

# Contents

## Chapter 1 Legislative Requirements and Health Benefit

Chapter outline .....	1
Health and safety .....	2
Safety, Health and Welfare at Work Act 2005 .....	3
Part II Section 8 – Duties of Employers .....	5
Part II Section 13 – Duties of Employees .....	7
General Application Regulations 2007 – Manual Handling	
of Loads .....	7
Regulation 68 – Definition of Manual Handling .....	8
Regulation 69 – Duties of Employers .....	8
Risk assessment where manual handling is unavoidable	10
Schedule 3 .....	12

## Chapter 2 Anatomy and Back Care

Chapter outline .....	20
The musculoskeletal system .....	20
The skeleton .....	21
The muscular system .....	23

Anatomy of the spine .....	26
Muscles of the spine .....	29
Joints of the spine.....	29
Posture, biomechanics and back injury.....	30
Posture .....	30
Biomechanics .....	33
Common occupational back disorders and injury mechanisms .....	35
The physiology of work .....	39
Muscle strength .....	41
Prevention of back injury .....	42
Fitness .....	44
Flexibility exercises .....	49

## Chapter 3 Ergonomic Principles and Risk Assessment

Chapter outline .....	56
Ergonomics .....	57
Manual handling risk assessment.....	58
Eliminating/reducing risk .....	67
Examples of risk elimination/reduction solutions .....	68

## Chapter 4 Manual Handling Principles and Techniques

Chapter outline .....	72
Lifting an object .....	73

Team lifting .....	75
Carrying an object .....	75
Pulling and pushing .....	76
Reaching .....	76
Manual handling risk assessment checklists .....	77
Report summary .....	82
Manual handling assessment form .....	83
Detailed manual handling assessment form .....	84
Manual handling frequently asked questions .....	89

## Chapter 5 Planning and Design of Manual Handling Training Programmes

Chapter outline .....	97
Adult learning .....	98
Characteristics of adult learners .....	98
Teaching adult learners .....	100
Motivation .....	101
Motivation to learn .....	101
Motivational learning environment .....	103
Learning styles .....	103
Left and right brain .....	104
Visual, auditory and kinaesthetic learning .....	106
Activist, reflector, theorist and pragmatist .....	107
Learning styles questionnaire .....	108
Barriers to learning .....	118
Aims and objectives .....	120

Chapter 6 Delivery of Manual Handling Training

- Chapter outline ..... 124
- Role of trainer ..... 125
- Communication ..... 126
  - Importance of first impression ..... 126
- Group learning ..... 127
  - Presence ..... 128
  - Knowledge of the material ..... 129
  - Handling a group ..... 130
  - Managing the activities ..... 131
  - Keeping on track ..... 132
  - Supplying appropriate examples and anecdotes ..... 133
  - Ability to give and receive feedback ..... 133
- Individual or OTJ training ..... 134
  - Presence ..... 134
  - Knowledge of the material ..... 135
  - Handling different learners ..... 135
  - Managing the activities ..... 135
  - Keeping on track ..... 135
  - Supplying appropriate examples and anecdotes ..... 136
  - Ability to give and receive feedback ..... 136
- Course/programme design ..... 137
  - Learning principles ..... 137
  - Target audience ..... 138
  - Organisational constraints ..... 138
  - Other methods ..... 138
  - Motivation of learners ..... 139

