6.1	7.0	7.9	8.8	9.8	10.7
	47	4.9	7.0	7.9	8.8	9.8	11.0	11.9
	52	5.5	7.6	8.8	9.8	11.0	12.2	13.1
	60	6.4	8.8	10.1	11.3	12.5	14.0	15.2
	72	7.6	10.7	12.2	13.7	15.2	16.8	18.3
	80	8.5	11.9	13.4	15.2	16.8	18.6	20.1

To use the table:

a. Locate the row that corresponds to the width of the screen that is being used;

b. Locate the column corresponding to the smallest font used for text; and

c. The intersection of the row and column is the maximum distance (in meters) from the screen that a person should be seated to easily read the text.

For example: for a 32-inch diagonal screen size TV with a 28-font text on the presentation material, the maximum distance that employee should be seated is 5.5 meters from the screen.

7.15.2 Recommended Documents Font Sizes

Word documents are recommended to range from font size of 12 to 14 to assist employees with visual impairments. However, employees should have access to alternative font sizes by magnifying the document or changing the font sizes on their own manually.

7.16 Environmental Factors Improvements

For recommendations on environmental factors improvement such as temperature, noise, air quality and lighting as shown in **Table 7.4.**

Table 7.4 Relevant guidelines and code of practices for environmental factors

Environmental Factor	Relevant guidelines and code of practices
Temperature	Guidelines on Heat Stress Management at Workplace
Lighting and illumination	Guidelines on OSH for Lighting at Workplace
Air quality	Industry Code of Practice on Indoor Air Quality
Noise	Industry Code of Practice for Management of Occupational Noise Exposure and Hearing Conservation

7.17 Work Rate and Work Load

The employer should ensure the employees work at a steady pace, consistently as opposed to maximal pace and ensure the overall workload be realistic with the employee's individual capacity. Increases in workload should be carefully managed with adjustment periods.

7.18 Rest Periods

Rest periods are a physiological necessity if performance, efficiency and well-being are to be maintained. Office jobs including DSE work, it is recommended to divide the daily work into four periods, separated by one rest-pause of 10-15 minutes in the morning, one in the afternoon shift and by lunch break of about 45 minutes at mid-day.

7.19 Job Variety and Rotation

The purpose of rotation through task and job variety is to allow the rest of specific muscle groups and to eliminate prolonged periods in sustained postures. It is recommended that DSE work is interspersed with other office duties. If it is not possible, employees should take "productive rest breaks" away from the DSE.

Productive rest tasks allow for a change in posture and the resting of muscles. These include tasks such as answering telephones or discussion. These should intersperse throughout the work routine.

It is recommended that DSE employees have several varied tasks ongoing and that they rotate through them, completing the tasks in a "piecemeal" fashion. e.g., several periods of photocopying to break keyboard work rather than completing all at once as shown in **Figure 7.16.**

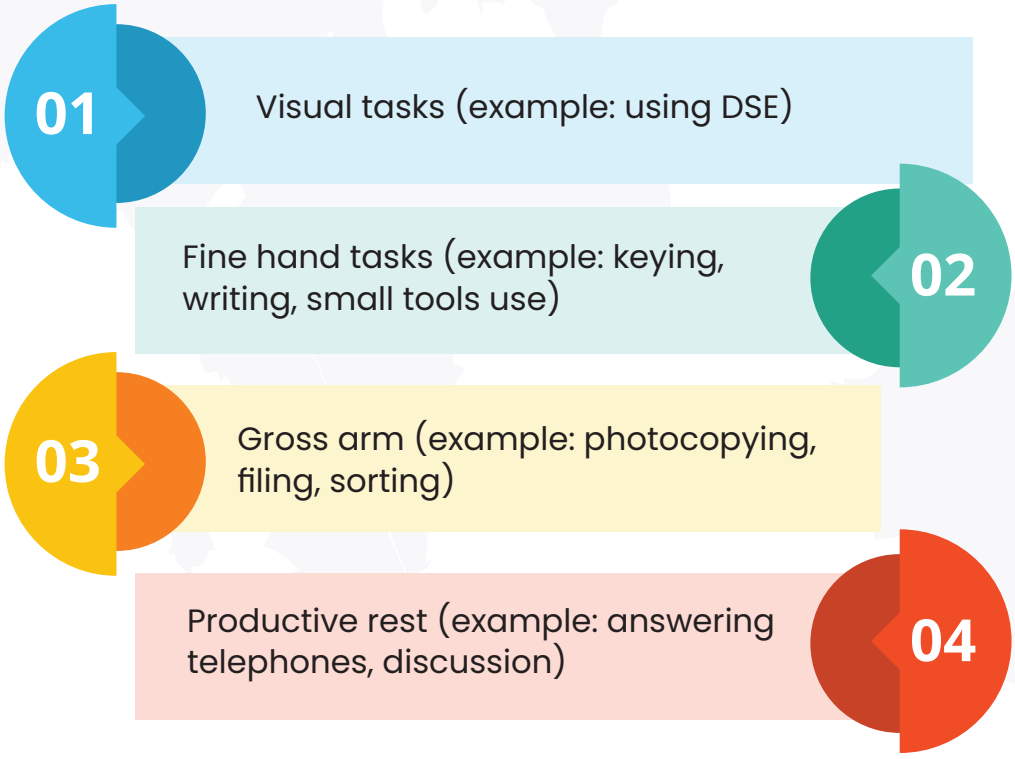


Figure 7.16 Recommended for job variety and rotation

7.20 Maintenance of DSE Equipment and Furniture

Maintenance of DSE equipment should be performed to suit the employee's actual operations to maintain a good working environment. The following measures are recommended:

Daily Checking and Adjustment

As part of routine work, before the day's operation or at an appropriate time (e.g., when an employees took over any DSE tasks from his colleague), in the course of the work, the DSE employees should check lighting, anti-glare measures, ventilation, etc. and adjust the display or screen, keyboard, chair and table.

Cleaning

The DSE's in workstation and other equipments should always be kept clean. Screens should be regularly cleaned using proper cleaning agents and cloths.

7.21 Medical Examination

Medical examinations may be provided to employees involving significant DSE usage. Examinations should include screening for physical characteristics and visual abnormalities.

To obtain a good knowledge of the health condition of employees assigned or reassigned to DSE work and to prepare for the future care of employees' health, the following examination is recommended to be performed by an Occupational Health Doctor (OHD) and Ophthalmologist:

a. Work history;

b. Medical history and subjective symptoms; and

c. Ophthalmologic test i.e :

- Vision test;
- Test of eye position;
- Test of amplitude of accommodation; and
- Measurement of ocular tension.

Any factors detrimental to a employee's health that have been detected through pre employment or periodical health examination should be analysed in detail and appropriate health guidance or other services should be provided to the employee concerned as per the OHD's advice.

7.22 Exercises at Workplace

Physical exercise can help improve job satisfaction and reduce the amount of stress at the workplace. This will also improve the overall health of the employees and reduce medical cost and absenteeism.

If employee have any pre-existing medical condition, employee must consult the physician before beginning any exercise. This general information is not intended to diagnose any medical condition or to replace the healthcare professional. Consult with the healthcare professional to design an appropriate exercise prescription. If employee experience any pain or difficulty with these exercises, stop and consult the healthcare provider.

Example of exercises which can be performed are listed in **Appendix 3**: Eye Exercises for DSE Employees and **Appendix 4**: Physical Exercises for DSE Employees.

7.23 Training and Information

Employees who are exposed to ERF should be provided with training and information, so that they understand their roles and responsibility in the control, prevention and mitigation of musculoskeletal injuries. Training and information programmes should be updated to be consistent with changes in ergonomics control measures and work processes.

