



# NEBOSH Award in Health and Safety at Work

## Unit HSW1

### WORKPLACE SAFETY FOUNDATIONS

#### ELEMENT 8: HAZARDS AND CONTROL ASSOCIATED WITH MANUAL HANDLING AND REPETITIVE MOVEMENT

#### SAMPLE MATERIAL

(Material correct at 1/11/2011)



#### RRC Training

27-37 St George's Road London SW19 4DS United Kingdom

T +44 (0)20 8944 3100 F +44 (0)20 8944 7099

info@rrc.co.uk www.rrc.co.uk Skype ID rrctraining



**RRC**  
TRAINING



## Hazards from Manual Handling and Repetitive Activities



### Key Information

- Manual handling includes any operation where a load is moved using physical force.
- Common manual handling and repetitive activities include:
  - Keyboard operation.
  - Assembly of small components.
  - Packing/unpacking.
  - Bricklaying.
  - Checkout operation.
- The risk of injury through manual handling and repetitive tasks is assessed by considering the following factors:
  - **Task** – the nature of the operation including the frequency, force required and duration of the operation.
  - **Individual** – their physical ability and competence/training.
  - **Load** – the size, weight, shape and associated hazards.
  - **Working Environment** – the space constraints, floor condition, heating and ventilation, etc.

### The Scope of Manual Handling and Repetitive Physical Activities

The terms “chronic” and “acute” are used to describe ill health conditions.

#### Manual Handling



#### Jargon Buster

##### Manual Handling

This means moving objects by using muscular strength and body weight. It may involve lifting, pushing, pulling, carrying and lowering.

Manual handling occurs whenever objects are moved at work, with the risk that a person may be injured. Injuries can occur with light and apparently easy to handle objects as well as the more obvious heavy loads. Examples of manual handling operations include hospital nurses lifting patients; delivery drivers transferring goods from vehicles to buildings; and employees moving equipment.

Manual handling injuries can occur due to:

- Using incorrect techniques to lift/move the load.
- Moving loads which are too heavy.
- Failing to grip the object(s) or load in a safe manner.
- Not wearing appropriate personal protective equipment.

Manual handling injuries can result in immediate, acute injury or longer-term, chronic mobility problems.

#### Jargon Buster

##### Acute

Acute conditions are immediate effects, which may be temporary or permanent. These include the immediate pulling of a muscle through incorrect lifting, a person being overcome by carbon monoxide gas and becoming unconscious (or even dying). Acute refers to the rate of onset of the illness/injury not the severity.

##### Chronic

Chronic conditions are those which take longer to develop, such as cancer, asbestosis, cumulative back injury and permanent hearing loss as a result of long term exposure.

#### Ergonomics

This is the study of the way in which people interact with equipment in their working environment with the objective of improving their comfort, safety and productivity. This involves putting the person at the heart of both task and workstation design, and building the working environment around his/her needs, rather than fitting the person into a predesigned working environment built around the needs of the task.



## Repetitive Physical Activities

In some instances physical injury is possible even though a worker may not be carrying out manual handling – if only light forces are used this can result in Work Related Upper Limb Disorders (WRULDs) rather than manual handling injuries. For example, a typist sat at a keyboard is not carrying out manual handling of any sort, yet the activities of typing on the keyboard and using the mouse are highly repetitive activities with risk associated with them.



### Jargon Buster

#### Work Related Upper Limb Disorders

Work Related Upper Limb Disorders (WRULDs) are temporary or permanent injuries of the hand, arm or wrist which include repetitive strain injuries (RSI), carpal tunnel syndrome and tenosynovitis.

## Common Injuries

- **Back Injuries**

These are caused by twisting, lifting or pushing loads where the stress is carried on the spine, usually towards the base. The most serious injuries are slipped or crushed discs, which can also cause sciatica (pain in the sciatic nerve which runs down the back of the legs). More generalised back problems such as lumbago can also be disabling. Back injuries can be immediate (as the result of lifting a heavy load) or build up over time, therefore early investigation of back pain complaints is advisable.



