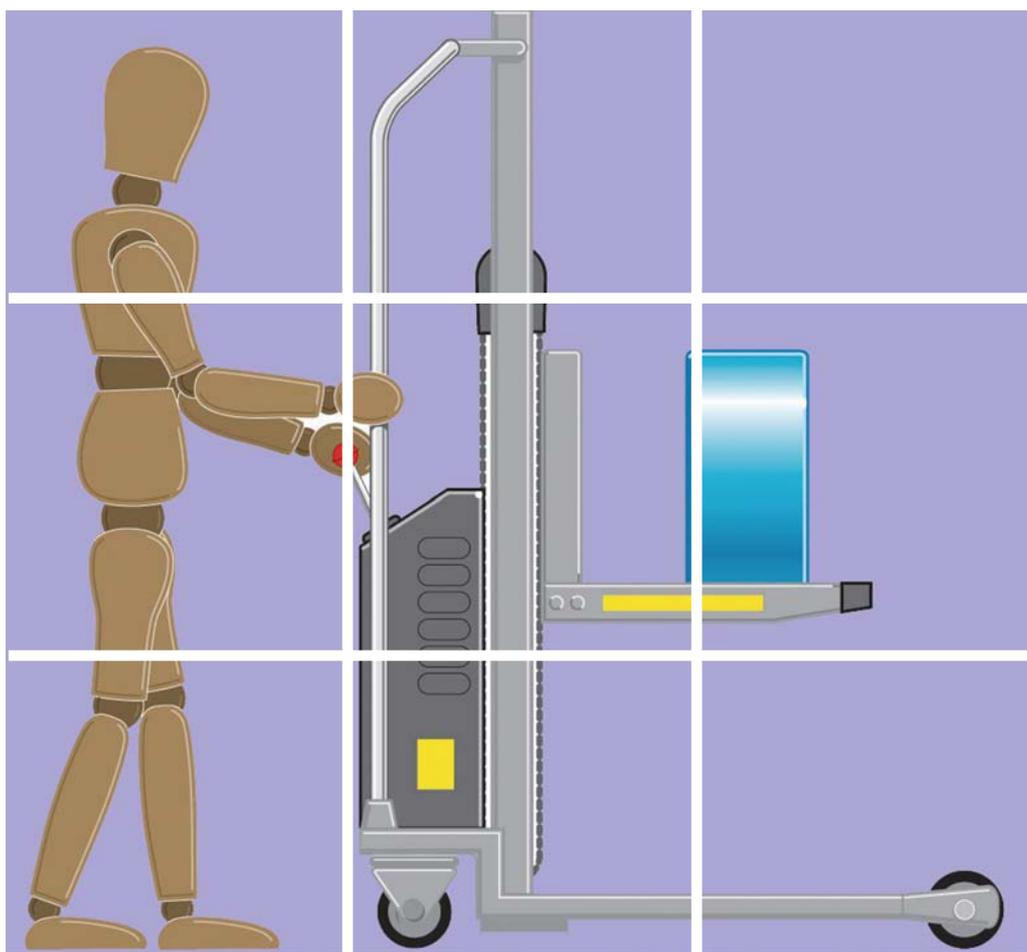




HEALTH AND SAFETY
AUTHORITY



Guidance on the Management of Manual Handling in the Workplace

€10

Guidance on the Management of Manual Handling in the Workplace

Published in June 2005 by the Health and Safety Authority, 10 Hogan Place, Dublin 2.

© All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Health and Safety Authority.

ISBN 1-84496-023-4

Table of Contents:

Introduction	3
The Extent of the Issue	4
The Legislation	6
A Manual Handling Management Programme	8
Element 1: Develop a Manual Handling Policy	9
Element 2: Consultation	12
Element 3: Risk Assessment and Implementation of Controls	13
Step 1: Identification of Tasks to be assessed	
Step 2: Development of a Risk Assessment Schedule	
Step 3: The Risk Assessment Process	
Stage 1: Task Observation	
Stage 2: Collection of Information	
Stage 3: Identification of Risk Factors	
Stage 4: Solution Development and Plan of Action	
Stage 5: Review Effectiveness of Control Measures	
Element 4: Training	27
Element 5: The Role of Ergonomics in the design of work activity	29
Conclusion	30
Appendices	31

Introduction:

This guidance outlines the key parts of the Manual handling of loads regulation and its related Schedule and it aims to give a better understanding of the risk factors associated with manual handling. These regulations are likely to be remade in 2005 without substantive changes. The guidance underlines the need to put an effective manual handling risk assessment process in place and it outlines the key stages of this process. This implies the need for proactive ergonomics input at the planning and design stage. It explains how manual handling can be avoided or reduced through better planning, consultation and systematic management. It provides ideas for solutions to different manual handling problems. Not all the ideas will be relevant in all circumstances; different manual handling situations require different solutions, depending on the nature and extent of the risk.

It is not within the scope of this guidance to cover in detail the area of back care management and injury management. These are necessary elements of back injury prevention, which need to be considered but fall outside the realms of the manual handling regulations.

The guidance is designed for all parties who play a part in managing manual handling risk and these include designers, architects, manufacturers, suppliers, contractors, health and safety professionals, safety representatives, employers and employees.

The Authority would like to acknowledge the Health and Safety Executive (UK) for some of the images used in these guidelines.

The Extent of the Issue:

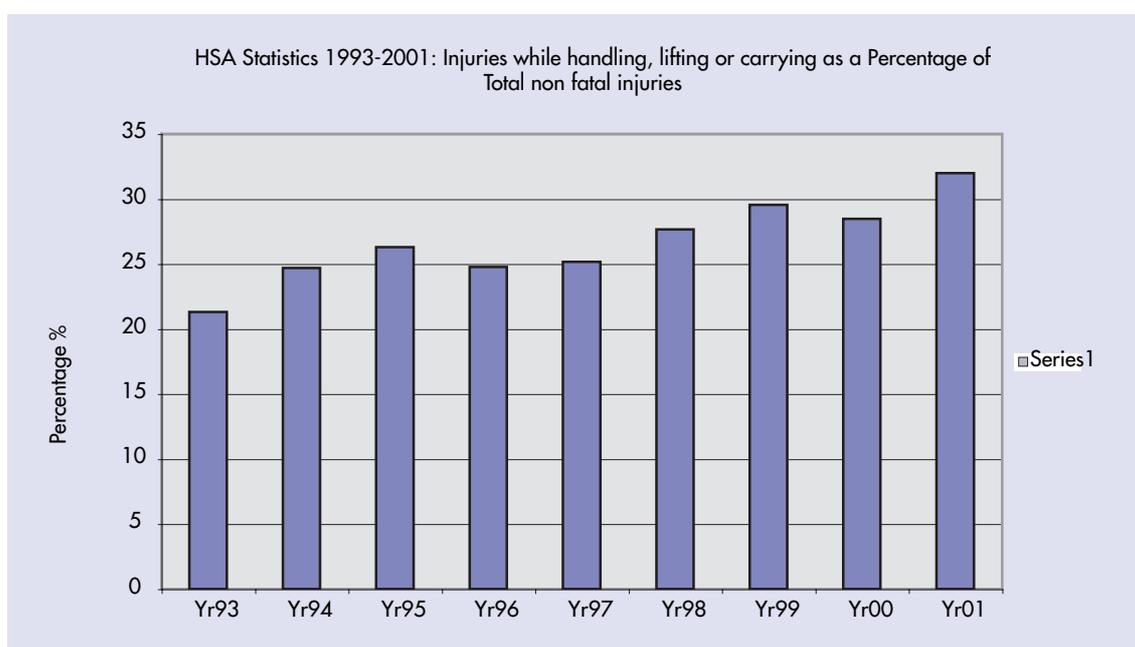
The manual handling of loads regulation and its related schedule sets out a framework for employers to reduce the risk of injury from manual handling activity. It seeks to reduce the very large incidence of injury and ill health arising from the manual handling of loads at work. The regulations place duties on employers in respect of their own employees.

The main concern with manual handling activity is the increased risk of injury due to wear and tear on the back, especially on the lumbar intervertebral discs, (Grandjean 2000). Back injuries can be painful and reduce one's mobility and can lead to long absences from work and in modern times are among the main causes of early disability.

Almost every occupational setting requires some form of manual handling. Space limitations, varied nature of the activity, and the reluctance to make substantial investment in mechanised/automated equipment are some of the reasons for not avoiding or reducing manual handling (Mital 1998). Invariably, the abilities of individuals to perform these activities, either frequently or occasionally are exceeded, resulting in severe chronic or acute injuries.

