IConstruction Hazard and Risk Control

Lecture Title: Construction sites issues and controls

Lecturer: Josette Cutajar

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Undergraduate Diploma in Occupational Health and Safety

This lecture covers the following learning objectives:

- Understanding the work processes and practices that may contribute to musculoskeletal disorders, work-related upper limb disorders and the appropriate control measures
- The hazards and control measures which should be considered when assessing risks from manual handling activities
- How to reduce the risk in the use of lifting and moving equipment with specific reference to manual and mechanically operated load moving equipment

Musculoskeletal disorders and work-related upper limb disorders

Ergonomics – interaction between workers, their work and their environment. It involves knowledge of their physical and mental capabilities in addition to their understanding of the job.

Musculoskeletal disorders (MSDs) affect muscles, joints, tendons, ligaments and nerves. MSDs usually affect the back, neck, shoulders and upper limbs (termed work-related upper limb disorders – WRULDs).keletal disorders and work-related upper limb disorders

Ill-health effects due to poor ergonomics

Work-related upper limb disorders (WRULDs):

Tenosynovitis

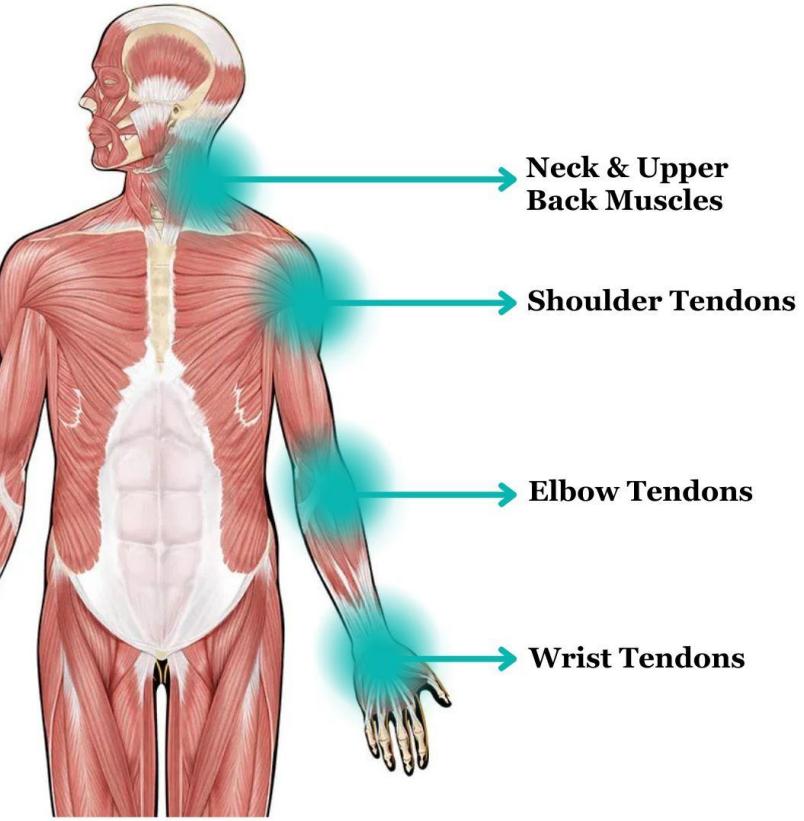
Repetitive strain injury (RSI)

Carpal tunnel syndrome

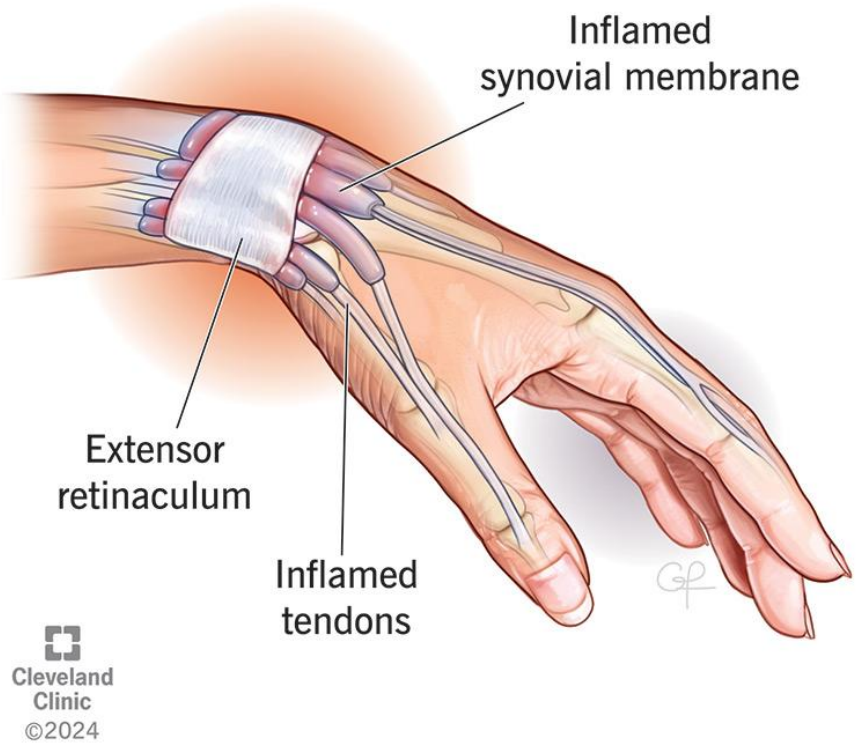
Frozen shoulder.

