

# Easy Steps



## **Unit 6743 (v7)**

**Demonstrate an understanding  
of ergonomic principles for  
computer workstations**

- ☒ Easy to follow
- ☒ Step-by-step instructions
- ☒ Covers Unit Standard Criteria

*A Cheryl Price Publication*

## **Unit Standard 6743 (Version 7)**

### **Demonstrate an understanding of ergonomic principles for computer workstations**

This book covers the course outline for the following New Zealand Qualifications Authority Unit Standard

Unit Standard 6743 - GENERIC COMPUTING (Level 2, Credit 2)

Demonstrate an understanding of ergonomic principles for computer workstations

All topics in this Unit Standard are included in this book.

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**ISBN 978-1-877562-63-1**

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**Published in New Zealand**

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Sample Document

# NZQA Outcomes and Evidence Requirements

## Unit Standard 6743 (Version 7)

<b>Title</b>	<b>Demonstrate an understanding of ergonomic principles for computer workstations</b>		
<b>Level</b>	<b>2</b>	<b>Credits</b>	<b>2</b>

<b>Purpose</b>	People credited with this unit standard are able to: describe ergonomic principles for computer workstations; and use a computer workstation according to ergonomic principles.
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<b>Classification</b>	Computing > Generic Computing
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<b>Available grade</b>	Achieved
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### Explanatory notes

- 1 Guidelines refer to the following publication:  
*ACC5637 Guidelines for Using Computers - Preventing and managing discomfort, pain and injury.* Accident Compensation Corporation - Department of Labour, 2010
- 2 Legislation relevant to this unit standard includes but is not limited to the:  
Health and Safety in Employment Act 1992,  
and its subsequent amendments.
- 3 An assessment resource to support computing unit standards (levels 1 to 4) can be found on the NZQA website at [www.nzqa.govt.nz/asm](http://www.nzqa.govt.nz/asm).

## Outcomes and evidence requirements

### Outcome 1

Describe ergonomic principles for computer workstations.

#### Evidence requirements

- 1.1 Ergonomic principles for computer workstations are described in accordance with the Guidelines.
- 1.2 The symptoms of health problems that may be caused by poor ergonomic arrangements are described in accordance with the Guidelines.

### Outcome 2

Use a computer workstation according to ergonomic principles.

#### Evidence requirements

- 2.1 The workstation arrangement is checked to ensure that it conforms to the Guidelines.
- 2.2 The workstation arrangement allows the computer to be used for the designed workstation purpose.
- 2.3 The position of the user conforms to the Guidelines.
- 2.4 The keyboard and mouse are operated in accordance with the Guidelines.

<b>Planned review date</b>	31 December 2016
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#### Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	8 July 1996	31 December 2013
Revision	2	28 July 1998	31 December 2013
Review	3	30 November 2000	31 December 2013
Revision	4	5 July 2002	31 December 2013
Revision	5	16 July 2004	31 December 2013
Review	6	22 May 2009	31 December 2015
Rollover and Revision	7	19 September 2013	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0226
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

# Ergonomic Principles

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## Learning Outcomes

*At the end of this section you should know about -*

- ☐ The purpose of ergonomic principles
- ☐ The relevance of the Health and Safety in Employment Act 1992
- ☐ The importance of a Code of Practice
- ☐ The relevance of the Approved Code of Practice for the Use of Visual Display Units in the Place of Work

# Ergonomics

Ergonomics is the study of efficiency, comfort and safety of people in their working environment. Ergonomics deals with workers, their tasks, their tools and their environment. Ergonomics is concerned with the application of appropriate methods, theory and data to improve human well-being and overall system performance.

Ergonomic changes reduce risk of injury, remove potential dangers and make tasks easier or less stressful. Some common ergonomic changes include adjusting a seat or computer screen, altering workstation layout, and providing a foot-rest or document holder.

The word ergonomics derives from the Greek words '**ergon**' meaning work and '**nomos**' meaning laws.

The cost of not incorporating good ergonomic principles into the workplace can be counted in terms of:

- Errors and reduced efficiency in doing a job
- Discomfort
- Frustration and dissatisfaction on the part of the user
- The potential for accidents and personal injury

These problems can be avoided if an ergonomics approach is used.

