

# Manual Handling

## IN THE MANUFACTURING INDUSTRY



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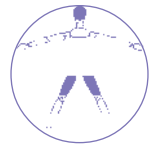


# Introduction

"Manufacturing" covers a wide range of industries including: textiles, clothing, footwear, motor vehicle assembly, food processing, pulp and paper, wood products and metal products.

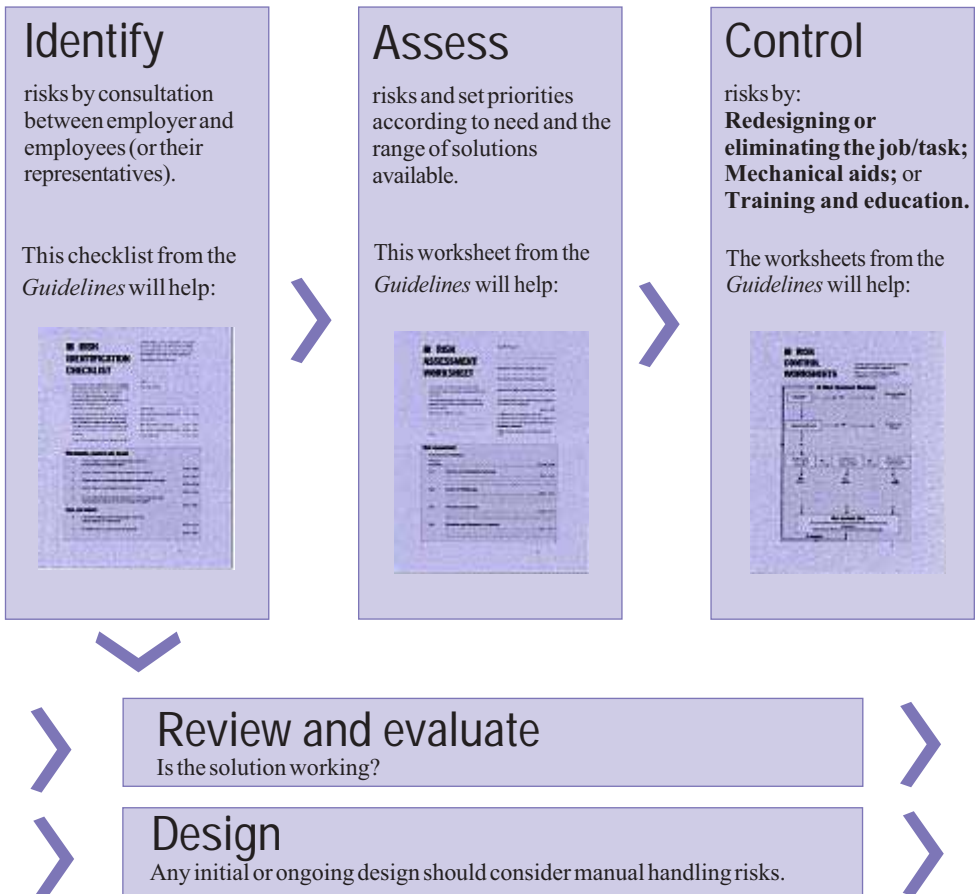
The most common manual handling injuries that occur in manufacturing industries are: sprains and strains, back injuries, foot injuries and abdominal hernias. Back pain is a common experience. It can be caused or aggravated by manual handling activities at work, and body postures that are adopted during work.

This booklet aims to help those people with little or no occupational health expertise to identify manual handling problems and prevent injuries. Using the approach set out in the detailed publication, *Manual Handling: Guidelines for the Workplace*, it gives practical advice and shows through examples how manual handling risks can be first be identified, then assessed and controlled in manufacturing industries.



# Assessing manual handling tasks

This booklet follows the approach for identifying, assessing and controlling manual handling risks that is set out in the publication *Manual Handling: Guidelines for the Workplace*. The approach is summarised by the diagram below, but it should be remembered that both employers and employees need to think about manual handling risks for practical solutions to be found.





# Risk identification

Make yourself aware of potential manual handling problems by asking the following questions.

1. Is the work strenuous?
2. Does anyone have to lift, carry, push or pull heavy or awkward loads?
3. Are mechanical aids, e.g. lifting equipment, readily available and being used?
4. Can the system of work (job design) be improved, e.g. workload spread evenly throughout the shift; heavy, tiring tasks alternated with light tasks?

5. Is lifting done at waist level, or is it high or low?
6. Are the heaviest and/or most frequently used items stored at waist height?
7. Can the work layout be improved e.g. more storage space to relieve cramped conditions?

8. Is all the equipment maintained regularly and in good working order?

9. What injuries or problems have already occurred in this area, that may be related to manual handling?
10. Is the workplace environment safe? e.g. are floor surfaces even and non-slip, are pathways clear?

11. What sort of training and education programmes are provided?



# Principles of preventing manual handling injuries

**1. Reduce the amount of manual handling.**

**2. Reduce the amount of bending, forward reaching, and twisting in all tasks.**

**3. Keep all equipment in good working order.**

**4. Keep the work environment safe.**

**5. Ensure that suitable training and education in manual handling is provided for all staff.**

These five basic principles will:

- Help you identify which manual handling tasks pose a risk to health and safety (risk identification); and
- Make you aware of some of the possible solutions to common manual handling problems (risk control). Some examples of these principles are illustrated in the following pages.