*Back injury due to lifting a heavy load in the wrong way.*

- **Muscular Problems**

When a muscle is stretched beyond its normal limit it is strained. When it is subjected to sudden or excessive force it may be sprained. Either of these two causes may tear or rupture the casing of the muscle, which is a serious injury. These injuries can be caused by stretching, lifting heavy loads or slips, trips and falls. In most cases they are short term injuries, but strains can build up over time.

- **Hernias**

A hernia is a tear in the muscles of the gut cavity wall, usually in the lower abdomen, which allows part of the intestine to stick out through the tear. It is caused by excessive strain on those muscles during lifting.

- **Cuts, Abrasions and Bruising**

These will be caused by contact with the surfaces of the objects or loads being handled.

- **Bone Injuries**

Fractures and breaks are usually impact injuries caused by crushing part of the body, usually fingers, under a load or dropping objects on feet. They may also be caused by slips, trips and falls.

- **Work-Related Upper Limb Disorders (WRULDs)**

Upper limb disorders affect the soft connecting tissues, muscles and nerves of the hand, wrist, arm and shoulder. Severity may vary from occasional aches, pains and discomfort of the affected part through to well-defined and specific disease or injury. Loss of function may result in reduced work capacity.

WRULDs arise from ordinary movements, such as repetitive gripping, twisting, reaching or moving. Whilst the forces required for each movement are very small, the hazard is created by prolonged repetition - often in a forceful and awkward manner - without sufficient rest or recovery time. WRULDs can result in temporary or permanent injury, causing pain and inflammation of tissues of the arms and hands.

There is an increased risk of WRULDs associated with:

- The use of excess force.
- Highly repetitive motions with little time for recovery.
- Awkward postures.
- A high pace of work.
- Some individuals might be more vulnerable, due to medical conditions, limited physical capability, etc.



## Common Activities Involving Manual Handling and/or Repetitive Activities

Many occupations involve manual handling or repetitive activities and as a result pose a risk of injury.

- **Keyboard operation**

Though a computer operator is not carrying out any manual handling activities they are carrying out highly repetitive activities as their hands make thousands of key-strokes and mouse clicks in a day. As a result there is a risk of WRULDs with the use of a poorly set up workstation. The risks include repetitive keyboard work, awkward gripping and twisting movements associated with mouse use and poor overall posture. Operators may also take infrequent breaks from the task.

- **Assembly of small components**

An operator assembling small components is again not carrying out any appreciable manual handling operations, however they are also at risk of WRULDs. The operations require repetitive motions (picking and manipulating the small components) and it is likely that this will be carried out over a prolonged period of time. Some degree of physical force/grip strength may also be required to assemble the parts, which can increase the risk of injury.



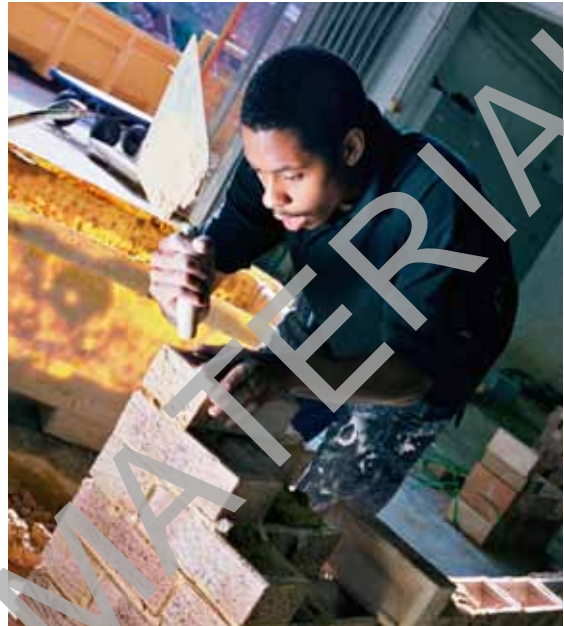
*Repetitive activities, such as working on an assembly line, can lead to injury*

- **Packing/Unpacking**

Operators who pack or unpack boxes, etc., such as those packing goods on an assembly line, are at risk of injury. These tasks could require a degree of manual handling (depending upon the goods being packed) posing a risk of back injury. The repetitive nature of the task can also increase the risk of WRULDs. This risk can be increased if the pace of work is rapid and beyond the control of the operator, for example on an assembly line where the pace of work is dictated by the speed of the operating line.