Training and information should be conducted for the employees at all level. The contents and scope of training should be as shown in **Figure7.17.**

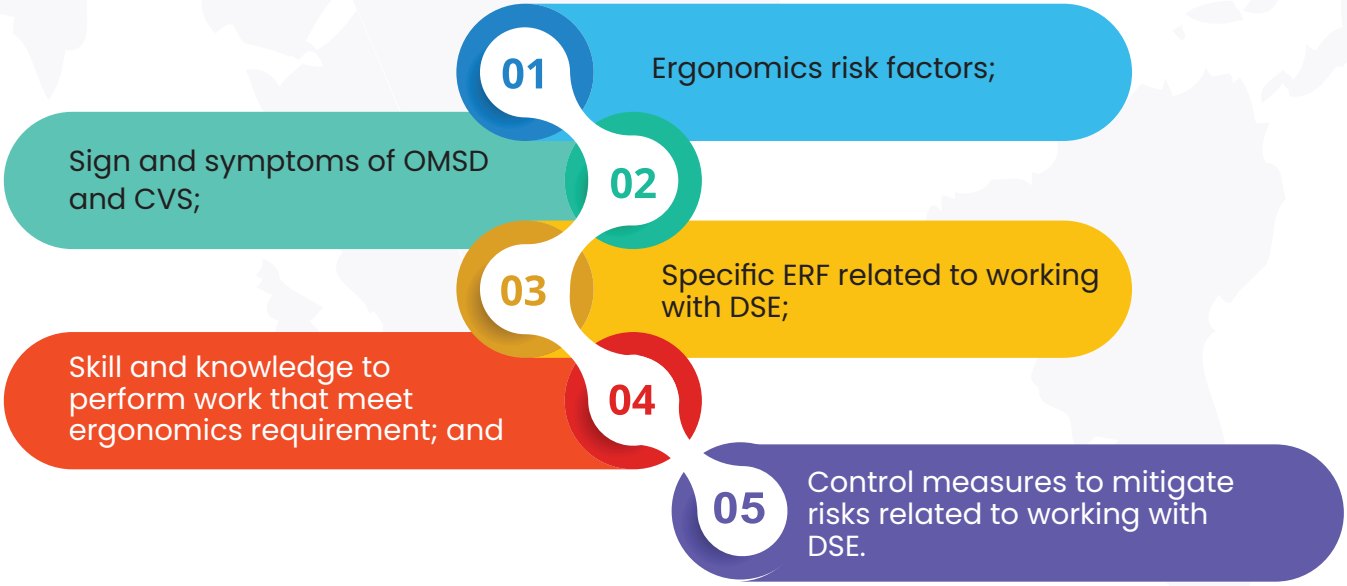


Figure 7.17: Recommended for training and information

8.0 ACTION BASED CHECKLIST FOR DISPLAY SCREEN EQUIPMENT

The Action Based Checklist for DSE as found in **Appendix 2** is used for employer to plan and manage the control measure related to DSE. The employer should answer either "Yes" or "No" for each of the items in the checklist after taking into consideration the "things to consider".

For items with "Yes" answers, no further action is required, while items with "No" answer will require investigation and/or remedial action by the employer. The actions which are planned should be recorded in the Recommendation Action column and a follow-up assessment should be carried out to see if the actions taken have resolved the problem. In this action-based checklist, there are five main areas of concern which are keyboards, mouse, display screens, furniture and environment.

As this action-based checklist can be used as a guide to implement control measures for DSE and only covers the workstation and work environment. It is necessary for the employer to also make sure that risks from other aspects of work are considered and avoided. The employer should improve and take the action based on the list of main areas with tick "No" for an answer.

REFERENCES

1. American Optometry Association. (2020). *Computer vision syndrome*. Retrieved from https://www.aoa.org/healthy-eyes/eye-and-vision-conditions/computer-visionsyndrome

2. Blehm, C., Vishnu, S., Khattak, A., Mitra, S., & & Yee, R. W. (2005). Computer vision syndrome: A review. *Survey of Ophtalmology*, 253-262.

3. Canadian Centre for Occupational Health and Safety. (2020). CCCOHS OSH Answer Fact Sheets. Retrieved from Positioning the Monitor:https://www.ccohs.ca/oshanswers/ergonomics/office/monitor_ positioning.html

4. Clarke, A. (2020). 12 Typography Guidelines For Good Website Usability. Retrieved from Usability Geek: https://usabilitygeek.com/ 12-typography- guidelines-forgood-website-usability/

5. Del Mar Seguí, M., Cabrero-García, J., Crespo, A., Verdú, J., & Ronda, E. (2015). A reliable and valid questionnaire was developed to measure computer vision syndrome at the place of work. J Clin Epidemiol, 662-673.

6. Department of Occupational Safety and Health (2003) Guidelines On Occupational Safety And Health For Working With Video Display Units (VDUs) Ekman, A., Andersson, A., Hagberg, M., & Hjelm, E. (2000). Gender differences in musculoskeletal health of computer and mouse employees in the Swedish workforce. Occupational Medicine, 608-613.

7. Heasman, T., Brooks, A., & Stewart, T. (2000). *Health and safety of portable display screen equipment*. London: Health and Safety Executive.

8. Hedge, A. (2003). Ergonomics Considerations of LCD versus CRT Displays.

9. Japan Ergonomics Society. (2012). *Ergonomic Design Guidelines for Flat Panel Display Televisions.*

10. Logitech. (2020). MX Vertical Advanced Ergonomic Mouse. Retrieved from Logitech: https://www.logitech.com/en-us/products/mice/mx-vertical- ergonomicmouse. 910-005447.html

REFERENCES

11 Melrose, A., Graveling, R., & Cowie, H. (2007). *Better Display Screen Equipment (DSE) work-related ill health data*. Edinburgh: Health and Safety Executive.

12 *Menozzi, M., Lang, F., Näpflin, U., Zeller, C., & H Krueger. (2001). CRT versus LCD: effects of refresh rate, display technology and background luminance in visual performance. Displays, 79-85.*

13 Mowatt, L., Gordon, C., Santosh, A., & Jones, T. (2018). Computer vision syndrome and ergonomic practices among undergraduate university students. *Int J Clin Pract*, 72(1). doi:10.1111/ijcp.13035

14 Nazakawa, T., Okubo, Y., Suwazono, Y., Kobayashi, E., Komine, S., Kato, N., & Nogawa, K. (2002). Association between duration of daily VDT use and subjective symptoms. American Journal of Industrial Medicine, 421-426.

15 Odell, D., & Johnson, P. W. (2015). Evaluation of flat, angled, and vertical computer mice and their effects on wrist posture, pointing performance, and preference. Work, 245-253.

16 Paradi, D. (2008). Selecting the correct font size. Retrieved from Think Outside The Slide: https://www.thinkoutsidetheslide.com/selecting-the-correct-font-size/

17 Rosenfield, M. (2011). Computer vision syndrome: A review of ocular causes and potential. *Ophthal Physiol Optics,* 502-515.

18 Sawyer, B. D., Dobres, J., Chahine, N., & Reimer, B. (2017). The Cost of Cool: Typograhic Style Legibility in Reading at a Glance. *Proceedings of the Human Factors and Ergonomics Society* 2017, (pp. 833-837).

19 Sheedy, J. (1995). Focus on computer-generated eye problems. *Occupational Health and Safety*, 46-50.

20 Sheedy, J. (2000). Doctor Ergo and CVS Doctors: Meeting the eye care needs of computer employees. Journal of *Behavioral Optometry*, 123-125.

REFERENCES

21 Staples. (2020). *Document Holders.* Retrieved from Staples: https://www.staples.ca/products/1383627-en-dac-eh-17004-blk- euroholdereasel-copyholder-black

22 Stretch Now Ptd Ltd. (n.d.). *VESA Float Document Holder*. Retrieved from Ergonomics Now: https://www.ergonomicsnow.com.au/ergonomicproducts/ accessories document-holders/vesa-float-document-holder

23 Toe, C., Gifford, P., Johnston, V., & Treleaven, J. (2019). Computer vision symptoms in people with and without neck pain. *Appl Ergonom*, 50-56.

24 University of North Carolina. (2020). *Document Holders.* Retrieved from UNC Institutional Integrity and Risk Management: https://ehs.unc.edu/place of worksafety/ergonomics/products/holders/

25 World Wide Web Consortium. (11 12, 2008). *Web Content Accessibility Guidelines (WCAG) 2.0.* Retrieved from World Wide Web Consortium.

26 Yan, Z., Hu, L., Chen, H., & Lu, F. (2008). Computer vision syndrome: A widely spreading but. *Comp Hum Behav*, 2026-2042.

