Managing Physical Hazards

Lecture 7 : Manual Handling & Ergonomic Hazards

Lecturer: Jean Paul Xuereb

12th June 2026

Undergraduate Diploma in
Occupational Health and Safety

Learning Objectives

By the end of this lesson, students will be able to: • Identify common ergonomic and manual handling hazards in different workplaces

- Understand relevant occupational health and safety legislation
- Explain how musculoskeletal disorders develop from poor practices
- Apply ergonomic principles to workstation setup
- Demonstrate safe manual handling awareness
- Recommend practical control measures (engineering, administrative, training)
- Conduct basic manual handling risk assessments
- Perform simple ergonomic workstation evaluations

What is Ergonomics?

Ergonomics is the science of designing work, tools, and environments to fit the person using them — rather than forcing the person to adapt to poor design.

Ergonomics = **fitting the job to the worker**. (Adapt the work to the worker not vice versa)

Key Features of Ergonomics

Focuses on **comfort, safety, and efficiency**

Prevents **musculoskeletal disorders (MSDs)** such as back pain and repetitive strain injuries

Improves **productivity and wellbeing**

What Ergonomics Looks At

Workstation setup (chair, desk, screen height)

Repetitive movements (typing, scanning items, lifting)

Posture and body positioning

Work environment (lighting, space, equipment design)

Why Ergonomics Matter?

- **Reduces long-term injury risk**

Effective ergonomics significantly reduces the likelihood of developing long-term musculoskeletal disorders such as chronic back pain, neck strain, and repetitive strain injuries. By designing tasks and workstations to support correct posture and natural movement, strain on muscles and joints is minimised. Early intervention through ergonomic adjustments helps prevent minor discomfort from progressing into serious, permanent injuries that may require medical treatment or extended sick leave.

- **Improves productivity and wellbeing**

When employees work in comfortable and well-designed environments, they experience less fatigue, discomfort, and distraction. This allows them to focus better and maintain consistent performance throughout the day. Reduced pain and physical stress also contribute to improved morale and job satisfaction. Healthy workers are generally more motivated, engaged, and efficient, leading to higher overall productivity and fewer work interruptions due to injury or illness.

- **Relevant across all workplaces**

Ergonomic principles apply to a wide range of workplaces, including offices, retail stores, warehouses, healthcare facilities, and schools. Any task involving sitting, standing, lifting, or repetitive movement can pose ergonomic risks if poorly designed. Whether using display screen equipment, stocking shelves, or assisting patients, proper ergonomic planning ensures safer work practices. Therefore, ergonomics is not limited to office environments but is essential in virtually every occupation.

Musculoskeletal Disorders (MSDs)

Musculoskeletal Disorders (MSDs) are work-related injuries or conditions affecting the **muscles, bones, joints, tendons, ligaments, and nerves** due to repeated physical stress over time. In occupational settings, they often develop from activities such as repetitive movements, prolonged sitting or standing, heavy lifting, awkward postures, and poorly designed workstations. Office workers may experience neck, shoulder, and wrist pain from extended computer use, while warehouse and healthcare workers are more prone to back injuries from manual handling tasks. These conditions usually develop gradually, starting with mild discomfort that worsens if risks are not addressed. Work-related MSDs can reduce mobility, productivity, and quality of life, and may lead to long-term disability if proper ergonomic controls, training, and risk assessments are not implemented.

Common Ergonomics Injuries?

Lower Back Pain - Often caused by poor sitting posture, prolonged sitting, or incorrect lifting techniques. Common in office workers and manual labourers. Continuous strain on the lower spine can lead to chronic pain and reduced mobility.

Neck Strain - Results from holding the head forward or downward for long periods, such as using low screens or phones. This places extra pressure on neck muscles and may cause stiffness, headaches, and long-term discomfort.

Shoulder Strain - Develops from repetitive reaching, lifting, or poorly positioned desks and equipment. Common in retail, healthcare, and warehouse work. Over time, it can limit shoulder movement and strength.

Repetitive Strain Injuries (RSI) - A group of conditions caused by repeated motions like typing or scanning. Symptoms include pain, stiffness, and reduced flexibility. Often develops gradually without early warning signs.

Carpal Tunnel Syndrome - Caused by pressure on the median nerve in the wrist due to repetitive hand movements. Leads to numbness, tingling, and weakness in the hand. Common in computer-based and assembly work.

Tendonitis - Inflammation of tendons due to overuse or repeated strain. Commonly affects wrists, elbows, and shoulders. Causes pain during movement and may worsen without rest or ergonomic changes.

Eye Strain (Digital Eye Strain) - Caused by prolonged screen use, glare, or poor lighting. Symptoms include headaches, blurred vision, and dry eyes. Very common in screen-based environments like offices and schools.

Ergonomics Risk Factors

- **Repetitive Movements**
Performing the same motion repeatedly (e.g., typing, scanning items, assembly work) can strain muscles and tendons over time, leading to repetitive strain injuries.

- **Awkward Postures**
Working in unnatural positions such as bending, twisting, reaching overhead, or slouching increases pressure on joints and muscles, especially in the back, neck, and shoulders.

- **Prolonged Static Positions**
Sitting or standing for long periods without movement reduces blood circulation and increases muscle fatigue, particularly in office and retail work.

- **Forceful Exertion**
Using excessive physical effort, such as gripping tools tightly or lifting heavy objects, increases strain on muscles and joints.

- **Poor Workstation Design**
Incorrect chair height, poorly positioned screens, or inadequate desk space can force workers into harmful postures.

