MANUAL HANDLING TRAINING
• Location of Fire Exits

• Location of Fire Assembly Point

• Location of Welfare Facilities (toilets, canteen etc.)

• All mobile phones must be turned off for the duration of the training session

• Please keep all bags under the tables to reduce the risk of a slip/trip hazard
AIM OF THE COURSE

To give you the skills and knowledge required to be proficient in Manual Handling Operations, and in doing so, to minimise the risk of injury to yourself and your colleagues.
COURSE CONTENT

• Manual Handling Legislation

• Anatomy of the spine / Injuries

• Posture and Fitness

• Manual Handling Risk Assessment

• Ergonomics

• Manual Handling Principles and Techniques
DID YOU KNOW?

• Lower back pain affects approximately 80% of the population at some stage in their lives

• Societal costs of back pain are estimated at €800 million per year

• The Health & Safety Authority state that approximately one-third of all injuries reported arise from manual handling

• These injuries often lead to chronic illness and disability
DID YOU KNOW?

• Manual handling training is required in the workplace by law.

• Learning and using the correct lifting techniques can also have an impact on our leisure activities and our everyday lives.
DID YOU KNOW?

• A number of factors contribute to back pain, including poor posture, incorrect lifting techniques, heavy physical work, repetitious lifting work and work that involves frequent bending, twisting, lifting and pulling

• Manual handling training teaches us the importance of using the correct techniques

• The relevant factors to be considered such as load weight and load stability when undertaking simple tasks
DID YOU KNOW?

• As very small children we all naturally lift correctly and without risk of injury.

• All incorrect lifting techniques are bad habits that we develop in later life.
COURSE CONTENT

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• Manual Handling Principles and Techniques
The Safety, Health & Welfare at Work (General Application) Regulation 2007, Chapter 4, regulations 68 and 69 apply to manual handling in the workplace

• The definition of “manual handling of loads” (Reg 68) is:
  — any transporting or supporting of a load by one or more employees, including lifting, putting down, pushing, pulling, carrying or moving of a load, which by reason of its characteristics or of unfavourable ergonomic conditions, involves risk, particularly of back injury, to employees
Regulation 69 requires:

• Manual handling risk assessments be carried out for manual handling tasks

• Manual handling should be planned and organised to avoid or reduce manual handling

• Facilitate the use of mechanical aids or other means

• Instruction and training must be provided to all personnel
Where manual handling cannot be avoided the employer must look at measures to reduce the risk involved in the manual handling of loads. They must consider risk factors (specified later), vulnerable groups of employees, and employee capabilities.

If it is possible to do so, employers should provide precise information about the weight of each load and the centre of gravity of the heaviest side.

Also organise workstations that make handling work as safe and healthy as possible.
Employers Duty of Care under Common Law

The employer must provide:

• A Safe workplace (e.g. access and egress)
• Safe plant and equipment (equipment safe for use and maintained)
• Safe systems of work (the way in which work is done is safe)
• Safe people (i.e. employees through their acts or omissions must not compromise the safety of their colleagues)
DUTY

Employees duties (Safety, Health & Welfare at Work Act, 2005)

• To take reasonable care of themselves and others

• To co-operate with the procedures and systems of work made by the employer

• To make correct use of personal protective equipment (PPE) supplied by the employer

• To report without delay any defective plant or equipment or systems of work or PPE to management
• Manual Handling Legislation

• Anatomy of the spine / Injuries

• Posture and Fitness

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• Ergonomics

• Manual Handling Principles and Techniques
Our ability to move rests upon our use of the muscles and bones which constitute our musculoskeletal system. This system provides us with:

- Form
- Shape
- Support
- Stability
- Protection
- Allows movement
Constituents of The Musculoskeletal System

In order to understand back injuries and the mechanism of injuries in relation to manual handling it is important to be familiar with the musculoskeletal system.

<table>
<thead>
<tr>
<th>Bones (skeleton)</th>
<th>Joints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscles</td>
<td>Ligaments</td>
</tr>
<tr>
<td>Tendons</td>
<td>Cartilage</td>
</tr>
<tr>
<td>Connective tissue (tissue that holds tissues &amp; organs together)</td>
<td>Discs</td>
</tr>
</tbody>
</table>
The skeleton is the body’s supporting structure.

• Skull
• Shoulder blade
• Ribs
• Bones

• Collar Bone
• Sternum
• Vertebral Column

The bones of the skeleton are divided into the:
- Appendicular skeleton (arm & leg bones)
- Axial skeleton (skull, spine, ribcage)
Fractures

• A fracture can result from forceful impact/stress or from a medical condition that causes the bones to weaken such as osteoporosis or cancer.

