

CODE OF PRACTICE FOR MANUAL HANDLING

Notice of Approval of a Code of Practice

Notice is hereby given that pursuant to subsection 63 (1) of *the Occupational Health, Safety and Welfare Act, 1986*, the following Code of Practice for Manual Handling, is an approved code of practice.



SOUTH AUSTRALIAN GOVERNMENT

APPROVED CODE OF PRACTICE FOR MANUAL HANDLING

WorkCover Corporation of South Australia

September 1990

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FOREWORD

This is an approved code of practice.

The term 'approved code of practice' has a particular meaning under the South Australian Occupational *Health, Safety and Welfare Act, 1986*.

An approved code of practice provides minimum standards of health and safety and is designed to be used in addition to the Act and regulations. In proceedings under Section 19(1) of the Act (the employer's duty of care), where it is proved that the employer failed to comply with a provision of a relevant, approved code of practice, the employer shall be taken to have failed to exercise the required standard of care, in the absence of proof to the contrary.

Thus, a code of practice provides practical guidance on how a particular standard of health and safety can be achieved. It describes the preferred methods or courses of action for achieving this standard of health and safety.

However, an approved code of practice allows the employer the flexibility to show that an equivalent or better standard of health and safety is achieved by alternative action. An approved code of practice is therefore different from a regulation where the responsible person must meet the specific requirement of the regulation.

In summary, an approved code of practice:

- provides practical guidance;
- should be followed unless there is another solution which achieves the same or a better standard of health and safety; and
- can be used to support prosecution.

This approved code of practice also includes some references to obligations imposed by an Act of Parliament or regulation. These obligations are preceded by the word 'shall'. Failure to observe these obligations is an offence against the Act or regulation. Preferred methods or courses of action are preceded by the word 'should'. **There is an obligation to follow the preferred method or course of action unless there is another solution which achieves the same or a better standard of health and safety.**

A code of practice approved by the Minister of Occupational Health and Safety comes into operation on the day on which the notice of approval is published in the *South Australian Government Gazette*, or on such later day as may be specified in the notice.

Codes of practice are approved by the Minister of Occupational Health and Safety, following a recommendation from the South Australian Occupational Health and Safety Commission. This Commission is made up of employer, union, expert and government representatives who jointly consider proposals for codes of practice taking into account public comment on the draft code.

Codes of practice developed by other organisations, such as the National Occupational Health and Safety Commission or the Standards Association of Australia, are not approved codes of practice within the meaning of the South Australian *Occupational Health, Safety and Welfare Act, 1986*, unless they have been approved and gazetted in accordance with the Act. While they do not have the particular status of an approved code of practice, they do provide explanation and advice about the prevention of hazards and may be taken into account in a prosecution, for the purpose of determining what action was reasonably practicable. They should therefore be considered as an important source of information and guidance.

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1. INTRODUCTION

PURPOSE

1.1 The purpose of the Approved Code of Practice for Manual Handling (hereinafter referred to as the Code of Practice) is to provide practical guidance in meeting the requirements of the *Occupational Health, Safety and Welfare (Manual Handling) Regulations, 1990*, (hereinafter referred to as the Manual Handling Regulations) for the identification, assessment and control of risks arising from manual handling activity in workplaces.

OVERVIEW

1.2 This Code of Practice provides guidance in the following areas:

- (a) General Principles (Section 2);
- (b) Risk Identification (Section 3);
- (c) Risk Assessment (Section 4); and
- (d) Risk Control (Section 5).

2. GENERAL PRINCIPLES

CONSULTATION

2.1 The *Manual Handling Regulations* provide (Regulation 8 (1)):

In complying with the identification, assessment and control measures required by these regulations, an employer must-

- (a) *consult with any health and safety representative who represents any employee who is required to carry out the manual handling task;*
- (b) *consult with any health and safety committee that has responsibility in relation to the employees who are required to carry out the manual handling task or the performance of the particular work;*
- (c) *consult with, so far as is reasonably practicable, the employees who are required to carry out the manual handling task;*
- (d) *where an employee who is required to carry out the manual handling is a member of a registered association and requests the employer to consult the registered association-invite the registered association to consult with the employer in relation to the manual handling;*
- (e) *where an invitation under paragraph (d) is accepted-consult with the registered association.*

2.2 Consultation may occur through formal and/or informal processes, and involve direct and/or representational participation. This consultation should occur:

- (a) as early as possible in planning for the introduction of new or modified manual handling tasks or in the review of existing tasks to allow for changes arising from the consultation to be incorporated;
- (b) when the employer is identifying the problem areas in order to establish priorities for assessment;
- (c) when determining the approach and methods to be used in assessing the manual handling tasks;
- (d) when decisions are being taken on various control measures to reduce risk factors; and
- (e) when the effectiveness of implemented control measures is being reviewed.

DESIGN

2.3 The *Manual Handling Regulations* provide (Regulation 5):

An employer must ensure, so far as is reasonably practicable-

- (a) *that the plant and containers used in the workplace are designed, constructed and maintained so as to be, so far as is reasonably practicable, safe and without risk to health and safety when handled manually;*
 - (b) *that work practices involving manual handling are designed, implemented and maintained so as to be, so far as is reasonably practicable, safe and without risk to health and safety;*
- and*
- (c) *that the working environment is designed, constructed and maintained so as to be, so far as is reasonably practicable, consistent with safe manual handling practices,*

2.4 Additional costs are incurred in redesigning or modifying plant or processes once they are being used in the workplace. It is more cost effective to reduce risk factors at the design stage.

2.5 Purchasing specifications should specify the uses or functions of the plant and equipment, and where possible, the general performance characteristics required to reduce the risk to health and safety.

2.6 Where design or purchase of plant, equipment and containers is planned, the appropriate consultation should occur in accordance with procedures in Sections 3.9-3.11 of this Code of Practice.

2.7 The design of plant, equipment and containers in workplaces needs to provide for a range of physical characteristics of the workforce. Information concerning human dimensions and capabilities should be taken into account to provide an optimum match between the plant or equipment and users.

Design Principles

2.8 Employers need to be aware of the enormous range of physical dimensions, for example height and reach, to be found in the workforce, and the implications of this for task design and the selection and use of plant, equipment, containers and furniture.

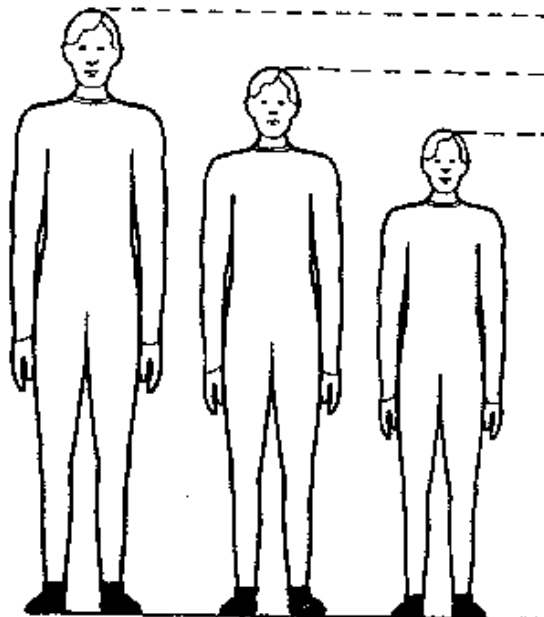


Figure 1 - *Workplaces should incorporate adjustable features to accommodate people who are not average size*

2.9 Plant, equipment, containers and furniture shall be designed so that they can be used safely. It is also desirable to design workplaces, activities and tasks to suit the capacity of the widest possible range of the workforce to avoid discrimination against particular groups. That is, the employer is required to take account of the safety of each employee, and not simply design a system which might be safe for an 'average' person of the workforce.

2.10 Some general principles for reducing risks associated with manual handling, which should be incorporated into the design of workplaces, work practices, plant, equipment, containers and furniture are:

- (a) minimise the lifting and lowering forces exerted;
- (b) avoid the need for bending, twisting and reaching movements; and
- (c) reduce pushing, pulling, carrying and holding.

2.11 Aspects to consider at the design stage include:

- (a) size, surface characteristics, stability and weight of objects;
- (b) vertical and horizontal movements involved;
- (c) workplace layout and general environment; and
- (d) work postures and space requirements.

2.12 These aspects should be considered in relation to the following stages of the handling process:

- (a) transportation and reception;
- (b) handling at the workplace; and
- (c) storage and distribution.

RISK IDENTIFICATION, ASSESSMENT AND CONTROL

2.13 This Code of Practice provides guidance on the following three key stages in the process of reducing manual handling injuries:

- (a) identification of risk factors in the workplace likely to cause manual handling injuries;
- (b) detailed assessment of particular risk factors; and
- (c) introduction of control measures to eliminate or reduce risk.

2.14 Figure 2 summarises these stages (see next page).

Figure 2 - The three stage approach to safe manual handling

1 **RISK IDENTIFICATION** (*Section 3*)

- Analysis of workplace injury records
- Consultation with employees
- Direct observation



2 **RISK ASSESSMENT** (*Section 4*)

- (A) Actions and movements
- (B) Workplace and workstation layout
- (C) Working posture and position
- (D) Duration and frequency of manual handling
- (E) Location of loads and equipment
- (F) Weights and forces
- (G) Characteristics of Loads and Equipment
- (H) Work organisation
- (I) Work environment
- (J) Skills and experience
- (K) Personal characteristics
- (L) Clothing
- (M) Other relevant factors



3 **RISK CONTROL** (*Section 5*)

- Job Redesign
 - Modify Object
 - Modify Workplace Layout
 - Rearrange Materials Flow
 - Different Actions, Movements, Forces
 - Modify Task - Mechanical Assistance
 - Modify Task - Team Lifting
- Mechanical Handling Equipment
- Training
 - General
 - Particular
- Other Administrative Controls
 - Special Needs
 - Clothing

RISK CONTROL

Risk Control Priorities

2.15 After the risk factors have been assessed, they shall be eliminated or controlled by particular actions. The *Manual Handling Regulations* proposes a priority order in controlling risk as follows (Regulation 7):

- (1) *If a manual handling task is assessed as being a risk to health and safety, the employer must take such steps as are reasonably practicable to control the risk.*
- (2) *For the purposes of subregulation (1) –*
 - (a) *the employer must-*
 - (i) *redesign the manual handling task to eliminate or control the risk factors; and*
 - (ii) *ensure that the employees involved in the manual handling task receive appropriate training, (including training in safe manual handling techniques) and appropriate supervision;*
 - and*
 - (b) *where redesign is not reasonably practicable, or as a short-term or temporary measure, the employer must-*
 - (i) *take one, or a combination of two or more, of the following measures as is appropriate—*
 - (A) *provide mechanical aids;*
 - (B) *provide personal protective equipment;*
 - (C) *arrange for team lifting;*
 - and*
 - (ii) *ensure that the employees receive appropriate training and supervision in the correct use, or application of any mechanical aids, personal protective equipment or team lifting procedures supplied or introduced for the purposes of subparagraph (i).*

2.16 It is likely that for many jobs the application of these types of control will not be mutually exclusive. In some jobs it may be reasonably practicable to redesign some parts, and to provide mechanical aids.

2.17 The Risk Control Section of this Code of Practice, gives advice about control options which can be considered depending on the severity of risk.

Weight

2.18 Weight is used in this Code of Practice as one of the important factors to be considered when identifying, assessing and controlling risk.