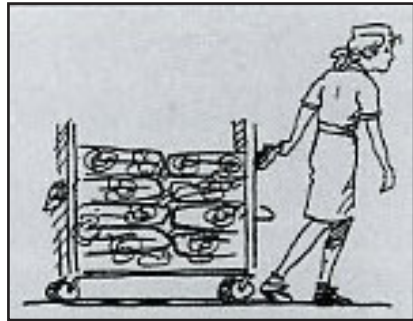


# Reduce the amount of manual handling

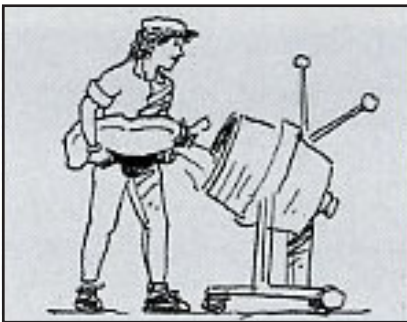
Manual handling is more than just lifting. Manual handling includes:



pushing



pulling

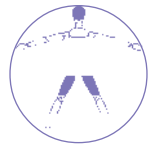


holding

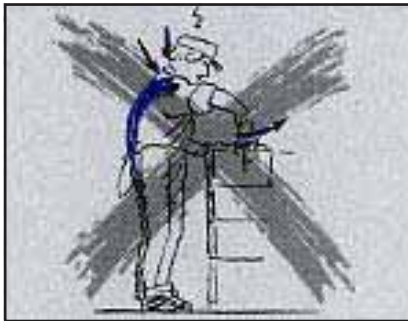


lifting

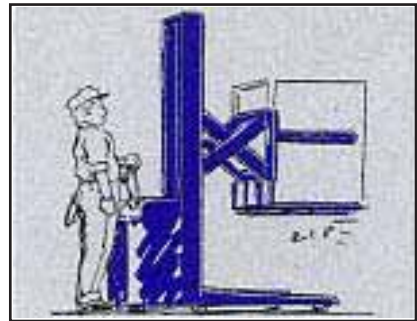
# Example: Unloading cartons



By increasing the size and weight of the load and mechanising, manual handling can be reduced and productivity increased.



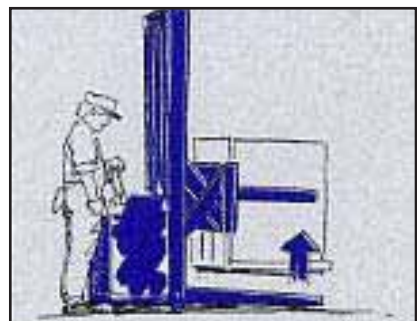
Opening 24 cartons of a commodity with a knife.



Using a forklift and tilting machine to lift and open a 1 tonne (1000 kg) container eliminates the repetitive manual handling and the risk of knife injury.



Lifting 24 x 20 kg cartons from a pallet and carrying them to the storage bay.



Lifting and moving the 1 tonne container with a hand-operated forklift, makes the job a lot less strenuous and reduces the time spent on unloading pallets.

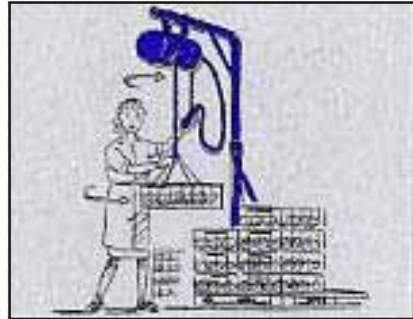




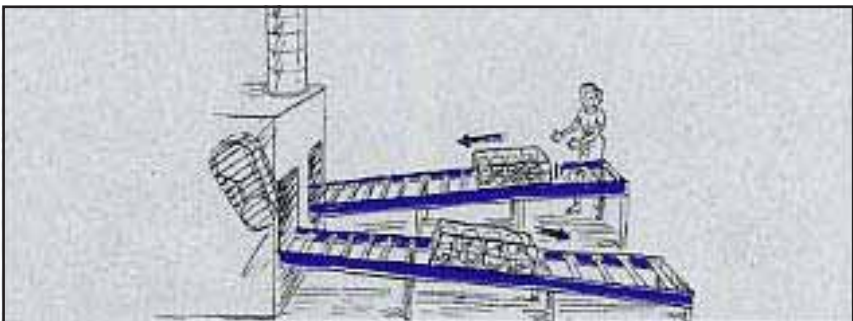
## Example: Degreasing metal components



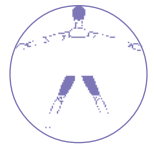
Lifting 30 kg baskets of metal components and carrying them to and from a degreasing machine.



Using a hoist to lift the baskets on to the roller conveyor, eliminates the heavy lifting.



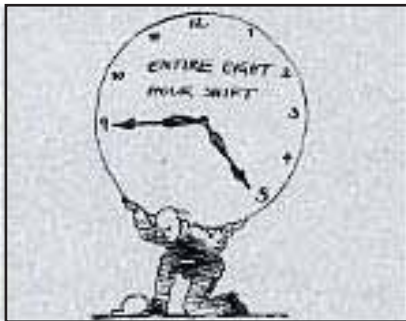
The conveyor is on an angle, so that the baskets can be slid easily over the rollers to and from the degreasing machine.