The Health and Safety in Employment Act 1992 has made many ergonomic requirements by law. There are additional considerations that most responsible employers choose to put in place to ensure a safe and efficient workplace.

The Department of Labour has published an Approved Code of Practice for the Use of Visual Display Units in the Place of Work, covering all of the ergonomic factors that should be considered in a computer environment. The Act and the Code of Practice are discussed in this section.

Section 2 outlines possible health problems that can occur if good ergonomic principles are not applied.

Section 3 discusses how to operate a computer workstation according to ergonomic principles encompassing what is a good office environment, how to take account of user characteristics, appropriate computer hardware and equipment, appropriate computer furniture and operator posture, and workstation and equipment layout.

Finally, Section 4 gives examples of good operator habits, including exercises that can be done at the workstation and stress relief tactics.



## The Health and Safety in Employment Act 1992

The Health and Safety in Employment Act 1992 is concerned with the prevention of harm arising out of work activities. This means taking action *before* any accident or harm occurs – not *after* the event.

Health and safety laws apply to *every employer, every worker and every workplace* in New Zealand.

The Health and Safety in Employment Act 1992 is the principal occupational health and safety Act, setting out the legal requirements for ensuring that workplaces are safe and healthy places.

The key principle in the Act is the responsibility the law places on the employer called the ‘*duty of care*’, which is “...the legal duty of the employer is to take all practicable steps to ensure the safety of employees while at work and to provide a safe working environment...”

### **Employers’ responsibilities**

Employers therefore have the main responsibilities.

Employers **must provide a safe workplace** and ensure it stays safe and healthy. **Managers and supervisors must help** employers meet this responsibility.

Employers must take **all practicable steps** to see that work is carried out safely and that the health of employees is not damaged. Fines go up to \$500,000 for failing to do so, and even imprisonment for up to two years.

It is the employer’s responsibility to ‘provide a safe workplace’, which means:

- Identifying and assessing the likelihood of hazards causing injury or illness.
- Controlling and minimising the risk of hazards.
- Providing information and ensuring workers are aware of particular hazards.
- Organising safe systems of work (safe ways to do things).
- Improving understanding of safe work procedures by instruction and training.
- Providing protective clothing and equipment.
- Ensuring tools, equipment and machinery are safe and kept safe.
- Developing procedures for dealing with emergencies that may arise while employees are at work.
- Supervising inexperienced workers to prevent exposure to hazard risks.
- Monitoring the workplace to ensure safety instructions are being followed.
- Keeping records of inspections and work-related injuries.

Employers also have a 'duty to take all practicable steps'. When deciding what is a practicable measure to take in order to protect health and safety at work, every employer must take into account:

- The likelihood of harm occurring if measures are not taken.
- The nature and severity of the harm that may be suffered if measures are not taken.
- The availability of measures to prevent harm, and the cost of such measures.

### ***Workers' responsibilities***

Under the Act, workers must take **all practicable steps** to take care for their own safety and that of others who may be affected by their actions. Workers must co-operate with their employer to protect health and safety.

But workers are only responsible for things under their own control, and then only after proper training and instruction have been given.

Workers' responsibilities are common sense things such as:

- Working/behaving in ways that take care of their own safety.
- Not endangering the health and safety of others.
- Following any reasonable instruction from their employer.
- Using personal protective equipment and clothing if provided.
- Taking care to use equipment and clothing if provided.
- Taking care to use equipment safely and only for its intended purpose.
- Reporting hazards.
- Reporting work-related injuries, near misses or harm to health.
- Ensuring they are not affected by alcohol or other drugs at work.
- Co-operating with their employer on safety and health matters.

## **Health and Safety in Employment Regulations 1995**

These regulations contain more detailed provisions that 'fill in' the duties and responsibilities outlined in the Act, including minimum standards that must be met by employers to ensure they have taken 'all practicable steps' to protect health and safety.

The regulations include:

- requirements applying to all workplaces covering washing facilities, fresh air, lighting, drinking water and emergency exits,
- duties of manufacturers, designers or suppliers of plant or protective equipment,
- certificates of competence for those involved with high-risk activities such as diving or construction,
- notifiable hazardous activities,
- managing particular hazards such as noise, working at height or with loose materials.