APPENDICES

Appendix 1 : International Standards Related to Display Screen Equipment

ISO 9241 Ergonomics Requirements for Office Work with Visual Display Terminals

ISO 9241 is a multipart standard that deals with both the hardware and software ergonomics aspects of the use of visual display terminals. Previously it consisted of 19 parts but currently, some part is undergoing revision.

ISO 6385 Ergonomic Principles in the Design of Work Systems

ISO 6385 establishes the fundamental principles of ergonomics as basic guidelines for the design of work systems and defines relevant basic terms. It describes an integrated approach to the design of work systems, where ergonomists will cooperate with others involved in the design, with attention to the human, the social and the technical requirements in a balanced manner during the design process.

ISO 10075 Ergonomic Principles Related to Mental Workload (3 Parts)

ISO 10075 is a multipart standard that provides a standard reference in the field of mental workload, covering mental stress and mental strain, and short- and long-term, positive and negative consequences of mental strain. It also specifies the relations between these concepts involved. Part 1 provides the design of working conditions concerning mental workload whereas part 2 and 3 provides the methods of measurement and principles of task design

ISO 11064 Ergonomic Design of Control Centres (7 Parts)

ISO 11064 specifies ergonomic principles, recommendations and requirements for the design of control centres. It covers design principles, control suites layout, design of workstation, display and control, environmental requirements and evaluation methods. It is applicable primarily to seated, visual-display-based workstations, although control workstations at which operators stand are also addressed.

ISO 14915 Software Ergonomics for Multimedia Worker Interfaces (2 Parts)

ISO 14915 establishes design principles for multimedia worker interfaces and provides a framework for handling the different considerations involved in their design. It addresses worker interfaces for applications that incorporate, integrate and synchronize different media including static media such as text, graphics or images, and dynamic media such as audio, animation, video or media related to other sensory modalities. Detailed design issues within a single medium (e.g. the graphical design of an animation sequence) are only addressed as far as they imply ergonomic consequences for the worker. Part 2 of this standard provides requirements and recommendation for the design of the organization of the content, navigation and media-control issues.

ISO/TR 16982 Ergonomics of Human-System Interaction - Usability Methods Supporting Human-Centred Design

ISO/TR 16982:2002 provides information on human-centred usability methods which can be used for design and evaluation. It details the advantages, disadvantages and other factors relevant to using each usability method. Some of the issues are dealt with more fully in ISO 9241 which is complementary to this standard.

ISO/IEC 11581 Information Technology – Worker System Interfaces and Symbols – Icon Symbols and Functions (2 Parts)

ISO/IEC 11581 applies to software products providing office applications such as document production, desktop publishing, finance and planning that present their functions via a graphical worker interface. It is meant to be used by persons involved in the design, implementation and evaluation of icons for graphical worker interfaces to computer-based office applications and by procurers of systems that employ such interfaces.

Appendix 2 : Action Based Display Screen Equipment (DSE) Workstation Checklist

Company Name :	
Company Address :	
DOSH Registration No :	
Date of Assessment Action Based DSE :	
Location / Work area :	
No. of Employee :	**Male :** **Female :**
Prepared By :	

Note:

1. Tick "Yes" answers, if items have been considered. Tick "No" which further action is required.
2. Tick "No" answers, if items have not been considered. Tick "Yes" which required investigation and/or remedial action by the employer.
3. Tick "N/A" answers, if items is not applicable.

Main Area	Answer	Please give details	Is further action required?	Recommended action
1. Keyboard				
Is the keyboard separated from the screen?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Does the keyboard tilt?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is it possible to find a comfortable keying position?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Does the employee have good keyboard technique?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	

Main Area	Answer	Please give details	Is further action required?	Recommended action
Are the characters clear and readable?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
2. Mouse				
Is the device suitable for the tasks it is used for?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is the device positioned close to the employee?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is there support for the device employee's wrist and forearm?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Does the device work smoothly at a speed that suits the employee?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Can the employee easily adjust software settings for speed and accuracy of pointer?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
3. Display Screen Equipment (DSE)				
Are the characters clear and readable?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is the text size comfortable to read?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is the image stable (i.e. free of flicker and jitter)?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is the screen's specification suitable for its intended use?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Are the brightness and/or contrast adjustable?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	

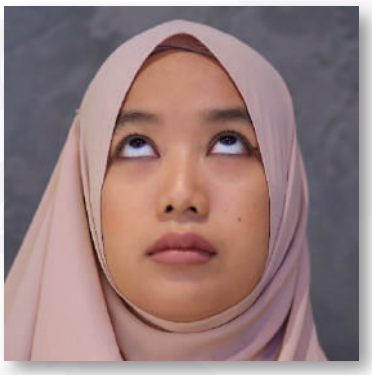
Main Area	Answer	Please give details	Is further action required?	Recommended action
Does the screen swivel and tilt?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is the screen free from glare and reflections?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Are adjustable window coverings provided and in adequate condition?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
4. Furniture				
Is the work surface large enough for all the necessary equipment, keyboard, mouse, etc.?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Can the employee comfortably reach all the equipment and documents they need to use?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Are surfaces free from glare and reflection?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is the chair suitable & stable?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is the chair adjusted correctly?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is the small of the back supported by the chair's backrest?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Are forearms horizontal and eyes at roughly the same height as the top of the DSE?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	

Main Area	Answer	Please give details	Is further action required?	Recommended action
Are feet flat on the floor, without too much pressure from the seat on the backs of the legs?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
5. Environment				
Is there enough room to change position and vary movement?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is the lighting adequated, e.g. not too bright or too dim to work comfortably?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Does the ventilation feel comfortable?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Is the temperature comfortable?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	
Are levels of noise comfortable?	☐ Yes ☐ No ☐ N/A		☐ Yes ☐ No ☐ N/A	

Appendix 3 : Eye Exercises for DSE Employees

The following are 15 eye exercises that are designed to relax and strengthen the eye muscles. These exercises take 10 minutes to perform and can be done anywhere.

1. The Eye Roll



Instructions

- Sit or stand straight. Relax your shoulders, straighten your neck and look ahead.
- Look to your right and then slowly roll your eyes up towards the ceiling.
- Roll your eyes down to your left and then down towards the floor.
- Repeat this in clockwise and anti-clockwise directions.

Time : 2 minutes
Sets & Repetitions : 2 sets of 10 reps

2. The Rub Down

Instructions

- Rub your palms together rapidly until they feel warm.
- Close your eyes and place your palms over each eyelid. Feel the warmth seeping into your eyes.

Time : 3 minutes
Sets & Repetitions : 1 set of 7 reps

3. The Moving Finger/Pencil

Instructions

- Sit comfortably. Relax your shoulders, straighten your neck and look ahead.
- Take a pencil and hold it in front of your nose. Focus on the pencil tip.
- Fully extend your arm.
- Bring it back to the starting position

Time : 2 minutes
Sets & Repetitions : 1 set of 10 reps


4. The Eye Press

Instructions

- Close your eyes and place a finger on each eyelid.
- Press gently for about 10 seconds.
- Lift your fingers for about 2 seconds and press gently again.

Time : 2 minutes
Sets & Repetitions : 1 set of 10 reps

5. Eye Massages

Instructions

- Sit straight and relax your shoulders.
- Tilt your head back a little and close your eyes.
- Place your index and middle fingers gently on each eyelid.
- Move the right fingers in anti-clockwise direction and left fingers in clockwise direction in circular motion.
- Repeat 10 times before changing the direction.

Time : 2 minutes
Sets & Repetitions : 2 sets of 10 reps

6. Blink

Instructions

- Sit comfortably, relax your shoulders, straighten your neck and look at a blank wall.
- Close your eyes.
- Hold for two seconds and then open your eyes.
- Do it 10 times to complete one set.

Time : 3 minutes
Sets & Repetitions : 2 sets of 10 reps

7. Flexing

Instructions

- Sit comfortably and look straight ahead.
- Without moving your neck, look up and then look down. Repeat 10 times.
- Then, while keeping your neck straight, look to your extreme right. Then, look to your extreme left. Repeat 10 times.