The data in **Table 1** below demonstrates that injuries due to manual handling make up a significant percentage of non-fatal accidents reported to the Health and Safety Authority every year. Since 1993 injuries due to manual handling activity have been on the increase, and in 2003, 34% of reportable accidents were injuries due to manual handling activity. It is accepted that there are situations where the cause of injury may be multi-faceted, however the official H.S.A. statistics do show a large incidence of injury due to manual handling activity.

TABLE 1:



These statistics are consistent with statistics across Europe including a report by the European Foundation for Living and Working conditions produced in 2001. In 2000 The Foundation carried out the Third European Survey and questioned 21,500 workers in face-to-face interviews on their working conditions. The most common work related health problem reported was back pain, which was reported by 33% of workers. It also reported that exposure to poorly designed work environments, which involved carrying heavy loads, and working in awkward painful positions remains prevalent. An increasing proportion of workers are reporting work-related health problems.

In this context the Health and Safety Authority developed a specific programme of work to assess the management of manual handling in the workplace. A key part of this programme was the completion of inspections across a number of sectors with a focus on manual handling. A report on the findings of this inspection programme was submitted to the Health and Safety Authority Executive and board at the end of 2001. This report identified a number of recommendations including the need to develop new guidance on manual handling risk assessment.

This guidance document is focused on giving advice on managing manual handling in the workplace.

The Legislation

The Safety Health and Welfare at Work (General Application) Regulations of 1993 are made up of ten pieces of legislation and twelve schedules which relate to specific parts of the legislation. Part VI of these regulations transposes EU Council Directive 90/269/EEC on the minimum health and safety requirements for the manual handling of loads into Irish legislation. The regulation is titled the Manual Handling of Loads Regulation. This regulation is likely to be remade in 2005 without substantive changes. The main structure of the regulation is as set out below:

REGULATION 27 INTERPRETATION FOR PART VI

In this part, “manual handling of loads” means any transporting or supporting of a load by one or more employees, and includes lifting, putting down, pushing, pulling carrying or moving a load, which by reason of its characteristics or unfavourable ergonomic conditions, involves risk, particularly of back injury, to employees.

This definition of manual handling refers to unfavourable ergonomic conditions.

DEFINITION OF ERGONOMICS:

“Ergonomics applies information about human behaviour, abilities and limitations and other characteristics to the design of tools, machines, tasks, jobs and environments for productive, safe, comfortable and effective human use.” (McCormick and Saunders 1993)

The objective is to achieve the best possible match between the job and the worker. In other words, ergonomics is the science of fitting the job to the worker. The unfavourable ergonomic conditions are detailed as reference factors in the Eighth Schedule of SI 44 of 1993.

REGULATION 28 DUTIES OF EMPLOYER:

- (a) take appropriate organisational measures, or use the appropriate means, in particular mechanical equipment, to avoid the need for manual handling of loads by employees.
- (b) where the need for the manual handling of loads cannot be avoided, take appropriate organisational measures, use appropriate means or provide his employees with such means in order to reduce the risk involved in the manual handling of such loads having regard to the factors specified in the Eighth Schedule
- (c) wherever the manual handling of loads by his employees cannot be avoided, organise workstations in such a way as to make such handling as safe and health as possible, and:
 - (i) assess the health and safety conditions of the type of work involved, and in particular examine the characteristics of the loads, having regard to the factors specified in the Eighth Schedule, and

- (ii) take care to avoid or reduce the risk, particularly of back injury, to his employees, by taking appropriate measures, considering in particular the characteristics of the load, the physical effort required, the characteristics of the working environment and the requirements of the activity, taking account of the factors for the manual handling of loads specified in the Eighth Schedule, and
- (d) without prejudice to the provisions of Regulation 11, ensure that those of his employees who are involved in manual handling of loads receive general indications and, where possible, precise information on
 - (i) the weights of each load
 - (ii) the centre of gravity of the heaviest side when a package is eccentrically loaded.

In a situation where there is no certainty as to the weight of a load, then such loads should be tested before lifting and if aids such as trolleys are required, then they should be made available. This is a point that could also be incorporated into a manual handling training programme for employees.

Manual handling risk assessment is not being addressed effectively in the Irish workplace (Power, 2003) and therefore there are minimal efforts being put in place to avoid or reduce manual handling.

The emphasis of this guidance is on injury prevention and it will underline the need for a health and safety management system specific to manual handling. This system will need to ensure that manual handling activities are assessed and that engineering and organisational measures are put in place to avoid or reduce the manual handling activity. It will also ensure that where appropriate manual handling training and supervision will be provided. It is important to underline that ideally the assessment of manual handling activities should be completed at the design stage of a project so that efforts can be made at that stage to put appropriate measures in place to eliminate potential risk factors.

The Regulations set no specific requirements such as weight limits; the ergonomic approach shows clearly that such requirements are based on too simple a view of the problem. However this guidance does offer numerical guidelines, which take into account weight, repetition and location of lift as a means of identifying handling activities, which involve risk.

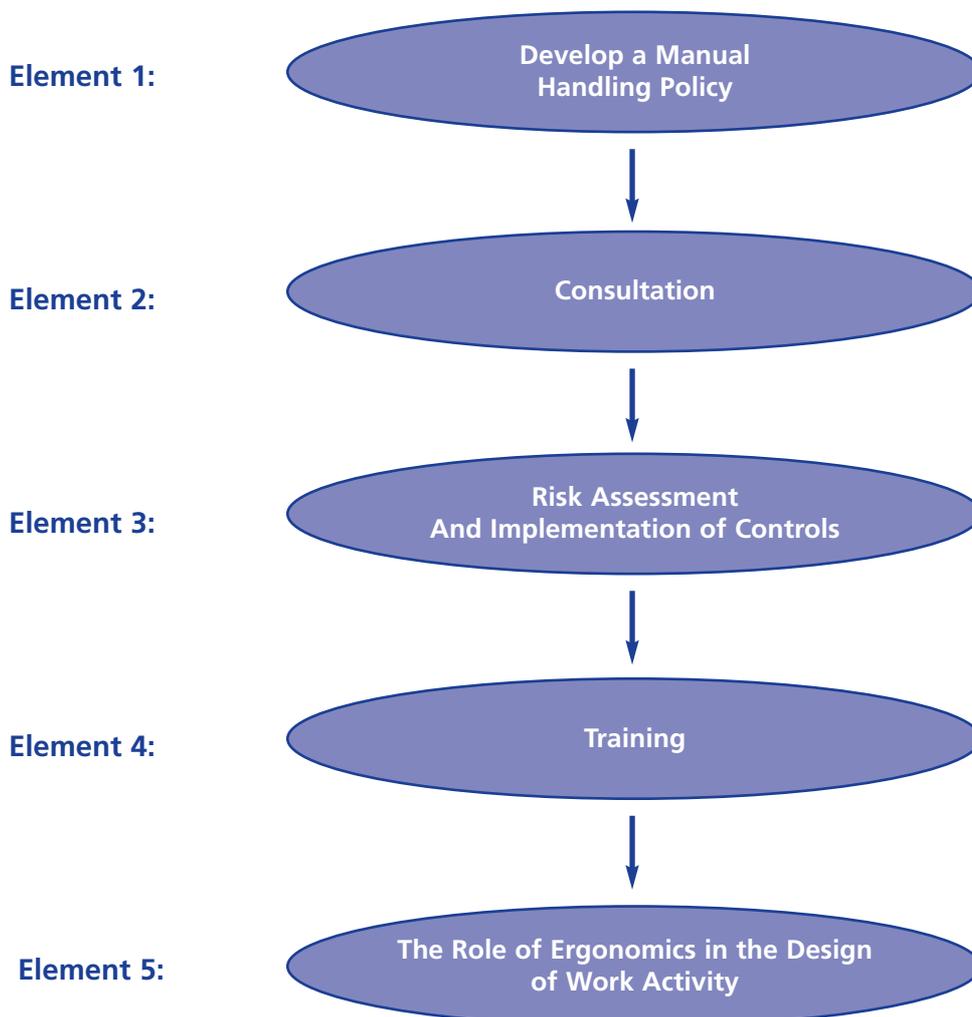
This guidance contains a general framework within which individual industries and sectors will be able to produce more specific guidance appropriate to their own circumstances.

A Manual Handling Management Programme (MHMP):

There is now substantial international acceptance of both the scale of manual handling hazards and methods of prevention. Modern medical and scientific knowledge stresses the importance of an ergonomic approach to remove or reduce the risk of manual handling injury. Ergonomics is sometimes described as “fitting the job to the person rather than the person to the job”. The ergonomic approach, therefore, looks at manual handling as a whole. It takes into account a range of relevant factors including the nature of the task, the load, and the work environment.

An effective way of managing manual handling in the workplace is to develop a manual handling management programme (MHMP). In the U.S. many industries have developed successful programmes aimed at preventing work related musculoskeletal disorders. The programme should not be considered in isolation but should be considered as a part of the overall system for managing health and safety.