Tips for trainers ..... 140

    Personal and practical considerations ..... 141

Vocal awareness for trainers ..... 144

    Healthy vocal habits ..... 144

Speaking to large groups ..... 149

    Techniques to make the voice seem louder ..... 150

How the voice works ..... 151

    Air flow ..... 151

    Vibration ..... 151

    Resonators ..... 152

    Voice problems ..... 153

Analysing the voice ..... 155

Appendix: Civil liability for manual handling ..... 157

Web resources ..... 173

# Chapter 3

---

## Ergonomic Principles and Risk Assessment

### Chapter Outline

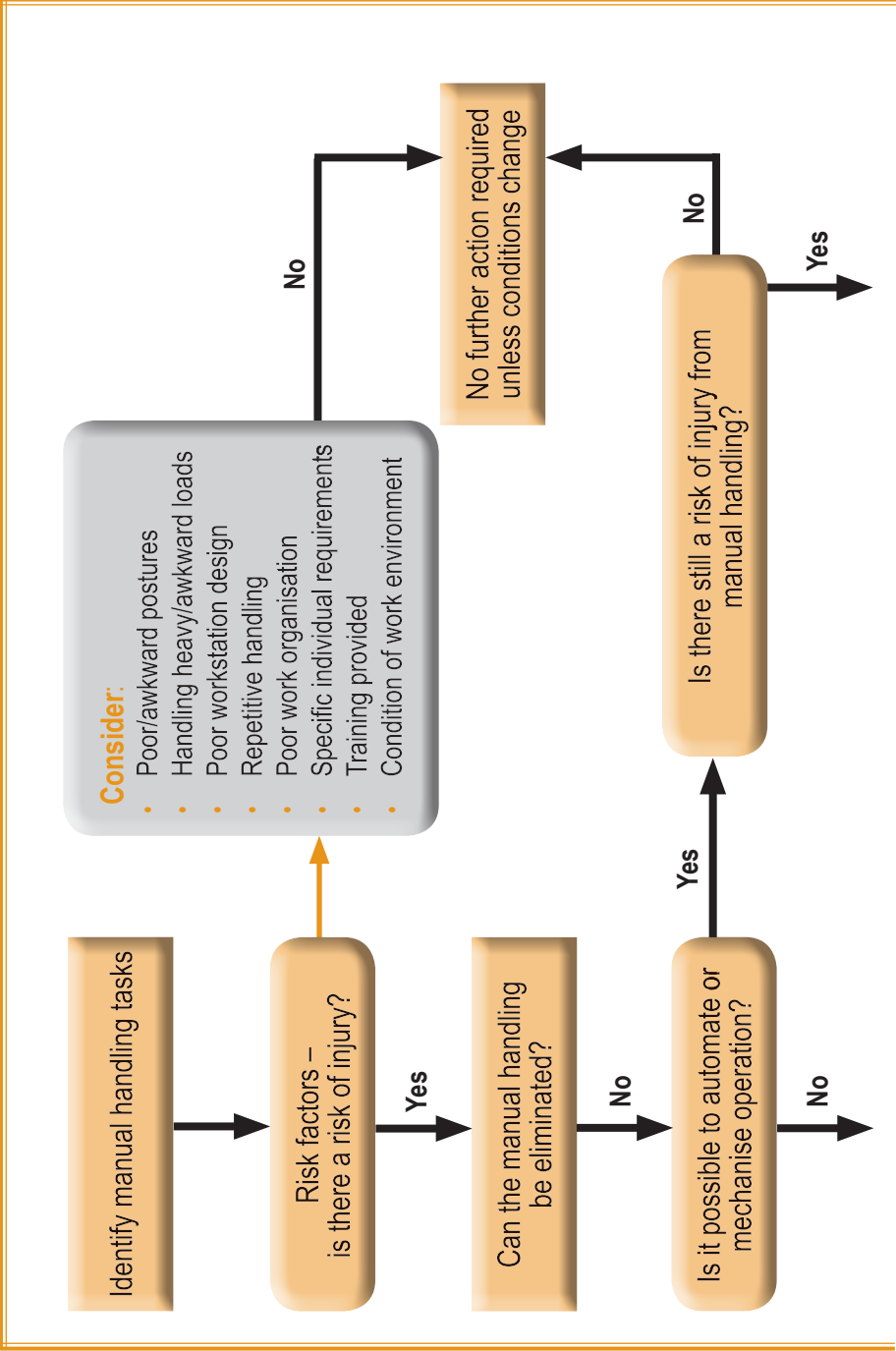
- Describe the concepts of ergonomics to include a description of key ergonomic principles for workplace design, and unfavourable ergonomic conditions, as detailed in the schedule to the current Manual Handling of Loads Regulations.
  - Explain the manual handling risk assessment process considering the use of manual handling case studies or scenarios.
  - Describe a range of controls to avoid and reduce the risk of injury.
-