Time : 3 minutes
Sets & Repetitions : 4 sets of 10 reps



8. Focusing

Instructions

- Sit 1 meter away from a window, look straight and relax your shoulders.
- Extend your right arm in front of you, stick your thumb out and focus on the tip for 1-2 seconds.
- Without moving your hand, focus on the window for 2 seconds.
- Focus on a distant object out of the window for 2 seconds.
- Focus back on the thumb.

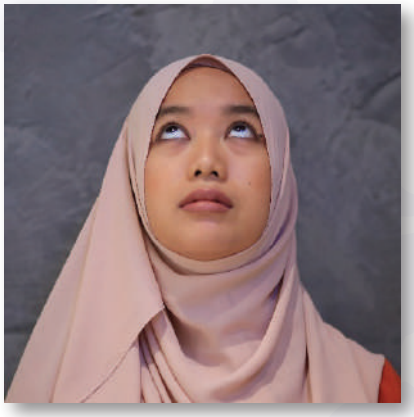
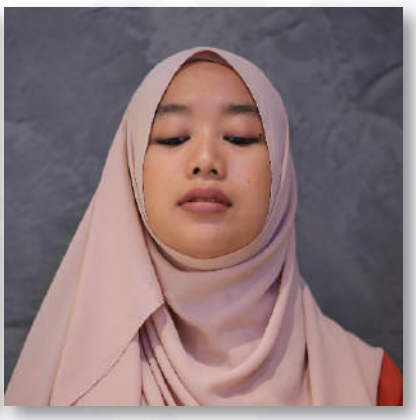
Time : 1 minutes
Sets & Repetitions : 2 sets of 10 reps

9. The Eye Bounce

Instructions

- Sit, stand or lie down. Look straight ahead.
- You can either keep your eyes open or closed.
- Move your eyes up and down quickly.
- Repeat 10 times before stopping and resting for 5 seconds.

Time : 1 minutes
Sets & Repetitions : 2 sets of 10 reps

10. Palming

Instructions

- Sit on a chair and keep your elbows on a table in front of you.
- Cup an eye in each palm.
- Breathe in and breathe out. Relax and release all tension.
- Keep the pose for 30 seconds.

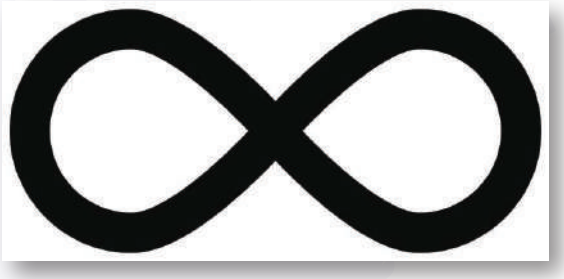
Time : 2 minutes
Sets & Repetitions : 4 reps

11. Trace an Infinity

Instructions

- Imagine a giant infinity symbol on a blank wall or ceiling.
- Trace a path along this figure with just your eyes, without moving your head.
- Repeat 5 times.

Time : 2 minutes
Sets & Repetitions : 4 sets of 5 reps



12. The Sidelong Glance

Instructions

- Sit, lie or stand comfortably and take a few deep breaths.
- Keeping your head still, try to look left as much as you can using only your eyes.
- Hold your vision for about 3 seconds and then look to the front.
- Look right as much as you can and hold your vision for 3 seconds.

Time : 2 minutes
Sets & Repetitions : 3 sets of 10 reps

13. Writing Messages

Instructions

- Look at a blank wall at least 2 meters away and imagine you are writing a word on it with your eyes. This makes the eye muscles move rapidly in different directions and exercises the weak ones.
- Do it for about 15-20 seconds.
- Do it for about 15-20 seconds.

Time : 2 minutes
Sets & Repetitions : 2 sets

ergonomics

14. The Double Thumbs Up

Instructions

- Sit comfortably, relax your shoulders, straighten your neck and look ahead. Hold both your thumbs at arm's length directly in front of your eyes.
- Focus your vision on the right thumb for about 5 seconds.
- Shift your focus to the space between the two thumbs, preferably at a distant object, for another 5 seconds.
- Finally, shift your gaze to the left thumb and focus on it for 5 more seconds, back to the space between the two thumbs and then the right thumb.

Time : 3 minutes
Sets & Repetitions : 3 sets of 5 reps

15. Treat the Eyelids

Instructions

- Massage the lower eyelids very gently with your ring fingers.
- Start with the inner edge of the lower eyelid and gradually move outwards.
- Massage the eyebrows in a similar fashion after finishing with the lower lids.

Time : 5 minutes
Sets & Repetitions : 5 sets of 10 reps

Appendix 4 : Physical Exercises for DSE Employees

UPPER BODY EXERCISES

TRICEPS DIPS

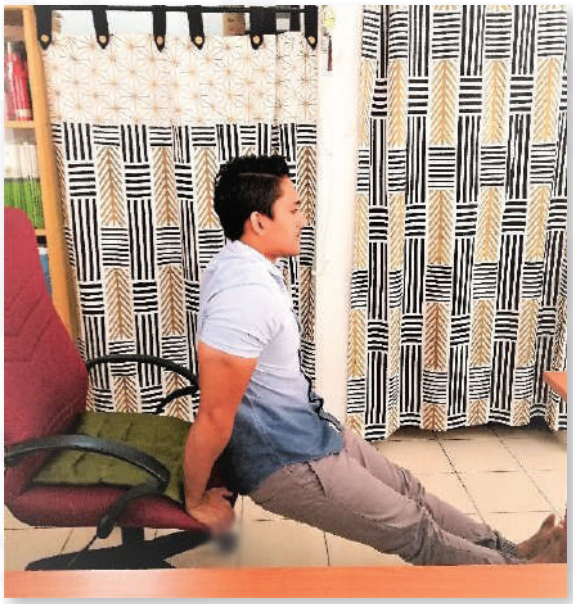
Equipment Required :

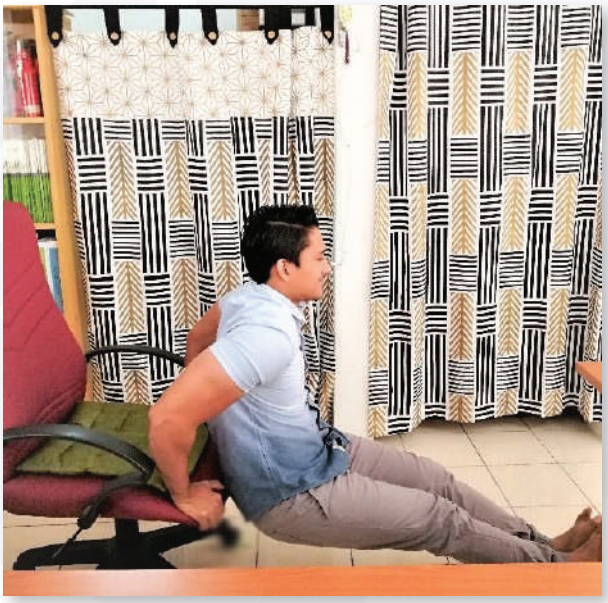
1. Stationary Chair.

Precautions Required :

1. Do not use wheeled chairs to perform this exercise.
2. Ensure correct form while performing the exercise.
3. Stop if there is any symptom of pain or fatigue.

Pictorial References :





Steps :

1. Scoot to the front of the chair with both hands facing forward.
2. Place palms flat on the chair.
3. Bend your elbows straight back.
4. Lower yourself straight down several inches and keeping your back as close to the chair as possible.
5. Then straighten your arms to rise back to start.
6. Complete 20 dips.