A programme such as this will be made up of a number of key elements, which include:



Element 1: Develop a Manual Handling Policy:

Occupational Health and Safety literature stresses management commitment as a key and perhaps controlling factor in determining whether any workplace hazard control effort will be successful (NIOSH 1997). Management commitment can be expressed in a variety of ways but essentially a management policy statement should include statements that:

- Treat management of manual handling as furthering the company's goals of maintaining a healthy and safe work environment.
- Commitment to implementing a risk assessment process to avoid or reduce manual handling activity.
- Expect full co-operation of the entire workforce at all levels including contractors and suppliers in working towards ergonomic improvements to avoid or reduce manual handling activity, which involves risk.
- Assign lead roles to appropriate trained and competent staff or external contractors. A number of Health Trusts in the UK have appointed Back Care Advisors. These are highly qualified professionals who advise on compliance with legislation, develop effective manual handling policies, implement risk assessment, provide more equipment and improved training programmes. The advantage of designating lead roles to appropriate, trained and competent staff within organisations would be that such individuals could drive manual handling programmes from within. This situation would be the norm for larger organisations. In the case of small and medium enterprises it would not be expected that such an approach would be implemented. However, it is expected that they would seek competent advice where necessary to assess manual handling tasks, which may pose a risk.
- Give the management of manual handling priority with other cost reduction, productivity and quality assurance activities.
- Have the support of all parties.

Apart from the development of a policy statement there should be regular consultation between management and staff to allow full discussion of the content of the policy and plans for implementation. The manual handling policy should also identify clear goals to address specific operations, which pose the greatest risk and should outline the resources, which will be committed to ensure effective implementation of the policy. These resources would include providing detailed instruction and training to those expected to assume a lead role, bringing in

outside experts for consultation about risk assessment or other difficult issues until such time as in-house expertise can be developed with the appropriate competencies.

The policy document must also outline how information will be furnished to all those involved in or affected by the manual handling management interventions. Communication at every stage of the process is essential, for example, management should be up-front regarding possible impacts of the programmes on work systems.

All good management programmes must have a means of measuring the effectiveness of the interventions; the policy document should stipulate what measures will be used to track performance. This will allow all staff to see what progress is being made and also what difficulties may arise during implementation, which need to be corrected.

A management policy on Manual Handling could have a set structure, which could include the following:

- **INTRODUCTION:**

This can make reference to injury rates, the need to integrate Manual handling into the Safety management system, the purpose of the document, the approach that will be taken in terms of resources, risk assessment and training.

- **MANUAL HANDLING POLICY**

This can make reference to the key objectives (e.g. To avoid and reduce risk associated from manual handling). It can reference the relevant legislation and outline the scope of the policy.

- **DEFINITIONS**

This section clearly defines key word or phrases used in the policy

- **THE POLICY - RESPONSIBILITIES**

This will outline the key responsibilities necessary to support the implementation of the manual handling policy which include:

- Employee Responsibilities
- Management Responsibilities
- Record keeping

- **THE PROCEDURES**

Risk Assessment:

This section makes reference to the risk assessment process, who should carry out the assessments, what should be included, how the assessments should be recorded, what controls should be considered and how they should be implemented.

Training:

The policy on manual handling training should be detailed and it should include a

section on the selection of staff to become instructors and arrangements to provide in-house training for staff.

– Accident Reporting and Accident Investigation:

This section should outline steps to take when an accident occurs and should consider the initial reporting of the accident, organising proper care for the injured party including provisions for organising modified early return to work and a procedure to follow, for the accident investigation. The accident report should include a drawing of the layout of the workplace where the accident happened with a clear description of the task and any equipment used.

– Procurement of Equipment:

This section should underline the need for the development of procurement policies that routinely include consultation and appropriate audit procedures when purchasing new equipment or making changes to existing systems of work which could affect the way manual handling tasks are carried out.

This could include the introduction of a new mechanical aid, which needs to be compatible with the work surroundings, other equipment and mechanical devices, and is easily maintained. It is important that a training plan is put in place to ensure that staffs are given appropriate training in the safe use of equipment. (e.g. Safe use of hoists for handling patients)

- **APPENDICES:**

This can include risk assessment forms, references to relevant guidance and legislation and examples of design and engineering solutions to avoid the need for manual handling.

Again in the case of small and medium enterprises it is not necessary to have detailed policies such as this. Such enterprises however should recognise the need to risk assess manual handling activities and to ensure that appropriate measures are taken to avoid or reduce risk.

Element 2: Consultation

The manual handling regulations place a duty on the employer to assess manual handling activities, to identify those activities, which involve risk, and to put effective measures in place to avoid or reduce risk. To be effective this process needs to be carried out in consultation with the people who do the job. Worker involvement through consultation on health and safety issues will allow the worker to give feedback on problem tasks and suggested solutions to avoid or reduce risk. This consultation should occur at the planning stage for the introduction of new systems of work, at the planning stage for identifying jobs to be assessed and when reviewing alternative control measures to address a problem job.

Encourage employees, their safety representatives and safety committees to play a positive part in the assessment process. They can assist the employer by highlighting difficulties from such things as the size or shape of a load to the space constraints, which make it difficult to handle a load.

Consultation may occur through formal and/or informal processes and the results should be formally documented.

If consultation is to be effective it is essential that a person with authority is involved in the consultation process. Also the recommendations resulting from the consultative process must receive timely responses and resources must be available to implement solutions.

Element 3:

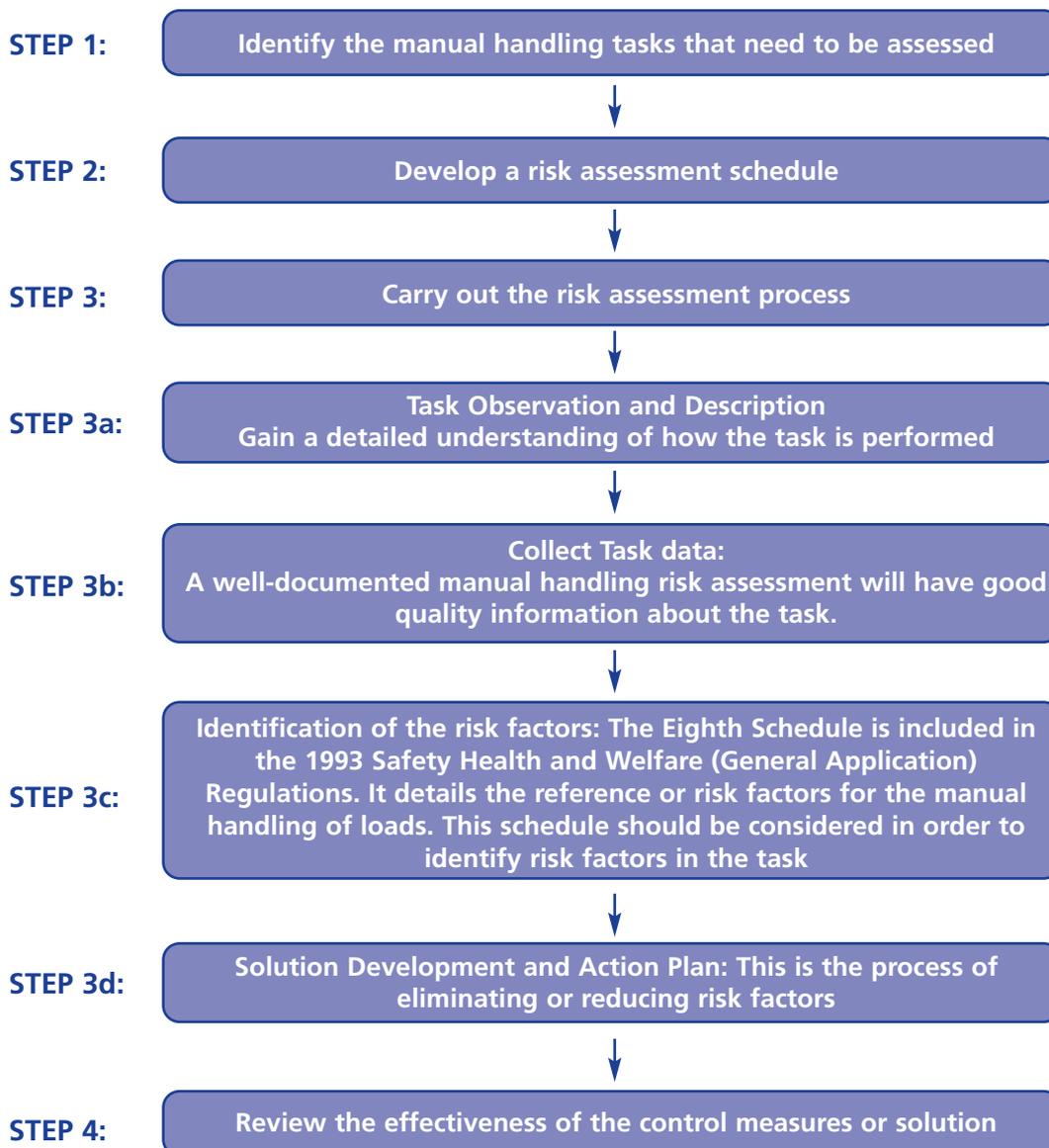
Risk Assessment and Implementation of Controls

The Manual Handling Regulations set out a framework for employers to avoid or reduce manual handling activity. Employers must assess their manual handling operations and take steps to avoid or reduce the risk of injury. The risk can be avoided or reduced through the introduction of appropriate organisational measures such as improved layout of work area to reduce unnecessary long carrying distances; or the use of appropriate means, in particular mechanical equipment.