Display Screen Equipment (DSE)

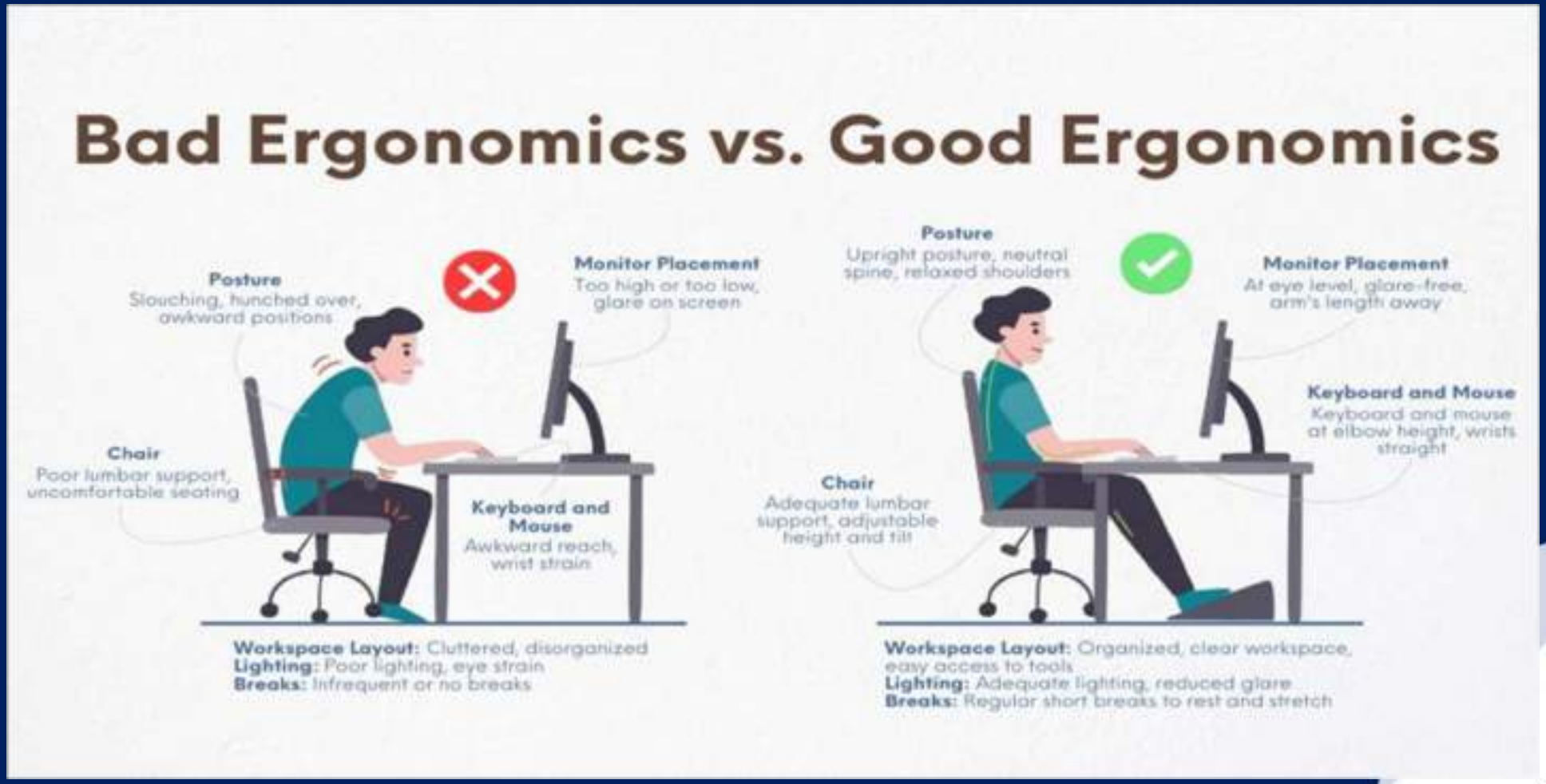
- **Definition and Scope**
  Display Screen Equipment (DSE) refers to any device with a screen used for work, including desktop computers, laptops, tablets, and other electronic displays. Employees who spend long periods interacting with these devices are exposed to specific physical risks. Poor workstation design, prolonged usage, and inadequate breaks can lead to strain on the eyes, neck, shoulders, and back. Understanding DSE and its potential hazards is essential for preventing workplace musculoskeletal and visual disorders.
- **Risks of Long-Term Use**
  Extended use of DSE without proper ergonomic practices can cause discomfort and injuries over time. Common issues include eye strain, headaches, neck and shoulder tension, back pain, and repetitive strain injuries in the wrists or fingers. Maintaining static postures for long durations increases muscle fatigue, while frequent poor positioning, such as leaning forward or slouching, amplifies the risk. Early recognition of these risks allows corrective measures before conditions become chronic.
- **Importance of Proper Ergonomic Setup**
  A correct ergonomic setup reduces strain and promotes comfort and productivity. Key practices include adjusting screen height to eye level, keeping the keyboard and mouse at a comfortable distance, supporting the back with an adjustable chair, and ensuring adequate lighting to reduce glare. Regular breaks and stretching exercises further protect workers. Employers are legally required to assess DSE workstations, provide guidance, and implement adjustments to safeguard employee health and prevent long-term injuries.

DSE Assessment

A **DSE assessment** is a structured evaluation of a workstation and how a worker interacts with display screen equipment, aimed at reducing ergonomic risks and preventing musculoskeletal disorders, eye strain, and fatigue. It ensures that the workstation is adapted to the individual's needs and complies with occupational health and safety regulations, such as SL 646.07. Regular assessments are essential in office, school, and healthcare settings where prolonged screen use is common.

- Screen Position: Place directly in front at eye level.
- Keyboard & Mouse: Keep within easy reach, wrists neutral.
- Chair: Adjustable height with lumbar support.
- Posture: Encourage upright, relaxed seating.
- Feet Support: Flat on floor or use footrest.
- Lighting: Ensure glare-free, adequate illumination.
- Environment: Check temperature, ventilation, and noise.
- Breaks: Schedule frequent micro-pauses and stretches.
- Equipment Condition: Maintain properly functioning devices.
- Training: Educate workers on correct posture and adjustments.

Wrong vs Wright Ergonomics Office Setup



Legal Notice 43 of 2002 SL 646.07— Minimum Health and Safety Requirements for Work with Display Screen Equipment

Here's a clear summary of **Legal Notice 43 of 2002 — Minimum Health and Safety Requirements for Work with Display Screen Equipment (DSE)** in Malta:

Legal Basis and Purpose:
Legal Notice 43 of 2002 (often referred to as the DSE Regulations) sets out the minimum health and safety requirements for workstations that involve the use of display screen equipment. It was made under the Occupational Health and Safety Authority Act and aims to protect workers who regularly use screens, such as computers and tablets, by reducing ergonomic and visual risks.

Who It Applies To:
The regulations apply to any person (whether an employee or other worker) who habitually uses display screen equipment as part of their work. "Workstation" is defined broadly to include the screen, keyboard, peripherals, desk, chair, software interface and the immediate environment.