ARM CIRCLES

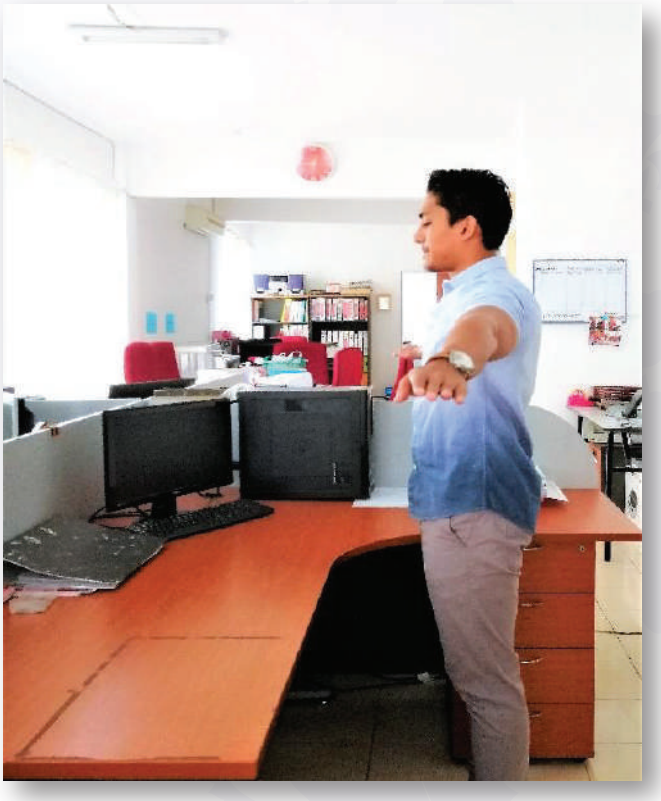
Equipment Required :

N/A

Precautions Required :

1. Make sure to perform this exercise at a free space without any obstacles at arm's length at standing height.
2. Ensure correct form while performing the exercise.
3. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. Stand with feet shoulder-width apart, arms extended straight out to sides at shoulder height.
2. Move your arms in a small backward circle.
3. Do 20 times in this direction.
4. Switch directions and repeat.

TABLE PUSH-UPS

Equipment Required :

1. Table

Precautions Required :

1. Ensure that the table is strong and sturdy enough to support body weight.
2. Ensure correct form while performing the exercise.
3. Stop if there is any symptom of pain or fatigue.

Pictorial References :

Steps :

1. Take a few steps back from your table, so you can place your hands flat on your desk, a little wider than shoulder-width.
2. Lower yourself down toward your desk, keeping your core tight.
3. Then push back up until arms are straight but not locked.
4. Try to do 20 reps.

WALL PUSH-UPS

Equipment Required :

1. Flat Wall

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :

Steps :

1. Stand a few steps from a wall and lean toward it, placing your hands flat and wider than your shoulders.
2. Lower yourself down toward the wall, keeping your abs tight to maintain a straight line from your head to your toes.
3. Push back up until your arms are straight (but not locked).
4. Complete 20 reps.

LOWER BODY EXERCISES

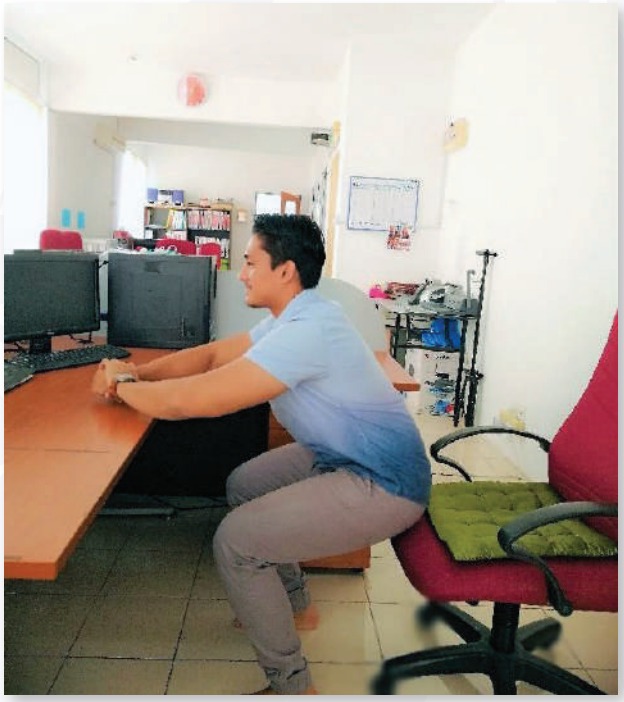
Equipment Required :

1. Flat Wall

Precautions Required :

1. Do not use wheeled chairs to perform this exercise.
2. Ensure correct form while performing the exercise.
3. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. All you have to do is stand up from your chair.
2. lower your body back down, stopping right before you sit back down. (Keep your weight in your heels to work those glutes).
3. Then stand back up again.
4. Repeat 10 times.

STANDING REAR PULSES

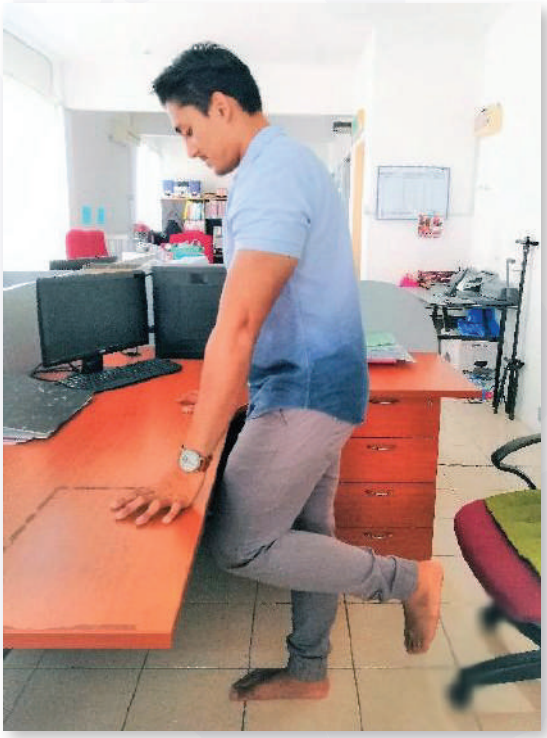
Equipment Required :

1. Workstation Table

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. Holding the edge of your desk for support, bend one leg behind you and flexing the foot.
2. Raise your heel up a few inches then release slightly and press your foot directly back behind you.
3. Continue to alternate between lifting your heel up then pressing it back.
4. Do 20 to 30 reps and then switch sides.

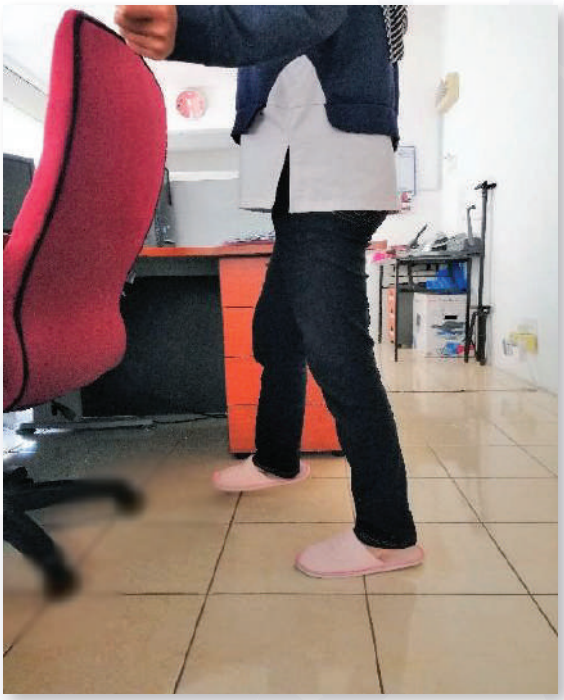
PRETEND JUMP ROPE

Equipment Required :

N/A

Precautions Required :

1. Ensure free and open space with no obstructions at arm's length.
2. Ensure correct form while performing the exercise.
3. Stop if there is any symptom of pain or fatigue.



Steps :

1. Hop on both feet at once or alternate if you need to modify.
2. You can up the intensity by moving your arms as if you were holding a rope.

PRETEND JUMP ROPE

Equipment Required :

1. Stationary Chair

Precautions Required :

1. Do not use wheeled chairs to perform this exercise.
2. Ensure correct form while performing the exercise.
3. Stop if there is any symptom of pain or fatigue.

Pictorial References :

Steps :

1. Stand up behind your chair and hold on for support.
2. Raise your heels off the floor until you are standing on your toes.
3. Slowly lower yourself back to the floor.
4. Do 3 sets of 10.