Risk assessment is a process which involves gaining a detailed understanding of a task being carried out, collecting all relevant technical details of the task, identifying if there are risk factors/hazards present, exploring what options or solutions are available to reduce or eliminate the risk factors/hazards and putting a plan in place to introduce the agreed control measures.

As already stated the risk assessment process should ideally be completed at the design stage of a project so that efforts can be made at that stage to put appropriate measures in place to eliminate potential risk factors. The process below incorporates hazard identification, assessment of risk and implementation of control measures. It supports the view that to effectively assess manual handling activity; it is necessary to study the task in detail, collect relevant information, identify and assess the risk factors/hazards having regard to the Schedule in the Regulation and then implement appropriate solutions or control measures.

The Table here summarises the key stages of this process.



STEP 1: IDENTIFY THE MANUAL HANDLING TASKS THAT NEED TO BE ASSESSED

A list should be put together of all tasks being performed on site where manual handling activity is a key component of the task. Consultation with workers and safety representatives may provide further information about key tasks that need to be assessed. Finally a walk through audit should be carried out at the workplace to become familiar with the tasks that are performed and to identify any further task to be assessed, which was not already identified.

STEP 2: DEVELOPMENT OF A RISK ASSESSMENT SCHEDULE

A plan should be put in place that will identify what tasks are going to be assessed and when the assessments are going to be completed.

The plan should also identify why the assessments are being carried out:

E.g.: “A full risk assessment is being carried out in Plant A to address manual handling, to ensure that efforts are being made to avoid or reduce manual handling activity which involves risk. A

schedule is enclosed which details when these assessments are to be completed. There will be widespread consultation during this process to invite feedback from relevant parties in identifying problem tasks, learning more about how tasks are performed and exploring possible improvements”

Involving staff in the planning and organisational processes can be an important way of increasing the likelihood of success of the risk control strategy.

STEP 3: THE RISK ASSESSMENT PROCESS

This Guidance intends to give general advice on how a manual handling risk assessment should be conducted. There are a number of key stages in this process which are outlined below:

STAGE 1: TASK OBSERVATION AND DESCRIPTION

The objective at this stage is to gain a detailed understanding of how the task is performed and to identify the sub tasks that contribute to the completion of the overall task. Invariably it is these sub tasks, which will give valuable information about any manual handling activity component in the task.

Each of these sub tasks is likely to have its own pattern of risk factors, which should be examined and addressed.

A study of the task should be a team effort and should include input from the worker as well as those conducting the assessment. Workers have first hand knowledge and a unique understanding about particular aspects of the task.

In most cases employers should be able to carry out the assessment themselves or delegate it to others in their organisation. A meaningful assessment can only be based on a thorough practical understanding of the type of manual handling tasks to be performed. Employers and managers should know about the manual handling taking place in their organisation.

While one individual may be able to carry out an assessment in a straightforward case, it may be necessary to draw on the knowledge and expertise of others. The team conducting the risk assessment must be properly trained in the performance of manual handling risk assessments, be familiar with key Ergonomic principles, understand the legislation, be able to recognise risk factors and be able to decide on appropriate control measures.

Where expertise is not available within the company to assess manual handling tasks or to decide on the most appropriate control measures, the employer is obliged to obtain the services of a competent person while maintaining an involvement in the risk assessment process

STAGE 2 COLLECT TASK DATA

A well-documented manual handling risk assessment will have good quality information about the task, which will include both technical information and general information. It is likely that much of this data will already be available as a result of the task observation stage. The form in

Appendix 1 could be used to document the findings of a manual handling risk assessment and the checklist in Appendix 2 can be used as an aide memoir when carrying out the assessment of risk.

Examples of technical information include data on load weights, physical measures of a work area, dimensions of load, number of manual lifts in a task, light levels, noise levels, frequency of activity (lifts per min/hour/day) and duration. It is not an exhaustive list and a good understanding of the task will produce good quality technical information about the task.

Examples of other information that can be collected include the type of personal protective equipment provided, level of consultation with workers, postures observed (bending, reaching or twisting), quality of work surface, number of staff performing the task, types of aids provided if any, and drawings of the layout of work area.

The quality of information collected at this stage of the risk assessment process will depend on how well the process was planned and what procedures were used to collect information. Procedures for collecting such information include direct observation of workers performing the task, special questionnaires or interviews, use of video recorders or camera, and direct measurement of key data with appropriate equipment including weighing scales, noise meters, light meters and tape measure.

Photographs of key sub tasks should be documented in the risk assessment documentation as this will assist during the process of identifying risk factors.

STAGE 3: IDENTIFICATION OF RISK FACTORS

A great deal of Ergonomic research has been conducted to identify workplace factors that contribute to the development of musculoskeletal disorders including back injury. (Elements of Ergonomics Programmes, NIOSH 1997). The National Institute of Occupational Safety and Health (NIOSH) has summarized the epidemiological scientific studies that show a relationship between specific work activities and the development of back injuries and other musculoskeletal disorders.

According to the scientific literature, the following are recognised as important risk factors:

- **AWKWARD POSTURES**
 - Body postures determine which joints and muscles are used in an activity, more stress is placed on the spinal discs when lifting, lowering or handling loads with the back bent or twisted compared with when the back is straight. Activities requiring frequent or prolonged work over shoulder height can be particularly stressful.

FIGURE 1: EXAMPLES OF AWKWARD POSTURES



Bending



Awkward Bending



Lifting above Shoulder height

- Forceful Exertions (including lifting, pushing, and pulling)
 - Tasks that require forceful exertions place higher loads on the muscles, tendons, and joints. Increasing force means increasing body demands such as greater muscle exertion. Prolonged or recurrent experiences of this type can give rise to fatigue and can lead to injury when there is inadequate time for rest or recovery.

FIGURE 2: EXAMPLE OF AWKWARD POSTURE



- **REPETITIVE MOTIONS**

- If motions are repeated frequently (e.g., every few seconds) and for prolonged periods such as an Eighth-hour shift, fatigue and muscle strain can accumulate. Effects of repetitive motions from performing the same work activities are increased when awkward postures and forceful exertions are involved. In industrial jobs, the time to complete one unit of assembly or to inspect one item is defined as a cycle. This activity is considered repetitive if cycle time is two minutes or less and is repeated throughout a shift. Highly repetitive tasks have cycle times of 30 seconds or less. (Eastman Kodak 1986)

The Eighth Schedule is detailed in the Safety Health and Welfare at Work (General Application) Regulations, 1993. It details the reference or risk factors for the manual handling of loads. The Manual handling regulations require the employer to have regard the factors specified in the Eighth Schedule when assessing manual handling activities. This allows the employer to identify what risk factors are inherent in the manual handling activity being assessed. The Eighth Schedule does not include an exhaustive list of risk factors. Other factors that should be considered include the age/gender of the individual, whether the person is physically suited to carry out the task in question and the type of protective clothing or footwear being worn. It is important to highlight that a combination of risk factors can be observed in an activity, for example an individual may be required to lift a very heavy load above shoulder height in a restricted space which requires a twisting motion.

A number of risk factors in the Eighth Schedule are outlined below and guidance is given on how to interpret the risk factor through the use of examples.

RISK FACTOR: THE LOAD IS TOO HEAVY.