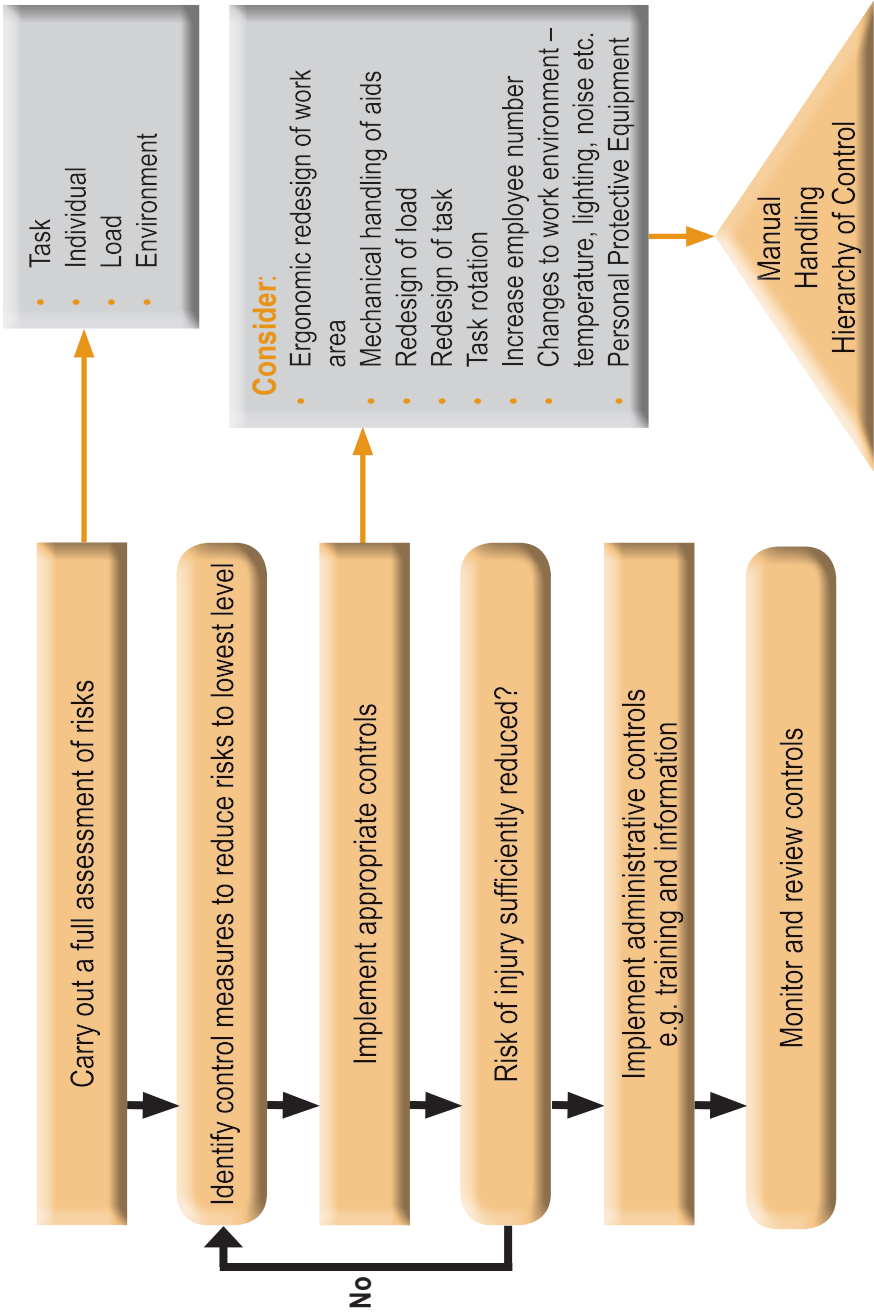
## Ergonomics

Ergonomics in the workplace deals with the interaction between people and their equipment and work environment. The ergonomic workplace ensures the health and safety of employees and prevents employee productivity being compromised by poor ergonomic design. The benefits of a workplace ergonomic programme increases comfort, performance, productivity, compliance with health and safety, and employee morale. It reduces the incidence of injury and illness, exposure to insurance claims and insurance costs.

# Manual Handling Risk Assessment







The purpose of a manual handling risk assessment is to:

1. Determine if there is a risk of injury to an employee or a number of employees.
2. Implement control measures preferably to eliminate the risk or alternatively to reduce the risk to an acceptable level.