Employer Duties:
Employers must assess and manage DSE-related risks, provide information and training on safe use, organise work patterns that include breaks and task variation, and ensure workstations are appropriately designed. Employers should also offer eye and eyesight tests where appropriate.

Poor Posture Risks

Poor posture significantly increases pressure on the spine, especially in ergonomics where individuals spend long hours sitting or using devices. When the spine is misaligned—such as slouching forward or craning the neck—it distributes body weight unevenly. This creates excessive strain on spinal discs, ligaments, and muscles. Over time, this added pressure accelerates disc wear and may contribute to conditions like herniation or nerve compression.

Another major consequence of poor posture is fatigue and physical discomfort. Muscles must work harder to stabilize the body when alignment is compromised, leading to unnecessary energy expenditure. For example, rounded shoulders or a forward head posture force neck and back muscles into constant tension. This sustained strain reduces circulation and oxygen flow to muscles, causing stiffness, soreness, and a persistent feeling of tiredness even during low-effort tasks.

If poor posture continues long term, it often leads to chronic pain and musculoskeletal disorders. Repeated strain can create inflammation and structural imbalances that worsen over time. Individuals may develop recurring neck, shoulder, or lower back pain that interferes with daily function and productivity. Without corrective ergonomic adjustments and posture awareness, these issues may become persistent, requiring medical treatment or long-term rehabilitation.

Poor Posture Risks

Ideal Sitting Postures

An ideal sitting posture supports the natural curves of the spine while minimizing strain on muscles and joints. Start by sitting with your back fully supported against the chair, keeping the spine in a neutral position rather than slouched or overly arched. Your shoulders should be relaxed and aligned over your hips, and your head should sit directly above your shoulders—not pushed forward. Maintaining this alignment reduces spinal pressure and helps prevent long-term discomfort.

Your lower body position is equally important. Keep your feet flat on the floor (or on a footrest) with knees bent at about a 90-degree angle and level with or slightly below your hips. Avoid crossing your legs for long periods, as this can affect circulation and pelvic alignment. Your hips should be positioned all the way back in the chair, using lumbar support if available to maintain the natural inward curve of the lower back.

For upper body ergonomics, position your desk and screen at proper heights. Your elbows should rest close to your body at roughly 90 degrees when typing, with forearms parallel to the floor. The top of your screen should be at or slightly below eye level to prevent neck strain. Regularly adjusting posture and taking short movement breaks every 30–60 minutes helps maintain comfort and prevents stiffness.

Chair Ergonomics

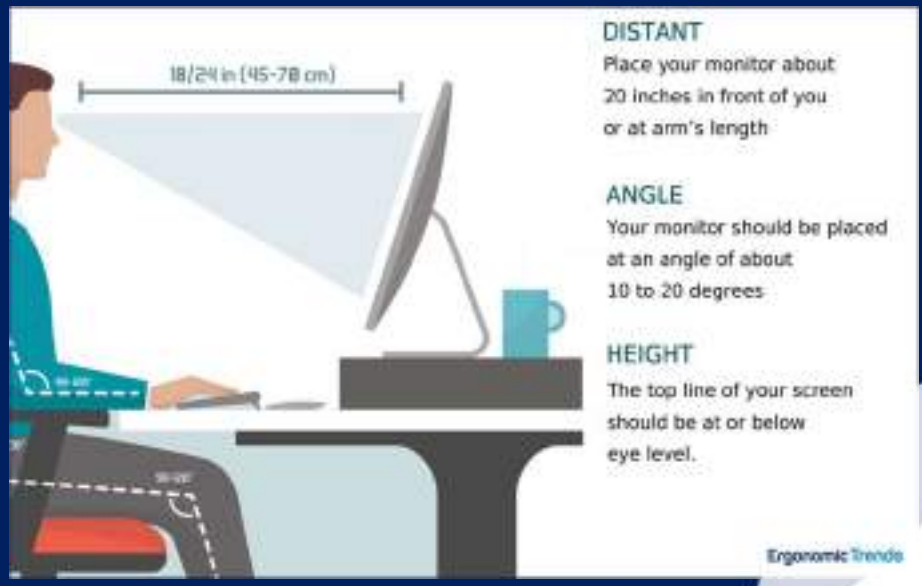
Chair ergonomics plays a vital role in maintaining comfort and preventing musculoskeletal strain during prolonged sitting. An adjustable chair height is essential because it allows users to keep their feet flat on the floor and their knees at a 90-degree angle, promoting proper lower body alignment. Lumbar support is equally important, as it maintains the natural inward curve of the lower spine and prevents slouching, reducing pressure on spinal discs. Additionally, armrests provide necessary support to the elbows and forearms, helping the shoulders stay relaxed and minimizing strain in the neck and upper back. Together, these features improve posture, enhance comfort, and reduce the risk of long-term back and shoulder problems.

- Adjustable height ensures proper leg and desk alignment
- Keeps feet flat and knees at 90 degrees
- Lumbar support maintains natural spinal curve
- Reduces lower back strain and disc pressure
- Armrests support elbows at 90 degrees
- Prevents shoulder and neck tension
- Improves overall sitting comfort and posture

Desk Screen Position

Proper desk and screen positioning is essential for maintaining good posture and reducing strain during prolonged computer use. The desk height should allow your elbows to rest comfortably at about a 90-degree angle, keeping forearms parallel to the floor and shoulders relaxed. The screen should be positioned directly in front of you to avoid twisting the neck, with the top of the monitor at or slightly below eye level. Maintaining an arm's length distance between your eyes and the screen helps reduce eye strain while supporting a neutral head position. When the desk and screen are correctly aligned, they promote spinal balance, minimize muscle fatigue, and improve overall comfort and productivity.