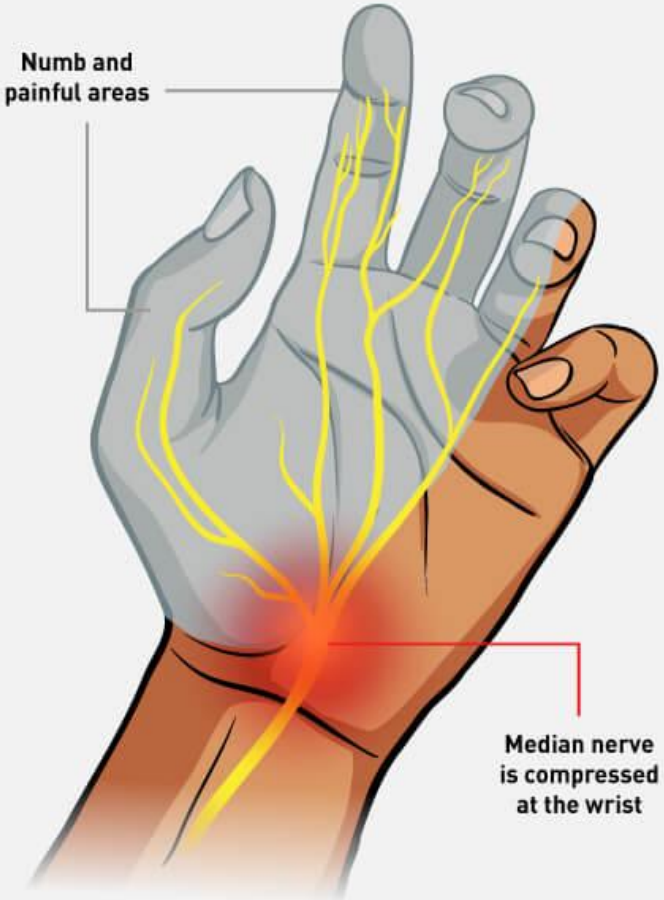
Often caused by repetitive operations – keyboard operations, brick laying, kerb laying, moving and fixing of plasterboard, erecting and dismantling of scaffolds and digging.