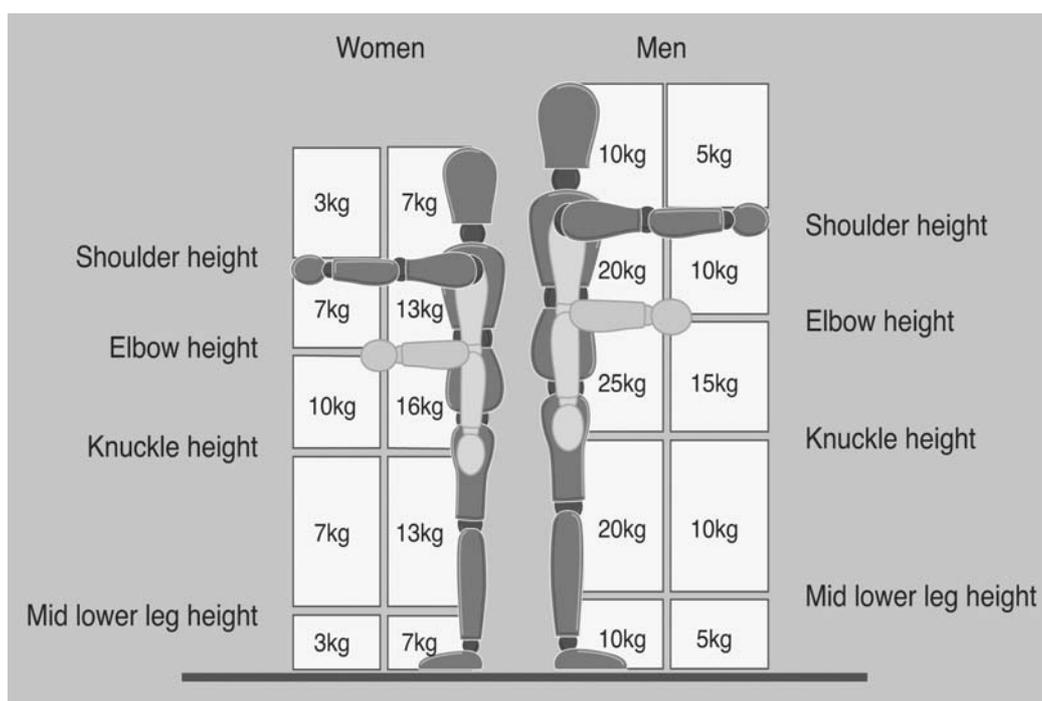
The Regulations set no specific requirements such as weight limits; the ergonomic approach shows clearly that such requirements are based on too simple a view of the problem. However this guidance does offer numerical guidelines, which take into account weight, repetition and location of lift as a means of identifying activities, which involve risk. In using the guideline weights in Figure 3; the assessor should take account of the nature of the work activities and have an appreciation of what realistic improvements can be put in place to avoid or reduce risk. In some situations it may not be possible to use a mechanical aid, in such circumstances other interventions should be considered. When assessing manual handling activities it is important to keep in mind that weight is not the only factor that needs to be considered. As detailed in this guidance other factors that should be considered include repetition, individual capacity, posture and the work environment.

The Guideline Weights can be used to determine if the load is too heavy. Working outside these guidelines is likely to increase the risk of injury.

In Figure 3 each box contains a guideline weight for lifting and lowering in that zone. As you can see the guideline weights are reduced if handling is done with the arms extended, or at high or low levels, as this is where injuries are most likely to occur.

Observe the work activity you are assessing and compare it to the diagram. Decide which box the lifter's hands pass through when moving the load. Then, assess the load weight being handled. If the load weight is less than the figure given in the box, the operation is within the guidelines. If the load weight is greater than the figure in the box than there is an increased risk of injury. If the lifter's hands enter more than one box during the operation, then the smallest weight figure applies

FIGURE 3:



Used by Kind Permission of the Health and Safety Executive

EXAMPLE:

A man is lifting a load weight of 40kg, the man is lifting it close to his body and he lifts the load from floor level to knuckle height. In looking at the Guideline Weights it is evident that the lifter's hands enter more than one box during the operation, therefore the smallest weight figure applies. In this case the smallest weight is 10kg. Therefore the conclusion is that there is an increased risk of injury as the load weight is greater than the guideline figure. It is important to look at the activity in more detail to identify what control measures can be put in place to avoid or reduce the risk of injury.

KEY POINTS ON THE USE OF THE GUIDELINE WEIGHTS

The guideline weights assume that the load is readily grasped with both hands and that the operation takes place with the lifter in a stable body position

The guideline weights are for infrequent operations up to about thirty operations per hour, where the pace of work is not forced, adequate pauses to rest or use different muscles are possible, and the load is not handled by the lifter for any length of time.

Reduce the weights if the operation is repeated more often. As a guide:

Where operations are repeated	Figures should be reduced by
Once or twice per minute	30%
Five to eight times per minute	50%
More than 12 times per minute	80%

(HSE, 2004)

RISK FACTOR: THE LOAD IS TOO LARGE.

A load, which was seven feet long, had to be lifted down a stairwell to another store location. In general, if any dimension of the load exceeds about 75cm, its handling is likely to pose an increased risk of injury and is too large for one person to handle.



FIGURE 4: EXAMPLE OF A LARGE LOAD

RISK FACTOR: THE LOAD IS UNWIELDY OR DIFFICULT TO GRASP.

The shape of the load will affect the way it can be held. For example if the bottom front corners of the load are not within reach when carried at waist height it will be harder to get a good grip.

Loads, which are unwieldy or difficult to grasp, include loads with dimensions which exceed 75cm, loads with sharp edges, loose contents, and loads which require the use of gloves or which do not have designated handles with adequate clearance.

The bulk of the load can also interfere with vision; the risk assessment needs to take account of the increased risk of slipping, tripping or falling.

RISK FACTOR: THE LOAD HAS TO BE HELD AT A DISTANCE FROM THE TRUNK.

A tool weighing 20kg was placed in a machine and this required the individual to over reach when positioning the tool and fixing it in position in the machine. Figure 5 below demonstrates this risk factor. As the load is moved away from the trunk the level of stress is increased on the lower back. As a guide, holding a load at arms length imposes about five times the stress experienced when holding the load close to the trunk.

FIGURE 5: EXAMPLE OF A LOAD BEING HELD AT A DISTANCE FROM THE TRUNK

**RISK FACTOR: THE PHYSICAL EFFORT IS TOO STRENUOUS.**

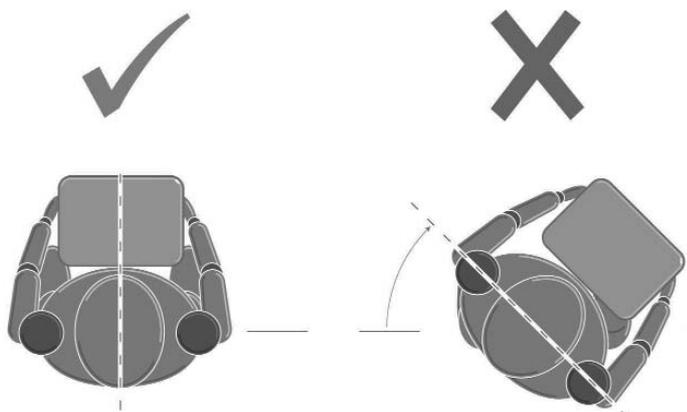
A meat carcass weighing 120kg is manually lifted from a truck and carried to a wash area where it is hooked onto a scale.

The physical effort would be considered too strenuous if the weights been handled are outside the guideline weights detailed in Figure 3 and the system of work requires the handling of a load with the back bent or twisted.

RISK FACTOR: THE PHYSICAL EFFORT IS ONLY ACHIEVED BY A TWISTING MOVEMENT OF THE TRUNK.

Stress on the lower back is increased significantly if twisted trunk postures are adapted or where a person twists while supporting a load.

FIGURE 6: EXAMPLE OF A PHYSICAL EFFORT ACHIEVED BY A TWISTING MOVEMENT OF THE TRUNK



RISK FACTOR: THE PHYSICAL EFFORT IS LIKELY TO RESULT IN SUDDEN MOVEMENT.

Product has to be removed from a stock location, the operator starts to remove the initial load from the racking, and the load is jammed and is difficult to remove. The load suddenly becomes free and the handler is unprepared or cannot retain complete control of the load.

In the Health Care sector there is also the associated risk factor, which can be described as a momentary lapse of physical co-ordination. A typical example would be:

“ I was doing a lift I do every day but I was distracted and did it awkwardly and felt my back give”.

RISK FACTOR: THE PHYSICAL EFFORT MADE WITH BODY IN AN UNSTABLE POSTURE.

This refers to the posture, which a person must maintain when carrying out a manual handling activity. A load may have to be lifted above shoulder height for a prolonged period of time, an operation may require a person to bend repetitively to take product from a cage or a person may have to stand on a stool while carry out a manual handling operation.

FIGURE 7: EXAMPLE OF PHYSICAL EFFORT, WITH THE BODY IN AN UNSTABLE POSTURE



CASE STUDY 1

Issue	Risk Factor	Solution
Operator in Moulding shop lifting 25 kg bags up steps and loading into the Material Dryer.	The effort is made with the body in an unstable posture. There are variations in the level of the floor or work surface	Feed material into a machine from a bulk bin or drum by suction or pumping.