Awkward postures may be used, e.g. outstretched arms as the production line is not set up according to individual need.

- **Bricklaying**



*This young person laying bricks could suffer a manual handling injury if the right control measures are not enforced.*

The activity of bricklaying involves manual handling, both of individual bricks as they are laid and also potentially manually transporting loads of bricks from the point of delivery to the worksite. The latter could result in back injuries (as the weight moved could be significant and over some distance), whilst the handling of individual bricks could result in work related upper limb disorders. Handling individual bricks is repetitive, carried out over prolonged periods and requires a degree of force to grip and twist. Cuts and abrasions are also possible whilst handling the bricks.

- **Checkout Activities**

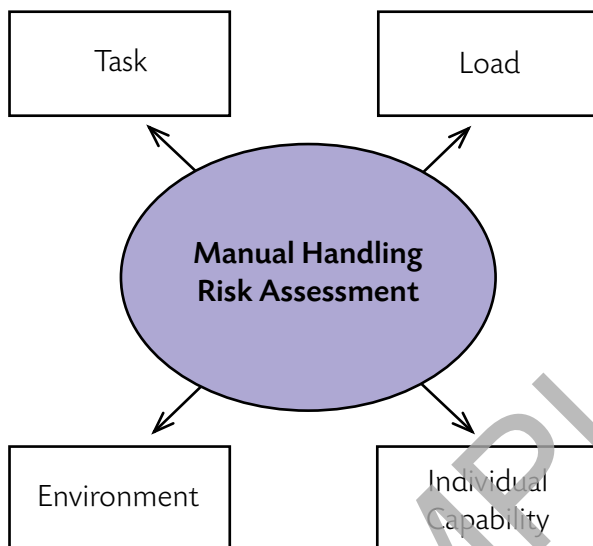
Operating a checkout requires the operator to manoeuvre potentially heavy and/or bulky items (such as heavy trays of drinks and large boxes of soap powder) from a position which can be seated or standing but is usually within a restricted area. This reaching, lifting and manoeuvring can result in back and upper limb injuries as a result of the manual handling. The operator is also required to grip and push or slide the goods from the scanning or checkout area towards the customer, usually with a degree of force from a seated position. This can result in a twisting motion with the possibility of further back and upper limb injuries, together with WRULDs. Finally there is often a requirement to carry out keying activities with risks similar to those seen for the operation of a keyboard. In addition the work may be stressful and there may be insufficient opportunity for rest breaks



## Factors Affecting Risk of Injury

One approach to the identification of hazards in manual handling operations involves four key factors:

- **Task** – analysis of the type of handling operation involved and identifying high-risk activities.
- **Individual capability** – consideration of the (mainly) physical characteristics of the people who are doing the handling operation and their ability in terms of knowledge, skills, health and strength.
- **Load** – analysis, including measurements, of the object(s) being handled.
- **Working environment** – analysis of the immediate physical surroundings within which the handling operation takes place.



*Assessing Manual Handling Risks*

**TIP** – the acronym “TILE” is often used to help remember the factors to be considered with assessing manual handling risks – “**T**ask, **I**ndividual, **L**oad, **E**nvironment”.

In general, all tasks involving manual handling, however trivial, should be subject to a risk assessment and the result should be recorded unless it is simple and obvious, and the operation itself is low-risk and of very short duration.

### Task

All tasks involving any form of manual handling operation should be analysed – it is easy to identify the obvious manual handling tasks, but there may be some operations involving manual handling which are overlooked, e.g. the canteen staff carrying trays of food and drinks to meetings. Any operation which involves lifting, lowering, pushing or pulling of a load, etc. is considered to be manual handling. The assessor should analyse the types, frequencies and durations of movements so that those which could cause injury are identified. Judgement should then be used to determine

the level of risk. Some higher risk movements include:

- Holding loads away from the trunk.
- Twisting.
- Stooping.
- Reaching upwards.
- Large vertical movement.
- Long carrying distances.
- Strenuous pushing or pulling.
- Unpredictable movement of loads.
- Repetitive handling.
- Insufficient rest or recovery.
- A work rate imposed by a process.