2.19 Weight is not used to prescribe absolute limits. However, particular attention should be given to Sections 4.21-4.27 and 5.19-5.43 of this Code of Practice which provide a general guide to weights which it is recommended that adults and juniors should not handle unaided.

New and Returning Employees

2.20 Notwithstanding the remainder of this Code of Practice, employees newly engaged on a manual handling task or process or returning from an extended absence should, where necessary, be allowed a period of adjustment to build up the skill and ability demanded by the tasks they are required to perform.

REVIEW AND EVALUATION

2.21 The implementation of this risk control approach, as with any successful systematic process, does not end with the implementation of some change. The effectiveness of the new control measures needs to be

reviewed regularly to ensure that the objectives are being achieved and that there are no unforeseen negative outcomes.

RECORD KEEPING

2.22 Records associated with the implementation of the *Manual Handling Regulations* should be maintained in a central location and should be made available to employee representatives on health and safety matters. Such records will make the task of review and evaluation easier.

2.23 The records may include information on:

- (a) the manual handling injury prevention program;
- (b) risk identification and assessment reports;
- (c) design modifications to and specifications for plant, equipment, containers, workplaces and work processes;
- (d) risk control measures implemented; and
- (e) training and education activities.

3. RISK IDENTIFICATION

3.1 This section of the Code of Practice provides means of identifying manual handling tasks likely to be a risk to health and safety in order that they can be examined and assessed as required by the *Manual Handling Regulations* 6 (1).

3.2 The purpose of risk identification is to:

- (a) identify; and
- (b) place in priority order;

the jobs or tasks which require risk assessment.

3.3 There are three basic steps to risk identification:

- (a) analysis of workplace injury records;
- (b) consultation with employees; and
- (c) direct observation or inspection of the task or work area.

3.4 If any of the three steps indicate the need for assessment, Section 4 of this Code of Practice provides guidance on that assessment.

ANALYSIS OF WORKPLACE INJURY RECORDS

3.5 Workplace records of injuries should be examined to identify where, and in what jobs, manual handling injuries have occurred.

3.6 Indicators to consider include:

- (a) the area of the workplace where the injury occurred;
- (b) the occupation, or job/task of the injured person;
- (c) the part of the body injured, for example, back, neck or shoulder;
- (d) the nature of the injury, for example, strain, sprain, laceration or fracture; and
- (e) the type of accident, for example, overexertion and physical stress in lifting objects, or slips and falls while handling objects.

3.7 It is often useful to examine injury records to find out the frequency and severity of injuries and compare them to the number of employees or hours worked, that is, incidence rate. Comparisons can also be made between locations, occupations or tasks.

3.8 Higher frequency and/or severity rates indicate priority areas.

CONSULTATION WITH EMPLOYEES

3.9 Regulation 8 of the *Manual Handling Regulations* requires employers to consult with employees and their representatives on health and safety matters when identifying manual handling risks in workplaces.

3.10 Consultation during the risk identification process with employees carrying out the tasks and with their representatives on health and safety matters, may also obtain information about associated risk factors.

3.11 Consultation should also occur when priorities for risk assessment are being established. Employees may be able to indicate tasks or movements which are particularly fatiguing, strenuous or difficult to perform.

DIRECT OBSERVATION

3.12 The direct observation of workplaces and of the task being performed will assist in identifying risks. Workplace inspections, audits and walk-through surveys, and the use of checklists can assist in the risk identification process. It is best if these direct observation tools are tailored to the specific characteristics of the organisation or industry concerned. A general risk identification checklist and guidance on its use is provided in Table 1. The checklist is also reproduced at the back of this publication so that it can be copied for use in the workplace.

3.13 The spaces provided at the top of the checklist enable the recording of relevant information on:

- (a) the building, plant and equipment (description of work location);
- (b) details of the task and/or workstation;
- (c) the person conducting the assessment on behalf of the employer; and
- (d) the name of the employee's representative(s) on health and safety matters consulted in the process.

If any of the questions in the checklist result in a YES answer further assessment of that risk factor is required. Generally the more YES answers that result for a particular task then the higher the priority for risk assessment.

TABLE ONE

**SAFE MANUAL HANDLING CHECKLIST
GENERAL RISK IDENTIFICATION**

Description of Work Location _____ Date ___/___/___

Task Description _____






Assessed by _____

Employees (s) _____

Health and Safety Representative _____

The existence of any one of the following key risk factors, that is, a *Yes* answer, indicates the need for further assessment as outlined in Section 4 - Risk Assessment in the Code of Practice.

**MOVEMENTS, POSTURE AND LAYOUT
DURING MANUAL HANDLING**

- | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| <p>1. Is there frequent or prolonged bending down where the hands pass below mid-thigh height?
If Yes see 4(a), 4(b), 4(c)</p> |  | <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> |
| <p>2. Is there frequent or prolonged reaching above the shoulder?
If Yes see 4(a), 4(b), 4(c)</p> |  | <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> |
| <p>3. Is there frequent or prolonged bending due to extended reach forward?
If Yes see 4(a), 4(b), 4(c)</p> |  | <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> |
| <p>4. Is there frequent or prolonged twisting of the back?
If Yes see 4(a), 4(b), 4(c)</p> |  | <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> |
| <p>5. Are awkward postures assumed frequently or over prolonged periods, that is, postures that are not forward facing and upright?
If Yes see 4(a), 4(b), 4(c)</p> |  | <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> |

TASK AND OBJECT

- | | |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| <p>6. Is manual handling performed frequently or for long time periods by the employee(s)?
If Yes see 4(d), 4(e), 4(h)</p> | <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> |
| <p>7. Are loads moved or carried over long distances?
If Yes see 4(d), 4(e)</p> | <p>Yes
<input type="checkbox"/></p> <p>No
<input type="checkbox"/></p> |

8. Is the weight of the object:
- | | | |
|-----------------------------------------------------------------------------------------------|---------------------------------|--------------------------------|
| (a) more than 4.5 kg and handled from a seated position?
If Yes see 4(f) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| (b) more than 16 kg and handled in a working posture
other than seated?
If Yes see 4(f) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| (c) more than 55 kg?
If Yes see 4(f) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

Note: Weight is not used to prescribe absolute limits, but is one of the important factors to be considered when assessing and controlling risk.

- | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------|
| 9. For pushing, pulling or other application of forces: are large push/pulling forces involved?
If Yes see 4(f) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| 10. Is the load difficult or awkward to handle, for example, due to its size, shape, temperature, instability or unpredictability?
If Yes see 4(g) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| 11. Is it difficult or unsafe to get adequate grip of the load?
If Yes see 4(g) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

WORK ENVIRONMENT

- | | | |
|------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------|
| 12. Is the task performed in a confined space?
If Yes see 4(i) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| 13. Is the lighting inadequate for safe manual handling?
If Yes see 4(i) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| 14. Is the climate particularly cold or hot?
If Yes see 4(i) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| 15. Are the floor working surfaces cluttered, uneven, slippery or otherwise unsafe?
If Yes see 4(h) and 4 (i) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

INDIVIDUAL FACTORS

- | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------|
| 16. Is the employee new to the work or returning from an extended period away from work?
If Yes see 4(h), 4(j), 4(k) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| 17. Are there age-related factors, disabilities or other special factors that may affect task performance?
If Yes see 4(h), 4(j), 4(k) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| 18. Does the employee's clothing or personal protective equipment interfere with manual handling performance?
If Yes see 4(l) | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

4. RISK ASSESSMENT

4.1 The *Manual Handling Regulations* provides (Regulation 6 (1))

An employer must ensure that any manual handling that is likely to be a risk to health and safety is identified and assessed.

4.2 The *Manual Handling Regulations* list (Regulation 6 (2)) the factors to be taken into account when making an assessment of a manual handling task. These factors highlight the complex nature of the causes of injury from manual handling.

4.3 Risk identification should be undertaken on a regular basis and when indicated, risk assessment carried out. Risk assessment is particularly critical whenever:

- (a) an injury has occurred arising from a work process and/or practice; and
- (b) a work process and/or practice is about to be introduced or modified.

4.4 In assessing a job or a task, all risk factors identified shall be considered, and in determining appropriate control measures, the interaction of all the factors identified shall be taken into account.

4.5 Guidelines on assessment of these risk factors follow.

(4A) ACTIONS AND MOVEMENTS

4.6 Actions and movements should not cause undue discomfort or pain. Actions should be performed smoothly and with control, avoiding sudden or jerky movements. Manual handling should be performed in a balanced and comfortable posture. Extreme ranges of joint movement should be avoided, especially when this is prolonged or repetitive. Repetitive bending, twisting and overreaching movements are among those liable to increase the risk of manual handling injuries.

4.7 Variation from the above and/or answering YES to any of the following questions indicates an increased risk.

- (a) Is the load shared unevenly between both hands, or lifted by one hand only?
- (b) Is the object pushed or pulled across the front of the body?
- (c) Is there a need to bend over to one side to lift an object or exert a force?
- (d) Are two actions performed at the same time, when one action is holding an unsupported fixed position?
- (e) Are several tasks performed in the one position where some are best done in a seated position and the others are best done in a standing position?

(4B) WORKPLACE AND WORKSTATION LAYOUT

4.8 The positioning of plant and its controls, equipment, tools and other materials in relation to each other and the employee affects working posture, working height, manual handling technique, duration, frequency and other work actions and movements.

4.9 The layout should permit the employee(s):

- (a) to adopt an upright and forward facing posture;
- (b) to have good visibility of the task; and
- (c) to perform the majority of tasks at about waist height and within easy reach.

4.10 Answering NO to any of the following questions indicates an increased risk.

- (a) Is the layout appropriate for the manual handling task and the physical dimensions of the employee(s) performing the task?
- (b) Is there adequate space for all movements involved in the manual handling task?
- (c) Are appropriate mechanical handling aids readily available for the task?
- (d) Are the working heights adjustable or matched to the size of the employee and the task?
- (e) Is there adequate clear space for moving legs and feet?
- (f) Are the different manual handling tasks performed by one person arranged so that excessive movement is avoided?

(4C) WORKING POSTURE AND POSITION

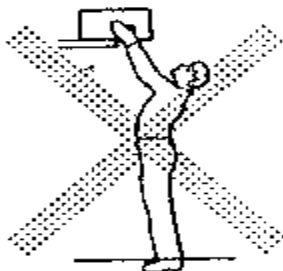
4.11 Work activities should permit the employee to adopt several different, but equally healthy and safe working postures. Any one posture should not be maintained for long periods and there should be an opportunity to change posture through variation of activity or rest.

4.12 During manual handling, bending and/or twisting of the spine should be avoided, especially when this is prolonged or repetitive.

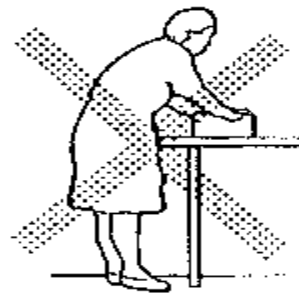
4.13 Answering YES to any of the following questions indicates an increased risk.

- (a) Is the object presented to the employee in a position which makes it difficult to reach or grasp?
- (b) During manual handling is there frequent or prolonged:
 - (i) above shoulder reach?
 - (ii) forward bending of the back?
 - (iii) twisting of the back?
 - (iv) sideways bending of the back?

Figure 3



Avoid above shoulder reach



Avoid forward bending of the back



Avoid sideways bending of the back



Avoid twisting of the back

(4D) DURATION AND FREQUENCY OF MANUAL HANDLING

4.14 The risk of injury rises with the increasing frequency, repetition and duration of manual handling activity by any one employee in a work period. How often, and for how long, a task is performed are key risk factors to be considered.