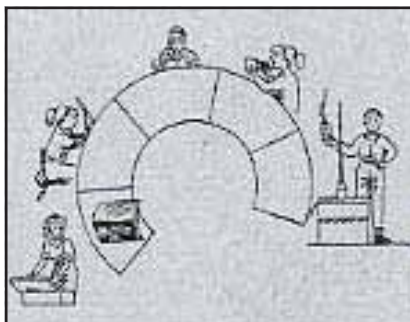
# Job rotation

Job rotation can be used to reduce the amount of manual handling that each employee does throughout the work shift. Job rotation can help prevent sprains and strains by providing employees with a change of activity.

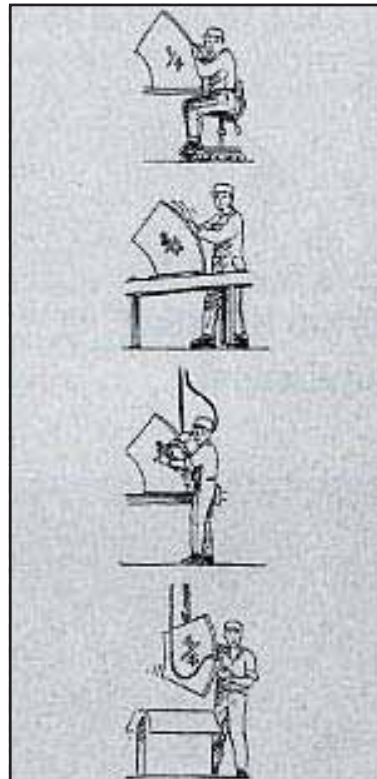
The ideal combination of jobs includes a variety of sitting, standing and walking activities.



Each employee does a single repetitive job over the whole work shift, e.g. an assembly task.



Each employee has a variety of jobs throughout the work shift, e.g. assembly, packing and machining tasks.



Each job is designed so that it includes a variety of activities, e.g. 1st class machinist • setting up machine • loading machine • checking machine • inspecting parts • loading parts to be taken away.



# Mechanical aids

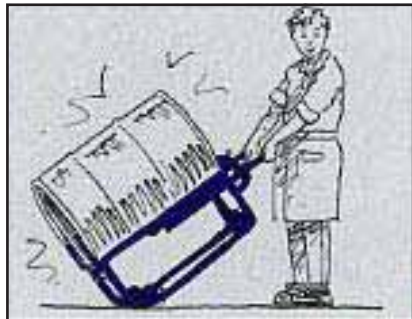
Mechanical aids can make the job easier, decrease the risk of injury and improve employee morale. They range from simple inexpensive aids such as handles, slings, levers and hooks to more expensive aids such as lifters, rollers, magnets, conveyors, platforms, hoists and cranes.

It is important that, where possible, the people doing the job are consulted so that the most appropriate and cost-effective mechanical aids are purchased. When new manual handling aids are introduced, it is essential that employees are trained to use them safely.

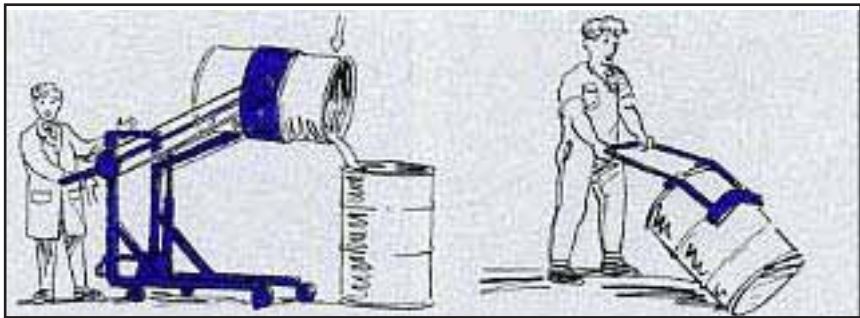
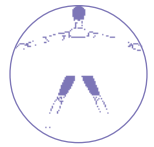
## Drum handling equipment



Manual handling of a 200 litre drum.

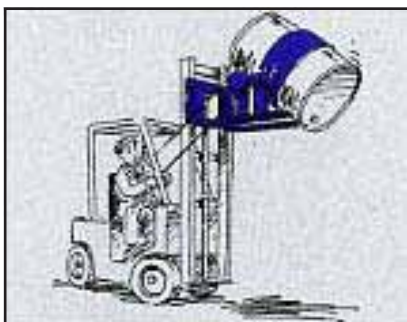


Moving the drum with a tilting drum stand reduces the effort required.

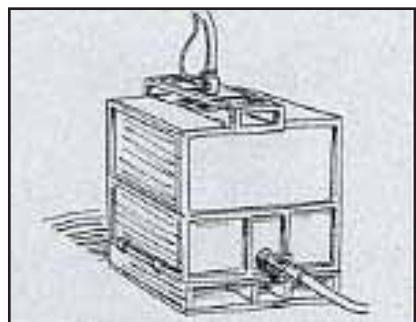


A drum lifter makes moving and emptying drums a lot easier and safer.