*By holding this object away from his body, this man is increasing his chance of injury.*

### Load

A load may be any individual moveable object, including another person. When assessing the load far more than the weight is taken into account – other factors include whether it is:

- Heavy.
- Bulky/unwieldy.
- Difficult to hold, e.g. no hand-holds provided.
- Unstable/unpredictable, e.g. unexpected off-centre loads.
- Harmful itself (e.g. sharp or hot).

Taking these factors into account, a bulky, light load may actually be more hazardous to handle than a small, heavy load. If we consider the movement of a large packet of toilet rolls and a brick of the same weight, the toilet rolls may be more hazardous to move due to their large bulky shape which has to be held further away from the body. Certain loads require particular attention as they require special handling techniques, as in the case of barrels, drums, kegs, sacks, sheet material, long loads, cylinders, coils or reels. For example, a sack can be potentially hazardous not only due to its weight, but also because



of its shape (lack of rigidity, lack of corners to hold), or it may be slippery when wet or liable to split open with rough handling. Unfamiliar loads may require one-off assessments by management, as experience of the nature of the load will be limited, and this could present unexpected hazards.

### Working Environment

The term “environment” refers to the general and specific conditions in the immediate surroundings where the manual handling operations take place. This should include any routes taken by loads.

The key considerations are:

- Restrictions on movement and posture, e.g. confined spaces or fixed chairs, or interference caused by certain types of clothing or personal protective equipment.
- Conditions of floors and other surfaces, e.g. slippery, broken or uneven floors, or unstable shelving may increase the risks.
- Variations in levels, e.g. the presence of steps or ladders, or shelving heights.
- Temperature and humidity, e.g. high heat and humidity can cause dehydration and significantly increase the hazards, and extreme cold can make objects hazardous to touch.
- Strong air movements, e.g. gusts of wind may make loads unstable.
- Lighting conditions, e.g. poor general lighting and high contrast between light and shade can increase risks.

### Individual Capability

There are three main points to assess in an individual’s ability to carry out manual handling tasks safely:

- **Whether the Task Requires Unusual Abilities**  
This considers the demands made by the task and the loads involved, e.g. whether it requires unusual strength or people of a particular height. Usually the level of risk of a task should be considered high if it cannot be carried out by most reasonably fit employees.
- **Whether the Task Presents a Risk to those with a Health Problem or to Pregnant Women**  
An individual’s general health and fitness is an important factor in that person’s ability to undertake manual handling operations. Those who are overweight, underweight, suffering from arthritis or other conditions causing painful backs or joints, have chest or heart complaints, or are suffering from a rupture or prolapse may be unsuited to some types of manual handling. They should not be expected to undertake any tasks which would make their

condition worse or which, because of the condition, may make them more prone to injury.

It may be appropriate to carry out medical checks to establish a person’s general fitness, or the implications of any relevant previous injury or complaint.

Certain tasks involving lifting moderately heavy weights, bending and twisting, or standing for long periods may present particular risks during pregnancy and during the 12 weeks following normal childbirth.



*Pregnancy can have an impact on a person’s ability to handle a load*

- **Whether the Task Calls for Special Information and/or Training**

All employees should be provided with sufficient information about the nature of the tasks they are expected to do if they are to operate safely. The assessment should therefore consider whether any special information should be provided, e.g. about the characteristics of the load or appropriate methods of carrying out the operation. Special training in working practices should be given where necessary.



### More...

Visit the HSE website for muscular skeletal disorders on [www.hse.gov.uk/msd](http://www.hse.gov.uk/msd) where there is a huge amount of information on back pain and upper limb disorders.

The HSE have developed tools for assessing manual handling and repetitive tasks – these are outside of the scope of this course but some of the resources are useful.



### Revision Questions

1. What does manual handling mean?
2. Sum up the aims of ergonomics in a simple phrase.
3. What are the most common injuries to employees as a result of manual handling operations?
4. What is a WRULD and how might it be brought about?
5. What are the characteristics of a load which may present a hazard?
6. Identify the main hazards presented by the working environment in relation to manual handling operations.