4.15 Problems with frequency and duration are not restricted to lifting or lowering of loads. Pushing, pulling, carrying and holding of loads can also be a problem if performed frequently or for prolonged periods.

4.16 The same manual handling task repeated over long periods of time may induce feelings of monotony and boredom. This reduction in alertness may also have important safety consequences.

4.17 There are several factors which influence a person's ability to continue prolonged exertion. These include available energy reserves, the employee's physical fitness and the relative work load, that is, the proportion of the employee's physical capacity engaged by the task.

4.18 Manual handling operations involving the use of smaller muscle groups such as hands (whether in sustained or repetitive static activity) should not be overlooked in assessing risks because these muscles fatigue quickly when overloaded.

(4E) LOCATION OF LOADS AND DISTANCES MOVED

4.19 Distances over which loads are manually handled should be as short as possible. The longer the distance the lighter the load that can be carried without increased risk.

4.20 If the load is located above the employee's shoulder height or below mid-thigh height or otherwise requires extended reach, then the risk of injury is increased. An increased risk also occurs where the load requires manoeuvring to be placed accurately into position.

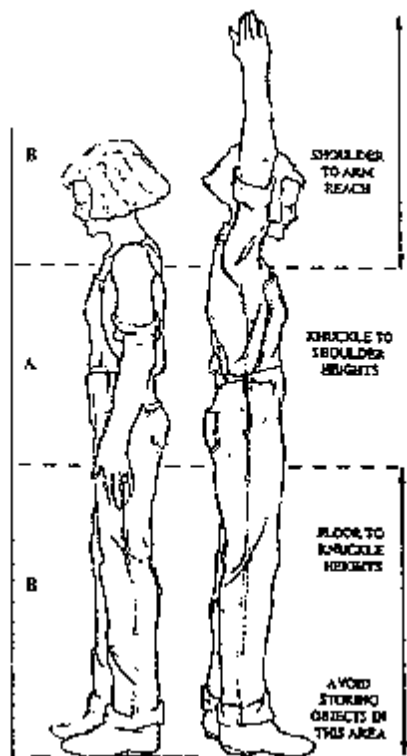


Figure 4 - Optimise location of loads. The best height range for handling loads is around waist level, with lifting between the knuckle and the shoulder being acceptable. Frequently used objects should be stored in the 'A' zone. Seldom used objects should be stored in the 'B' zone.

(4F) WEIGHTS AND FORCES

4.21 The weight of any load which is manually handled shall be considered in relation to other key risk factors including in particular:

- (a) frequency and duration;
- (b) position of load relative to the body;
- (c) distance moved; and
- (d) characteristics of the load.

4.22 Where heavier objects are handled, more care is needed in the assessment of risk and in the application of appropriate control measures.

4.23 For lifting, lowering or carrying loads:

- (a) in seated work, it is advisable not to lift loads in excess of 4.5 kg;
- (b) some evidence shows that the risk of back injury increases significantly with objects above the range of 16-20 kg, therefore from the standing position it is advisable to keep the load below or within this range;
- (c) as weight increases from 16 kg up to 55 kg, the percentage of healthy adults who can safely lift, lower, or carry the weight, decreases. Therefore, more care is required for weights above 16 kg and up to 55 kg in the assessment process. Mechanical assistance and/or team lifting arrangements should be provided to reduce the risk of injury associated with these heavier weights; and
- (d) generally, no person should be required to lift, lower or carry loads above 55 kg, unless mechanical assistance or team lifting arrangements are provided to lower the risk of injury.

4.24 Apart from lifting, lowering and carrying of objects, many tasks in industry involve the use of force to push, pull, hold or restrain objects.

4.25 When pushing levers or pulling or sliding objects the amount of force used is not necessarily related to the movement, for example, a large force may be required to move a lever a short distance. The posture required and the working conditions affect the risk associated with applying a force to push, pull or restrain an object. Figure 5 illustrates the application of force in two circumstances.



4.26 Static stress occurs during prolonged tension of the same muscles without any movements. When there is no opportunity for rest or variety the result is likely to be strain, muscular pain and fatigue. Bent, twisted or extended postures can entail high stress in or near the joints. Similarly, the muscles of the neck and shoulders suffer heavy static stress in keeping the arms lifted. The amount of static stress in such postures will depend on the condition of joints and muscles, the frequency and duration of the postures, and the force applied.

4.27 Answering YES to any of the following questions indicates an increased risk.

- (a) When sliding, pulling or pushing an object, is the object difficult to move?
- (b) Is the employee required to exert a large force while seated?
- (c) Is the employee required to push/pull while seated without having good seating and solid foot support?

(4G) CHARACTERISTICS OF LOADS AND EQUIPMENT

4.28 Characteristics of loads and equipment to consider when assessing risk, in addition to weights and forces, include dimensions, stability, rigidity, predictability, surface texture and temperature, grips and handles.

4.29 The requirement for gloves or similar personal protective equipment also needs to be assessed in relation to manual handling risks. Gloves may protect against hand injuries, such as, abrasions and burns, but they will affect grip stability, dexterity and strength. The size, shape, structure and material of the load can affect the risk of injury.

4.30 The handling of live animals or humans increases the difficulty of assessing the risk, and limits the availability of some of the common controls which are used for inanimate objects. This is because the person or animal being handled can hinder (or assist) by moving independently of the persons performing the handling. This may require the handlers to apply additional force to restrain the person or animal, or to exert sudden force in response to unexpected movements.

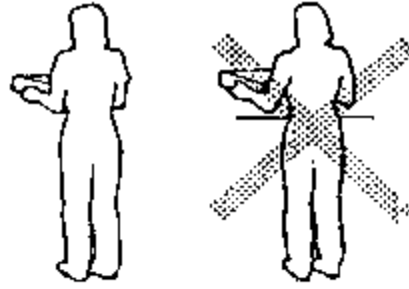
4.31 The nature of the person or animal may place additional demands on the handlers or limit the way the handling may be performed. Some examples are:

- (a) hospital patients require extreme care in handling, often while attached to fragile medical equipment; and
- (b) disturbed patients or animals may require restraint in addition to the force needed to move them.

4.32 Answering YES to any of the following questions indicates an increased risk.

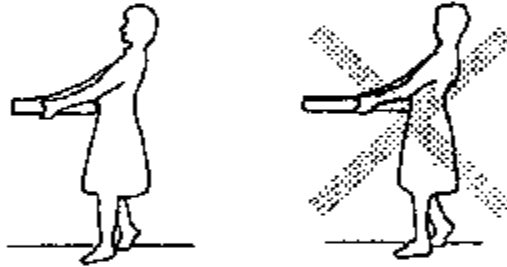
- (a) Does the person or animal need to be moved in a special way to ensure their health or safety?
- (b) Is the person or animal disturbed, excited or moving vigorously?
- (c) Is the object an awkward shape to carry in a balanced posture?
- (d) Is the object difficult to grasp or hold?
- (e) Is the object unstable or unbalanced, or does it have contents that may move suddenly?
- (f) Is the object smooth, slippery, greasy or wet?
- (g) Does the object have sharp edges or protrusions?
- (h) Is the object very hot or cold?
- (i) Does the object block the view of the employee when being handled?
- (j) Does one person handle sheet material, or other large-sized loads without straps, special holders or a second person to assist?
- (k) Is the object more than 50 cm wide (measured in direction across the body)?

Figure 6



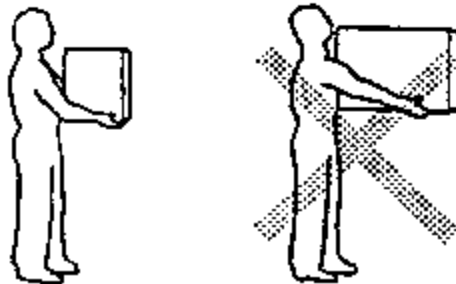
(l) Is the object more than 30 cm long (measured in direction away from the body)?

Figure 7



(m) Are any two of the object's dimension more than 75 cm?

Figure 8



(4H) WORK ORGANISATION

4.33 Work organisation factors that may influence risk by interacting with other risk factors include staffing levels, availability of equipment, work schedules, shift work, workspace, task variety, rest breaks and recovery time, and work procedures.

4.34 Answering YES to any of the following questions indicates an increased risk.

- (a)** Is the work frequency affected by bottlenecks, or sudden changes or delays to the flow of materials?
- (b)** Is the work affected by the unavailability of people to complete tasks within a deadline?
- (c)** Team lifting is not provided and/or safely organised when required?
- (d)** Are there insufficient numbers of employees to carry out the work including where peak workloads occur?
- (e)** Is there lack of an effective maintenance program for tools, plant and equipment used for manual handling?
- (f)** Are procedures for reporting and fixing unsafe equipment or environmental conditions inadequate?

- (g) Is the workflow not smooth and even?
- (h) Is there a lack of effective selection/purchasing, instruction and maintenance program for loads, equipment and mechanical handling devices?

(4I) WORK ENVIRONMENT

4.35 Factors in the work environment that influence risk include climate, lighting, space, floors, and other surfaces underfoot.

4.36 Housekeeping and footwear are associated factors that have particular relevance for risk of slips, trips and falls while handling loads.

4.37 Answering YES to any of the following questions indicates an increased risk.

- (a) Are the floors and surfaces underfoot uneven or slippery?
- (b) Are there different floor levels in the workplace?
- (c) Is the workplace untidy with a lack of attention to housekeeping details?
- (d) Are there extremes of heat, cold, wind or humidity?
- (e) Are there high levels of fumes, dusts, gases or vapours?
- (f) Is there excessive vibration?
- (g) Is the task performed in a confined space?
- (h) Is the lighting below the levels recommended in Australian Standard AS 1680 *Code of Practice for Interior Lighting and the Visual Environment*?

(4J) SKILLS AND EXPERIENCE

4.38 Employees should have the knowledge and ability required to perform the task. A mismatch can cause an increased risk of injury.

4.39 Answering NO to any of the following questions indicates an increased risk.

- (a) Has the employee received appropriate training/education in manual handling hazards and/or techniques?
- (b) Has the employee received appropriate training in recognising risk and evaluating tasks in order to select and apply appropriate handling techniques?
- (c) Has training, appropriate to the tasks, been provided which relates to manual handling?
- (d) Has the employee been properly inducted into the job practices and safety requirements in the workplace?
- (e) For heavy handling tasks, has the employee had previous experience with heavy manual handling.
- (f) Are the demands of the task within the physical capacity of the employee?

(4K) PERSONAL CHARACTERISTICS

4.40 Manual handling tasks are performed by people and it is people who risk injury in performing the tasks. Injury may occur during manual handling activities unless full account is taken of the capacity of individuals to perform particular tasks. Differences in capacity may be determined by a number of personal characteristics of the individuals. Young workers are at greater risk than adult workers because they are still developing physically. For older workers, as age increases, the person's capacity may decrease, giving rise to greater risk.

4.41 However, age alone is not sufficient for assessing risk and all relevant risk factors must be taken into account. These include:

- (a) strength and degree of bodily development;
- (b) general state of health and fitness;
- (c) bodily dimensions, for example, height and hand grip size;
- (d) physical capacity, for example, muscle strength, aerobic capacity (endurance), mobility and flexibility of joints;
- (e) stage of musculo-skeletal development;
- (f) training and experience;
- (g) susceptibility to fatigue; and
- (h) degree of physical preparation undertaken prior to commencing a task.