A drum tilting lever reduces the effort required in up-ending filled drums.



Using a forklift to move a drum eliminates the manual handling required.



For bulk handling of liquids, a container system which is transported by forklift eliminates the manual handling of drums.



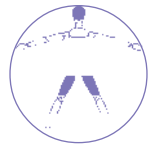
# Example: Unloading bags of granules

## Platforms

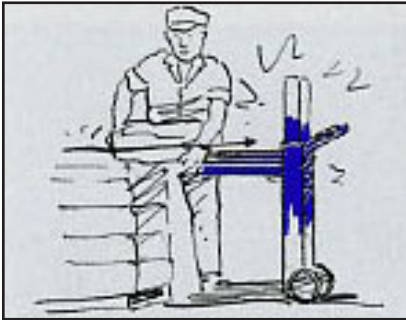


Holding the 30 kg bag of granules whilst emptying the contents slowly into a cooker.

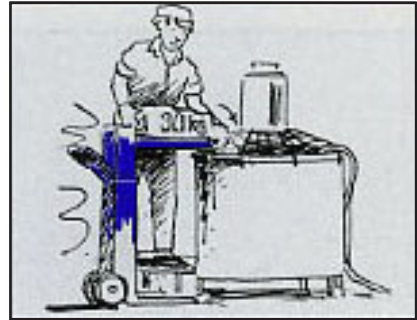
The platform is then raised. The employee stands on the steps and guides the granules but doesn't have to hold the bag.



## Lifters



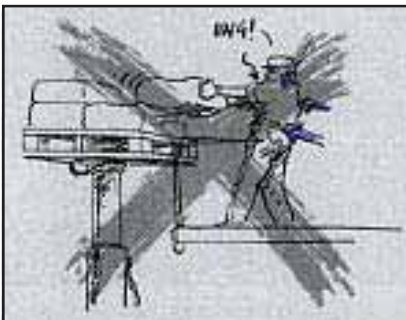
A hydraulic or power-operated lifter can be used to reduce the effort of moving. By adjusting the height of the lifter, the bags can be slid across to the lifter, rather than lifted.



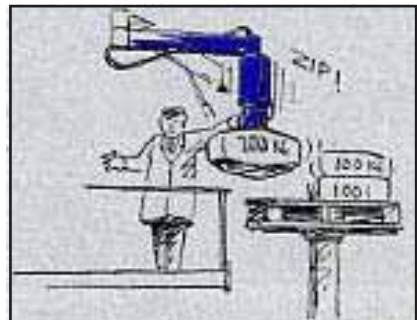
The lifter can act as a platform for holding the bags whilst the contents are being emptied.

## Vacuum lifters

Vacuum lifters are commonly used for picking up awkward, heavy loads, and large flat sheets, e.g. metal, glass, chipboard.



Unloading 40 kg bags from a pallet.



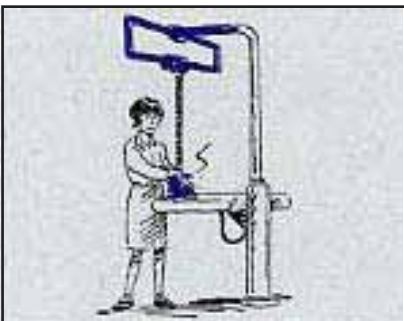
An electrically-operated vacuum lifter eliminates the heavy lifting. The mechanical arm is guided by the employee.



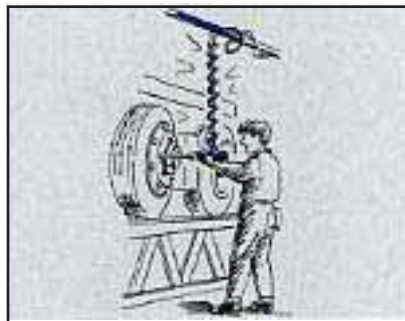
## Counterbalanced equipment



Equipment that is heavy, or used continuously, can be counterbalanced to reduce the manual handling effort required, e.g. hose of the vacuum lifter, tools used on an assembly line.

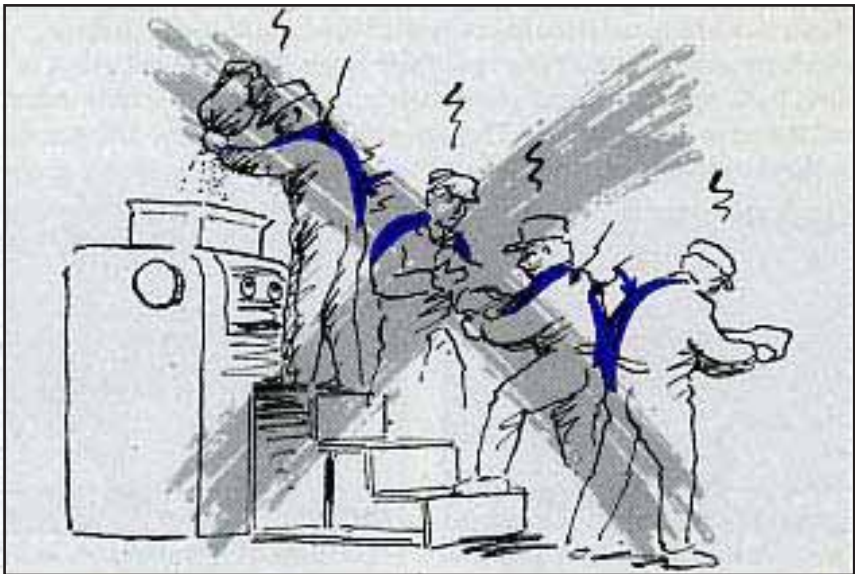
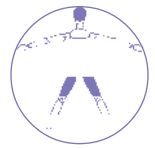


Irons used in the clothing industry can be counterbalanced to reduce the effort of lifting them continuously.