(Suggested Answers are at the end of the course.)



## Control Measures

### Key Information

To reduce the risk of manual handling and repetitive injuries, action should be taken to control the:

- **Task** – avoid where possible. Consider using equipment and aids to reduce the risks. Avoid repetition and exposure through job rotation and provision of variation/breaks.
- **Individual** – consider ability (health considerations) and competence.
- **Load** – take action to reduce the weight of load and the force needed to grip it. Ensure it is not awkward to lift/carry.
- **Environment** – ensure that the environment has adequate space in which to work, and that the workstation can be adjusted to the individual.

### Avoiding or Minimising the Risks from Manual Handling

When controlling the risk of manual handling injuries consideration should once again be given to the Task, Individual, Load and Environment.

The basis of safe systems of work for manual handling operations lies in adopting appropriate strategies to minimise risk in terms of the same four factors which we discussed for the risk assessment process.

#### Task

Where possible manual handling should be eliminated. If this is not possible the risk should be reduced with the use of lifting aids. There are a great many lifting aids available:

- **Manually propelled or powered devices** – where the weight of the load is taken by devices such as trolleys, sack trucks and pallet trucks, which are then pushed or pulled manually; or where the power source for the device used to raise a load comes only from the person operating it (such as with pulley hoists).
- **Mechanically powered devices** – where the power to lift and/or move the load is provided by a motor or other mechanical means, possibly together with manual power. Examples include various types of lift truck, conveyor belts, mechanical hoists and cranes.

Introducing these aids does not eliminate risk from the operation. Instead, it changes the types of risk faced. The use of motorised devices presents many hazards and is a cause of a great many accidents in the workplace.

Where it is not possible to use mechanical aids, consideration should be given to the re-design of the task itself. The following aspects of the task may be considered:

- Altering the order of the tasks to minimise the number of operations.
- Reducing repetition and introducing variation to provide breaks, or by using job rotation.
- Using team lifts or rotating the tasks between a number of people.



*Mechanically-powered device to assist handling a load and avoid the risk of manual handling*





## Element 8: Hazards and Control Associated with Manual Handling and Repetitive Movement

### Load

Attention should be given to reducing the weight of loads and making them easier to handle safely. The following aspects may be considered:

- **Weight and size** – is it possible to break up loads so that individual items are lighter and/or smaller? It may mean that more handling operations are necessary, with higher risks arising from more task repetition.
- **Making the load easier to grasp** – where it is not possible to make the load smaller, hand grips or handles may have to be provided.
- **Making the load more stable and rigid** – considering the way that items are packed can help to prevent loads moving whilst carrying. Consideration should be given to the centre of gravity of loads. Flexible containers such as sacks should be avoided.
- **Making the load less damaging to hold** – ensuring so far as possible that the surfaces of the load are clean, smooth, not slippery (or wet or greasy, or even dusty) and, in the case of hot or cold items, that they are held in insulated containers.
- **Markings** – it is helpful to those handling loads (particularly unfamiliar ones) if they are aware of the approximate weight, where to hold the load and where the centre of gravity is.

### Working Environment

We can improve the conditions for people who are carrying out handling operations by changing different features:

- **Workstation design** – the object should be to make access to the load being handled and any equipment used during the operation as comfortable as possible. There should be adequate space for all movements involved. Individuals should be able to position themselves comfortably when lifting, therefore conveyor belt heights may need to be adjustable, or adjustable chairs provided for checkout staff.
- **Floor conditions** – all floors should be free of obstructions, bumps, holes and any materials which may cause people to slip, fall or otherwise lose their footing while undertaking the handling operations.
- **Changes of level** – the use of steps and ladders should be avoided wherever possible when carrying loads, particularly where they may obstruct visibility. Ramps may have to be provided.
- **Atmospheric conditions** – heating and ventilation should be set up so that conditions are comfortable to work in and do not cause fatigue. There should be adequate lighting levels in all parts of the workplace so that employees are able to see all parts of the loads they are handling and the floor and other working surfaces used.