4.42 In some instances, employees may have special needs that need to be considered in the risk assessment process. These may be permanent or temporary, for example, returning to work from an illness, or extended leave of absence, pregnancy, specific disability, etc.

(4L) CLOTHING

4.43 The type of clothing an individual wears at work may hinder safe manual handling, for example, tight clothing which restricts movements will adversely affect manual handling technique. When specialist clothing is required, such as a uniform or personal protective equipment, its effect on risk needs to be assessed.

5. RISK CONTROL

5.1 The *Manual Handling Regulations* require (Regulation 7):

(1) If a manual handling task is assessed as being a risk to health and safety, the employer must take such steps as are reasonably practicable to control the risk.

(2) For the purposes of subregulation(1) -

(a) the employer must-

(i) redesign the manual handling task to eliminate or control the risk factors;

and

(ii) ensure that the employees involved in the manual handling task receive appropriate training, (including training in safe manual handling techniques) and appropriate supervision;

and

(b) where redesign is not reasonably practicable, or as a short-term or temporary measure, the employer must-

(i) take one, or a combination of two or more, of the following measures as is appropriate -

(A) provide mechanical aids;

(B) provide personal protective equipment;

(C) arrange for team lifting;

and

(ii) ensure that the employees receive appropriate training and supervision in the correct use or application of any mechanical aids, personal protective equipment or team lifting procedures supplied or introduced for the purposes of subparagraph (i).

5.2 Risk control is the process of eliminating or reducing identified and assessed risk factors.

5.3 Risk control can best be accomplished by a combination of:

(a) job redesign;

(b) mechanical handling equipment; and

(c) provision of training.

5.4 Care should be taken to ensure that further risks to health and safety are not created by the application of control methods aimed at reduction of manual handling risks.

INTRODUCTION TO RISK CONTROL OPTIONS

5.5 Table 2 indicates which risk control options are relevant for particular risk factors, job redesign being the preferred risk control option. No one single option will necessarily reduce a risk. A combination of different control options is often needed to address risk factors and reduce the overall risk of manual handling injuries.

5.6 Table 2 lists the risk control options described below and indicates which control option(s) may be effective at reducing the risk of each factor.

5.7 (**NOTE:** The asterisks should not be interpreted absolutely, rigidly, or independently. Some risk factors, and some control options, contain a broad range of situations or possible activities. It may be possible in some circumstances to reduce the risk of a particular factor by one of the control options for which there is no asterisk linking to the risk factor.)

5.8 To illustrate the preference the five preferred job redesign control options, and their connections with the key risk factors have been placed in a shaded box.

5.9 An introduction to each control option is given below.

Job Redesign

Modify Object

5.10 The object being handled may be modified or repackaged into a bigger or smaller load or a different size or shape.

Modify Workplace Layout

5.11 The layout of the plant, equipment and furniture may be modified or rearranged. This may include increased attention to housekeeping and maintenance functions.

Rearrange Materials Flow

5.12 The schedule or timing, and path(s) of materials flow may be modified. The risks may be reduced by rearranging containers and the way materials are moved around the workplace.

Different Actions, Movements and Forces

5.13 With or without workplace modifications, a task may be done in a different way, using different actions, movements and forces.

Modify Task-Mechanical Assistance

5.14 The risk associated with a task can be reduced by mechanical assistance, minor rearrangements of plant and equipment, and an improved (or effective) maintenance program.

Modify Task-Team Lifting

5.15 The actions, movements and forces required for manual handling can be modified by team lifting arrangements.

Mechanical Handling Equipment

5.16 The provision of mechanical handling equipment with the provision of appropriate training can reduce the risk by reducing the force required.

Training

5.17 Where the previous options have not been able to reduce a significant risk, then the person requires particular instruction, training and/or education in the manual handling task

RISK CONTROL OPTIONS AND RISK FACTORS

<i>Risk factors</i>	<i>Risk control options</i>								
	<i>Job redesign</i>								
	<i>Modify object</i>	<i>Modify workplace layout</i>	<i>Rearrange materials flow</i>	<i>Different actions, movements, forces</i>	<i>Modify task-mechanical assistance</i>	<i>Modify task-team lifting</i>	<i>Mechanical handling equipment</i>	<i>Training</i>	<i>Other administrative controls</i>
a. Actions and movements	*	*	*	*	*		●	●	
b. Workplace and workstation layout		*	*	*	*		●	●	
c. Working posture and position	*	*		*	*	●	●	●	
d. Duration and frequency			*	*	*			●	
e. Location of loads and distances moved	*	*	*			●		●	
f. Weights and forces	*	*	*	*		●	●	●	
g. Characteristics of loads and equipment	*		*	*	*	●	●	●	

<i>Risk factors</i>	<i>Risk control options</i>								
	<i>Job redesign</i>				<i>Modify task- mechanical assistance</i>	<i>Modify task- tteam lifting</i>	<i>Mechanical handling equipment</i>	<i>Training</i>	<i>Other administrative contols</i>
	<i>Modify object</i>	<i>Modify workplace layout</i>	<i>Rearrange materials flow</i>	<i>Different actions, movements, forces</i>					
h. Work organisation		*	*	*		●		●	
i. Work environment		*	*				●		
j. Skills and experience				*	*		●	●	
k. Personal characteristics	*	*	*	*	*		*	●	●
l. Clothing								●	●

* The asterisks indicate the control option of job redesign as preferred to the other options, indicated by a dot ●.

NOTE: Each risk factor control option should be considered in order of priority.

Other Administrative Controls

5.18 Other administrative controls requiring consideration include any special needs relating to the employee, such as their state of health, and clothing.

JOB REDESIGN

Modify Object

5.19 Where the presence of a risk factor has been identified, the modifications suggested in the following questions may assist to reduce the risk:

- (a) Can the object be made lighter?
- (b) Can the object be packaged in smaller containers?
- (c) Can the object be made less bulky, so that it can be handled closer to the employee's centre of gravity?
- (d) Can the shape or surface texture of the object be changed to make it easier to grip?
- (e) Could the surface be cleaner or cooler, or the edges less sharp, so the employee can hold the object against the body?
- (f) Can handles be provided, or some type of sling used to move the object?
- (g) Is the object designed, or the material packaged, so that it will not shift unexpectedly while it is being moved?

Modify Workplace Layout

5.20 Modification of the workplace layout can reduce the risk associated with manual handling. Where risk factors have been identified, then particular workplace modification may be effective in reducing the risk. Examples of the modification of workplace layout are given in the following figures (Figures 9-16).

Modify workplace layout

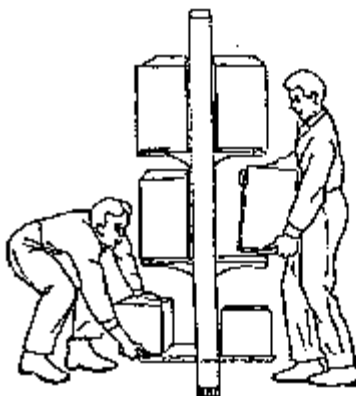


Figure 9 - Store heavier and frequently used items at waist level

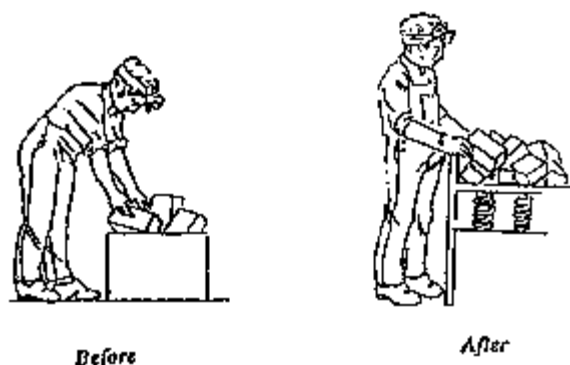


Figure 10 - Raise work level by use of self-adjusting platform

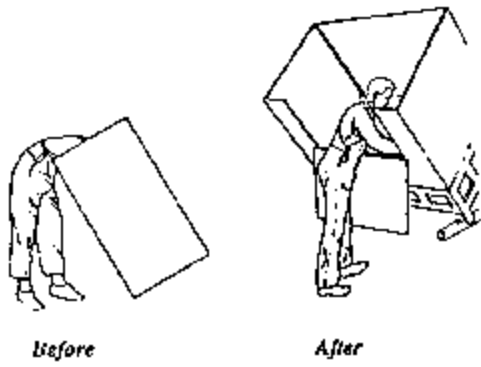


Figure 11 - Prevent excessive bending of the back by adjusting work level

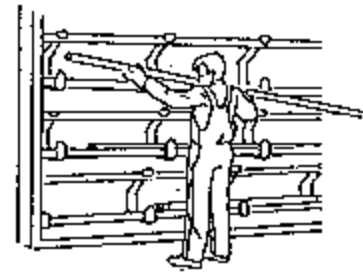


Figure 12 - Adjustable storage heights

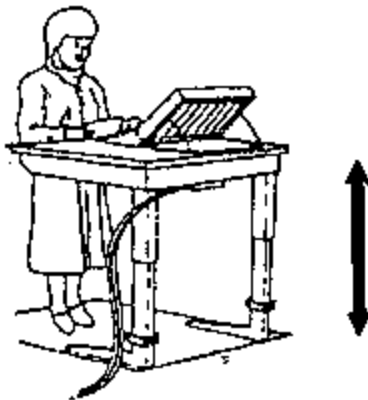
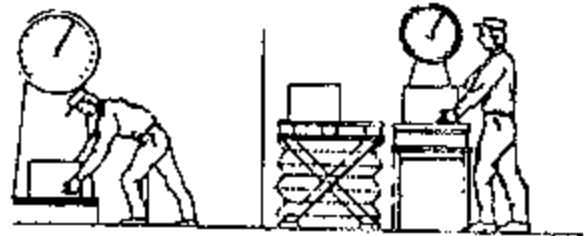


Figure 13 - Adjustable work heights



Poor

Better

Figure 14 - Adjustable work heights

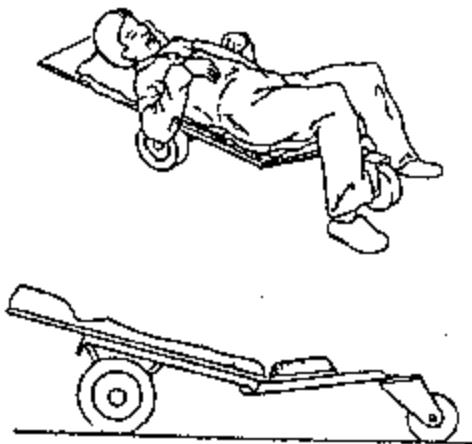
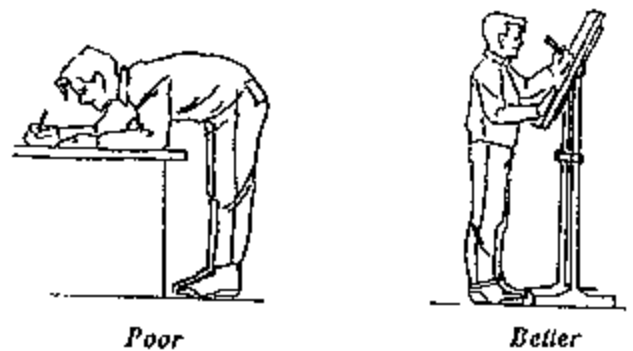


Figure 15 - Avoid muscle fatigue when working in awkward positions



Poor

Better

Figure 16 - Improve posture

Tool Design and Modification

5.21 The design of tools, implements and controls has an influence on work postures, movements and physical stress. Some principles of good design are:

- (a) Tools are as light as their function will permit, that is, heavy tools are fitted with devices to save the employee from having to support an unnecessary weight and designed for two handed use.