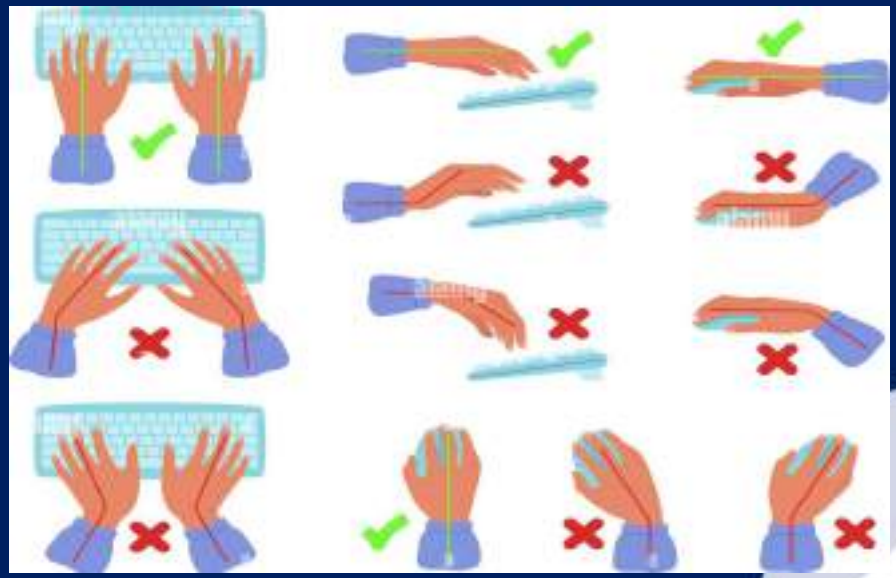
- Desk height should keep elbows at ~90 degrees
- Forearms parallel to the floor
- Shoulders relaxed, not raised or slouched
- Screen placed directly in front of the user
- Top of monitor at or slightly below eye level
- Screen about an arm's length away
- Prevents neck strain and eye fatigue
- Supports neutral spine and better posture



Keyboard and Mouse Placement

Proper keyboard and mouse placement is essential for preventing strain injuries and maintaining comfortable working posture. Both the keyboard and mouse should be positioned close to the body so that the elbows remain at about a 90-degree angle and stay near the sides. This reduces unnecessary shoulder movement and prevents muscle fatigue. Wrists should be kept in a neutral, straight position—not bent upward, downward, or sideways—to avoid pressure on the tendons and nerves. Excessive reaching for the mouse or keyboard can strain the shoulders, arms, and upper back over time. Keeping input devices within easy reach promotes better alignment, reduces tension, and lowers the risk of repetitive strain injuries.

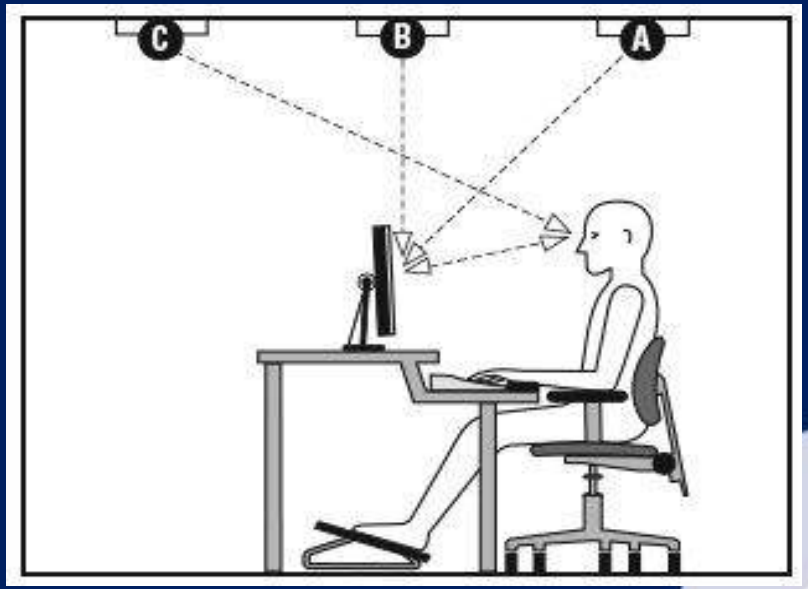
- Keyboard and mouse kept close to the body
- Elbows at approximately 90 degrees
- Arms relaxed and near the sides
- Wrists maintained in a neutral, straight position
- Avoid bending wrists up, down, or sideways
- Do not overstretch to reach the mouse
- Reduces shoulder, arm, and wrist strain
- Helps prevent repetitive strain injuries



Lighting and Glare

Lighting plays a critical role in ergonomic comfort and visual health. Poor lighting conditions, whether too dim or too bright, can strain the eyes and lead to headaches, blurred vision, and fatigue. Inadequate lighting forces the eyes to work harder to focus, especially during prolonged screen use. Glare from overhead lights or sunlight reflecting off screens can also negatively affect posture, as users may lean forward, tilt their heads, or adjust their sitting position to see clearly. This creates unnecessary strain on the neck, shoulders, and back. To reduce these risks, it is important to control light sources by using blinds, curtains, or repositioning screens to avoid direct reflections. Proper lighting setup improves visibility, supports good posture, and enhances overall comfort and productivity.

- Poor lighting causes eye strain and fatigue
- Can lead to headaches and blurred vision
- Eyes work harder in dim or harsh lighting
- Glare from lights or windows reduces visibility
- Users may lean or twist to avoid reflections
- Leads to poor posture and neck strain
- Use blinds or curtains to control sunlight
- Reposition screens to minimize glare
- Improves visual comfort and posture



Repetitive Strain Injuries (RSI)

Repetitive Strain Injuries (RSI) are musculoskeletal conditions caused by repeated movements and overuse of specific muscles, tendons, and nerves. These injuries commonly occur when the same motion is performed continuously without sufficient rest, leading to inflammation and tissue stress. Typing, clicking a mouse, and repetitive hand movements are major contributors, especially in office or computer-based environments. RSIs often affect the wrists, hands, forearms, shoulders, and neck. Poor ergonomics, such as awkward wrist angles or unsupported arms, further increase the risk by placing extra strain on soft tissues. Over time, this repeated stress can impair mobility and reduce work performance.

One of the key characteristics of RSI is that it develops gradually rather than appearing suddenly. Early signs may include mild discomfort, tingling, stiffness, or weakness in the affected area. If ignored, these symptoms can progress into persistent pain, reduced grip strength, and limited range of motion. Because RSIs build up slowly, individuals may not recognize the problem until it becomes more severe. Preventive measures such as proper workstation setup, regular breaks, stretching, and posture awareness are essential to reduce the risk and maintain long-term musculoskeletal health.