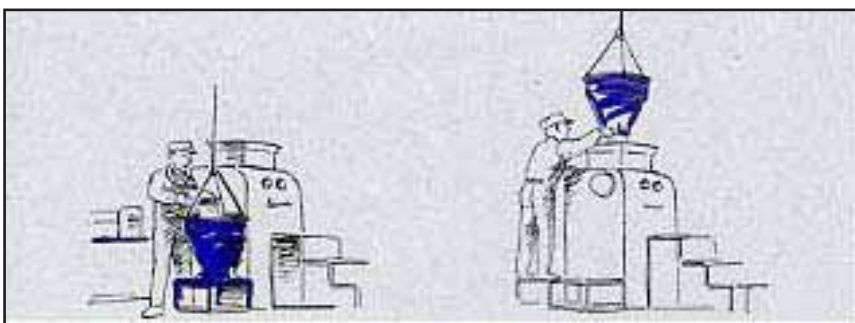


Tools that are used repetitively, such as drills and screwdrivers, can also be counterbalanced.

# Hoists



Each ingredient is carried up the steps and fed in by hand.



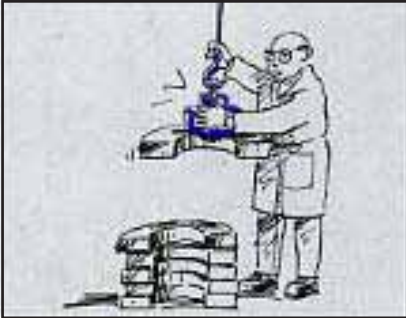
All the ingredients are put into a hopper which is lifted with a hoist and emptied by hand. This reduces the holding and carrying work required.



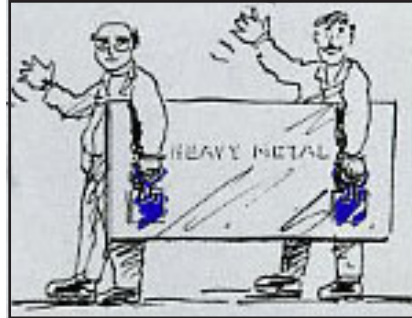


## Lifting magnets

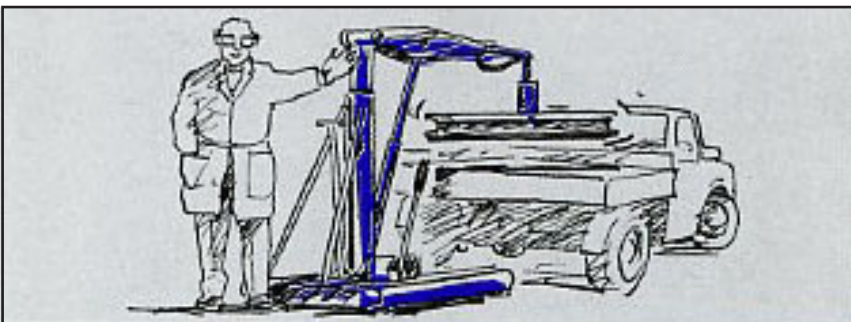
Magnets can be a useful aid in the manual handling of metal products, which are generally heavy and have sharp edges. They are used widely in sheet metal workshops, engineering workshops, the motor vehicle industry and the scrap metal industry. They are particularly useful for lifting and stacking steel plate and metal sheets, which are large and awkward to carry.



This magnet is used with a hoist, to lift one sheet or block of metal at a time from a stack.

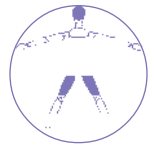


These magnetic handles are designed for lifting and moving single sheets of metal.



This magnet is used together with a mobile crane to unload and transfer metal products up to 900 kg. It makes the job easier, safer and quicker.

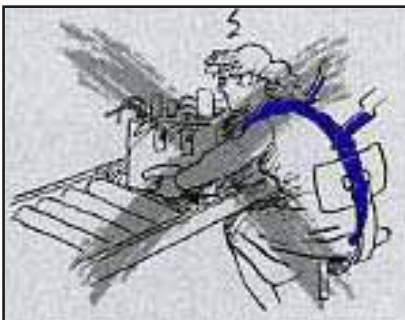
# Turntables



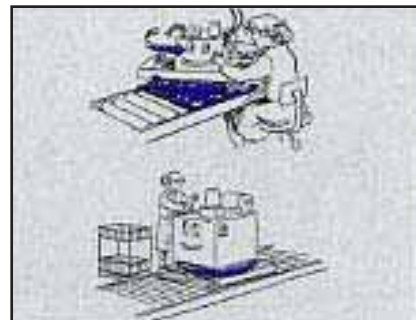
Leaning over the pallet to load and unload boxes on the far side.