• Spinal fractures may pinch, compress or tear the spinal cord.
33 vertebrae separated by intervertebral discs

<table>
<thead>
<tr>
<th>Region</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical</td>
<td>7 (C1 – C7)</td>
</tr>
<tr>
<td>Thoracic</td>
<td>12 (T1 - T12)</td>
</tr>
<tr>
<td>Lumbar</td>
<td>5 (L1 – L5)</td>
</tr>
<tr>
<td>Sacral Fused</td>
<td>5 (S1 - S5) Fused</td>
</tr>
<tr>
<td>Coccygeal fused-</td>
<td>4 Fused – Tail Bone</td>
</tr>
</tbody>
</table>

**SPINAL COLUMN**

- Cervical Vertebrae
- Thoracic Vertebrae
- Lumbar Vertebrae
- Sacrum
- Coccyx
Each vertebrae is composed of:
- A front segment (vertebral body)
- A back segment (vertebral neural arch)
## Functions of Vertebral / Spinal Column

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection</td>
<td>Protects the spinal cord, which it encloses.</td>
</tr>
<tr>
<td>Movement</td>
<td>Permits movement of the trunk: forward, backward, and left and right bending.</td>
</tr>
<tr>
<td>Support</td>
<td>Supports the head.</td>
</tr>
<tr>
<td>Production</td>
<td>Produces red blood cells.</td>
</tr>
<tr>
<td>Attachment</td>
<td>Provides structural attachment for the ribs</td>
</tr>
</tbody>
</table>
The point at which two or more bones connect is known as a joint.

Joints are classified according to their structure and function.

<table>
<thead>
<tr>
<th>STRUCTURE</th>
<th>CHARACTERISTICS /FUNCTIONS</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibrous</td>
<td>Joined by fibrous connective tissue; allows little or no mobility.</td>
<td>Skull</td>
</tr>
<tr>
<td>Cartilaginous</td>
<td>Joined by cartilage; allows slight mobility.</td>
<td>Vertebrae</td>
</tr>
<tr>
<td>Synovial</td>
<td>Not directly joined; allows a range of movement.</td>
<td>Shoulder, Hip, Elbow, Knee</td>
</tr>
</tbody>
</table>
• Joints of the spine
• Connect each vertebrae with the vertebrae above and below
• These permit movement of the vertebral column
INJURY TO JOINTS

• Manual handling involving excessive bending, twisting and overextension may cause damage to the joints

• Repeated lifting to and from a height may cause the facet joints to be pressed together creating intolerable strain

• Over time this excessive strain may cause the joints to degenerate
MUSCLES

- Muscles are formed by the binding together of small muscle fibres into bundles

- Muscles are classified as:
  - Skeletal
  - Cardiac
  - Smooth

<table>
<thead>
<tr>
<th>TYPE OF MUSCLE</th>
<th>CHARACTERISTICS /FUNCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skeletal or voluntary muscle</td>
<td>Held by tendons to the bone; cause movement and maintain posture.</td>
</tr>
<tr>
<td>Smooth or involuntary muscle</td>
<td>Located in the walls of the stomach, intestines, bladder, urethra, uterus, blood vessels and bronchi. These muscles are not under our conscious control.</td>
</tr>
<tr>
<td>Cardiac muscle</td>
<td>Located only in the heart. This muscle is also involuntary.</td>
</tr>
</tbody>
</table>
MUSCLES

• Muscles are formed by the binding together of small muscle fibres into bundles

• Nerve impulses cause contraction of the muscle fibres. This causes the shortening of the muscle and causes movement at the joint
• The back muscles provide the power for movement in the spine

• The abdominal muscles also play a part

• However the quadriceps (thigh) muscles should be predominantly involved when lifting loads
# INJURY TO MUSCLES

Muscles can be injured in a number of ways:

<table>
<thead>
<tr>
<th>MOVEMENT</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudden, sharp or strong movement</td>
<td>Action when attempting to push a car.</td>
</tr>
<tr>
<td>Repetitive low force contractions</td>
<td>Working at a production line.</td>
</tr>
<tr>
<td>Prolonged static muscle work</td>
<td>Sitting for long periods of time.</td>
</tr>
<tr>
<td>Awkward angle of pull of the muscle</td>
<td>Bending and twisting</td>
</tr>
<tr>
<td>Sudden increase of work intensity and/or workload</td>
<td>Soccer player may cause injury to hamstring when accelerating suddenly during a game</td>
</tr>
</tbody>
</table>
Ligaments connect bones to bones to form a joint.

Cruciate ligaments are those that are crossed in pairs (i.e. they are arranged in an ‘x’ form).

Such ligaments can be found in the knee. This formation of ligament provides stability to the joint and permits a huge range of motion.