- Caused by repeated motions and overuse
- Common in typing and mouse use
- Poor ergonomics increases risk
- Early signs: tingling, stiffness, mild pain
- Prevented with breaks and ergonomic setup

Affects muscles, tendons, and nerves

Frequently impacts wrists, hands, and forearms

Develops gradually over time

Can progress to chronic pain and weakness

Breaks and Movement

Taking regular breaks and incorporating movement into the workday is essential for reducing physical fatigue and musculoskeletal strain. Prolonged sitting or repetitive tasks place continuous stress on muscles and joints, especially in the neck, shoulders, back, and wrists. Short breaks allow these tissues to relax and recover, improving blood circulation and reducing stiffness. Even brief pauses of 2–5 minutes every 30–60 minutes can significantly lower the risk of discomfort and long-term injury. Regular movement also helps maintain energy levels and mental focus, enhancing overall productivity.

Breaks are also an opportunity to perform simple stretching exercises that relieve tension and improve flexibility. Gentle stretches for the neck, shoulders, wrists, and lower back can counteract the effects of static posture. In addition to stretching, standing up, walking around, or changing positions throughout the day supports better posture and joint mobility. Encouraging consistent movement during work hours promotes both physical well-being and long-term ergonomic health.

- Reduces muscle fatigue and joint strain
- Improves blood circulation
- Prevents stiffness from prolonged sitting
- Take short breaks every 30–60 minutes
- Encourages stretching of neck, shoulders, and back
- Supports flexibility and posture
- Stand, walk, or change positions regularly
- Enhances focus and productivity

Ergonomic Control Measures

Ergonomic control measures are strategies used to reduce the risk of injury and improve comfort in the workplace by adapting tasks, tools, and environments to suit human capabilities. One of the most effective measures is proper workstation design, including adjustable chairs, desks, and monitor placement to support neutral body posture. Using ergonomically designed equipment such as supportive keyboards, mice, and lumbar cushions helps minimize strain on muscles and joints. Work organization is also important—scheduling regular breaks, rotating tasks, and encouraging movement can prevent fatigue and repetitive strain injuries. In addition, employee training on posture awareness and safe work habits ensures individuals understand how to maintain ergonomic practices. Together, these measures create a safer, more comfortable, and productive work environment.

- Adjust workstation to fit the user
- Use ergonomic chairs and adjustable desks
- Maintain correct monitor and screen height
- Use ergonomic keyboards and mice
- Ensure proper lighting and minimal glare
- Take regular breaks and stretch
- Rotate tasks to reduce repetition
- Train workers on posture and safe habits
- Encourage movement throughout the day

Manual Handling

Manual handling refers to the process of lifting, lowering, pushing, pulling, carrying, or moving objects by hand or bodily force. It encompasses any task where a person uses their muscles to move loads, whether heavy or light, over short or long distances. Manual handling is common in workplaces such as warehouses, offices, healthcare settings, and construction sites.

Improper manual handling techniques can lead to injuries, particularly affecting the back, shoulders, arms, and legs. Common problems include muscle strains, sprains, and repetitive strain injuries. Factors that increase risk include heavy or awkward loads, poor posture, twisting or bending while lifting, and insufficient rest or training.

To reduce risks, safe manual handling practices are essential. These include planning the lift, keeping the load close to the body, maintaining a straight back, bending the knees rather than the waist, using mechanical aids when possible, and avoiding twisting while carrying objects. Proper training and adherence to ergonomic principles are key to preventing injuries and maintaining workplace safety.

Why Manual Handling is Risky?

Manual handling is risky because it places direct physical stress on the muscles, joints, and spine, which can easily lead to injury if not done correctly. When lifting, carrying, pushing, or pulling loads, the body may be forced into awkward positions, such as bending, twisting, or overstretching, which increases strain on the back, shoulders, arms, and legs. Heavy or uneven loads amplify this stress, raising the likelihood of acute injuries like muscle strains, ligament sprains, or even disc herniation.

Repetitive manual handling tasks also contribute to long-term musculoskeletal problems. Repeated lifting or pushing over time can cause chronic pain, joint wear, and conditions like repetitive strain injuries (RSI) or cumulative trauma disorders. Fatigue further increases the risk, as tired muscles are less able to support proper posture and absorb physical stress.

Environmental factors add to the danger as well. Slippery floors, cramped spaces, poor lighting, or unstable loads can make manual handling more hazardous. Without proper training, equipment, and ergonomic precautions, employees face a high risk of both sudden injuries and long-term musculoskeletal disorders.

- Puts stress on muscles, joints, and spine
- Awkward postures (bending, twisting) increase injury risk
- Heavy or uneven loads cause strains and sprains
- Repetitive tasks lead to chronic pain and RSIs
- Fatigue reduces muscle support and stability
- Environmental hazards (slippery floors, poor lighting) increase danger
- Lack of training or equipment worsens risk

Manual Handling Common Injuries

Manual handling can cause both **acute** (sudden) and **chronic** (long-term) injuries, depending on the nature, frequency, and technique of the tasks performed.

Acute Injuries:
These occur suddenly, often due to a single incident, such as lifting a heavy object incorrectly or slipping while carrying a load. Common acute injuries include:

Muscle strains and sprains – sudden overstretching of muscles or ligaments, especially in the lower back, shoulders, or arms.

- **Herniated or slipped discs** – caused by lifting heavy objects with poor posture, leading to nerve compression and intense pain.
- **Fractures or bruises** – from dropping objects or losing balance.
- **Cuts or abrasions** – if sharp or rough loads are handled without proper protection.

Chronic Injuries:
These develop gradually over time, often due to repetitive stress or poor manual handling habits. Common chronic injuries include:

- **Lower back pain** – persistent discomfort from repeated lifting, bending, or twisting.
- **Tendinitis** – inflammation of tendons, often in the shoulders, elbows, or wrists.
- **Carpal tunnel syndrome** – nerve compression in the wrist due to repeated gripping or lifting.
- **Cumulative trauma disorders** – long-term joint or muscle degeneration caused by repeated strain.
- Proper training, ergonomics, and safe lifting techniques are essential to prevent both acute and chronic

Protection against risk of Back injuries Regulations LN 35/2003 SL 646.10

- **Protection against risk of Back Injuries Regulations LN 35/2003 SL 646.10"**. These regulations are generally designed to prevent workplace injuries related to manual handling, particularly those affecting the back.
- **Key Points / Summary:**
- **Risk Assessment**
  - Employers must identify tasks that involve manual handling likely to cause back injuries.
  - Evaluate the weight, frequency, and posture involved in lifting, carrying, pushing, or pulling.
- **Preventive Measures**
  - Implement mechanical aids (e.g., trolleys, hoists) to reduce manual lifting.
  - Redesign work processes to minimize awkward postures or repetitive strain.
- **Employee Training**
  - Provide training on safe lifting techniques and proper manual handling.
  - Encourage awareness of posture, team lifting, and risk mitigation.
- **Health Monitoring**
  - Monitor employees for signs of musculoskeletal strain.
  - Offer medical guidance or adjustments for workers at risk.
- **Regulatory Compliance**
  - Ensure workplace practices comply with legal limits and recommendations for load handling.
  - Maintain records of risk assessments and preventive measures.