A pallet hoop turntable allows the pallet to be rotated 360° and reducing the carrying or bending required — also providing toe space, to allow the load to be kept closer to the body.



Products being assembled on a line frequently need to be lifted and turned around.



A rotating turntable on the assembly line, or rotating base on the product, eliminates the need to lift, and the amount of bending and twisting.



# Reduce the amount of bending, forward reaching and twisting

## Design of equipment and workstations

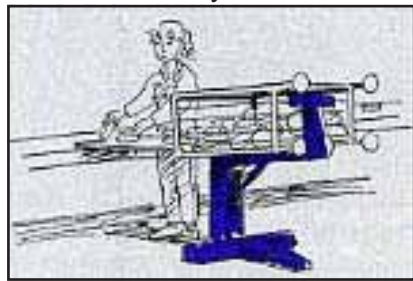
The design of equipment and workstations dictates, to a great extent, the work postures and work methods required. Use of equipment that requires prolonged bending and twisting postures should be avoided. New equipment should ideally be tested and assessed by the employees concerned, prior to purchase. Professional ergonomic expertise may also be required.



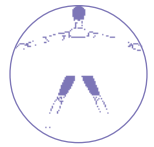
A spring-loaded base keeps the components at a convenient height.



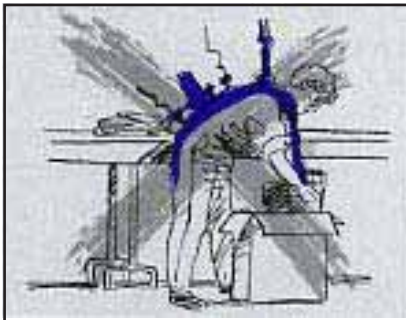
Repetitive bending is required to empty components out of a crate and on to a conveyor belt.



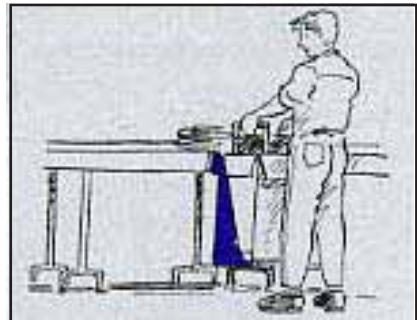
A forklift loads the crate on to a "tipper" platform, and the "tipper" is then operated to keep the components at waist height.



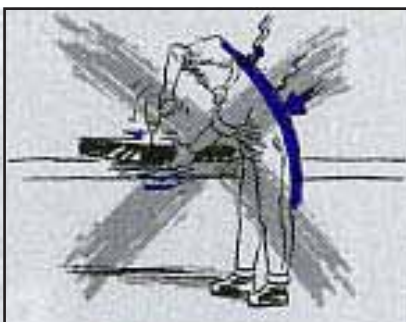
Employees often think of a better or easier way to do a job. There are many examples where, by working together within the organisation, employees and management have been able to come up with some successful "in-house" solutions to manual handling problems.



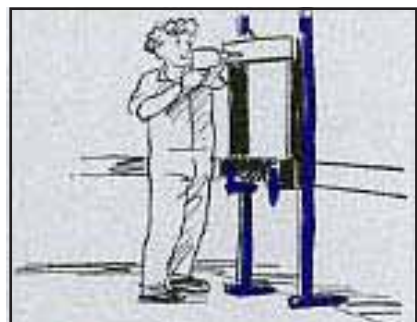
Packing a heavy welding machine on the floor.



A custom-built frame attached to the conveyor belt reduces the amount of lifting and bending required.



The drilling is done on an unstable surface in an awkward position.



A custom-built frame which reduces the amount of holding and bending, forward reaching, and twisting required.

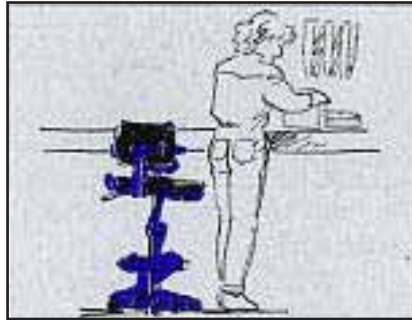


## Seating

Sitting for prolonged periods in awkward postures whilst engaged in manual handling activities, e.g. inspection, light assembly tasks, can lead to back pain or aggravate an existing back problem. Good seating is often neglected in the manufacturing industry. Stools (kitchen-type) and cast-out office chairs are frequently provided. These are inappropriate in most cases because they are not the right height and do not offer good back support. The two most important features to look for in a chair are: height adjustability and a good lumbar (low back) support. Where possible, it is preferable for people to be able to change between sitting and standing postures as they wish.



Sitting with a bent back on a stool which does not provide any back support or adequate foot support.



At this workstation the employee is able to change between sitting and standing postures.

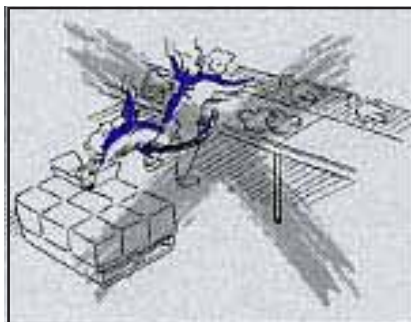
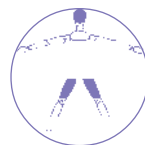


Sitting with a bent back on a kitchen-type chair which is too low and does not provide adequate low back support.