WALL SITS

Equipment Required :

N/A

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :

Steps :

1. Slide your back down a wall until your hips are at the same level as your knees and your knees are together at 90-degree angles.
2. Maintain the position for 30 to 60 seconds, then release.
3. Stand up straight back again.
4. Aim for 15 reps.

LUNGES

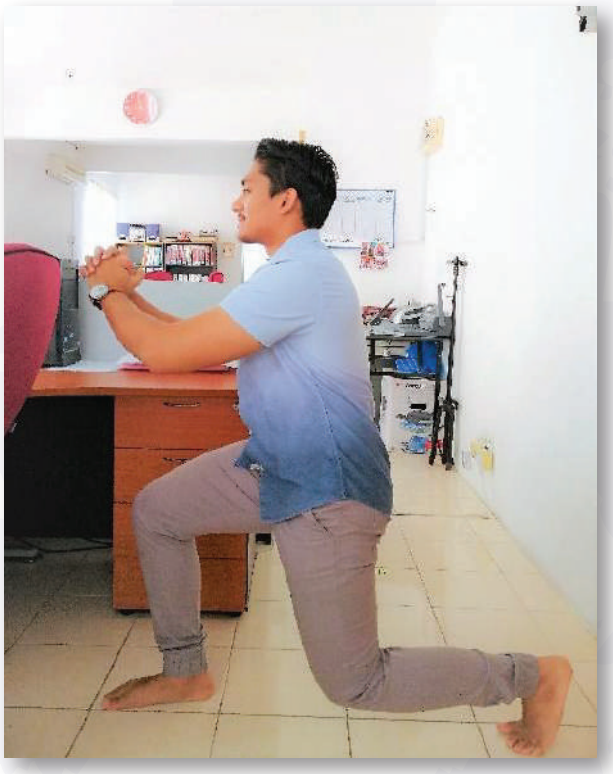
Equipment Required :

N/A

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. With one leg in front of the other.
2. Gently lower the knee of your back leg down towards the ground.
3. 10 times on each leg.

CORE EXERCISES

SEATED BICYCLE CRUNCHES

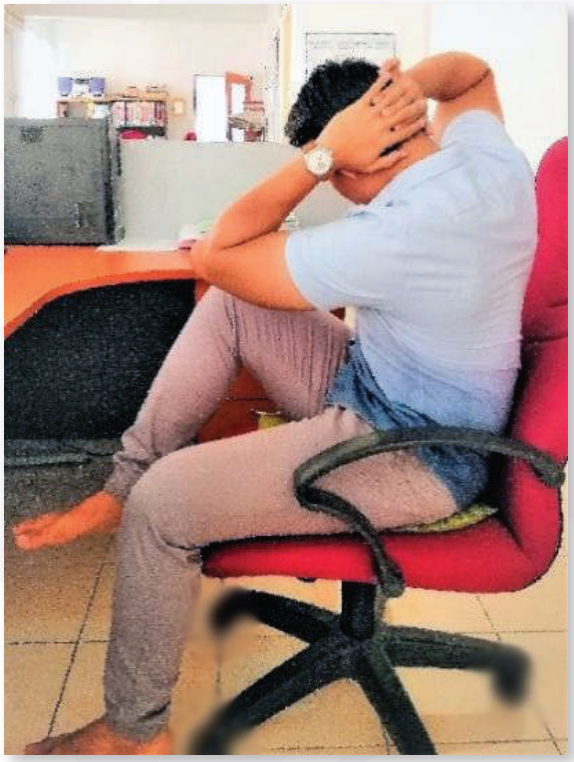
Equipment Required :

1. Stationary Chair

Precautions Required :

1. Do not use wheeled chairs to perform this exercise.
2. Ensure correct form while performing the exercise.
3. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. Sit in your chair with your feet flat on the floor.
2. Position your hands behind your head and lift one knee toward the opposite elbow, twisting your body down toward it.
3. Then return to the seated, straight-back position.
4. Finish 15 twists, then repeat on the other side.

OBLIQUE TWISTS

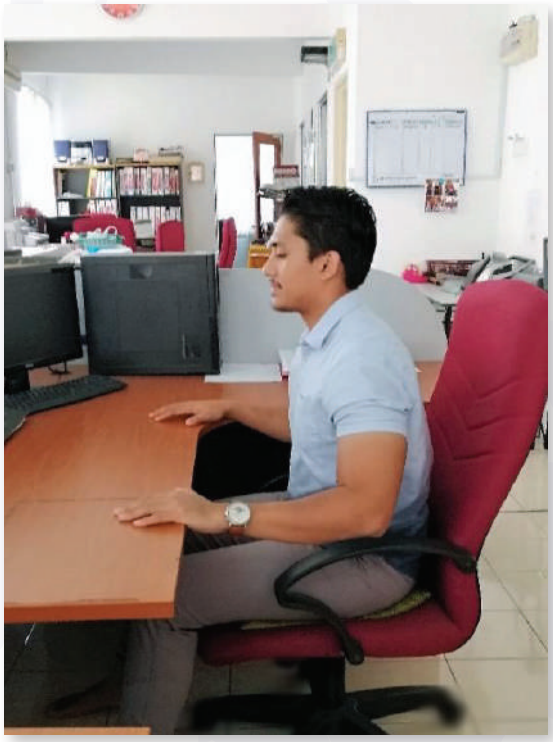
Equipment Required :

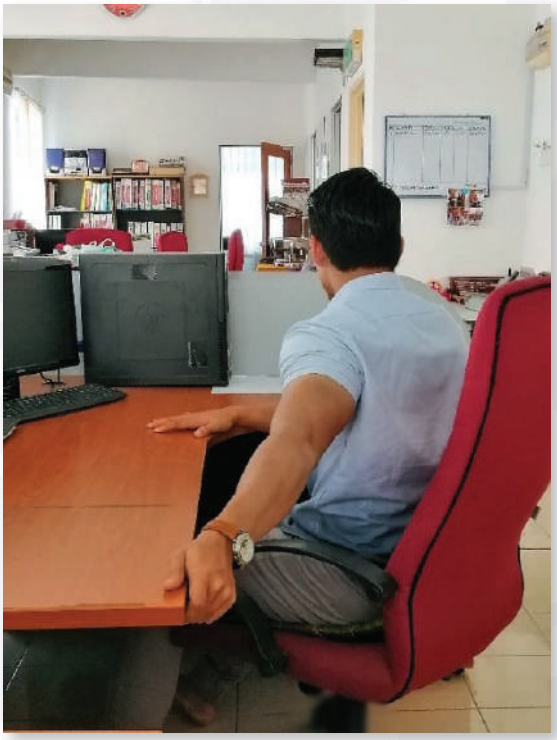
1. Any Chair

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :





Steps :

1. Sitting in upright position and with the feet hovering over the floor.
2. Hold onto the edge of your desk.
3. Next, use the core to swivel the chair from side to side.
4. Go back and forth 15 times.

LOWER-ABS LEG LIFTS

Equipment Required :

1. Any Chair

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :

Steps :

1. Sit straight up, with feet flat on the floor.
2. Lift one leg up at a time, keeping core tight.
3. To make it more challenging, try lifting both up at the same time.
4. Do 20 reps.

STRETCHES

TRICEPS STRETCH

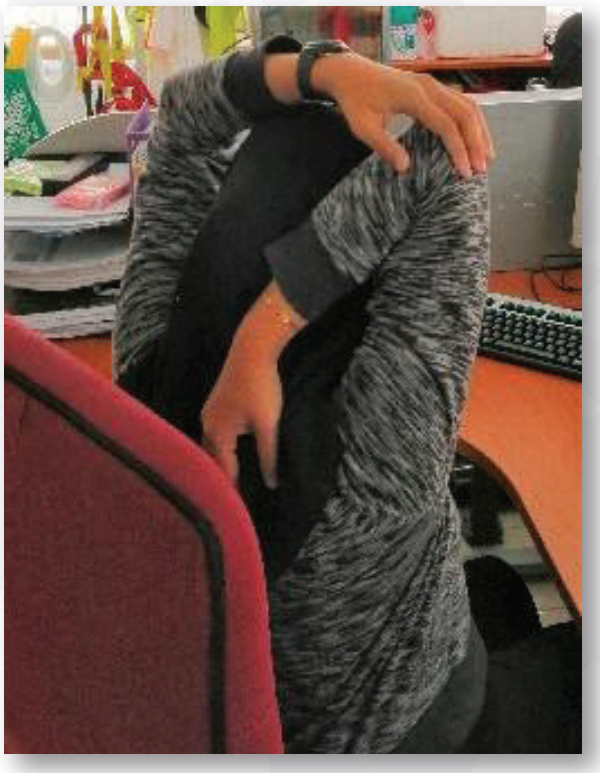
Equipment Required :

N/A

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. Raise one arm and bend it so that your hand reaches to touch the opposite shoulder blade. (It's fine if you can't reach it.)
2. Use your other hand and pull the elbow toward your head.
3. Hold for 2 to 3 deep breaths. Repeat on the other side.