A manual handling risk assessment should focus on the activity in its entirety while identifying and assessing the individual risk factors, outlined as task, individual, load and work environment. Knowledge of the workplace, the system of work and a good understanding of the manual handling activities being carried out are essential when carrying out an effective risk assessment. Confidence in determining whether an activity may be high risk or low risk and in selecting control solutions will be gained with experience.

### ***Tips for Carrying Out a Manual Handling Risk Assessment***

When carrying out a manual handling risk assessment, it is beneficial to gather as much information as possible prior to carrying out the assessment, for example information about the work environment, system of work, accident records, previous manual handling risk assessments, number of employees in the area and so on.

1. Consider seeking the assistance of others e.g. engineers and maintenance staff.
2. Determine whether manual handling training has been carried out before – when and what did it cover?
3. Ensure that employees understand what is being done and why.
4. Observe employees carrying out the tasks for an adequate length of time.

5. Discuss the system of work with the supervisor and employees – are the tasks being carried out in accordance with work procedures?
6. Are the principles of safe manual handling being employed? If not, then why not?
7. Ask the supervisor and employees for their advice on solutions, as they are the ones who know the job and may have the ultimate solution.
8. Consider short-term, medium-term and long-term controls – are the controls reasonable?
9. What resources in terms of time, effort and money will be required to implement the controls?
10. Will the workers be willing to comply with the new controls and are they user-friendly?
11. Document the risk assessment results and forward a copy to management.
12. Monitor and review the controls.

An effective method of remembering the hazards to consider when carrying out a manual handling risk assessment is to use the ‘TILE’ mnemonic:

<b>T</b>	<b>Task</b>
<b>I</b>	<b>Individual</b>
<b>L</b>	<b>Load</b>
<b>E</b>	<b>Environment</b>

Use this checklist as a reminder when assessing the task. Look at the individual components of the task, bearing in mind the overall system of work, for example time constraints and rest breaks. Has training been provided and did it consider the actual handling tasks being carried out? Does the task require unusual capabilities?

When assessing the individual, observe the working postures of the employee(s). Consider whether the design of the work environment is hindering safe handling practices and good posture. Has any employee a past history of musculoskeletal injury (this information is generally confidential to the HR/occupational health department)?

Postures that can contribute to the development of work-related musculoskeletal disorders (WMSDs) include:

- Excessive bending of the spine.
- Twisting (rotation) and bending of the spine.
- Twisting and backward bending of the spine.
- Working with arms outstretched.
- Working with shoulder girdle elevated (bench height too high).
- Prolonged sitting in a fixed position.

## **Individual Differences in a Manual Handling/Ergonomic Risk Assessment**



When carrying out an ergonomic risk assessment, it is essential to understand that no two individuals have the same levels of strength, flexibility and general fitness. When deciding on workplace design issues to suit individual needs, the following should be considered:

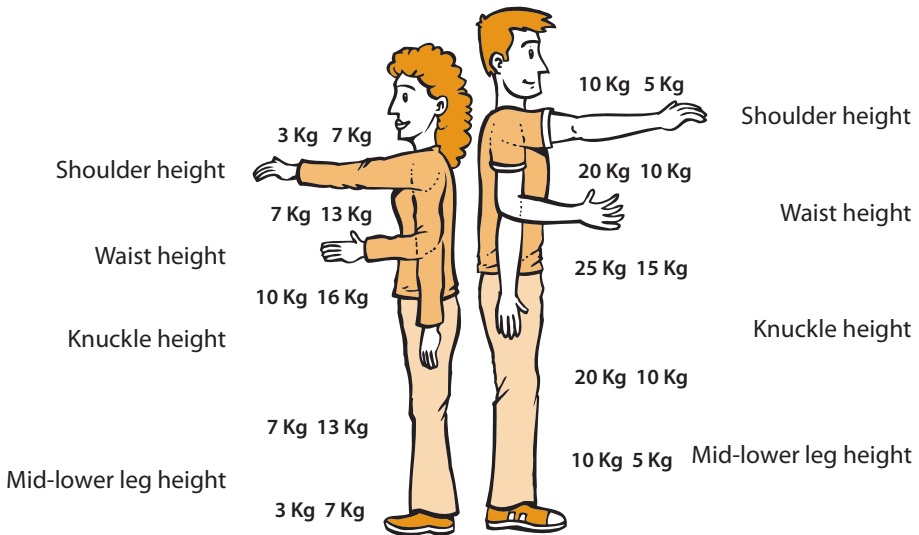
1. **Sex:** The safe load guidelines developed by the British Health Service Executive (HSE) will protect nearly all males and two-thirds of females. Therefore, to protect nearly all females (95 per cent), the guideline figures should be reduced by one-third. The guidelines take into consideration that there are differences in physical strength between most men and women. On average, males are stronger than females by two-thirds.