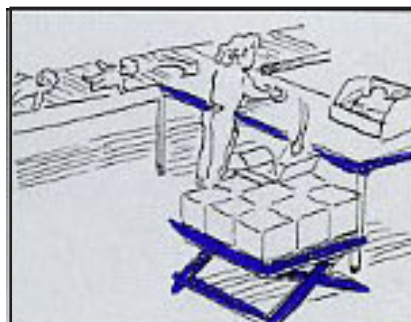


This chair is height adjustable and provides good low back support.

# Work layout



This work layout requires forward bending and reaching over the conveyor belt, as well as turning to pack the product in boxes.



When the work is close to the body the employee can sit or stand with a straight back.



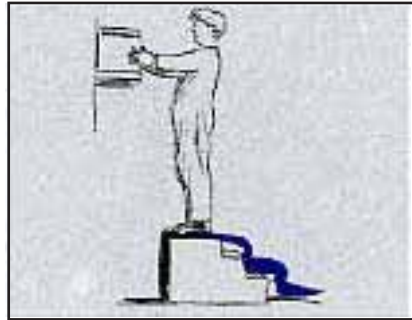
Inadequate leg room under the conveyor belt forces the employee to sit side-on in a twisted position.



Adequate leg room under the conveyor allows the employee to sit with a straight back.



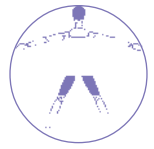
## Get the work height right!



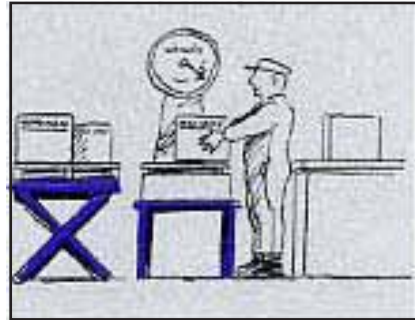
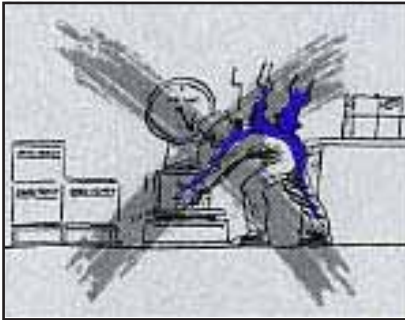
The ideal work height depends on the activity. Generally, lifting should be done in front of the body at between shoulder and mid-thigh height — to reduce the amount of bending and twisting of the back.



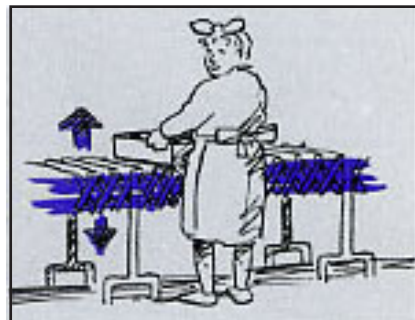
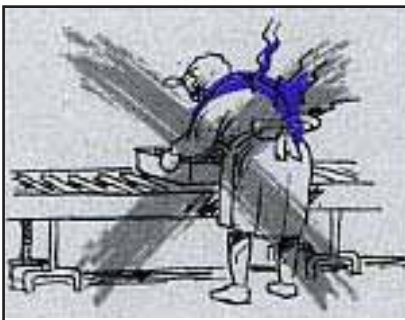
When the work height is too high, aids such as steps, stools, platforms, ladders or stairs should be provided, to reduce backward bending and twisting actions of the spine.



When the work height is too low, aids such as tables, chairs, platforms and adjustable conveyor systems should be provided, to reduce the amount of forward bending and twisting of the back required.

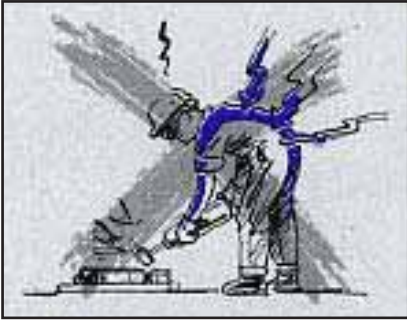


Scissor-lift platform and table.

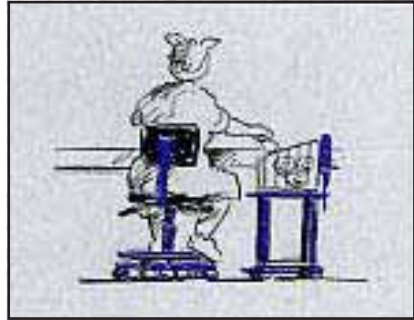


Height-adjustable conveyor system.