Manual Handling Risk Factors

Manual handling tasks can be risky due to a combination of **load, individual, task, and environmental factors**.
Identifying these risk factors helps prevent injuries such as strains, sprains, and long-term musculoskeletal disorders.

- **Key Risk Factors:**

1 Load-Related Factors

- Heavy or awkwardly shaped loads that are difficult to grip
- Unstable, sharp, or slippery objects
- Loads that block vision, forcing twisting or stretching

2 Individual Factors

- Poor physical fitness or previous musculoskeletal injuries
- Lack of training in safe lifting techniques
- Fatigue or stress reducing muscle efficiency and focus

Manual Handling Risk Factors

3 Task Factors

- Repetitive lifting, carrying, pushing, or pulling
- Twisting, bending, or reaching while handling loads
- Handling loads over long distances or at awkward heights

4 Environmental Factors

- Slippery, uneven, or cluttered floors
- Poor lighting or restricted workspace
- Extreme temperatures affecting grip and comfort

5 Work Organization Factors

- Time pressure and insufficient rest breaks
- High frequency of manual handling tasks without rotation
- Lack of mechanical aids or team lifting

When it Comes Hazardous

Task

Too Stannous

Awkward Postures

Individual

Physical Capacity

Training/ Supervision

Load

Too Heavy

Too Large

Environment

Climate
(Temperature/Ventilation)

Available Space

The TILE Approach

- **TILE** is a framework used to analyse and optimize workplace ergonomics by breaking down the work system into four key components:
- **Task** – *Nature of Activity*
  - What the worker is actually doing
  - Includes physical, cognitive, and postural requirements
  - Helps identify which aspects of the job may cause strain or inefficiency
- **Individual** – *Worker Ability*
  - Focuses on the worker's physical and mental capabilities
  - Considers skill level, strength, flexibility, and experience
  - Ensures tasks match worker capacity
- **Load** – *Physical and Mental Demands*
  - Quantifies forces, repetitions, and postures required
  - Includes psychological stress and mental workload
- **Environment** – *Workplace Conditions*
  - Lighting, noise, temperature, space, and equipment
  - Impacts comfort, safety, and performance

Manual Handling Task Factor

Frequency of Lifting
The frequency of lifting refers to how often a worker performs lifting tasks during a shift. Repeated lifts increase fatigue and the risk of musculoskeletal injuries, particularly in the back, shoulders, and arms. High-frequency tasks require careful planning, such as rotating workers, introducing rest breaks, or using mechanical aids. Even moderate-weight loads can become hazardous if lifted repetitively without proper technique or recovery time. Understanding frequency helps in designing safer work schedules.

Distance Carried
Distance carried is the horizontal or vertical span over which a load is moved. Longer distances increase exertion and the likelihood of accidents, especially when carrying awkward or heavy objects. Horizontal distance demands more grip strength and balance, while vertical distance increases spinal loading. Minimizing carrying distance, using conveyors, trolleys, or placing materials closer to the work area can significantly reduce physical strain and improve overall task efficiency.

Required Posture
The posture required during a task affects the distribution of forces on the body. Bending, twisting, reaching overhead, or stooping places stress on the spine and joints, increasing injury risk. Proper ergonomic design encourages neutral postures, keeps loads close to the body, and avoids awkward positions. Training workers in safe lifting techniques, adjusting work heights, and using assistive devices all help maintain healthy posture, ensuring that manual handling tasks are performed safely and effectively.

Manual Handling Individual Factor

Fitness and Strength
A worker's physical fitness and strength greatly influence their ability to safely perform manual handling tasks. Stronger muscles, good cardiovascular health, and flexibility reduce fatigue and the likelihood of injury. Tasks involving lifting, carrying, or repetitive movements place significant demands on the body, so individuals with higher fitness levels can manage these loads more efficiently. Employers should consider fitness assessments and encourage physical conditioning to match job demands, improving both safety and productivity.

Age and Experience
Age and work experience affect a person's capacity to handle manual tasks safely. Younger workers may have greater physical strength but less experience, leading to improper techniques or risk-taking. Older workers might have reduced physical capacity but often possess valuable knowledge of safe handling methods. Experience can compensate for physical limitations by enabling better judgment, awareness of hazards, and proper body mechanics, emphasizing the importance of balancing age, capability, and expertise in task assignments.

Training Level
The level of training a worker has received directly impacts their ability to perform tasks safely and efficiently. Proper manual handling training teaches correct lifting techniques, posture maintenance, and use of equipment, reducing injury risk. Workers without adequate training are more likely to adopt unsafe methods, increasing strain and accidents. Continuous refresher courses, hands-on demonstrations, and supervision ensure that all staff maintain safe practices, adapt to changing tasks, and comply with workplace safety standards consistently.

Manual Handling Load Factor

Weight and Size
The weight and size of a load are critical factors in manual handling safety. Heavier objects increase the physical demand on muscles and joints, while large or bulky items can be difficult to manoeuvre and balance. Overestimating one's ability or underestimating the load can lead to strain or injury. Proper assessment, team lifting, or mechanical aids are essential for safely managing heavy or oversized items, ensuring the task is performed efficiently without overloading the worker.

Stability of Load
The stability of a load refers to how securely it holds together during movement. Unstable, shifting, or unevenly packed loads increase the risk of accidents, sudden strain, or dropping items. Workers handling unstable loads must use extra caution, maintain proper grip, and adjust posture to compensate for movement. Packaging, securing items with straps, or using containers designed for stability can significantly reduce hazards and improve control during lifting, carrying, or transporting tasks.