RISK FACTOR: There is not enough room, in particular vertically to carry out the activity. The place of work prevents the handling of loads at a safe height or with good posture.

An operator has to transfer product from one room to another and has to lift product through a narrow aisle way, which requires her to continuously manipulate the load.

The importance of maintaining good postures during the lifting and handling of a load has already been highlighted. However, the working environment may interfere with the postures adopted by the operator, which can place an increased risk when they attempt to move an object. Minimal space either around or above an operator will make the movement difficult.

FIGURE 8: EXAMPLE OF A WORK AREA WITH RESTRICTED ACCESS



Operators should be able to adopt reasonably upright postures when lifting and carrying objects. Clearance and work height are key design parameters, which can have a major impact on the posture, maintained during manual handling:

CLEARANCE

In designing work activities and workplaces, it is necessary to provide adequate headroom, elbowroom, legroom, etc. Environments must provide adequate access and circulation space. There is data available on different measurements of the human body for the male and female population. This data takes account of the smaller population (5th percentile), the average population (50th percentile) and the larger population (95th percentile). This data is needed due to the large differences in body size due to gender and genetics; (Pheasant 1996). Where clearance is necessary to allow safe access and circulation space, this body of data can be used to identify the appropriate dimension of clearance. This is done by identifying the height and breadth measurements of the larger member (95th percentile) of the working population; this will mean that the remainder of the population smaller than this will be accommodated.

WORK HEIGHT AND REACH

The height above the ground at which the standing person performs manual activities is a major determinant of that person's posture. If the working level is too high the shoulders and upper limbs will be raised leading to fatigue and strain in the muscles. Figure 3 details guidance of recommended weight limits for lifting at different heights. The ability to grasp or handle a load

is dependent on the work height and reach. As already stated there is data available, which details different body measurements for the range of the working population. These measurements would include body measurements for standing shoulder height, standing elbow height, forward grip reach and standing knuckle height for each range of the working population from the smallest to the largest (Pheasant 1996). This data should be referenced if necessary during a risk assessment process.

RISK FACTOR: THE FLOOR IS UNEVEN OR IS SLIPPY OR THE FLOOR OR FOOTREST IS UNSTABLE.

An example could include a floor surface, which has cracks and small potholes, which do not allow safe movement of materials or mechanical aids. A floor, which has oil, powder or granules, can cause problems when handling loads. It also relates to the need for good housekeeping in order to reduce the risk of slips, trips and falls.

RISK FACTOR: THE TEMPERATURE, HUMIDITY OR VENTILATION IS UNSUITABLE.

As long as a hot work climate is not uncomfortable, a warm environment will affect neither light physical work nor mental task performance. However as the temperature rises above the comfort level, problems can arise which can impair workers efficiency. It can be assumed that at 18-24 degrees Celsius the relative humidity can fluctuate between 30 and 70 % without creating thermal discomfort.

TABLE 2 BELOW GIVES GUIDANCE ON RECOMMENDED ROOM TEMPERATURES FOR VARIOUS ACTIVITIES (GRANDJEAN 1997)

Type of Work	Temperature (Celsius)
Sedentary mental work	21
Sedentary light manual	19
Standing light manual	18
Standing heavy manual	17

RISK FACTOR: OVER FREQUENT OR OVER PROLONGED PHYSICAL EFFORT INVOLVING IN PARTICULAR THE SPINE.

As stated already the effects of repetitive motions from performing the same work activities are increased when awkward postures and forceful exertions are involved. Ideally efforts should be made to avoid or reduce handling of loads from floor level, or above shoulder height and to store heavier loads at waist height. The activity is considered repetitive if cycle time is two minutes or less and is repeated throughout a shift and highly repetitive tasks have cycle times of 30 seconds or less.

CASE STUDY 2

Issue	Risk Factor	Solution
Operator has to remove product from a caged container	This requires repetitive bending and over stretching	Source a container with a removable side, which allows the operator to reach the bottom without over stretching or source a mechanical aid that allows the container to be raised at an angle thus reducing the bending activity.

RISK FACTOR: THERE IS INSUFFICIENT BODILY OR RECOVERY PERIOD.

Rest or recovery in a job is not synonymous with full cessation of activity or a scheduled work break. A rest phase may be any period of light activity, such as record keeping, that alternates with more demanding activities.

RISK FACTOR: THERE IS EXCESSIVE LIFTING, LOWERING OR CARRYING DISTANCES.

The lift and lowering distance can be important, large distances are more demanding physically than others. Lifting or lowering over a large distance will necessitate a change of posture which could involve starting the lift with a bent posture and finishing the lift with the load held above the shoulder for a prolonged period of time. Therefore lifts beginning or ending at floor level or above shoulder height should be avoided.

The carrying activities, even though less pervasive than manual lifting, are still being performed routinely in the workplace. If a load can be safely lifted and lowered it can also be carried without endangering the back. As a guide if a load is carried further than 10metres then the physical demands of the carrying activity will predominate and lifting capacity will be reduced. (HSE 1992)

STAGE 4: SOLUTION DEVELOPMENT AND PLAN OF ACTION

The risk factors, which are inherent in the task that has been assessed, need to be documented and evidence of each risk factor, should be outlined. Appendix 4 gives a worked example of a manual handling risk assessment.

The development of solutions is the process of eliminating or reducing assessed risk factors. The employer in consultation with the workers doing the task should carry it out.

It is necessary to evaluate the controls that are feasible for each problem. The rationale for deciding on a control measure must be clearly documented in that it should outline why other control measures were not possible and how the suggested control measure will avoid or reduce risk of injury.

The introduction of any control measure such as a mechanical aid or a new work layout means the introduction of a new system of work. Therefore a new system of work must also be assessed to ensure that any new hazards are identified and controlled.

Finally a plan of action must be put in place to identify what changes are planned, to allow people time to adjust to the changes, and to communicate all the changes to all relevant personnel. Consultation is necessary at this stage to ensure that all parties are working together to determine the recommended control measures are practical, to solicit feedback on other possible controls and to ensure the effective implementation of the plan of action.

Appendix 3 details examples of solutions that were put in place to avoid or reduce manual handling in a workplace setting.

Note: Individual capability: Reducing the risk of injury

Particular consideration should be given to employees who are or have been pregnant, or who are known to have a history of back, knee or hip trouble, hernia or other health problems, which could affect their manual handling capability. Appropriate systems of health surveillance must be put in place as required in the regulations in Statutory Instrument Number 44 of 1993.

The employer can create an environment that encourages early reporting (NIOSH 1997):

- By providing education and training to employees regarding the recognition of the symptoms and signs of musculoskeletal injury.
- Encouraging early reporting of symptoms and prompt evaluation by an appropriate health care provider.
- Modifying jobs or accommodating employees who have functional limitations

Health care providers such as doctors, nurses and chartered physiotherapists should be consulted as part of the risk assessment process where necessary and they can work well with employees and health and safety professionals in developing suitable control measures.

STAGE 5: REVIEW OF EFFECTIVENESS OF THE CONTROL MEASURES

Effectiveness is the degree to which the control measures have avoided or reduced the risk of injury. This will depend on how timely the changes were implemented and the level of worker acceptance. The timeliness is the time before the risk factors are reduced or eliminated. This is usually the time it will take to fully implement a control measure, including the time required for the control measure to effectively work (e.g., with a work methods change, the workers may not fully embrace the new method).

Whether or not the workers accept and use the solution is a key measure of the effectiveness of a control measure.

Element 4: Training

It should not be assumed that the provision of information and training alone would ensure safe manual handling. There is strong evidence that interventions predominantly based on technique training have no impact on working practices or injury rates (Hignett 2003).

It cannot be overstated that the primary objective in avoiding or reducing the risk of injury should always be to optimise the risk assessment process. Regulation 13 in SI 44 of 1993 places a duty on the employer to provide training on matters of safety and health to his employees to ensure that particularly sensitive groups of employees are protected against any dangers which specifically affect them including in relation to the manual handling of loads.

The manual handling training needs to be specific to the tasks involved. It should aim to ensure that the employee understands the reasons for doing the job with least risk, can recognize the risks and decide the best way to go about it and can perform the task in that way.

There are a wide variety of manual handling tasks, which make it impossible to set down a specific training course, which in content would be appropriate for all situations. The objective of a training programme must be to ensure that the training received is put into effect in the work situation. The training should be supplemented by appropriate supervision. Also the results of the risk assessment process should be presented at a training course. The instructor should outline the control measures put in place to avoid or reduce risk of injury related to specific work activities at the site. The instructor should ensure that all participants understand and can apply good handling techniques. Manual handling skills and the review of the findings of the risk assessment process should be an integral part of the training programme.