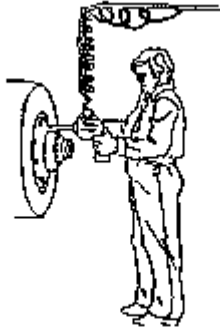


Figure 17 - Suspended tools avoid unnecessary load

- (b) Tools are well balanced. The angle between handle and working parts is designed to avoid unnatural bending of the hands and arms.
- (c) The handle is designed to suit the grip and force required, and preferably in such a way that the user can change grip.
- (d) The grip surface does not conduct heat or cold easily. It is sufficiently rough to prevent hands from slipping and it has no sharp or projecting parts to impose an uneven or unnecessarily heavy surface pressure on the hand.
- (e) The positioning, resistance direction of movement and length of travel of controls are suitable for the employees and job.
- (f) Tools are provided with adequate vibration insulation if necessary.
- (g) Tools are suitable for both right-handed and left-handed employees and for hands of different size.

Controls Design

5.22 In relation to controls, hand controls are often preferable for precision or speed of operation, while foot controls are generally best if greater force has to be applied. Pedals are most conveniently and safely operated from a seated position. If the employee has to stand up, the pedal shall be designed and positioned in such a way that the employee can support the foot on the pedal at the heel. This will make it easier to keep balance.

Rearrange Materials Flow

5.23 Where the presence of risk factors has been identified, then the following rearrangement may reduce the risk:

- (a) Rearranging the containers and the way materials are moved around the workplace, between different parts of the work process.
- (b) Placing loads to be handled in an optimum location will also reduce the risk. The best height range for handling loads is around waist level with lifting between the knuckle and the shoulder being acceptable.

5.24 The principles outlined above are illustrated in Figures 18-24.

Rearrange materials flow

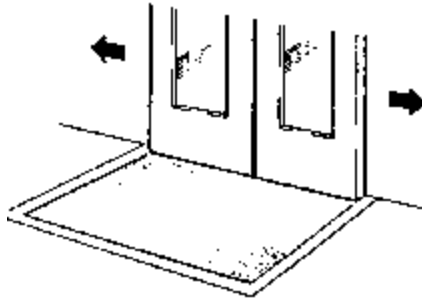


Figure 18 - Automatic door

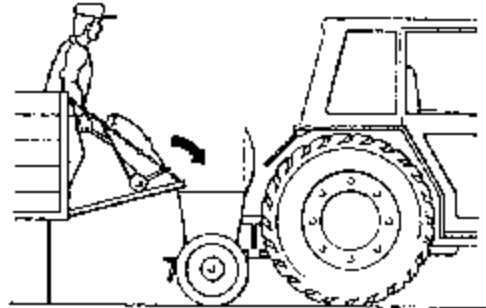


Figure 19 - Gravity feed principle to avoid lowering

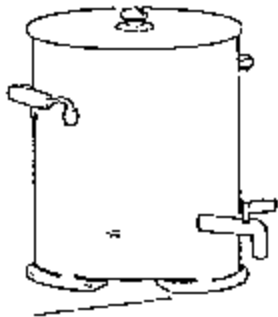


Figure 20 - Tap avoids lifting to empty

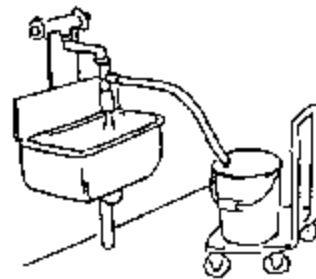


Figure 21 - Hose avoids lifting

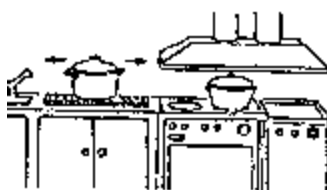


Figure 22 - Rollers avoid carrying

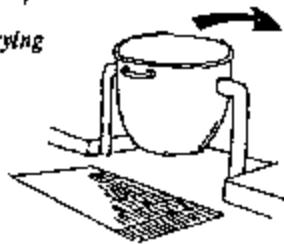


Figure 23 - Pour without lifting

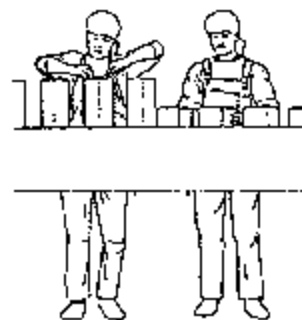


Figure 24 - Tilt objects to reduce work height

Different Actions, Movements, Forces

5.25 Where risk factors have been identified, the following suggestions may assist in reducing the risk.

5.26 Bending movements can be reduced by:

- (a) using lift tables, work dispensers and similar mechanical aids;
- (b) raising the work level;
- (c) positioning all material at work level;
- (d) keeping materials at work level, for example, avoid lowering objects that shall later be lifted; and
- (e) eliminating large horizontal reaches.

5.27 Twisting movements can be reduced by:

- (a) positioning all tools and materials in front of the employees;
- (b) using conveyors, chutes, slides or turntables to change the materials flow direction;
- (c) providing adjustable swivel chairs;
- (d) providing sufficient work space for the employee's whole body to turn; and
- (e) improving layout of the work area.

5.28 Reaching motions can be reduced by:

- (a) positioning tools and machine controls close to the employee;
- (b) positioning materials, workpieces and other heavy objects as near the employee as possible;
- (c) enabling the object handled to be kept close to the body;
- (d) reducing load or container size; and
- (e) enabling the employee to walk around the load or to rotate it.

5.29 Lifting and lowering forces can be reduced by:

- (a) eliminating the need to manually do this by using lift tables, forklifts, cranes, hoists, balancers, drum and barrel dumpers, work dispensers, elevating conveyors and similar aids, raising the work level, lowering the position of the employee and using gravity dumps and chutes;
- (b) reducing object weight by reducing load size (specify to suppliers, for example, in regard to photocopying paper packaging), reducing capacity of containers, reducing the weight of the container, reducing load in each container and reducing the number of objects lifted or lowered at one time;
- (c) increase object weight so that it shall be handled mechanically by using a unit or bulk load concept such as palletised loads;
- (d) reducing the holding position away from the body by changing object shape, providing suitable grips or handles, providing greater access to the load and improving workplace layout; and
- (e) converting to pushing or pulling.

5.30 Pushing and pulling forces can be reduced by:

- (a) eliminating the need to push or pull by using powered conveyors, using powered trucks or movers and using slides, rollers or chutes;
- (b) reduce required forces by reducing load weight; using non-powered conveyors, air bearings, ball castor tables, monorails and similar aids; using four-wheel hand trucks, hand trolley with good bearings and large diameter wheels or castors appropriate to the particular surfaces; providing good maintenance of equipment and floor surfaces; using mechanical pushers or pullers; and
- (c) reduce the distance of push or pull by improving work area layout; relocating production or storage area, or similar system change.

5.31 Carrying forces can be reduced by:

- (a) converting to pushing or pulling by use of conveyors, air bearings, ball castor tables, monorails, slides, chutes and similar aids, using forklifts, two or four-wheel hand trucks, trolleys and similar;
- (b) reducing object weight by reducing object size, reducing capacity of containers, reducing container weight, reducing load in each container and reducing the number of objects carried at one time; and
- (c) reducing carry or transport distance by improving work area layout, relocating storage or production area, or similar system change.

5.32 Holding forces can be reduced by:

- (a) reducing object weight, as above;
- (b) reducing object size;
- (c) reducing holding time;
- (d) eliminating holding by using, for example, jigs and fixtures; and
- (e) using mechanical loading and unloading.

5.33 Principles involved in minimising the risk of injury when applying force include:

- (a) pushing/pulling is more efficient if applied at or around waist level;
- (b) pushing in/pulling out is stronger than left/right (across the body); and
- (c) for manual handling, significantly higher push/pull forces are possible when standing than when seated, and the use of body weight in pushing/pulling is preferred.

Modify Task - Mechanical Assistance

5.34 Examples of mechanical aids and some potential hazards which may be encountered in their use are given below.

Hooks

5.35 The employee should be trained in the use of hand or packing hooks so that they will not glance off hard objects. If the hook is carried in the belt, the point shall be covered.

Bars

5.36 The major hazard in the use of a crowbar is that it may slip. The point or edges should have a good 'bite'.

Rollers

5.37 Rollers are often used to move heavy and bulky objects. Fingers or toes may be pinched or crushed between a roller and the floor.

Jacks

5.38 All jacks should be clearly marked with their safe working load. The surface onto which a jack is placed shall be level, clean and be sturdy enough to support the load. After the load is raised, additional support should be placed under it. Employees using jacks should wear safety shoes and instep guard protection because handles may slip or parts may fall.

Platforms

5.39 Platforms are useful for loading and unloading, provided that the load is maintained at a convenient height for lifting and handling.

Trestles

5.40 These and other support may be used for manoeuvring long loads on the point of balance, or for readjusting the grip or carrying posture.

5.41 The following figures (Figures 25-46) are examples of the use of mechanical assistance.

Modify task - mechanical assistance



Figure 25 - Adjustable platform reduces stooping and reaching

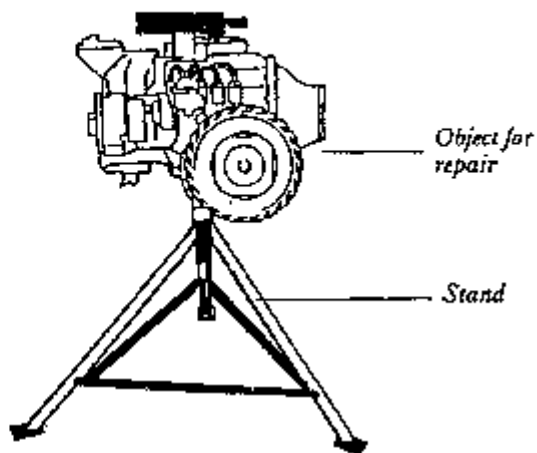


Figure 26 - Stand avoids awkward posture

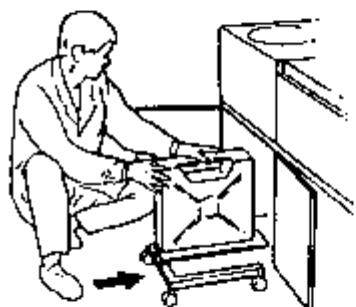


Figure 27 - Simple trolley avoids awkward handling

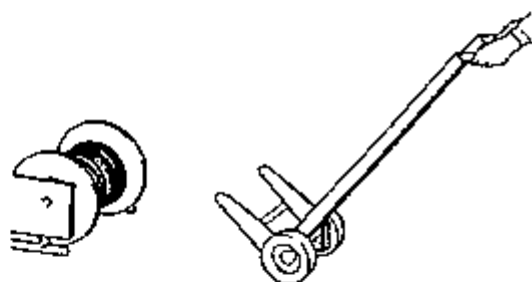


Figure 28 - Simple lever and wheels avoids stooping and reduces effort

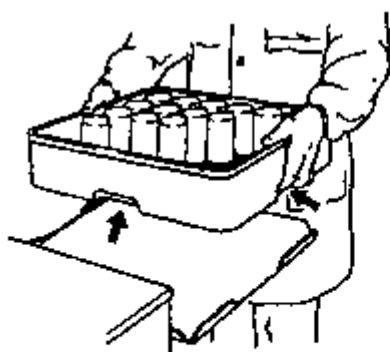


Figure 29 - Design for finger space

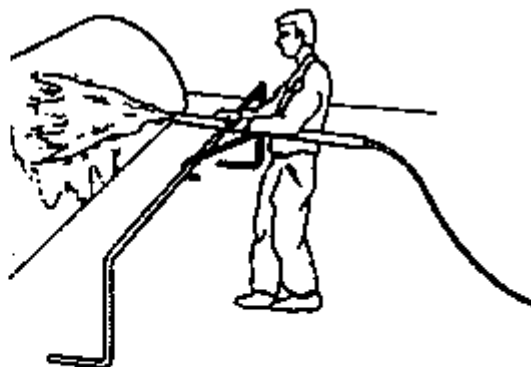


Figure 30 - Use structures to absorb reaction forces



Figure 31 - Simple frame enables better posture

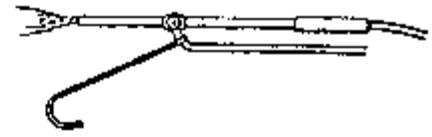
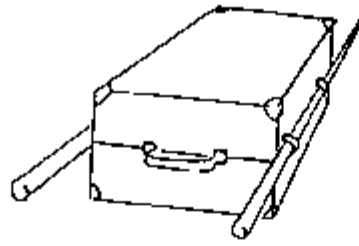