NECK ROLLS

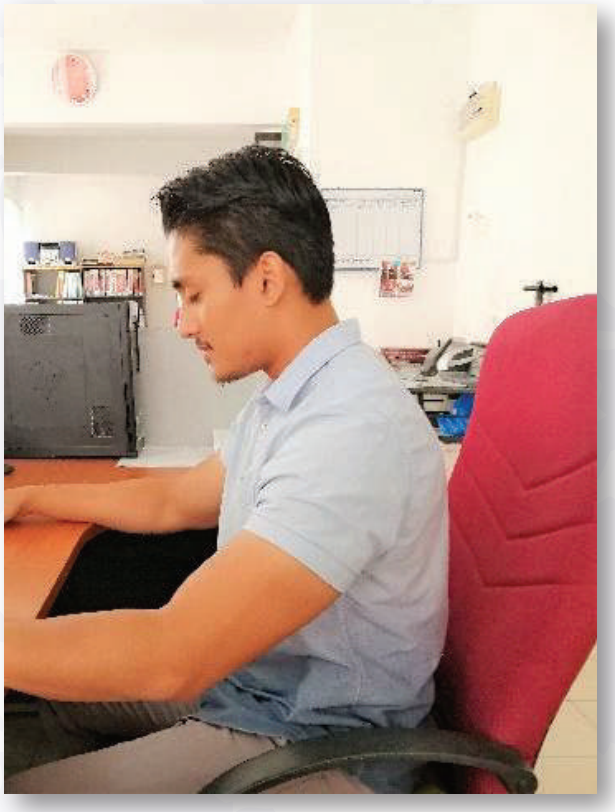
Equipment Required :

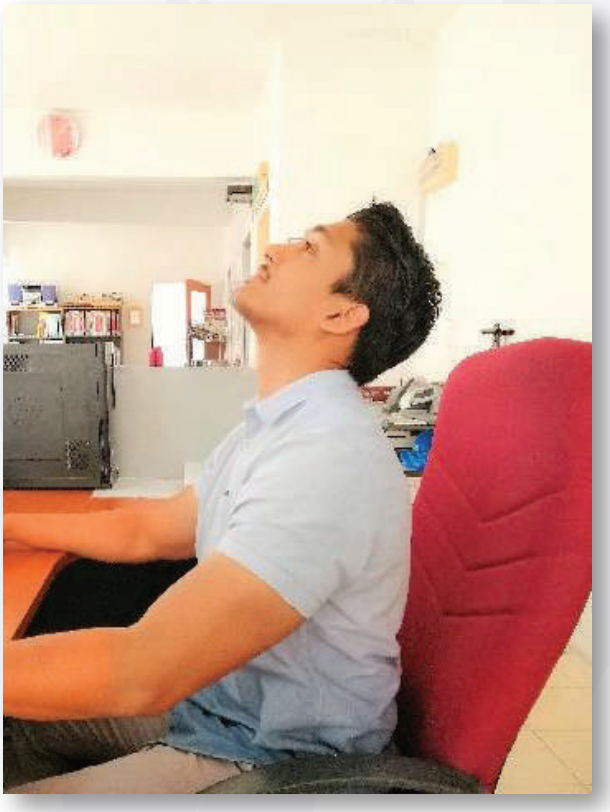
N/A

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :





Steps :

1. Relax and lean your head forward.
2. Slowly roll head in a circle on one side for 10 seconds.
3. Repeat on the other side.
4. Do this three times in each direction.

SHOULDER STRETCH

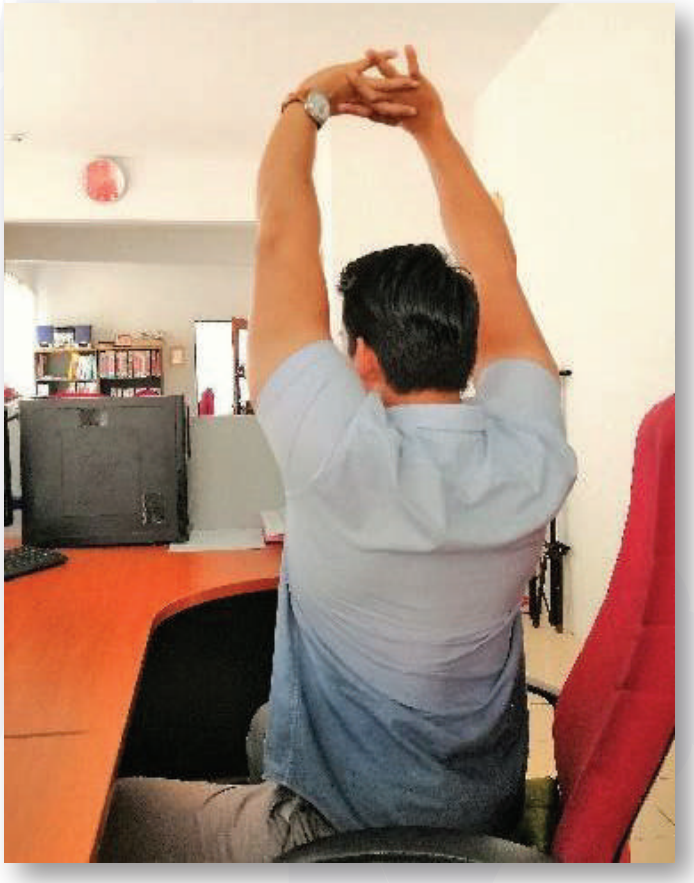
Equipment Required :

N/A

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. Clasp hands together above the head with palms facing up toward the ceiling.
2. Push your arms up, stretching upward.
3. Hold for 2 to 3 deep breaths.

SHOULDER ROLLS

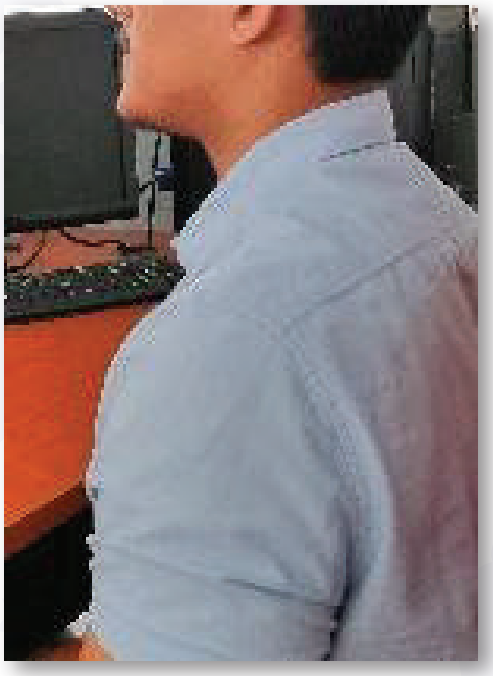
Equipment Required :

N/A

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. Raise both shoulders up toward ears.
2. Slowly roll them backwards.
3. Repeat, rolling forward.
4. Do this three times in both directions.