Common Sites of RSI



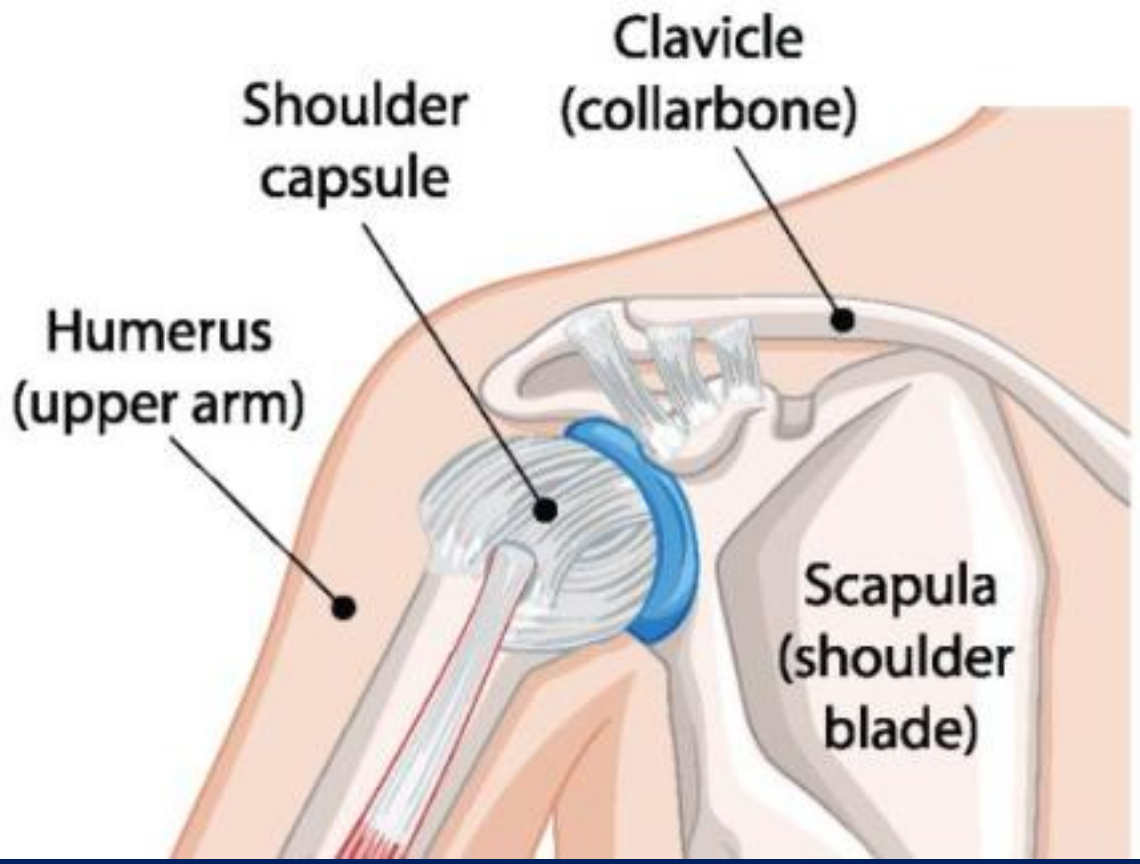
Tenosynovitis

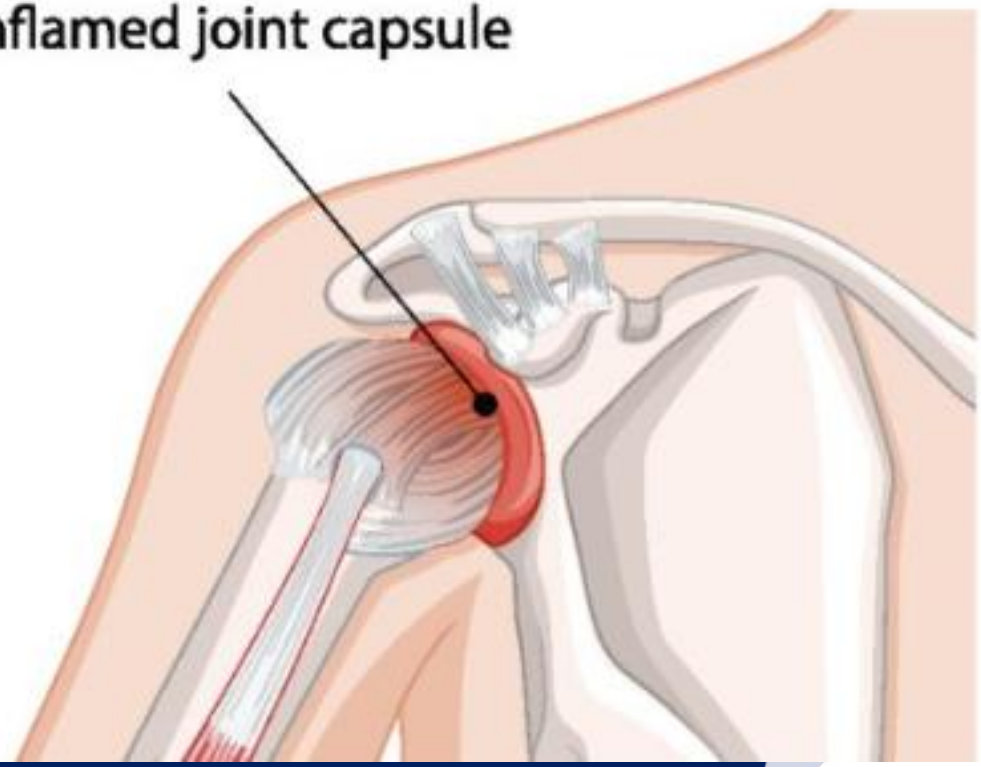




FROZEN SHOULDER (ADHESIVE CAPSULITIS)

Characterized by stiffness and pain in the shoulder joint.





Display Screen Equipment (DSE)

Requirements of the Health and Safety (Display Screen Equipment) Regulations:

1. Suitable and sufficient risk assessment
2. Workstation compliance with minimum specifications given in the Regulations
3. Adequate breaks in work programme
4. Free sight test if required
5. Information and training.

Ill-health hazards from DSE work:

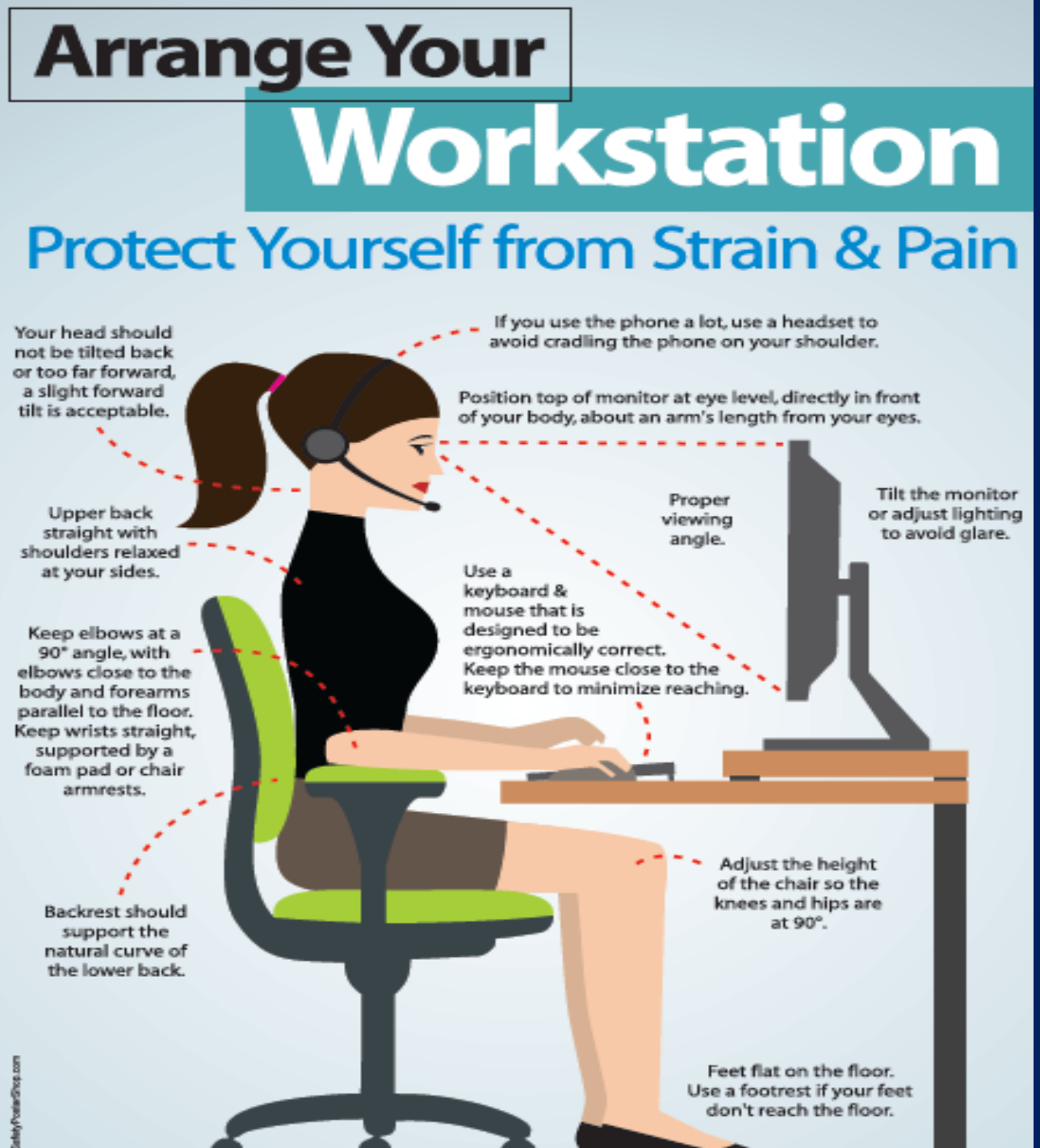
Musculoskeletal problems
Visual problems
Psychological problems

Display Screen Equipment (DSE)

The DSE risk assessment should consider the following factors:

1. the height and adjustability of the monitor
2. the adjustability of the keyboard, the suitability of the mouse and the provision of wrist support
3. the stability and adjustability of the DSE user's chair
4. the provision of ample foot room and suitable foot support
5. the effect of any lighting and window glare at the workstation
6. the storage of materials around the workstation
7. the safety of trailing cables, plugs and sockets
8. environmental issues – noise, heating, humidity and draughts.

Display Screen Equipment (DSE)



Manual handling hazards, risks and control measures

Manual handling can involve any load movement by human effort only (lifting, pushing, pulling, carrying or supporting).

Requirements of the Manual Handling Operations Regulations:

1. to avoid manual handling, if possible;
2. to mechanise or automate the lifting process, if possible;
3. if unavoidable, undertake a risk assessment;
4. instigate risk controls and review; and
5. give employees information on loads

Manual handling hazards are:

1. lifting a load which is too heavy and/or cumbersome
2. poor posture and/or poor lifting technique
3. dropping the load on the foot
4. lifting sharp-edged or hot loads

Injuries caused by manual handling include:

1. muscular sprains or strains
2. back injuries
3. trapped nerve
4. hernias
5. cuts, bruises and abrasions
6. fractures
7. work-related upper limb disorders (WRULDs)
8. rheumatism