The posterior longitudinal ligament is found within the vertebral canal and it restricts the range of forward flexion or bending of the spine. The anterior longitudinal ligament is found on the anterior surface of the spine.
INJURY TO LIGAMENTS

• Ligaments in the back may become strained from incorrect lifting, bending and twisting movements

• It is these movements that may put our backs under constant or repeated strain

• When ligaments become over-stretched they may lose their ability to hold the joints of the back in their correct position resulting in back strain
**TENDONS**

- **Tendons** are composed of fibrous connective tissue that connects muscle to bone (e.g. the Achilles tendon located behind the ankle)

- **Ligaments** connect bones to bones to form a joint. Cruciate ligaments are those that are crossed in pairs (i.e. they are arranged in an ‘x’ form)

- **Cartilage** is composed of flexible connective tissue. It is found at the joints between bones, ear, nose, bronchial tubes and the intervertebral discs. Fibro cartilage is present in the annulus of the intervertebral discs
INTERVERTEBRAL DISCS

• Discs are located between the vertebrae

• Each disc has two functions
  - It forms a joint which permits slight movement of the vertebrae
  - It works like a ligament by holding the vertebrae together
• The discs are composed of an outer part called the annulus, which surrounds the inner part, called the nucleus.

• The nucleus contains a gel substance with the consistency of a jelly.
• The nucleus of the disc absorbs shock from the body.

• This nucleus may be forced out of the disc completely (herniated disc), causing pain as it exerts pressure on the nerve lying near the disc.
Functions of the Disc:

- Resist compression and shearing stresses on the spine
- Shock absorber
- Separates vertebrae
INVERTEBRAL DISC

• Because the discs have little in the way of direct blood supply they rely on a supply of nutrients through the blood vessels and tissues.

• Spinal injuries may occur as a result of repeated bending, twisting and lifting or sudden unexpected movements; holding awkward and/or static postures for long periods of time.
The normal disc—is perfectly formed and cushions the vertebrae above and below it.

The degenerative disc—illustrated the natural process of degeneration of the disc as we age. It loses its flexibility, elasticity and ability to absorb shock.
The Bulging Disc
—may result when the disc moves out of its normal position. This may occur as part of ageing. It is more likely to occur gradually than suddenly.
The Herniated Disc
—similar to the bulging disc, but may result from sudden injury sustained when lifting without bending the knees and keeping the back straight.
COURSE CONTENT

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• Ergonomics

• Manual Handling Principles and Techniques
• Leaning and maintaining good posture is a sure method to prevent back pain.

• Remember the spine has natural curves both slightly forward (in the lumbar region) and backward (in the thoracic region)

• A neutral or good posture is ensured when the ears, shoulders, hips, knees and ankles are aligned, whether sitting or standing.
There are 4 elements to fitness:

- Endurance
- Flexibility
- Strength
- Aerobic Fitness
FITNESS

• **Endurance** - The ability of the body to exert itself for a period of time

• **Flexibility** - The ability of your joints and muscles to move within a certain range. The degree of flexibility varies from one person to another

• **Strength** - Assists the protection of joints and muscles from injury (e.g. the abdominal and back muscles support the back during lifting)

• **Aerobic fitness** - Improves the function of the heart and lungs, and increases circulation efficiency and reduces blood pressure
FITNESS

Remember!

Before undertaking any fitness or training programme, seek the professional advice from your G.P. or other competent person.
COURSE CONTENT

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• Manual Handling Principles and Techniques
If manual handling cannot be avoided, certain procedures need to be adopted to reduce the risk of manual handling injury.

- Identify the task

- Obtain and consider the description of the job, and break it down into its obvious stages (e.g. does the job require different manoeuvres, i.e. lifting, pushing, etc.)
• The scheme of questions known by the acronym T.I.L.E. is a useful tool for guiding you through such analysis

• Safety, Health & Welfare at Work (General Application) Regulations 2007 - Schedule 3
Remember the definition of manual handling as per the SHWW (General Application) Regulation 2007?

**Definition:**
Manual handling is any transporting or supporting of a load by one or more employees, including lifting, putting down, pushing, pulling, carrying or moving of a load, which, by reason of its characteristics or of unfavourable ergonomic conditions, involves risk, particularly of back injury, to employees.
In order to conduct a risk assessment it may be useful to break the process down into 3 steps:

• **Step 1:**
Gather information about the lift (i.e. how it is to be undertaken (e.g. team lift may be required)). If you are carrying out a risk assessment for others (i.e. you are not involved in the lifting task) it is vital that you consult anyone who is involved
RISK ASSESSMENT

• **Step 2:**
  List technical issues (e.g. weight of the load, which if any is the heavier side of load, size of the load, etc.)

• **Step 3:**
  Consider the assessment factors. Assessment factors are those mentioned earlier, remember the acronym T.I.L.E
T – Task

• Do you have to hold the object at a distance from your trunk?

• Do you have to twist and/or bend?