Figure 32 - Hose rests on and clips over bar

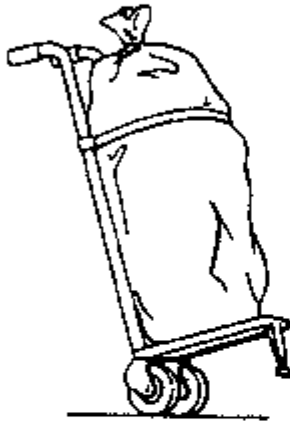


Figure 33 - Hand trolley

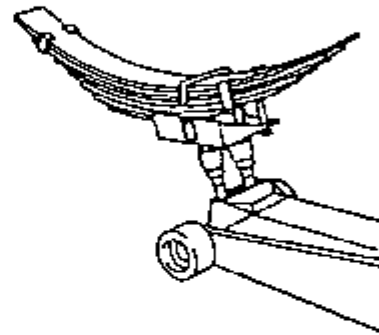


Figure 34 - Support weight by use of jack

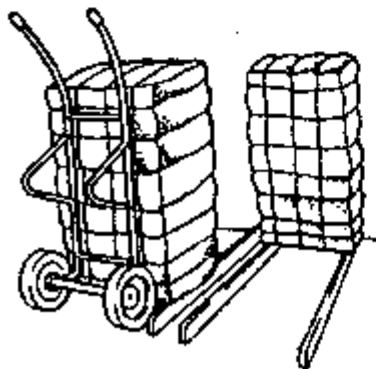


Figure 35 - Rails enable trolleys to slide under loads

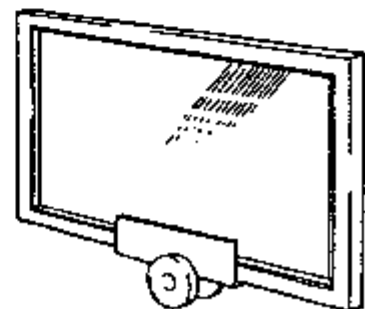


Figure 36 - Wheel set enables pushing in place of lifting

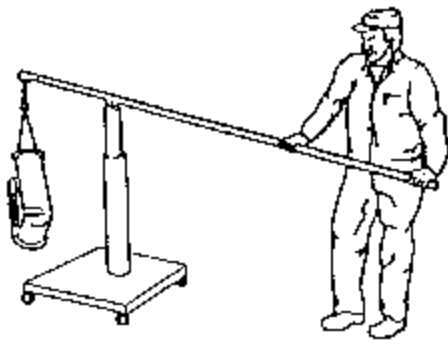


Figure 37 - Lever and rolling platform reduce effort

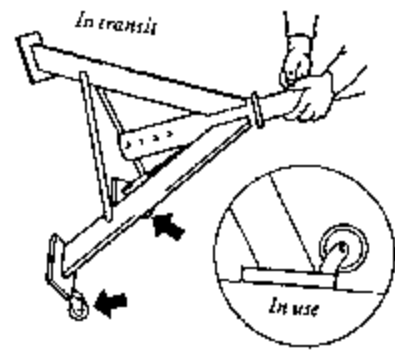


Figure 38 - Wheels avoid carrying when moving

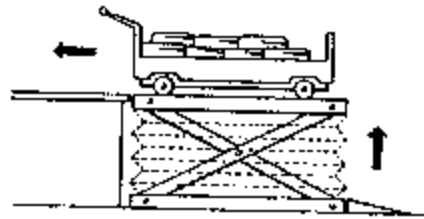


Figure 39 - Adjustable height platform reduces lifting

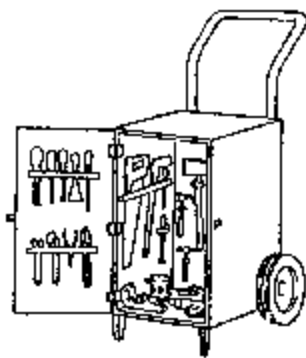


Figure 40 - Custom-made trolley avoids carrying

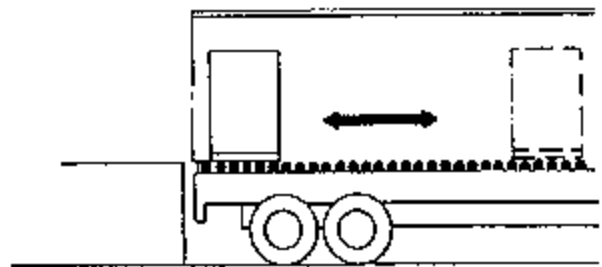


Figure 41 - Floor rollers assist moving

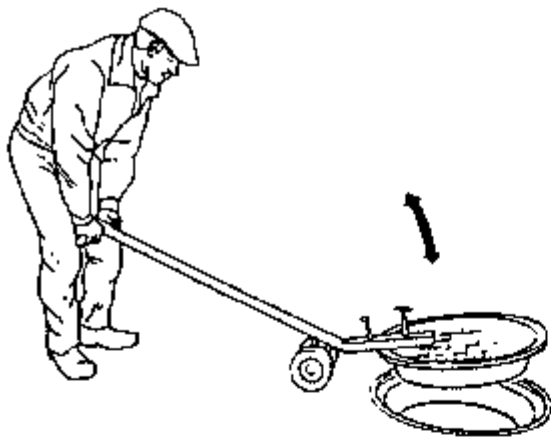


Figure 42 - Levers reduce force required

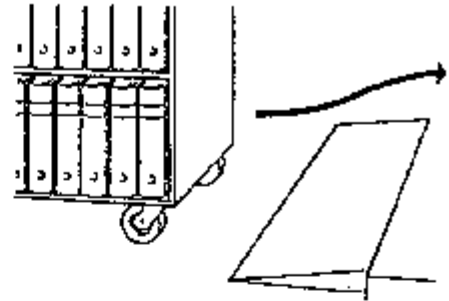


Figure 43 - Ramps avoid lifting or dragging



Figure 44 - Rolling platform to avoid lifting

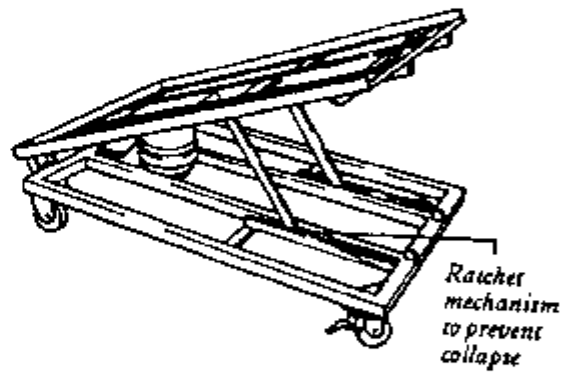


Figure 45 - Rolling platform with tilt mechanism

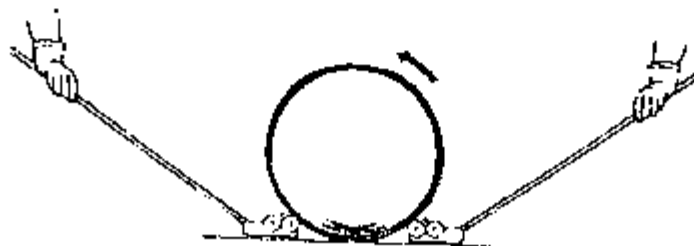


Figure 46 - Rollers and lever avoid stooping

Modify Task - Team Lifting

5.42 The regular need for team lifting usually signals the need for redesign. Introduction of team lifting may be effective in reducing risk in certain manual handling tasks.

5.43 Whenever team lifting is used, it is essential to co-ordinate and carefully plan the lift. In organising a lift it is important to ensure:

- (a) an adequate number of persons in the team;
- (b) that one person is appointed to coordinate the lift;
- (c) that the team members are of similar capacity and know their responsibilities during the lift;
- (d) that appropriate training in lifting has been provided; and
- (e) the lift has been rehearsed, including what to do in case of emergency.

Mechanical handling equipment

5.44 Where risk factors have been identified, then the provision of mechanical handling equipment may reduce the risk.

5.45 Mechanical handling equipment includes:

- (a) simple aids, for example, levers, sliding rails, conveyers, that is, belt conveyors and roller conveyors;
- (b) cranes and hoists, for example, jib cranes, overhead travelling cranes and mobile hoists;
- (c) positioning equipment, for example, lift jacks; and
- (d) industrial vehicles, for example, fork lift trucks and two-wheeled hand trucks.

5.46 Mechanical handling equipment should:

- (a) be easy to use and not cause an obstruction;
- (b) be designed to suit the load; and
- (c) be readily available even in emergencies.

5.47 Operators should have information, instruction, and opportunities for hands-on experience on their use.

5.48 The design, installation and use of mechanical handling equipment may be subject to State or Territory legislation.

Examples of Mechanical Handling Equipment

Conveyors

5.49 Conveyors are generally useful when loads are uniform, materials move continuously, routes do not vary, loads are constant, movement rate is relatively fixed, conveyors can bypass cross traffic, and the path to be followed is fixed. Types of conveyors include:

- (a) roller conveyors;
- (b) belt conveyors;
- (c) screw conveyors;
- (d) chutes;

- (e) monorails; and
- (f) trolley conveyors.

Cranes and hoists

5.50 Cranes and hoists are most commonly used when movement is within a fixed area, moves are intermittent, loads vary in size and weight, cross traffic will interfere with conveyors, and/or loads handled are not uniform. Types of cranes and hoists include:

- (a) overhead travelling cranes;
- (b) gantry cranes;
- (c) jib cranes;
- (d) hoists; and
- (e) stacker cranes.