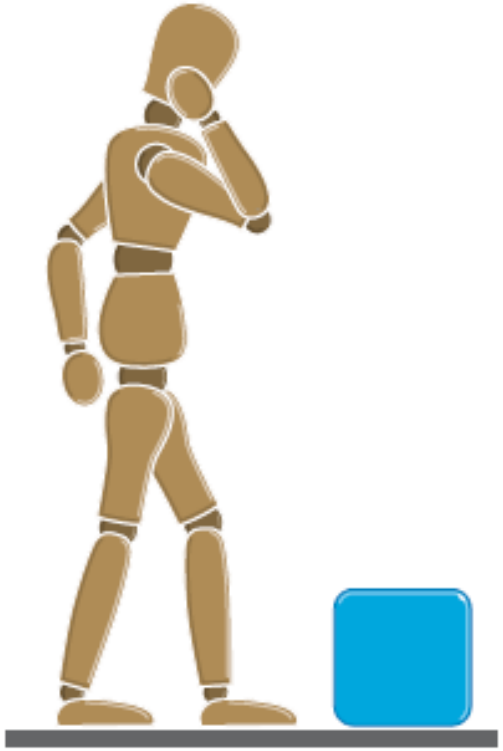
Manual handling training includes:

1. the types of injury;
2. the manual handling assessment findings;
3. potentially hazardous manual handling operations;
4. the correct use of manually operated load moving equipment, such as sack and pallet trucks;
5. the correct use of mechanical aids;
6. the correct use of personal protective equipment;
7. good housekeeping issues;
8. the factors that can affect an individual

Proper Lifting Technique:

- Think about:
- how best to carry out the task and minimise the risks
- who needs to be informed about and/or involved in the task
- what equipment or aids are needed
- where is the load going and how far
- how quickly and often will the task need to be carried out

Proper Lifting Technique



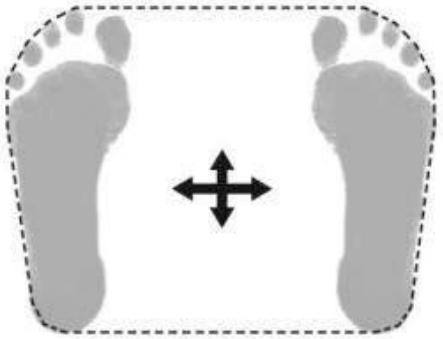
Think before lifting/handling. Plan the lift. Can handling aids be used? Where is the load going to be placed? Will help be needed with the load? Remove obstructions such as discarded wrapping materials. For a long lift, consider resting the load midway on a table or bench to change grip.

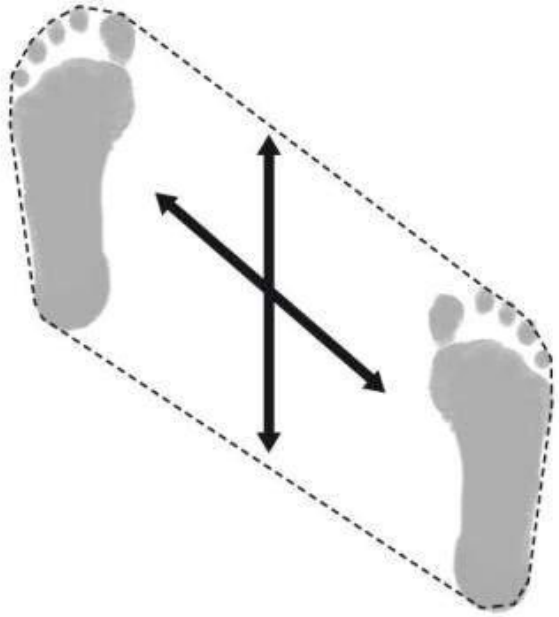
Adopt a stable position. The feet should be apart with one leg slightly forward to maintain balance (alongside the load, if it is on the ground). The worker should be prepared to move their feet during the lift to maintain their stability. Avoid tight clothing or unsuitable footwear, which may make this difficult.

Dynamic stable base

- stable but ready to move
- weight within feet
- less effort required
- reduced likelihood of sudden movements

Feet shoulder width apart





Arrows indicate level of movement

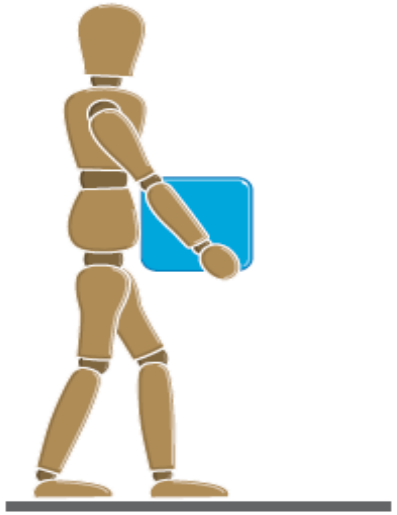
Feet staggered

Proper Lifting Technique

Get a good hold. Where possible, the load should be hugged as close as possible to the body. This may be better than gripping it tightly with hands only.