2. *Age*: The age of the worker can sometimes have an impact on ability to carry out tasks. The risk of manual handling injuries is generally greater for those in their teens or late 50s and 60s. However, it is worth remembering that the experience and knowledge of the older employee can also impact positively.
3. *Pregnancy*: Pregnancy has significant implications for the risk of manual handling injury. Hormonal changes can affect ligaments, increasing the potential for injury. Postural problems can also increase as the pregnancy progresses. Employers must also bear in mind that women involved in manual handling are at risk of injury in the first three months following childbirth.
4. *General health status*: If there is good reason to suspect that an individual may be at risk of injury due to a particular health problem, medical advice should be sought.
5. *Training*: It is a legal responsibility for all employers to ensure that employees have received manual handling training, which includes the principles of safe manual handling, and training specific to the tasks being carried out and to any equipment used to facilitate the handling.
6. *Load*: If there is concern that the load being handled is heavy or perhaps handled too frequently, the HSE guidelines for assessing the weight risk factor can be used.

### ***Guidance on the Calculation of Risk for Load Weight***

Working within the HSE guidelines does not mean the work is safe, just as working outside them does not necessarily mean it is dangerous. The decision whether the work involves risk or not depends on an effective risk assessment.

**Note:** No attempt should be made to interpret this diagram without reading the text opposite first.



These guidelines assume that the load is easily grasped; handled less than 30 times per hour; and not supported for any length of time. The guidelines also assume that the load is handled by 'average men'; the operation takes place in reasonable working conditions; the lifter is in a stable body position; and there is no twisting, pushing or pulling. **If any of these conditions are not met, then the guideline weights need to be reduced (sometimes substantially).**

**Remember:** The load needs to be reduced by about one-third to provide the same degree of protection for most women.

The following table contains extra information about how to modify these guidelines when additional risk factors exist:

<b>Additional Risk Factors</b>	<b>Rough Guide</b>
Operation repeated once or twice per minute	Reduce weight by 30 per cent
Operation repeated five to eight times per minute	Reduce weight by 50 per cent
Operation repeated more than 12 times per minute	Reduce weight by 80 per cent
'Average' female	Reduce weight by 30 per cent
Handler twists through 45 degrees	Reduce weight by 10 per cent
Handler twists through 90 degrees	Reduce weight by 20 per cent
Handler seated and twisting	Less than 5 kg
Handler seated	About 5 kg
Pushing or pulling a load (assuming that force is applied with hands between knuckle and shoulder height)	About 25 kg for starting or stopping a load, about 10 kg for keeping a load in motion

## ***Environment***

The work environment in which employees are required to carry out manual handling may have a significant impact on their ability to carry out the work safely and the following factors should be considered as part of any manual handling risk assessment:

- Lighting levels
- Thermal conditions (e.g. temperature, relative humidity, ventilation, and weather conditions if tasks are conducted outside)

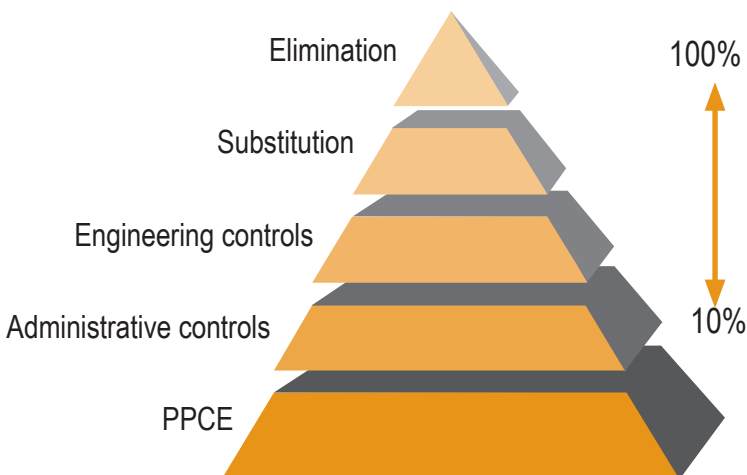


- Floor surfaces
- Space constraints
- Inadequate access to the load
- General housekeeping
- Noise.