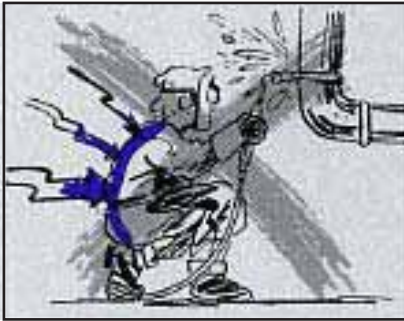
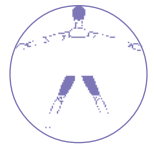




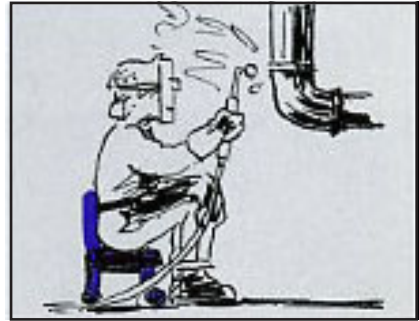
Use a table.



Use a chair.



Working close to ground level requires bending and twisting, and can be fatiguing.



Using a small stool on castors — or a box — may reduce the effort, as well as the bending and twisting.



This inspection task involves repetitive forward reaching. There is static loading of the neck, arms and back.

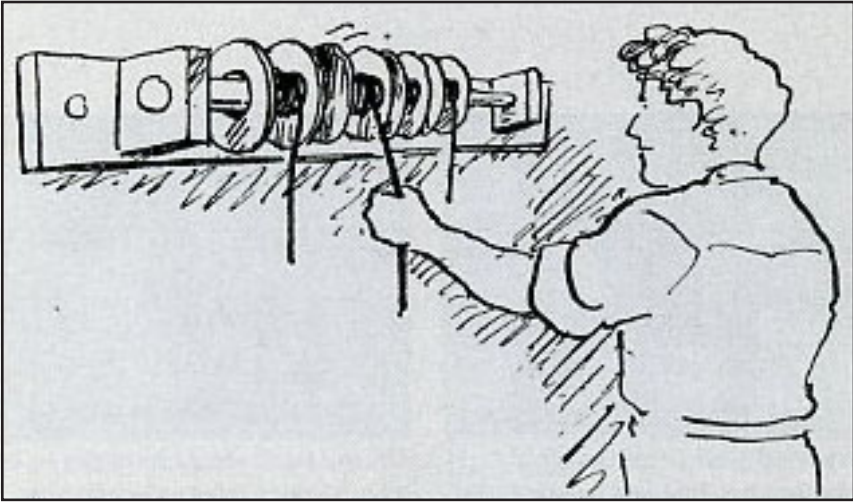


The forearm supports and the back support of the chair reduce the static loading, and reduce the amount of forward reaching required.

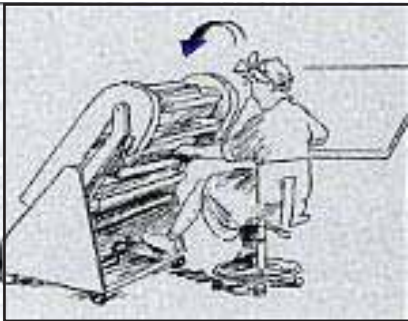


## Storage

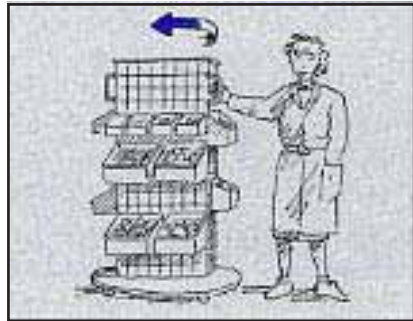
All frequently used components should be stored within easy reach, i.e. within 400 mm of the body. When large numbers of components need to be on hand, e.g. assembly tasks, then the method of storage needs consideration.



Wire, tubing and hose can be stored on reels and fixed at a convenient height.



A foot-operated conveyor system brings the components up to a convenient height.



Components can be stored on rotating turntables.



# Keep all equipment in good working order

Unexpected or forceful actions required due to faulty or poorly maintained equipment can lead to strains and injuries. All equipment should be maintained on a regular basis and repaired promptly when necessary.

What are the maintenance procedures  
at your workplace?

Is equipment and machinery maintained  
to a checklist?

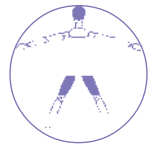


# Keep the work environment safe

Slips, trips and falls during manual handling activities can lead to serious injury. Uneven or slippery floor surfaces, trailing hoses and cords, and obstacles on the ground are common hazards. Pathways, access ways and work areas need to be marked and kept clear so that collisions can be avoided. Manual handling injuries can be avoided by regular maintenance and housekeeping procedures.



Pushing a trolley over an uneven surface can require a forceful action. Torn floor coverings are also a tripping hazard.



# Provide suitable education and training

Employees should get appropriate education and training in manual handling techniques so that they are able to choose the best technique for each particular situation. Training and education is more than teaching people how to lift correctly. The broad aims of training and education are:

1. To ensure that each employee has the skills and knowledge to be able to do their job safely.
2. To ensure that each employee has an understanding of the principles of back care and the prevention of injury, which is relevant to their particular situation.
3. To ensure that each employee has an understanding of the many factors that can cause back pain and injury.
4. To encourage each employee to take an active role in the prevention of manual handling injuries at work.



Using mechanical aids when they are available.



Using the correct lifting method when possible by: bending the knees, keeping the back straight and keeping the load close to the body.