Other regulations provide more detailed instruction still, for example safe practices regarding specific hazards, which must be followed (such as the *Asbestos Regulations 1998*). Regulations are legally binding enforceable.

## Codes of Practice

**Codes of Practice** provide guidance on preferred work arrangements, and how to comply with the law (both Acts and Regulations). Codes are designed to be used as additional information to the Acts and Regulations.

**Codes of Practice** provide advice to employers on how to meet safety requirements and fulfil their duty of care to workers. The code spells out the **duties** of employers and other particular groups of people in **controlling risks** associated with specific hazards.

**Codes of Practice** are not legally enforceable, but can be used in the courts as evidence that legal safety requirements have or have not been met. Courts of law may also refer to other codes or industry standards, but they don't have the formal status of an 'approved code of practice' under the Act.

A Code of Practice:

- provides practical guidance,
- should be followed unless another solution achieves the same or better results,
- may be used in support of preventative and controlling measures.

### ***Why is a Code of Practice needed?***

As already mentioned, employers have obligations to provide for the health and safety of employees under the Health and Safety in Employment Act. As well, in proceedings for an offence against the Act, a court may take into account whether or not an employer has followed the requirements of a code of practice.

### ***The Approved Code of Practice for the Use of Visual Display Units in the Place of Work (Department of Labour, 1995)***

The introduction of computers into the workplace has changed the nature of employment, the structure of jobs, work surroundings and organisations themselves. While, in many cases, this has led to increased skills and efficiencies, it has sometimes led to health problems. Often these are due to the inefficient use of equipment and labour, and misunderstanding. The aims of this code are to improve this situation and to dispel many of the myths surrounding computer use.

Employers and employees should use the code in any situation in the workplace where a person uses a computer during their normal work. When deciding if the code applies in a particular situation, factors to be considered include the nature and duration of the task, the type of equipment being used, and aspects of the physical environment.

An employer should treat each situation on its merits and take account of the differences between individuals and the variety of tasks they perform.

The code acknowledges that, while there are some problems known to cause difficulties for some computer users, many workplaces and many users will be free of these problems. The code therefore recommends **preferred practices**, rather than making rigid requirements – allowing for greater flexibility.

### What does the Code say?

The Code runs to more than 60 pages. You are not expected to know every word of it. However, it contains important information that could help you to avoid health problems at work so you should be aware of it in general terms and know where to find it, if you should want to read up on it further. The Code is split into four parts, which cover the following material:

Part 1 introduces the code and explains its status and how it should be used.

Part 2 contains recommendations about the design of VDU work under five main headings: the organisation of VDU work; the design of the computer components; the design of the office furniture; the design of the office environment; and information and training.

Part 3 discusses several potential health problems that can arise from VDU use, and makes recommendations about how employers should monitor for these problems.

Part 4 explains the relationship between the code and the Health and Safety in Employment Act 1992.

#### Exercise 1

If you have Internet access, find the Code of Practice for the Use of Visual Display Units in the Place of Work and bookmark it.

It is available at <http://www.osh.dol.govt.nz/order/catalogue/pdf/vdu-ac.pdf>

#### Exercise 2

Name and explain some of the negative effects on an employer's business if good ergonomic principles are not put in place.

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## Possible Health Problems caused by poor Ergonomic Arrangements

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### Learning Outcomes

*At the end of this section you should know about -*

- ☐ The causes, risks and symptoms of occupational overuse syndrome
- ☐ Eye-related health problems
- ☐ Stress in the workplace
- ☐ Other health problems that could occur in the workplace

# Health and Safety at Work

Your work area is the place where you spend most of your time. It may be a desk, a bench, a general area, the cab of a forklift or many other places. Within that area, you have some control over your work habits and this should be exercised to minimise health problems that can be caused by work.

Workers can cause themselves harm through the incorrect use of equipment, incorrect posture, the way they sit and stand, as well as working techniques.

They can cause injury to themselves through:

- Incorrect posture
- Incorrect seating
- Working techniques

This book concentrates on the health problems of *computer operators*. However, it should be remembered that ergonomic principles apply to *all* workers – not just those who work with computers.