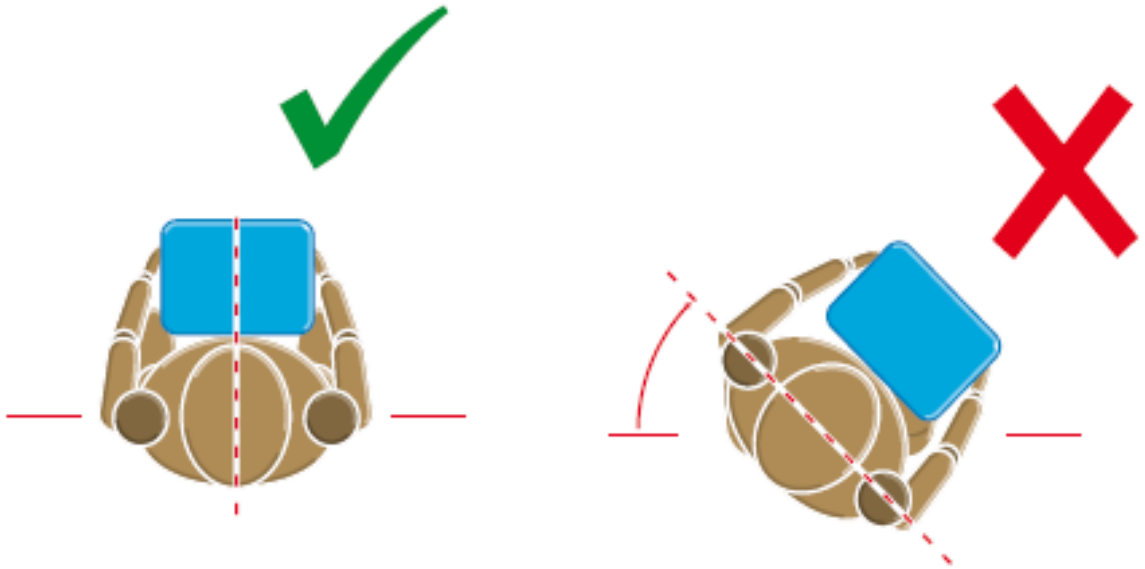
Start in a good posture. At the start of the lift, slight bending of the back, hips and knees is preferable to fully flexing the back (stooping) or fully flexing the hips and knees (squatting).

Don't flex the back any further while lifting. This can happen if the legs begin to straighten before starting to raise the load.



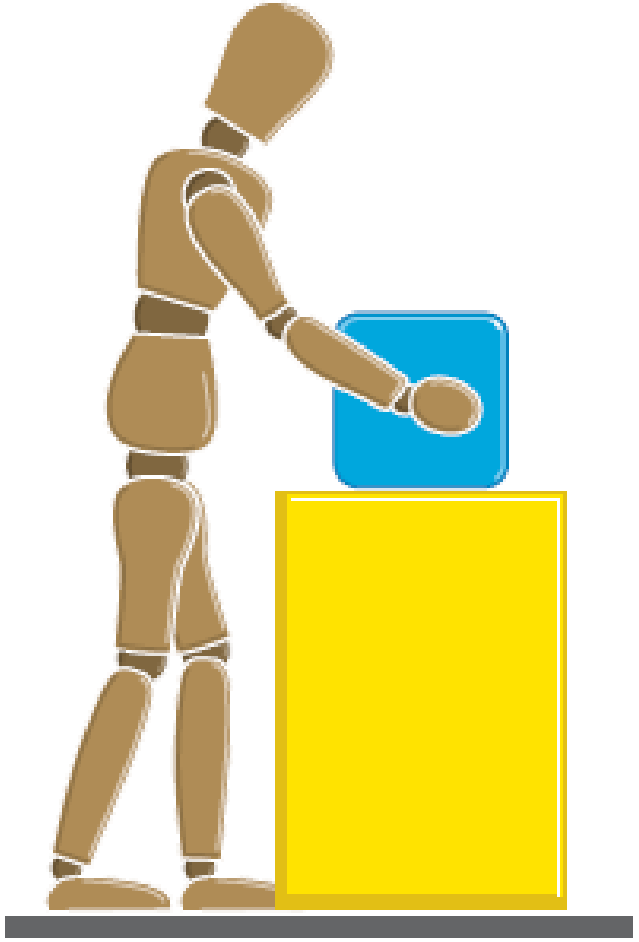
Keep the load close to the waist. Keep the load close to the body for as long as possible while lifting. Keep the heaviest side of the load next to the body. If a close approach to the load is not possible, try to slide it towards the body before attempting to lift it.

Proper Lifting Technique



Avoid twisting the back or leaning sideways, especially while the back is bent. Shoulders should be kept level and facing in the same direction as the hips. Turning by moving the feet is better than twisting and lifting at the same time.

Proper Lifting Technique



Put down, then adjust. If precise positioning of the load is necessary, put it down first, then slide it into the desired position.

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Lifting and moving equipment

Types of manually operated load handling equipment

- simple tools
- wheelbarrows
- trucks and trolleys
- roller tracks and chutes
- pallet trucks
- conveyors
- various types of hoists that can be used to lift people as well as other loads

Hazards associated with manually operated load handling equipment

- incorrect use, such as overloading or attempting to carry unstable loads
- manual handling hazards due to pushing or pulling a truck or trolley
- lack of maintenance
- injuries to pedestrians using the same walkway.