Industrial trucks

5.51 Industrial trucks are generally used when loads are moved intermittently, movement is over varying routes, loads are uniform, cross traffic would prohibit conveyors, clearances and running surfaces are adequate and suitable, most of the operation consists of, for example, pallet-lifting, manoeuvring and stacking, and material can be put into unit loads. Types of industrial trucks include:

- (a) forklift trucks;
- (b) platform trucks;
- (c) two-wheel hand trucks;
- (d) tractor-trailer trains; and
- (e) hand stackers.

5.52 Illustrations of mechanical handling equipment follow (Figures 47-63).

Mechanical handling equipment

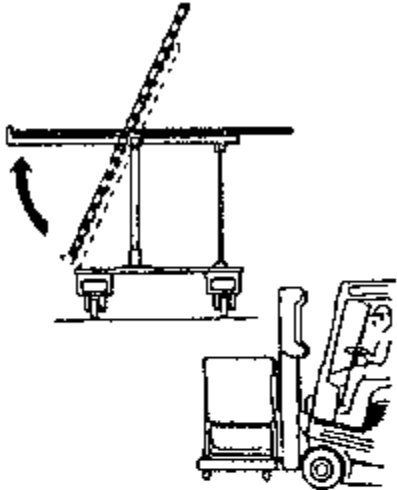


Figure 47 - A transport wagon designed for handling sheets of material

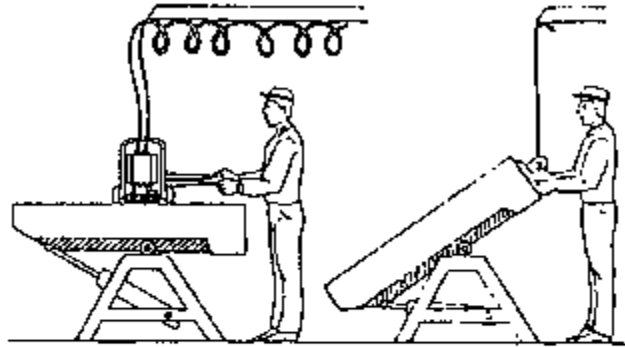


Figure 48 - Adjustable support stage provides a better work position for finishing surfaces

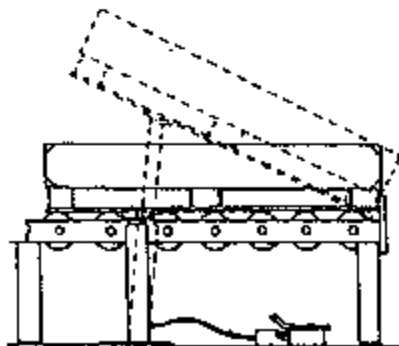


Figure 49 - Hydraulic tilt bed

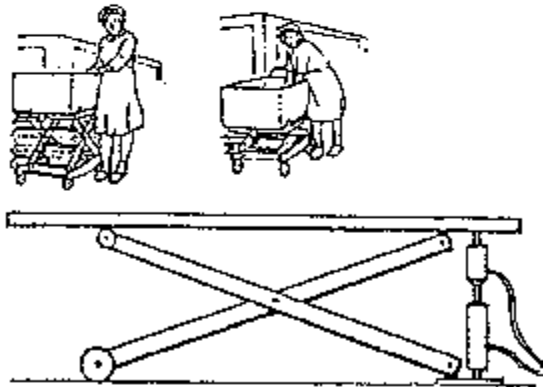


Figure 50 - Adjustable scissor table for different work heights

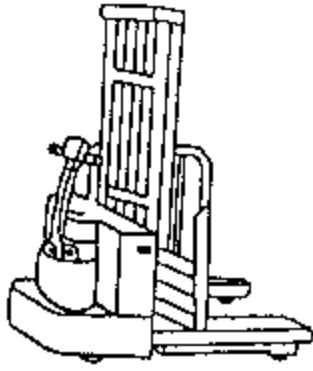


Figure 51 - Forklift

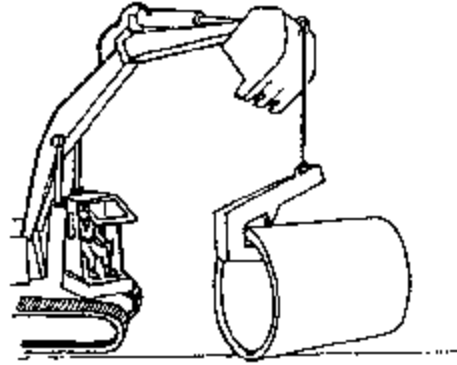


Figure 52 - Using c-hook to move cylinders and pipes

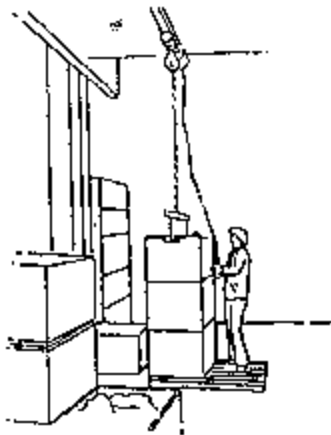


Figure 53 - Electric hoist

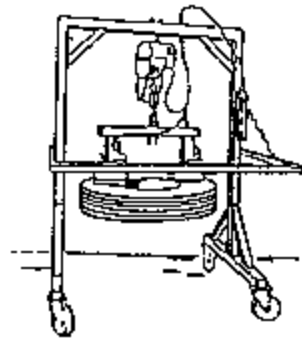


Figure 54 - Gantry crane for lifting heavy material off pallets

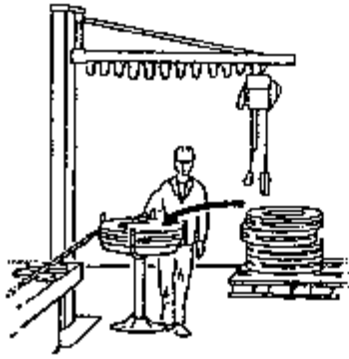


Figure 55 - Overhead crane for heavy lifting

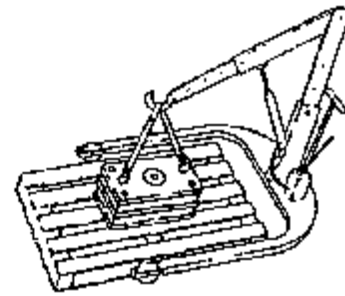


Figure 56 - Mobile crane

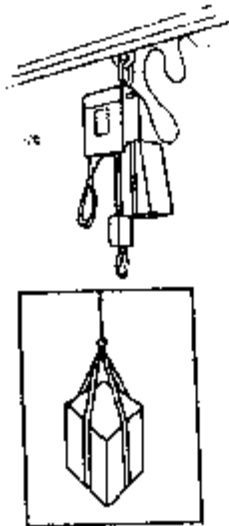


Figure 57 - Specially designed hooks or slings for lifting

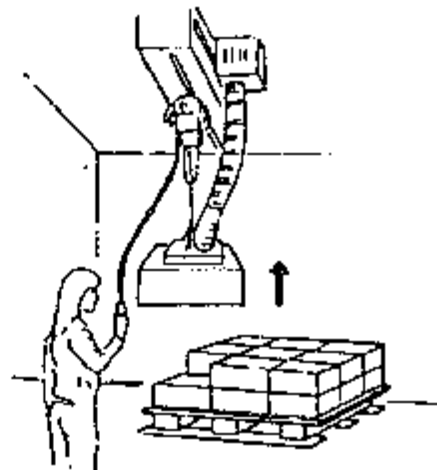


Figure 58 - Vacuum lifter for material handling

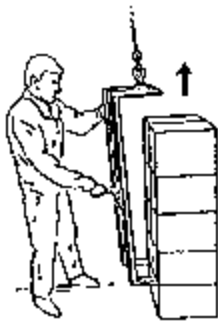


Figure 59 - Lifting device for moving boxes and crates

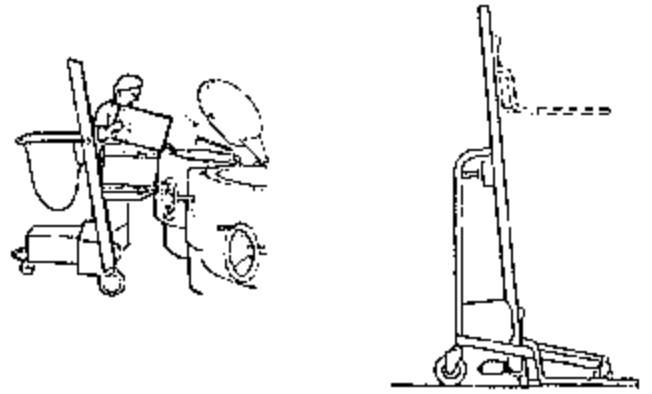


Figure 60 - A lifting cart makes it easier to dispense material above shoulder height

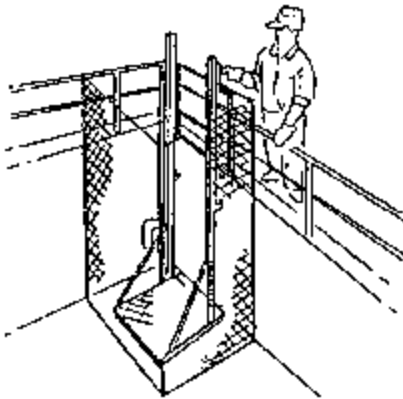


Figure 61 - Elevator for transporting goods between floors

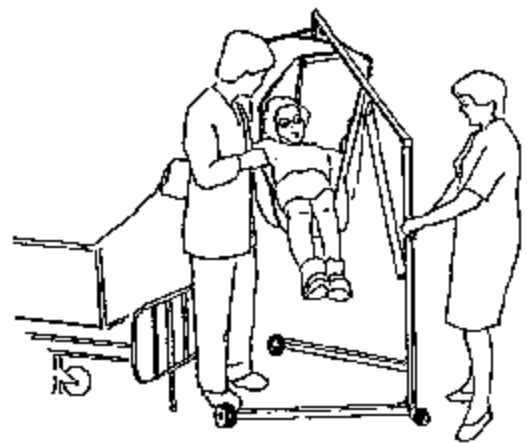


Figure 62 - Mechanical aids for patient lifting and moving

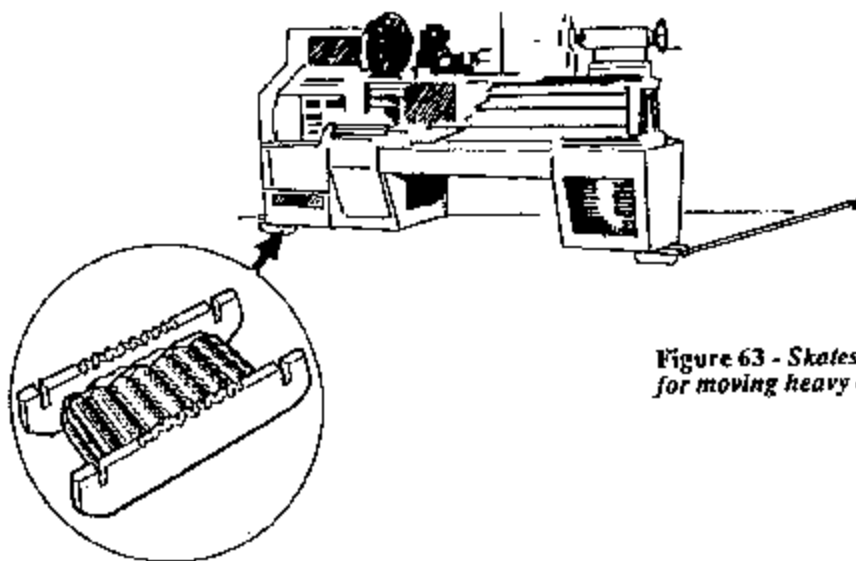


Figure 63 - Skates are useful for moving heavy equipment

TRAINING

General Training

5.53 The *Manual Handling Regulations* provide (Regulation 7 (2) (a)):

the employer must:

(ii) ensure that employees involved in the manual handling task receive appropriate training, (including training in safe manual handling techniques) and appropriate supervision.