This section discusses concerns about health problems that are often raised in connection with computer use.

- Occupational Overuse Syndrome
- Eye problems
- Stress
- Other health problems in brief

## Occupational Overuse Syndrome

Occupational Overuse Syndrome (OOS) is a condition previously known as ‘Repetitive Strain Injury’ or RSI. It generally shows up as pain or swelling, numbness, weakness or restricted movement, usually in or around muscles, tendons and other soft tissues. The most common parts of the body affected are the neck, back, shoulders, elbows, wrists and hands.

OOS is associated with manual handling but specifically involves movements and postures that are repetitive and/or sustained over periods of time.

OOS can happen in any industry or profession. It can be a problem in process work (assembly-line workers, packers and press operators), piece work (clothing machinists at home or factory), office work (keyboard operators), kitchen work, mail sorting, cleaning, carpet laying and hairdressing.

## The Causes, Risks and Symptoms

Muscle fatigue or repetitive strain can cause this type of injury, as can improper use of equipment, including:

- One-fingered typing
- Keyboard raised too high
- Screen too close and too bright
- Not taking breaks
- Not using a copy-holder
- Seat at an inappropriate height

### ***The Muscle Tension theory***

In basic terms, normally your muscles and tendons get blood through capillaries, which pass among the muscle fibres. When you tense a muscle, you restrict the blood flow. By the time you are exerting 50% of your full power, you are completely restricting your blood flow. Without fresh blood, your muscles use stored energy until they run out, and then they switch to anaerobic (without oxygen) metabolism, which generates nasty by-products like lactic acid, which cause pain.

#### *What is anaerobic activity?*

This is essentially the conversion of stored sugars into energy through a chemical process within the body. This chemical process leaves behind a waste product called **lactic acid**. If lactic acid is allowed to build up in a muscle, joint, etc. it can start causing damage to soft tissues. Prolonged tension in the muscle prevents lactic acid from being flushed away through normal circulation.

Some people suggest that if lactic acid becomes concentrated enough it may also cause damage to the nervous system. Since other soft tissue is capable of regeneration this perhaps explains long-term disabilities and conditions that appear to cover a wide range of muscle groups and other soft tissue.

### ***Risk factors for OOS***

- Working in cold conditions.
- Vibration and heat stress, which are often caused by equipment.
- Poor posture, eg leaning too far forward when using a computer.
- Inappropriate selection of computer hardware and software.
- Inappropriate selection of office furniture.
- An inappropriate VDU environment.
- Poor workstation layout.
- Musculoskeletal and static load due to loading on our frame from improper carrying (eg carrying a heavy backpack), or due to improper posture.
- Task invariability, ie sticking to one job for long periods without variation.

- Cognitive demands, mental activity and stress have been known to result in physical problems such as OOS.
- Poor work organisation.
- Personal factors, eg from relationships, past events, family medical history etc.
- Lack of education, training and skills.

One or more of these risk factors will almost certainly be present where OOS occurs. But the nature of OOS is such that individuals may be affected differently by these risk factors. There may be a relationship between the intensity of work, the length of exposure to it, and the onset of the condition, but it is not possible to predict exactly what it will be for a particular person. Therefore if you think you have a problem, but none of your work colleagues do, you should still do something about it. Just because no one is suffering, doesn't mean that your injury isn't real.

### **Warning signs and symptoms**

The symptoms of OOS are very diverse and can affect any soft tissue in the body, although the main conditions affect the neck, shoulders, arms and hands. (Common conditions include, but are by no means limited to, tendonitis, tenosynovitis, carpal tunnel and muscular reflex sympathetic dystrophy.)

#### **Symptoms may include:**

- Pain
- Muscle discomfort (tightening or tension)
- Fatigue
- Soreness
- Hot or cold sensations
- Tingling or numbness
- Loss of strength
- Lack of co-ordination

The type and severity of symptoms can vary enormously. It is vital that OOS is detected early and that preventative measures are taken quickly to avoid severe, long-term problems (including permanent disability in some cases).

If you think that you may have OOS, then see your doctor as soon as you can and get a firm diagnosis and start treatment.