## Eliminating/Reducing Risk

Eliminating/reducing the risk associated with manual handling is a major factor for any organisation. The following diagram outlines the system to consider when recommending risk control measures. Elimination or avoidance of risk is the ultimate solution but in many situations this may not be reasonable or practicable. Some control measures may require a combination of engineering and administrative controls.

### Hierarchy of Control



As indicated by the diagram, elimination of manual handling is 100 per cent effective. On the other hand, manual handling training (administrative control) as an isolated control measure to reduce the risk of musculoskeletal injury is less than 10 per cent effective. Therefore, manual handling training should only be considered as one component of an effective risk management system.

## Examples of Risk Elimination/Reduction Solutions

1. *Elimination*: Does the load have to be moved?
2. *Substitution*: Is it possible to purchase 25 kg bags of cement rather than 50 kg bags?
3. *Engineering controls*: Can the workstation be designed to eliminate the need to store equipment above shoulder level? Could a height adjustable pallet truck be used at the end of the production line, which would avoid the need to lift items to a pallet at ground level?
4. *Administrative controls*: Provision of appropriate manual handling training; introduction of a procedure to tag heavy loads; introduction of an employee rotation system from heavy to light duties etc.
5. *PPCE (Personal Protective Clothing and Equipment)*: Provision of safety gloves for carrying hot loads or to protect hands when handling loads that could cause hand injury.

## ***Reducing the Risk of Musculoskeletal Injury***

### **The Task**

Is it possible to:

- Improve workplace layout to improve efficiency?
- Reduce the amount of twisting and stooping?
- Avoid lifting from floor level or above shoulder height?
- Avoid or minimise repetitive handling?
- Reduce carrying distances or provide mobile lifting equipment?
- Provide breaks and/or vary work to allow one set of muscles to rest while another is used?



## Individual Capacity

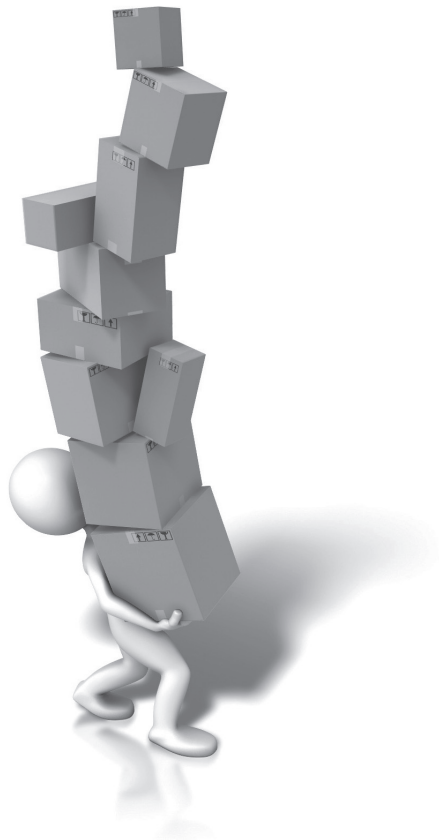
Is it possible to:

- Re-design the task and/or the workplace so that a wider range of employees can safely undertake the task?
- Take better care of those who have a physical weakness or are pregnant?
- Give employees more information e.g. about the range of tasks they are likely to face?
- Provide training?
- Is pre-employment screening carried out?

## The Load

Can the load be made:

- Lighter or less bulky?
- Easier to grasp?
- More stable?
- Less damaging to hold (have suppliers been asked to help)?



## **The Working Environment**

Is it possible to:

- Remove obstructions to free movement?
- Provide better flooring?
- Avoid steps and steep ramps?
- Prevent extremes of hot and cold?
- Improve lighting?
- Consider less restrictive clothing or PPCE?