Precautions with the use of manually operated load handling equipment

- when handling aids are being selected, the subsequent user should be consulted whenever possible;
- moving and handling tasks are often made easier by good design;
- a safe system of work should be in place;
- all operators of mechanical handling equipment must be properly trained in its use and supervised while they are using it;
- sufficient room available to manoeuvre the equipment easily;
- adequate visibility and lighting available;
- the floor is in a stable condition;

Precautions with the use of manually operated load handling equipment

- regular safety checks to identify any faults with the equipment;
- a regular maintenance schedule for the equipment;
- the proposed use will be within the safe working load of the equipment;
- the lifting equipment is CE-marked; and
- advice is sought from the suppliers/hirers on its suitability for the proposed task and any maintenance requirements

Safety in the use of mechanically operated lifting equipment

Positioning and installation of lifting equipment

Risks during lifting operations should be reduced by:

- avoiding the equipment or its load striking a person;
- avoiding a load drifting, falling freely or being released unintentionally;
- avoiding the need to lift loads over people;
- stopping safely in the event of a power failure;
- where possible, enclosing the path of the load with suitable and substantial interlocked gates

The organisation of lifting operations

Every lifting operation, which is lifting or lowering a load, shall be:

- properly planned by a competent person;
- appropriately supervised; and
- performed in a safe manner

Summary of the requirements for lifting operations

There are four general requirements for all lifting operations:

- strong, stable and suitable lifting equipment;
- the equipment should be positioned and installed correctly;
- the equipment should be visibly marked with the safe working load; and
- lifting operations must be planned, supervised and performed in a safe manner by competent people

Lift plans

A lift plan identifies the ways in which the risks involved in a lifting operation can be eliminated or controlled and involves:

1. initial planning to ensure that the lifting equipment provided is suitable for the task; and
2. the planning of individual lifting operations so that they can be performed safely with the lifting equipment provided.

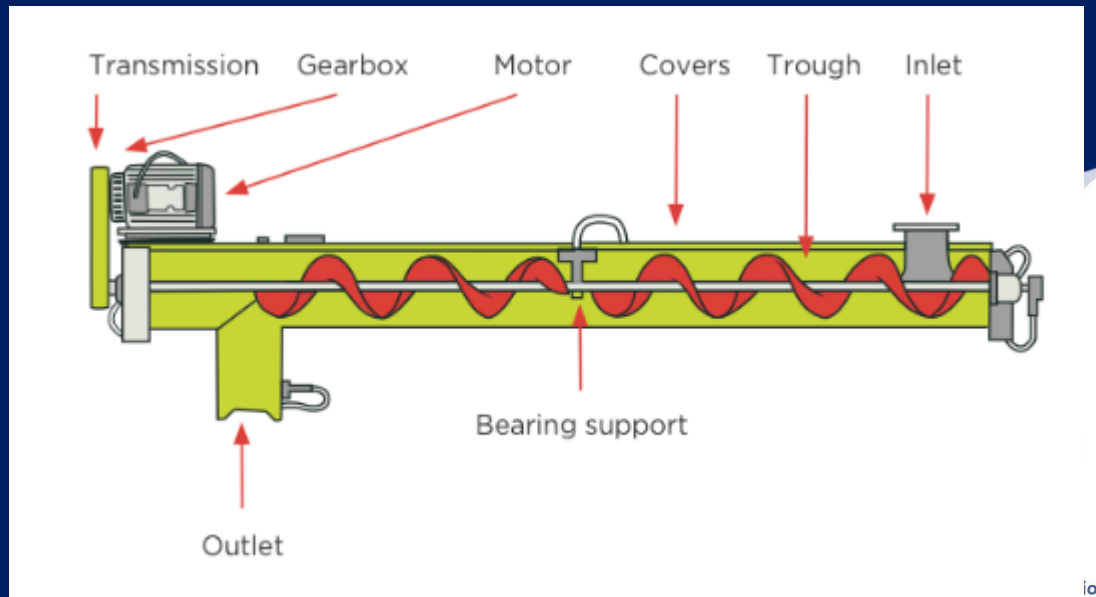
The details of the plan depend on the type of lifting equipment

Types of mechanical handling and lifting equipment

Conveyor

There are three types of conveyor – belt, roller and screw. Typical hazards include:

- in-running nips
- Entanglement
- loads falling from conveyor
- impact against overhead systems
- contact hazards – sharp edges
- manual handling hazards
- noise and vibration hazards.



Elevator

An elevator transports goods between floors. The most common hazard is caused by loads falling from the elevator.