Ease of Gripping
The ease with which a load can be gripped affects safety and efficiency in manual handling. Objects that are smooth, slippery, or irregularly shaped increase the risk of dropping or awkward lifting postures. Secure, ergonomic handles or modifications, such as gloves with grip or added handholds, reduce the risk of strain and accidents. Ensuring a firm, comfortable grip allows workers to lift and carry loads closer to the body, maintaining balance and minimizing stress on muscles and joints.

Manual Handling Environmental Factors

Slippery Floors
Slippery floors significantly increase the risk of slips, trips, and falls during manual handling tasks. Wet, oily, or uneven surfaces make it difficult for workers to maintain balance while lifting or carrying loads, increasing the likelihood of accidents and injuries. Proper floor maintenance, anti-slip mats, and clear signage are essential preventive measures. Workers should also wear suitable footwear with good traction to reduce the impact of slippery conditions and ensure safer handling of materials.

Poor Lighting
Insufficient or uneven lighting affects visibility and spatial awareness, making manual handling tasks more hazardous. Poor lighting can lead to misjudging distances, obstacles, or load placement, increasing the risk of collisions, trips, or dropping objects. Ensuring adequate, well-distributed lighting in work areas improves accuracy, reduces fatigue, and enhances worker safety. Task-specific lighting, combined with routine checks, helps workers perform lifts and movements confidently, even in complex or high-risk environments.

Limited Space
Limited workspace constrains movement and forces workers into awkward postures, increasing strain during manual handling. Narrow aisles, crowded storage areas, or low ceilings make it difficult to manoeuvre loads safely, often requiring twisting, bending, or reaching. Planning layout, optimizing storage, and maintaining clear pathways can significantly reduce these risks. Providing workers with sufficient space to position their bodies correctly during lifting or carrying tasks minimizes musculoskeletal stress and promotes safer, more efficient task performance.

Safe Lifting Principles (1/3)

Safe lifting is essential to prevent musculoskeletal injuries, especially to the back, shoulders, and arms. It combines proper planning, correct posture, and use of aids. Key principles include:

1. Assess the Load

- Check the weight, size, and stability of the item before lifting.
- Determine if it is within your physical capacity or requires mechanical aids or team lifting.
- Identify obstacles or hazards along the route.
- **Example:** If a box seems too heavy, use a trolley or ask a colleague for assistance.

2. Plan the Lift

- Decide on the best path, remove obstructions, and ensure enough space.
- Visualize the lifting process, including where the load will be placed.
- Bend your knees and hips, not your back, to prepare for the lift.
- **Tip:** Avoid twisting while lifting—turn your whole body instead.

Manual Handling Environmental Factors

3. Use Correct Posture

- Keep your back straight and core muscles engaged.
- Hold the load close to your body to reduce strain.
- Feet should be shoulder-width apart for stability.
- Lift smoothly, avoiding jerky movements.
- **Remember:** Avoid bending from the waist or reaching overhead with heavy loads.

4. Lift Gradually and Avoid Twisting

- Apply your leg muscles to push upward, not your back.
- Keep your head up and eyes forward to maintain balance.
- Pivot with your feet when changing direction rather than twisting your torso.

Safe Lifting Principles (2/3)

5. Use Mechanical Aids When Needed

- Use trolleys, hoists, pallet jacks, or conveyor belts for heavy or awkward loads.
- Reduces fatigue and minimizes risk of injury.

6. Team Lifting

- For heavy or bulky loads, coordinate with another person.
- Communicate clearly and lift together in a synchronized manner.

7. Rest and Rotate Tasks

- Avoid repetitive lifting without breaks.
- Rotate workers between tasks to reduce cumulative strain.

Safe Lifting Principles (3/3)

5. Use Mechanical Aids When Needed

- Use trolleys, hoists, pallet jacks, or conveyor belts for heavy or awkward loads.
- Reduces fatigue and minimizes risk of injury.

6. Team Lifting

- For heavy or bulky loads, coordinate with another person.
- Communicate clearly and lift together in a synchronized manner.

7. Rest and Rotate Tasks

- Avoid repetitive lifting without breaks.
- Rotate workers between tasks to reduce cumulative strain.

S.M.A.R.T. Lifting

Size up that load

- Assess the load (shape, size and weight)
- Determine where the load needs to be moved and placed

Move the load as close to the body as possible

- Carry the load as close to the body as possible
- Secure your grip

Always bend your knees

- Keep feet apart, in a comfortable position (usually in line with the hips)
- Minimise lower back bending
- Bend knees (squat or semi-squat position

Raise the load with your legs

- Lift the load with your legs, not your back, in a smooth motion (avoid twisting or jerky movements)
- Maintain normal curvature of the spine

Turn your feet in the direction you want to move

- Change direction by pointing your feet and not twisting your back
- To set the load down, squat down, keep your head up and allow your legs to carry the weight

Team Lifting

Consider:

- Are there enough people?
- Are all persons of the same size with similar strength?
- Are there any known pre-existing injuries?
- Who is coordinating the lift?
- Is there a plan, and has been communicated to those involved?

Pushing & Pulling

Consider:

- When pushing, lean forward
- Stand close to the trolley
- When pulling, lean backwards (**pushing is preferable** as it involves less work by the lower back muscles and allows for maximum use of body weight). It allows employees to adopt a forward-facing posture, providing clearer vision in the direction of travel
- Ensuring you have a good grip
- Avoiding twisting and turning
- Checking that the handle height is between shoulder and waist height

Safe Storage

Consider:

- Storing frequently and heavy items between waist and shoulder height
- Storing smaller, lightweight or infrequently used items in lower or higher areas
- Knowing shelving weight limits
- Having access to a step-ladder
- Testing the weight of the object before picking it up
- Conducting quarterly workplace inspections