5.54 In addition to the employees involved in manual handling, other target groups also requiring training include:

- (a) supervisors and managers of employees involved in manual handling tasks;
- (b) employees' representative(s) on health and safety matters; and
- (c) staff responsible for work organisation, job and task design.

5.55 Objectives in relation to training should be established and should include:

- (a) the prevention of manual handling injuries by an approach based on risk identification and assessment, and primary control through job and task design;
- (b) the recognition and promotion of understanding of the multi-faceted nature of manual handling activities; and
- (c) the promotion and utilisation of safe manual handling techniques.

Training Content

5.56 The content of any training program should be tailored to the specific needs of the group being trained.

5.57 Topics should include:

- (a) a review of the risks to health from manual handling;
- (b) the magnitude of the problem;
- (c) a review of the potential effect of manual handling on the body;
- (d) the identification and assessment of job and individual risk factors associated with manual handling injuries;
- (e) control strategies, with primary emphasis being placed on work organisation, job and task design;
- (f) safe manual handling techniques;
- (g) safe use of mechanical handling aids and personal protective equipment; and
- (h) responsibilities of the parties.

Particular Training

5.58 In addition to the general training above, the *Manual Handling Regulations* provide (Regulation 7(2)(b))

The employer must:

(ii) ensure that the employees receive appropriate training and supervision in the correct use or application of any mechanical aids, personal protective equipment or team lifting procedures supplied or introduced for the purposes of subparagraph (i).

5.59 The provision of particular training should follow an analysis of the task(s) involved which will have identified the risk factors present. Once the analysis has eliminated job design options as impracticable, how to do the job with least risk shall be defined and forms the basis of the particular training.

5.60 The training shall be specific to the task and will aim to ensure that the employee:

- (a) understands the reasons for doing the job with least risk;
- (b) can recognise the risks and decide the best way to go about it;
- (c) knows what is the best way to go about it; and
- (d) can perform the task in this way.

5.61 This training should be supplemented by appropriate supervision when required. Any training which is provided for employees required to carry out the manual handling, should also be provided to their supervisors.

Training in the Principles of Correct Manual Handling and Lifting

Manual Handling

5.62 For purposes of training programs, the following principles apply for most manual handling tasks.

Plan

5.63 As one way of avoiding overexertion injuries, the employee undertaking the manual handling should assess the load, determine where it will be placed and decide how it will be handled. By first assessing the situation, the employee can decide if mechanical assistance/aids or another person is needed to move the object, animal or person.



Figure 64 - Plan the lift

Determine the best technique

5.64 All factors should be taken into account when determining the best technique. The best handling technique involves suitable balance and avoidance of unnecessary bending, twisting and reaching. A person undertaking a lift should lift efficiently and rhythmically, minimising bending of the lower back. The knees should be bent, but preferably not at a right angle. When applying force, the principles in Section 5.25-5.33 of this Code of Practice are also relevant.

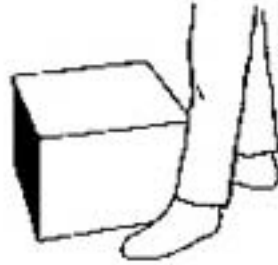


Figure 65 - Determine the best lifting technique

Take secure grip on the object being handled

5.65 The grip helps to determine how safe the task will be. Whenever possible, a comfortable power grip (with the whole hand) should be used rather than a hook or precision grip (with fingers only).

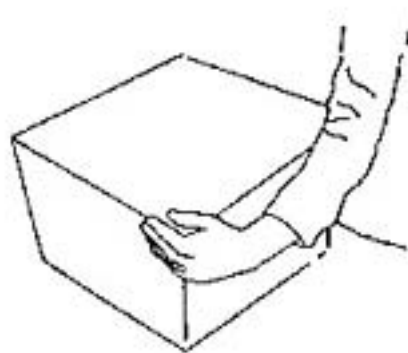


Figure 66 - Get a secure grip

Pull the load in close to the body

5.66 For lifting in particular, it is important to have the centre of gravity of the load close to the body to prevent excessive stress on the back and to use the strongest muscles of the arms to hold the load. It is important to minimise the effects of acceleration by lifting slowly, smoothly and without jerking.

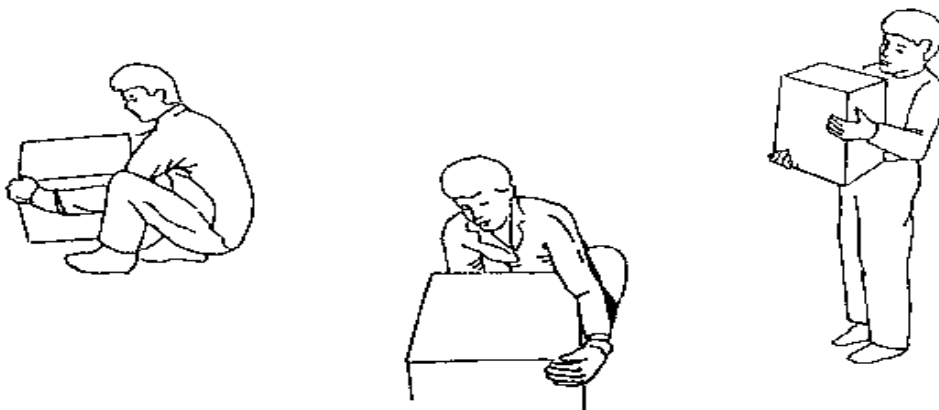


Figure 67 - Pull the load in close to your body

Vary heavy handling tasks with lighter work

5.67 The job/task should be designed so as to provide alternative tasks that do not heavily stress the same muscles. Throughout the work shift, heavier handling tasks should be alternated with lighter tasks which allow the active muscles to recover.

Team lifting

5.68 To enable load sharing, lifting partners should be of similar height and build and should be trained in lifting techniques. There should be a person nominated as team leader to coordinate the lift. Team lifting should not be used as a first option in risk control.



Figure 68 - Team lifting

Manual Lifting

5.69 It is difficult to generalise about the optimum or maximum weight of a load to be lifted, because there are so many factors involved besides the actual weight to be lifted.

5.70 The following points should be considered:

- (a) Lifting aids should be used if possible.
- (b) There should be sufficient space for lifting to be done in the right position and with correct posture and body movements.
- (c) There should be no obstructions when moving objects.
- (d) The start and finish height of the load should be a suitable level above the floor, that is, between mid-thigh to shoulder height, preferably at about waist height.
- (e) The centre of gravity of the load should be as close to the body as possible. A load is more difficult (heavier) to lift or carry if it is not close to the body. For example, 10 kg held at a distance of 80 cm imposes the same load as 50 kg right next to the body.
- (f) The back should not be twisted or bent sideways.
- (g) Lifting with one hand should be avoided.
- (h) If lifting has to be performed frequently or for prolonged time periods, then the acceptable weight of the load rapidly diminishes.

Other administrative controls

Special Needs

5.71 The state of an individual's health should be taken into consideration when allocating manual handling duties, drawing upon medical advice as appropriate. When an individual's health changes and those changes affect capacity to perform normal duties, whether permanently or temporarily (such as hernia, pregnancy or post-operative recovery), as far as workable the work system should be adapted to suit the new circumstances or the individual should be allocated other tasks.

5.72 In making such decisions, it may be necessary to seek medical assessment of individual cases in relation to the specific duties of a job, rather than generalised conclusions about the capacities of groups to perform manual handling tasks.

Clothing

5.73 In some situations, special clothing is required to reduce risk of injury. The following examples demonstrate how special clothing can reduce the risk of injury:

- (a) gloves provide protection from cuts and abrasions;
- (b) proper footwear assists prevention of injuries from slips and falls, and from dropped loads; and
- (c) proper clothing allows loads to be carried close to the body.

APPENDIX A

SAFE MANUAL HANDLING CHECKLIST GENERAL RISK IDENTIFICATION

Description of Work Location _____ Date ____/____/____

Task Description _____






Assessed by _____

Employee(s) _____

Health and Safety Representative _____

The existence of any one of the following key risk factors, that is, a *Yes* answer, indicates the need for further assessment as outlined in Section 4 - Risk Assessment in the Code of Practice.

MOVEMENTS, POSTURE AND LAYOUT DURING MANUAL HANDLING

- | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------|--------------------------------|
| <p>1. Is there frequent or prolonged bending down where the hands pass below mid-thigh height?
If Yes see 4(a), 4(b), 4(c)</p> |  | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| <p>2. Is there frequent or prolonged reaching above the shoulder?
If Yes see 4(a), 4(b), 4(c)</p> |  | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| <p>3. Is there frequent or prolonged bending due to extended reach forward?
If Yes see 4(a), 4(b), 4(c)</p> |  | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| <p>4. Is there frequent or prolonged twisting of the back?
If Yes see 4(a), 4(b), 4(c)</p> |  | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| <p>5. Are awkward postures assumed frequently or over prolonged periods, that is, postures that are not forward facing and upright?
If Yes see 4(a), 4(b), 4(c)</p> |  | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

TASK AND OBJECT

- | | | |
|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------|
| <p>6. Is manual handling performed frequently or for long time periods by the employee(s)?
If Yes see 4(d), 4(e), 4(h)</p> | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| <p>7. Are loads moved or carried over long distances?
If Yes see 4(d), 4(e)</p> | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| <p>8. Is the weight of the object:</p> <p>(a) more than 4.5 kg and handled from a seated position?
If Yes see 4(f)</p> | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| <p>(b) more than 16 kg and handled in a working posture other than seated?
If Yes see 4(f)</p> | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |
| <p>(c) more than 55 kg?
If Yes see 4(f)</p> | Yes
<input type="checkbox"/> | No
<input type="checkbox"/> |

Weight is not used to prescribe absolute limits, but is one of the important factors to be considered when assessing and controlling risk.

9. For pushing, pulling or other application of forces: are large push/pulling forces involved?
If Yes see 4(f)

Yes No

10. Is the load difficult or awkward to handle, for example, due to its size, shape, temperature, instability or unpredictability?
If Yes see 4(g)

Yes No

11. Is it difficult or unsafe to get adequate grip of the load?
If Yes see 4(g)

Yes No

WORK ENVIRONMENT

12. Is the task performed in a confined space?
If Yes see 4(i)

Yes No

13. Is the lighting inadequate for safe manual handling?
If Yes see 4(i)

Yes No

14. Is the climate particularly cold or hot?
If Yes see 4(i)

Yes No

15. Are the floor working surfaces cluttered, uneven, slippery or otherwise unsafe?
If Yes see 4(h) and 4 (i)

Yes No

INDIVIDUAL FACTORS

16. Is the employee new to the work or returning from an extended period away from work?
If Yes see 4(h), 4(j), 4(k)

Yes No

17. Are there age-related factors, disabilities or other special factors that may affect task performance?
If Yes see 4(h), 4(j), 4(k)

Yes No

18. Does the employee's clothing or personal protective equipment interfere with manual handling performance?
If Yes see 4(l)

Yes No