The course content should include both instruction and practical training and should cover the following topics:

- Information on the law relating to manual handling
- Information on the anatomy and biomechanics of the spine and muscles, and how injuries and damage take place from manual handling. There is no need for overly detailed physiological and medical explanations. The information should give a basic understanding of the function of the spine, intervertebral disc, muscles and ligaments and how certain hazardous postures can contribute to the risk of injury.
- Guidance on fitness for the task, written guidance can be given on exercises for flexibility and muscle toning. However, practical exercises for flexibility and muscle toning are outside the scope of occupational manual handling training. Participants should not engage in such exercises without consulting a relevant medical professional.

- Information on the specific manual handling hazards identified in the risk assessment and any possible measures to avoid or reduce manual handling: Organisation solutions, such as smaller loads or sharing the manual handling or mechanical solutions.
- Information on good handling techniques and practice at applying these techniques
Procedures for dealing with unfamiliar loads
- Instruction on appropriate clothing and footwear while handling loads and on PPE if essential for the work activity
- Instruction on the maintenance of the workplace in a safe condition.
- Co-operation of trained employees

The length of time taken for training depends on many factors, not least the level at which the training is being taken. The duration of the training course should be tailored to the number and complexity of handling procedures being taught.

Refresher training will be at intervals not more than every three years and when there is any major change in the work involved or equipment used or when an employee is transferred to another activity requiring different loads to be handled.

Employers may engage outside competent trainers. Training for trainers in manual handling is available from a number of organizations. The authority does not operate a system for recognizing the competence of trainers in manual handling.

Suitable trainers are those who have received appropriate training and have knowledge, skill and experience in the subject, have the ability to communicate effectively, are able to give practical demonstrations and have appropriate teaching materials.

A typical training course will last five (5) days. The training course will include all the contents of the manual handling course as detailed above, communication and presentation skills, Risk assessment of manual handling risk and the design of training courses and the use and selection of training materials.

Element 5:

The Role of Ergonomics in the design of work activity

Ergonomics has already been defined in this guidance and its primary focus is on the design of work activity that suits the person in that it takes account of their capabilities, limitations and behaviour. Matching the requirements of a job with the capabilities of the worker is the approach to be adopted in order to reduce the risks of musculoskeletal injuries resulting from handling materials manually.

Proactive Ergonomics emphasises the prevention of work related musculoskeletal disorders through recognising, anticipating and reducing risk factors in the planning stages of new systems of work or workplaces. The elements already discussed offer a plan for identifying manual handling tasks, risk factors and control measures to avoid or reduce risk of injury. In contrast, proactive approaches are geared to preventing these kinds of problems from developing in the first place.

Proactive Ergonomics emphasise efforts at the design stage of work systems to recognise the need for avoiding risk factors that can lead to musculoskeletal problems. In effect, to design operations that ensures proper selection and use of tools, job methods, workstation layouts and materials that impose no undue stress and strain on the worker. Additional costs are incurred in redesigning or modifying work processes therefore it is more cost effective to reduce risk factors at the design stage. The primary design strategy is the removal of manual handling, where this is not possible, then design strategy should focus on reducing risk factors associated with manual handling.

The essential considerations in ensuring a proactive approach include:

- Designers should have appropriate training in ergonomics and have appropriate information and guidelines regarding risk reduction
- Manual handling issues are identified and resolved in the planning process
- Management commitment and employee involvement in the planning activity are essential
- Decision-makers planning new work processes must become aware of manual handling risk factors and principles. Designers must have appropriate information and guidelines about risk factors
- Design strategies emphasise fitting job demands to the capabilities and limitations of workers. For example, for tasks requiring heavy materials handling, use of mechanical assist devices to reduce the need for manual handling would be designed into the process
- Other aspects of design that can be considered include the load design, the layout of the workplace to allow for ease of access when using mechanical aids, to eliminate unnecessary lifting activities or to improve housekeeping. The arrangement of materials can be considered to allow for more efficient movement of materials and the risks associated with the task can be reduced by the use of mechanical assistance.

Conclusion:

This publication gives general guidance on managing manual handling in the workplace.

It details the requirements of the Manual handling regulations and highlights the need for effective health and safety management systems to allow the effective management of manual handling with an emphasis on prevention of ill health and back injury. It underlines the need to put an effective manual handling risk assessment process in place and it outlines the key stages of this process. . It explains how manual handling can be avoided or reduced through better planning, consultation and systematic management. It provides ideas for solutions to different manual handling issues.

Appendix 1:

A GUIDE ON THE KEY ASPECTS OF MANUAL HANDLING RISK ASSESSMENT

This document outlines examples of the type of information, which can be collected when putting together a risk assessment. Each risk assessment is unique and not all information is applicable in each situation. However the headings given should act as an aid in trying to follow a structure in the risk assessment process.

TASK DESCRIPTION:

This would involve obtaining a detailed description of the job and a breakdown of the key stages of the job.

TECHNICAL DETAILS:

This really involves collecting all relevant technical data. Examples include:

- Information on physical heights of workstations, reach distances, load weights and load dimensions and environmental aspects such as temp/humidity/noise etc.
- Information on equipment used, this would include the type of guarding, availability of an instruction manual or the training needed to operate the equipment safely.
- Information on duration of task, frequency and number of staff involved.
- Photos of critical aspects of the job and video analysis of stages of the job.

Note: This is not an exhaustive list

PHOTOGRAPHS/DRAWINGS/SCHEMATICS:

Photographs should demonstrate the activities in each stage of the job. Drawings/Schematics should be clear and simple and detail the physical dimensions of the work area.

ASSESSMENT OF THE TASK: (USE THE CHECKLIST IN APPENDIX 2 AS AN AIDE MEMOIR)

This is where the job is analysed in detail to identify relevant risk factors at each stage of the task.

- Need to refer to the Schedule in the Manual Handling of loads Regulation and the guidance weights in Figure 3.
- Once risk factors are identified it is then necessary to ask:
- Can they be avoided?
- If risks can be avoided then one needs to detail how they can be avoided and also determine if the control measures will introduce new hazards. The controls measures need to be assessed to avoid or reduce the likelihood of new hazards. E.g.: Provide training in use of machinery, ensure machinery is guarded and its use is supervised also ensure maintenance of the machinery.
- If the risk cannot be avoided it is then necessary to explore if the risk factors can be reduced?
- If the risks can be reduced one needs to identify suitable controls and assess any risks, which might result from the introduction of such controls.
- Manual Handling training must be provided for relevant staff and must meet the requirements as set out previously in this guidance.

- Other factors to consider include the role of designers, manufacturers/suppliers in providing control measures to avoid or reduce risk factors.

SOLUTION DEVELOPMENT AND PLAN OF ACTION:

The appropriate solutions need to be assessed and approved prior to developing a plan of action. Once the appropriate solutions are identified one needs to document clearly all the actions needed to implement the solution. This should identify who is responsible and what is the expected completion date. Communication and consultation is critical in dissemination of information such as; specifications of changes needed, training needs, maintenance requirements for equipments, instructions for in- house purchasers of equipment, instruction to designers/engineers on issues raised and information supplied to medical people.

REVIEW OF EFFECTIVENESS OF CHANGES:

This involves checking to ensure changes are in place and working well, there is need for regular supervision.

Appendix 2

Risk Factor	Example
The load is too heavy.	A person has to manually lift a machine part weighing 70kg from floor level to waist height. Also refer to figure 3 showing guidelines weights
The load is too large.	A load, which was seven foot long had to be lifted down a stairwell.
The load is unwieldy or difficult to grasp.	This includes loads with dimensions, which exceed 75cm, loads with sharp edges and loose contents.
The load has to be held a distance from the trunk.	A person had to over reach when lifting a heavy load and positioning it into a machine.
The physical effort is too strenuous.	A meat carcass weighing 120kg is manually lifted from a truck.
The physical effort is only achieved by a twisting movement of the trunk.	A person is load from a pallet onto a conveyor with restricted room for movement, which only allows a twisting movement of the trunk.
The physical effort is likely to result in a sudden movement.	A person starts to remove a load from racking which is jammed. The load suddenly comes free and handler is unprepared and cannot control the load.
The physical effort is made with the body in an unstable posture.	A person stands on a stool while carrying out a manual handling activity.
There is not enough room, in particular vertically to carry out the activity. The place of work prevents the handling of loads at an unsafe height.	A person has to lift product through a narrow aisleway. A person has to stack a pallet with product, which requires him to lift loads above shoulder height to position on the pallet.
The floor is uneven or is slippery or the floor or footrest is unstable.	A floor surface with cracks which makes it difficult to move loads with a pallet truck.
The temperature, humidity or ventilation is unsuitable.	See guidelines in Table 2.
Over frequent or over prolonged physical effort involving in particular the spine.	A person is involved in a task, which involves scooping product into a container while bending the back for long periods of time.
There is insufficient bodily or recovery period.	A rest phase may be any period of light activity, such as record keeping, that alternates with more demanding activities.
There is excessive lifting, lowering or carrying distances.	Lifts of heavy beginning or ending at floor level or above shoulder level height should be avoided.