• Is there any risk of sudden movement of the load?

• Does the task require frequent or prolonged physical effort?

• Is it repetitive?
I - Individual Capacity

• Does the task require a person of unusual height or strength?

• Does the task pose risks for pregnant women or those with health problems?

• Is special knowledge or training required for the task to be done safely?
L - Load

• Is it heavy?

• Is it Bulky?

• Is it awkward and difficult to grasp?

• Is it unstable and will the content move?

• Is it hot or sharp?
E - Environment

• Is there sufficient space?

• Is the floor uneven, or slippery?

• Are there variations, in the floor or workstation levels?

• Is the room temperature too hot or too cold?

• Is the room/ area poorly lit?
RISK REDUCTION MEASURES

Consider the following:

• Organisation of workstations

• Sensitive risk groups (young, mature, pregnant)

• Individual capacity

• Health surveillance
COURSE CONTENT

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• Posture and Fitness
• Manual Handling Risk Assessment
• Ergonomics
• Manual Handling Principles and Techniques
What is Ergonomics?

Ergonomics deals with the interactions between people with their equipment and people and their work environment.

Some ergonomic factors to be considered are:
• Force (required to perform a task)
• Frequency (of the task)
• Intensity (or pace of the task)
• Duration (the time the task is performed for)
• Awkward Postures/Static Loading (performing task)
ERGONOMICALLY CLUELESS
COURSE CONTENT

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• Ergonomics

• Manual Handling Principles and Techniques
LIFTING AN OBJECT

1) Assess the Task, the Area and the Load

Decide on the action required (e.g. load to be lifted, pushed etc.) and make sure you know the intended location. To assess the load, push gently using your foot, or hands/arms
LIFTING AN OBJECT

2) Establish a Broad Stable Base

Feet should be shoulder width apart
3) Bend at Knees

• Bend the knees and lower the trunk

• You may also assess the weight of the load at this stage by tilting it
4) Ensure Good Posture

Maintain natural S - curve of the spine
LIFTING AN OBJECT

5) Establish a Firm Grip

Grasp the load firmly using full palmar surface
6) Keep Arms Close to your Trunk

- Ensure your arms are close to your trunk
- Lift your head and rise avoiding sudden movements
LIFTING AN OBJECT

7) Keep the weight close to the centre of gravity

Ensure the weight is close to your centre of gravity
8) Use Feet to Change Direction

To prevent injury, use your feet to change your direction rather than twisting.
LIFTING AN OBJECT

ALWAYS REMEMBER:

If the load is too heavy get help or use a mechanical aid such as a trolley.
LIFTING AN OBJECT

ALWAYS REMEMBER:

If the load is too heavy get help but make sure she or he is equal in size & ability to you!
CARRYING LOADS

To avoid the possibility of pain and/or injury remember to use the same principles for carrying as for lifting, but also remember to balance your body by

- Carrying two small loads rather than one large one

- If the load cannot be divided, hold it close to your body with a firm grip in both hands. Always ensure that you can see over the load
When Pushing a Load:

• Transfer your weight on to the front leg and move off. Maintain the natural S curve of the back

• It is better to push rather that to pull an object - exerts less pressure on your back
When Pulling a Load

• Place one foot in front of the other.

• Transfer the weight of your body on to the back leg, ensure that you bend the knee slightly then pull.

• Maintain a natural S curve of the back.

• Stop every few steps, release the load and ensure that the way is clear.

• Do NOT twist
Apply the basic principles of lifting for all of the following basic lifts:

When lifting to and from a Floor, Bench, Height or Pulling, Pushing.
1. Always assess the task, Area and Load
2. Bend your knees
3. Maintain broad stable base
4. Maintain good back posture (natural S curve)
5. Establish firm palmar grip
6. Keep arms in line with your trunk
7. Keep weight close to the centre of gravity
8. Point feet in the direction of movement
CLOTHING & FOOTWEAR

Appropriate Clothing and Footwear

• Wear clothes that do not restrict your movement or posture

• Clothes should be loose and footwear with good grip should be worn where appropriate or necessary

• Other personal protective equipment may be required such as gloves

• Where other PPE is provided ensure you wear it
Personal Protective Clothing (PPE)

• ALWAYS USE THE CORRECT PPE!
• Most of us encounter manual handling every day of our lives both at home and in the workplace.

• It is because we lift objects every day that we need to ensure that we lift correctly.

• By applying basic principles when manual handling, the risks can be reduced.

• It is important to remember to avoid manual handling of heavy loads, always use a mechanical means of moving/lifting loads or get help.
REMINDER

• Where manual handling cannot be avoided - observe T.I.L.E. and the 8 principles of lifting

• Always use correct lifting techniques, take gentle exercise and ensure your lifestyle is conducive to maintaining good physical fitness
QUESTIONS?