UPPER BACK STRETCH

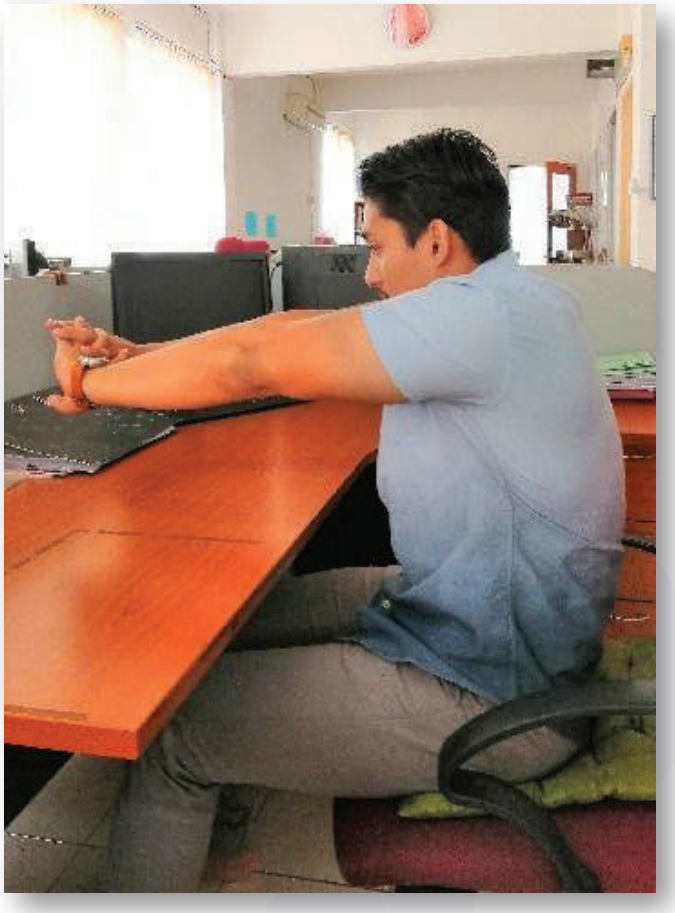
Equipment Required :

N/A

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. Hold your arms out straight in front of you, palms facing down.
2. Lower your head in line with your arms and round the upper back while looking down toward the floor.
3. Hold for 2 to 3 deep breaths.

TORSO TWIST

Equipment Required :

N/A

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :

Steps :

1. Place feet firmly on floor and place one hand on the back of your chair.
2. Exhale and twist your upper body toward the arm on chair back, using your other hand to press against your leg for leverage.
3. Hold for 2 to 3 deep breaths and repeat on other side.

HAMSTRING STRETCH

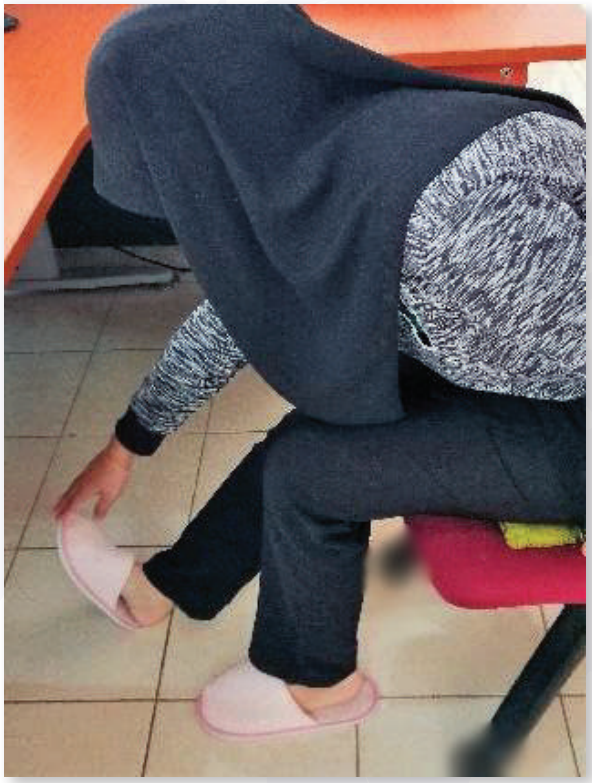
Equipment Required :

1. Stationary Chair

Precautions Required :

1. Do not use wheeled chairs to perform this exercise.
2. Ensure correct form while performing the exercise.
3. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. Sit in your chair with both feet on the ground, then extend one leg outward.
2. Reach toward your toes.
3. Hold for 2 to 3 deep breaths. Repeat on the other leg.

HAMSTRING STRETCH

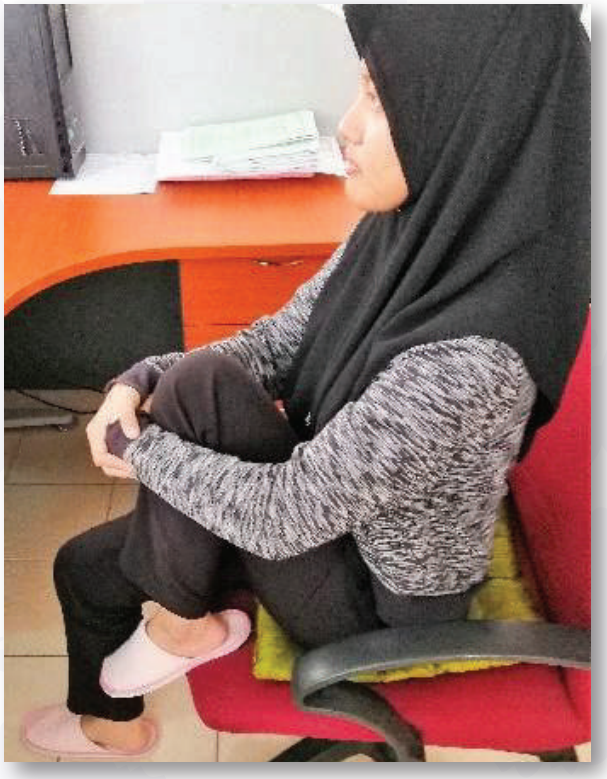
Equipment Required :

1. Stationary Chair (if performed while sitting)

Precautions Required :

1. Do not use wheeled chairs to perform this exercise. (if performed while sitting)
2. Ensure correct form while performing the exercise.
3. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. Lean back in chair.
2. Hug one knee at a time, pulling it toward your chest.
3. Hold for 2 to 3 deep breaths, then switch legs.
4. This exercise can also be done standing up.

WRIST AND FINGERS STRETCH

Equipment Required :

1. Workstation Table

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :

Steps :

1. Standing, place both hands on your desk, palms faced down, fingertips facing your body.
2. To intensify the stretch, lean forward.
3. Hold the stretch until you feel the tension release.

EAGLE ARMS

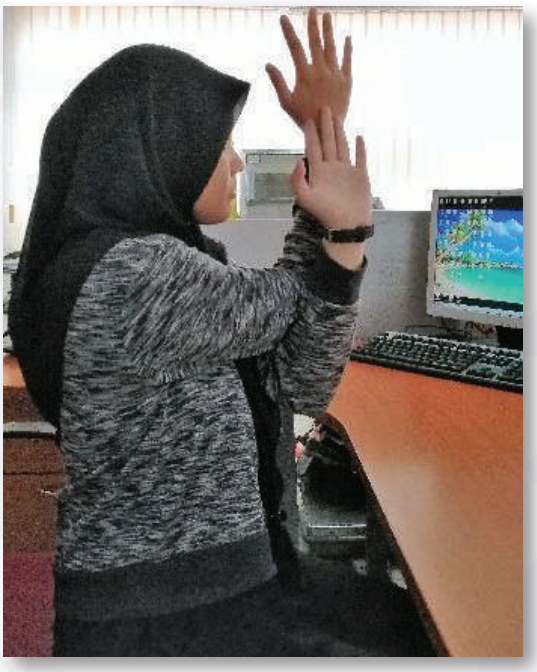
Equipment Required :

N/A

Precautions Required :

1. Ensure correct form while performing the exercise.
2. Stop if there is any symptom of pain or fatigue.

Pictorial References :



Steps :

1. While sitting, reach your arms straight out in front of you.
2. Bend the left arm upward and sweep the right arm under it.
3. Wrap your right arm around the left until you are able to grab the outside edge of the left arm or until you are able to clasp your palms together.
4. Lift the elbows away toward the ceiling and pull your hands away from your face. Turn your head side-to-side.
5. Hold for 2 to 3 deep breaths. Repeat on the other side.

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