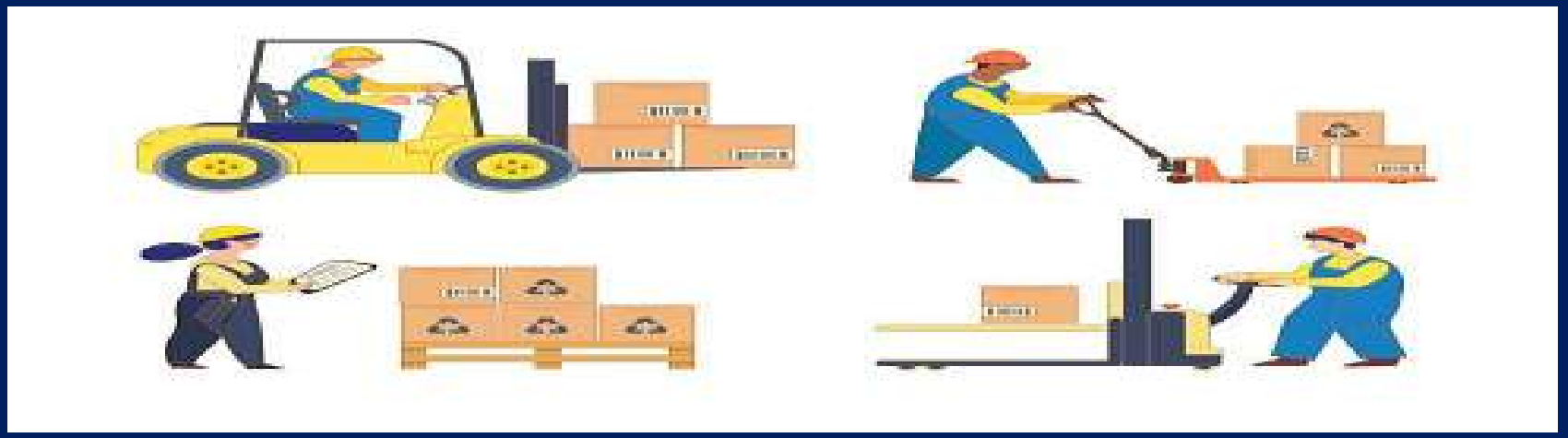
Mechanical Aids

Mechanical aids are devices or equipment designed to reduce the physical strain and injury risk associated with manual handling tasks. They assist workers in lifting, carrying, pushing, pulling, or moving heavy or awkward loads, minimizing the stress on the back, arms, and legs. Using mechanical aids improves efficiency, allows safer handling of large or repetitive loads, and ensures compliance with workplace safety standards. Choosing the right aid depends on the load, environment, and task requirements.

Examples of Mechanical Aids:

- **Trolleys and Carts** – For moving boxes, tools, or equipment over flat surfaces.
- **Hoists and Cranes** – For lifting heavy or bulky items vertically.
- **Pallet Jacks** – For transporting stacked pallets in warehouses.
- **Conveyor Belts** – For moving materials efficiently along production lines.
- **Lift Tables** – For raising or lowering loads to a safe working height.
- **Hand Trucks/Dollies** – For transporting heavy objects with wheels, reducing carrying effort.
- **Powered Exoskeletons** – Wearable devices that assist with lifting and posture support (in advanced workplaces).

Mechanical Aids



Task Redesign

Reduce Load Weight
One key strategy in task redesign is reducing the weight of individual loads. Lighter loads are easier to handle, decreasing the risk of musculoskeletal injuries such as back or shoulder strain. This can be achieved by splitting heavy items into smaller, manageable units or using smaller containers for bulk materials. Reducing load weight also allows workers to maintain better posture, improves efficiency, and makes repetitive lifting tasks safer over long periods.

Store Items at Waist Height
Adjusting storage to waist height minimizes the need for bending, stooping, or reaching overhead, which are common causes of injury during manual handling. Placing frequently used items between mid-thigh and shoulder level allows workers to lift and lower loads safely, keeping them close to the body. This simple adjustment reduces spinal loading, improves posture, and increases efficiency. Task redesign should consider accessibility and workflow to optimize both safety and productivity in the workplace.

Minimise Repetition
Repetitive lifting or carrying can cause cumulative strain, leading to fatigue and injuries over time. Task redesign should aim to minimize repetition by **rotating tasks, using mechanical aids, or reorganizing workflows**. For example, alternating between lifting and other non-repetitive activities reduces stress on the same muscle groups. Automating repetitive tasks with conveyors or hoists also helps. By addressing repetition, workers remain healthier, fatigue is reduced, and overall efficiency and safety in manual handling operations improve significantly.

Workplace Scenarios

1. Health Care

In health care, nurses and caregivers often lift or reposition patients, which can lead to back and shoulder injuries. Corrective measures include using **patient hoists, sliding sheets, and adjustable beds** to reduce strain. Staff should receive proper **manual handling training**, practice team lifting for heavy patients, and follow protocols for posture and body mechanics. Regular risk assessments of patient handling tasks help identify high-risk situations and ensure appropriate aids and staffing levels are in place.

2. Construction

Construction workers frequently lift heavy materials such as bricks, timber, or cement bags, often in awkward positions. Corrective measures involve **using wheelbarrows, hoists, cranes, and trolleys**, along with planning lifts to avoid carrying loads over long distances. Workers should wear **proper footwear and gloves**, rotate tasks to prevent repetitive strain, and maintain **good lifting posture**. Site layouts should minimize obstacles and allow safe access, while teamwork is essential for moving particularly heavy or bulky materials.

Workplace Scenarios

3. Manufacturing

In manufacturing, employees handle machinery components, raw materials, or finished products repetitively. Corrective measures include **conveyor belts, lift tables, and adjustable workstations** to reduce bending, twisting, and lifting strain. Training in **safe lifting techniques** and task rotation minimizes fatigue and repetitive strain injuries. Clear pathways, adequate lighting, and ergonomically designed workstations ensure workers can handle components safely, improving efficiency while reducing injury risk.

4. Warehouse

Warehouse workers often move heavy boxes or pallets over long distances, sometimes in confined spaces. Corrective measures include **pallet jacks, forklifts, trolleys, and stacking aids** to reduce manual lifting. Staff should follow **team lifting procedures**, maintain safe stacking practices, and ensure aisles are free from obstacles. Training in correct posture and frequent breaks for repetitive tasks help prevent musculoskeletal injuries, while workplace layouts should minimize the need for awkward lifts or carrying loads above shoulder height.

Workplace Scenarios

5. Hospitality

Hospitality staff frequently lift catering trays, laundry bags, and supplies, often in busy or cramped spaces. Corrective measures include using trolleys, carts, and hoists, and keeping loads small and manageable. Staff should receive training in ergonomic lifting techniques, maintain clear and dry walkways to avoid slips, and organize workstations to minimize reaching or twisting. Rotating tasks and planning lifts ahead reduces fatigue, ensuring both worker safety and smooth service operations in hotels, restaurants, or event venues.

21 ACADEMY

Undergraduate Diploma in Occupational Health and Safety