Also there are manual handling hazards at either end of the elevator

Fork-lift trucks

Fork-lift trucks-Hazards

overturning
overloading
collisions with pedestrians or other vehicles or structures
the silent operation of electrically powered fork-lift trucks makes pedestrians unaware of their presence
uneven road surface
overhead obstructions
loss of load
failure of the hydraulic system
inadequate maintenance
lack of driver training
use as a work platform and/or carrying passengers
speeding
poor vision around load
dangerous stacking technique, particularly on warehouse racking
fire – when battery charging or refuelling

Fork-lift trucks-Hazards

- Noise
- exhaust fumes
- vibrations
- manual handling
- ergonomic – musculoskeletal injuries due to soft tyres, expansion joints

Driver daily checks

- tyres and tyre pressures
- brakes
- reversing horn and light
- mirrors
- secure and properly adjusted seat
- correct fluid levels
- correct working of all lifting and tilting systems

Cranes-Principles of safe operation

- brief inspection prior to each use (including lifting tackle);
- loads not left suspended when crane not in use;
- prior to lift, ensure that nobody can be struck by load or crane;
- the load must not exceed the safe working load (SWL);
- never carry loads over people;
- good visibility and communications;
- any banksmen or signallers used during the lifting operation must be trained and competent;
- only lift loads vertically – do not drag load; travel with load as close to the ground as possible; and
- switch off power to crane when unattended

Mobile jib cranes

- plan each lift (maximum load and radius of operation);
- identify overhead obstructions and hazards;
- assess load-bearing capacity of ground; and
- if fitted, outriggers should be used.

Tower cranes

Typical causes of serious incidents with tower cranes include:

- mechanical failure of the brake or lifting ram;
- overturn of the crane;
- jib collapse;
- a load or dropped load striking a worker;
- sling failure

Reasons for crane failure:

- overloading
- poor slinging of load
- overturning
- collision with another structure or overhead power lines
- foundation failure
- structural failure of the crane
- operator error
- lack of maintenance and/or regular inspections.

During lifting operations, ensure that:

1. driver has good visibility;
2. there are no pedestrians below load and barriers are in place; and
3. audible warning given prior to lifting operation.

https://youtu.be/ReMX0JUOMB8?t=191

Lifts, hoists and items of lifting tackle

A lift or hoist incorporates a platform or cage. Its movement is restricted by guides and it may carry passengers and/or goods alone.

They are required to:

- be of sound mechanical construction;
- have interlocking doors or gates that must be completely closed before the lift or hoist moves;
- be fitted, if carrying passengers, with an automatic braking system to prevent overrunning and a safety device to support the lift in the event of suspension rope failure;
- be rigorously maintained by competent persons; and
- protect others during maintenance operations from falling down the lift shaft and other hazards

Lifting Tackle

Other items of lifting tackle include chain slings and hooks, wire and fibre rope slings, eyebolts and shackles.

Important points include:

- loads must be properly secured and balanced in slings;
- lifting hooks should be checked for wear and hook distortion;
- shackles and eyebolts must be correctly tightened;
- slings must be checked for any damage before use and only used by competent people;
- training and instruction should be given in the use of lifting tackle;
- regular inspections of tackle should be made in addition to the mandatory thorough examinations; and
- lifting items should be carefully stored between uses

Passenger Lift

Passenger-carrying lifts must be fitted with an automatic braking system to prevent overrunning, at least two suspension ropes, each capable alone of supporting the maximum working load, and a safety device which could support the lift in the event of suspension rope failure. Maintenance procedures must be rigorous, recorded and only undertaken by competent persons. It is very important that a safe system of work is employed during maintenance operations to protect others, such as members of the public, from falling down the lift shaft and other hazards

Passenger Lift

The following additional issues are relevant to the safe operation of passenger lifts:

- An emergency mushroom stop button should be fitted in the lift.
- A direct telephone line is required if the internal alarm sounder/siren cannot be heard by rescue staff in the building.
- A risk assessment for possible injuries to the lift passengers should be undertaken on the design, sensitivity and performance of the door edges. The lift inspector should have the relevant standard to help with this.
- A lift stop switch should be available in the pit as well as the motor room at the top of the lift.
- The lift beam should be inspected by the lift inspector – the safe working load should be stated on it to prevent overload

Passenger Lift

- If there are any moving or revolving mechanisms accessible by lift technicians performing their maintenance tasks, then they should be protected from inadvertent contact by suitable guards.
- It is advisable to locate a fire extinguisher inside the access door of the motor room although this is not a statutory requirement.
- Emergency door release devices must not be routinely operated during non-emergency situations. The emergency keys are intended to allow emergency access to the lifting platform in the event of people becoming trapped and should be under strict control.
- Emergency unlocking should be undertaken only in exceptional circumstances and by suitably trained and authorised people.
- Safe working procedures and arrangements should be in place setting out what to do in the event of an emergency or failure. For example, how to deal with trapped people and the arrangements for repairing faults.
- All lifts and lifting platforms must be inspected, serviced and maintained. Where the lift is used for work purposes, it must be thoroughly examined by a competent person.

21 ACADEMY

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