It is worth noting that other illnesses can have the same symptoms as OOS. OOS can be distinguished from these other causes by:

- A pattern of symptoms that are felt after performing certain tasks.
- Symptoms progressively worsen through the week and then disappear with rest, eg over the weekend. However, unless changes are made these symptoms get progressively worse and eventually do not disappear after rest.



## **Prevention of OOS**

OOS can be prevented by practising good ergonomic principles. We will discuss these in full in the next section of this book, but in summary the following techniques in the workplace will reduce your risk of contracting OOS.

### ***Set up your workstation ergonomically***

First, use your workstation and then identify any muscles or muscle groups that must be tensed to perform the task. Then attempt to reduce the amount of tension on the muscles or muscle groups by fine-tuning the workstation where possible. For example, if you are constantly using the telephone, make sure it is within easy reach.

### ***Practise good posture***

It is important not only to be aware of what good posture is, but also to ensure that you don't lock into any fixed position. Because tension is the basic cause of OOS it is important that you work in as relaxed a way as possible (ie loose and flowing as opposed to slumped and erratic). Periodic systematic relaxation can be very beneficial.

### ***Vary your tasks***

This strategy involves considering the components of your job and ensuring that you try to use a good mix of tasks to give particular muscles and muscle groups a break. For example, if one task involves sitting, try to change to a task that involves standing or walking. It is recommended that you spend no longer than 50 minutes at any single, concentrated task.

### ***Take regular breaks***

If all your tasks involve the same groups of muscles then regular breaks (say every 50 minutes) are important. Morning tea, lunch and afternoon tea breaks give muscles a chance to relax and help reduce the build up of tension (and consequently lactic acid).

### ***Take micropauses***

The micropause is a very short rest every few minutes. 5 to 10 seconds every 3 minutes has been shown to be beneficial.

### ***Get fit!***

There appears to be a significant correlation between levels of personal fitness and the incidence of OOS (ie unfit people are more likely to develop OOS). Healthy fit muscles seem better able to resist the effects of lactic acid. The recommended minimum weekly amount of aerobic (ie that makes you puff) exercise is three separate 20 minutes sessions. Exercises such as stretching, shaking out limbs etc, can also be beneficial – particularly to improve circulation. Adequate intake of water can be helpful as well.

### ***Relax***

Relaxation is important because we need to fully relax and get rid of the build up of tension and stress.

## Eye Problems

Eye problems can occur because computer operators tend to have a fixed distance and angle of gaze. This is because a monitor cannot be moved around like a book can.

This means that the internal eye muscles that focus and fix the point of vision hold the same position for long periods because the eyes need to move very little to maintain clear viewing. This, in turn, requires that the VDU user's posture remains fixed. Like any muscles, the ones in the eye need to relax.

These two factors – the constant holding of the eye, head, neck and shoulder in fixed positions and the constant focus and fixed point of gaze – are thought to be the main contributors to visual and ocular discomfort.

Symptoms can include:

- Soreness of the eyes
- Reddening of the eyes
- Watering or dryness of the eyes
- Blurring of vision
- Eyes feeling “heavy” or “gritty”
- Headaches.

Other causes of visual and ocular discomfort may be:

- Uncorrected visual anomalies
- An inappropriate glasses or contact lens prescription
- Poor office furniture selection and/or design
- Inadequate lighting.

## Stress

Stress is the reaction to internal or external pressures.

Computer operators might experience stress as a result of their work – rather than from general causes – because it can go on for a long time without interruption. Often, people need to meet strict deadlines or get carried away with the work they are doing, and are unable or forget to get relief from the intensity of it. Sometimes the nature of the work at the VDU is “isolating”. The absence of workplace interactions can increase the stress of VDU work.



## Managing Stress at Work

### *Challenge or stress?*

Research shows that a certain amount of stress is a good thing. The body releases adrenalin in response to stress and this stimulates the body to deal with difficult situations, whether they arise at home or at work. It keeps us on our toes when we have to focus on important or urgent things.

But to feel ‘stressed out’ at work is to feel uncomfortable, under pressure and anxious. Problems begin if the pressure feels excessive or intolerable or when a person thinks that s/he is unable to meet