- **Personal protective equipment** – operators should be provided with such equipment as is necessary to protect themselves and their own clothing from harm or damage as a result of the types of load handled. This will include gloves, aprons, protective footwear, etc., with the type of equipment depending on the risks involved.

### Individual Capability

Part of the function of a safe system of work for manual handling should be to make sure that individuals are capable at all times of carrying out the necessary operations in a competent manner.



*Every workplace has employees with a range of different capabilities.*

People who may be at increased risk of manual handling injuries include:

- Those with existing (temporary or permanent) health problems.
- Pregnant women and new mothers.

Appropriate instruction and training should be provided. This should be closely related to a person's job and include theoretical and practical supervised sessions, using typical loads and working conditions, to ensure a thorough understanding of such points as:

- The design of the tasks involved.
- Recognition of different types of load, e.g. assessing the likely weights of loads and deciding which may or may not be handled without assistance.
- The need for good housekeeping in and around the work location.
- Safe lifting and handling techniques, including the risks from careless and unskilled handling.
- Correct use of personal protective equipment.
- Correct use of mechanical aids.



## Topic Focus

### Good Technique For Lifting

- **Think before lifting/handling** – before lifting plan the lift and consider using lifting aids, getting help and clearing your route.
- **Keep the load close to the waist** – keep the load as close to the body as possible and if you can't get close to the load before you lift it, slide the load closer to you.
- **Adopt a stable position** – feet should be apart with one leg slightly forward to maintain balance. The feet will need to move to maintain balance. As this is a physical task, clothing and footwear must be suitable, e.g. avoid tight clothing.
- **Get a good hold** – wherever possible hug the load close to the body rather than just gripping with the fingers/hands.
- **Start in a good posture** – at the start of the lift a slight bend in the back, hips and knees is better than stooping or squatting.
- **Don't flex the back further whilst lifting.**
- **Avoid twisting or leaning sideways** – shoulders should face the same direction as the hips and if turning, move the feet.
- **Keep the head up** – once the load is secure look ahead.
- **Move smoothly**, avoid jerking or snatching the load.
- **Don't lift more than can be easily managed** – if in doubt seek advice and help.
- **Put down, then adjust** – if necessary put the load down then slide it into position.

For more information see the HSE publication INDG147 - "*Getting to Grips with Manual Handling*".

Additional measures to reduce risks are in the form of developing safe systems of work and providing appropriate support for the individual.

### Systems of Work

The organisation of tasks within jobs and over time acts to reduce the duration of activities which may put an employee under physical stress and/or allow for recovery. Examples include:

- Providing for regular breaks – short, frequently occurring rest breaks appear to be more satisfactory than longer ones taken occasionally, and they should be arranged so that they are taken prior to the onset of fatigue and not as a recovery period from it.
- Job or task rotation.
- Assigning a second employee to assist in performing particular tasks.
- Enlarging job responsibilities so that the same task is not performed repeatedly.
- Limiting overtime work.

### Individual Measures

The provision of information and training is important and should cover correct posture, including the adjustment of work equipment to suit the individual, and correct use of that equipment, including for example the software used on a computer.

## Avoiding or Minimising the Risks from Repetitive Activities

The main risk controls involve engineered solutions, e.g.:

- Altering the equipment and ensuring that it is suitable for the task.
- Ensuring equipment is adjustable to the user.
- Positioning equipment so that it is comfortable and allows movement.



RRC SAMPLE MATERIAL



### More...

Download INDG398 "Are You Making the Best Use of Lifting and Handling Aids" from [www.hse.gov.uk/pubns](http://www.hse.gov.uk/pubns) look particularly at the examples of mechanical lifting aids on pages 6-8.

Download leaflet INDG171 "Aching Arms" from [www.hse.gov.uk](http://www.hse.gov.uk) and look at the risks increasing the likelihood of WRULDs on pages 5-6, and the possible controls on pages 8-9.



### Revision Questions

7. What is the primary means of minimising the hazards of manual handling?
8. How can manual handling tasks be redesigned to make them less hazardous?

(Suggested Answers are at the end of the course.)