Appendix 3

CASES STUDIES:

The assessment of manual handling activity is important in understanding the risk factors that pose a problem. Once these risk factors have been identified after the assessment of tasks, the next step is to look at the possibilities of reducing the risk of injury by addressing the risk factors present.

The employer must always ensure that every effort is made to avoid or reduce manual handling activity, which poses a risk through the reorganization of the work or the provision of mechanical aids.

Below are just some examples of solutions, which were put in place following an assessment of work activity:

MANUFACTURING SECTOR

Issue	Risk Factors	Solution
Large coils weighing 15kg were stored at ground level due to lack of storage space.	Repetitive bending posture.	A new platform was designed to allow coils to be stored at waist height.
Large wooden parts were lifted from below knee height and packed in a steel chute, which was located above shoulder height.	Repetitive bending posture and lifting at an unsafe height.	A new platform was designed to allow access to the steel chute.
Bins were being pushed from one area to another.	The physical effort was made with the body in an unstable posture.	New handles attached to bins to allow movement of bins in upright posture.
Operator in Moulding shop lifting 25 kg bags up steps and loading into the Material Dryer.	The effort is made with the body in an unstable posture. There are variations in the level of the floor or work surface.	Feed material into a machine from a bulk bin or drum by suction or pumping.
Manually raising beef carcass portions to a ceiling rail using a rope.	The load is too heavy.	Air-operated quartering hoist installed.
A maintenance task involved the handling of large 75kg units from one machine to another.	The load is too heavy. The load is difficult to grasp.	A new unit purchased to eliminate the need to transfer from one machine to the other and a hoist was introduced.
A maintenance task involved manually lifting a part onto the machine.	The load is too heavy. The load is lifted at an unsafe height	A hoist was introduced to avoid the manual handling of the unit.
The task involves lifting 60kg rolls of paper from a pallet onto a trolley.	The load is too heavy The task involves a repetitive bending posture.	A new cage designed to allow the rolls to be lifted by forklift and the pushed onto the cage.

MANUFACTURING SECTOR (CONTINUED)

Issue	Risk Factors	Solution
Manually handling 50kg sacks to hoppers.	The load is too heavy. The effort is made with the body in an unstable posture.	Scissors lifts with rotating turntables provided and sack weight reduced to 25kg.
Operator has to remove product from a caged container.	This requires repetitive bending and over stretching.	Source a container with a removable side, which allows the operator to reach the bottom without over stretching or source a mechanical aid that allows the container to be raised at an angle thus reducing the bending activity.

CONSTRUCTION SECTOR

Issue	Risk Factors	Solution
Manual tying of rebar.	Repetitive bending posture.	Automatic tying using a special tool requires a pull rather than a twisting action and can improve body posture.
Plasterboard is moved up to the first floor of a construction site.	The load is unwieldy and difficult to grasp.	Arrangements were made so that all new deliveries of plasterboard were made as close as possible to the hoist to reduce manual handling at this point. The contractor brought in a panel trolley, which was used to take plasterboard from the hoist to the point of use
A labourer had to manually unload 50kg bags of cement	The load is too heavy	Source 25kg bags of cement or use mechanical lifting equipment

WHOLESALE/RETAIL SECTOR

Issue	Risk Factors	Solution
A pallet, which is made up of 60 sacks of potatoes is moved from one location to another with the aid of a hand pallet truck.	The load is too heavy.	Electric Pallet truck is purchased to eliminate unnecessary manual handling.
A Carcass of beef manually lifted from a truck to a weighing scales.	The load is too heavy and difficult to grasp The load is handled at an unsafe height.	The Warehouse was redesigned to allow carcass to be transferred directly from the truck to an overhead gantry.
Product was stacked in a warehouse without the use of proper racking systems.	The physical effort was made with the body in an unstable posture	The floor is uneven, thus presenting tripping hazards. A new racking system was put in place to allow safe access and egress.

WHOLESALE/RETAIL SECTOR (CONTINUED)

Issue	Risk Factors	Solution
Loads manually lifted from an upstairs mezzanine area to the ground floor.	There are variations in the work surface The physical effort is made with the body in an unstable posture.	Introduce gate access on mezzanine floor to allow access for forklift truck. Put a safe system of work in place. Conveyors can be used to transport loads between different heights.
Female staff were required to manually lift 33kg loads down a stairwell and carry through a warehouse into the main work area.	The load is too heavy. There is excessive carrying distance. The work surface is uneven. The load is difficult to grasp. The load had to be lifted at a distance from the trunk.	Mechanical aids introduced. Product shipped directly to the point of use.
Televisions and washing machines weighing 78kg were being handled manually.	The load is unwieldy and difficult to grasp. The physical effort is too strenuous.	A mechanical aid was sourced to handle the loads.

HOTEL SECTOR

Issue	Risk Factors	Solution
Moving cooking suites for cleaning. Cooking suite made as a complete unit with no castors.	The load is too heavy. The physical effort is too strenuous.	Wheels were made and fitted to the unit base. Inform the purchasing department that equipment should be supplied with castors where required.
Storage and distribution of Sodium Hypochloride. Sodium Hypo delivered in 25 litre drums, offloaded then manually taken down steps into the plant room.	The load is difficult to grasp. The floor is uneven. The physical effort is made with the body in an unstable posture.	New system employed whereby the Sodium Hypo is delivered in a 1000 litre bulk container, stored outside, and piped directly to the dosing pumps.

HEALTH SERVICES SECTOR

Issue	Risk Factors	Solution
95% of patients in a facility were dependent on wheelchairs for mobility. Nursing staff were expected to lift patients manually.	Physical effort is too strenuous.	Equipment was purchased to eliminate manual methods of handling patients.
Nursing staff had to help infirm patients by supporting them to the bathroom and helping them in and out of the bath. The patients were awkward to handle and heavy, presenting a considerable risk of back injury. There was not enough room to use a patient hoist.	Physical effort too strenuous. The physical effort is made with the body in an unstable posture.	After wide consultation, proposed changes to the bathroom layout were presented. These changes created more space by replacing partitions with curtains, the bath was moved away from the wall giving room to use the patient hoist and staff could get to both sides of the bath.
Nursing staff had to help old and infirm patients with limited mobility to get to the toilet. Limited space made it difficult for staff to adopt good posture, and the sustained effort need for many heavy patients made this worse.	The physical effort is made with the body in an unstable posture.	A longer retractable handle was provided to one side of the toilet, so that patients could lift themselves up using both hands. A vertical handle was provided so that patients could hold onto it and pull themselves to their feet.
In a plastering department, patients had to be lifted on and off a high bench so that the plasterer could apply the cast, creating risks to staff and patients.	Physical effort is too strenuous.	The hazard was removed by providing a bench that could be raised and lowered, enabling the patient to get on and off the bench safely and still allow the plasterer to work at a comfortable height.
Staff had to help patients up steps to a patient trolley and had to transfer patients to and from the operating table.	Physical effort is too strenuous.	Patient trolleys and operating tables were replaced with variable height operating trolleys.

Appendix 4

A GUIDE ON THE KEY ASPECTS OF MANUAL HANDLING RISK ASSESSMENT

Note: This is not an exhaustive list

TASK DESCRIPTION:

Maintenance of Moulding Machine

Part A is taken from the machine shop and placed on a trolley; the trolley is then pushed out to the Moulding machine. Part B is disassembled and manually lifted from the Moulding machine and placed on the ground. Part A is then lifted from the trolley onto the machine and assembled. Part B is lifted onto the trolley and transferred into the machine shop for maintenance.

TECHNICAL DETAILS:

Load Weight 75kg

Trolley height 20"

Load Dimensions 49" x 15" x 16"

Number of manual lifts in changeover: 6

The part has to be loaded onto the moulding machine at shoulder height

PHOTOGRAPHS/DRAWINGS/SCHEMATICS:

Photographs can be placed in this section

ASSESSMENT OF THE TASK: (USE THE CHECKLIST IN APPENDIX 2 AS AN AIDE MEMOIR)

Risk Factors:

The load is too heavy for manual handling (75kg)

The load is unwieldy and difficult to grasp

The load has to be held at a distance from the trunk and there is repetitive bending posture when placing load on the ground.

There is strenuous physical effort when lifting such a load

The load is not handled at a safe height (above shoulder height)

Comments:

These risks can be avoided by introducing a mobile hoist.

SOLUTION DEVELOPMENT AND PLAN:

Solution Development and approval	Management Team	Week 22 2003
Source a mobile hoist	Safety Officer	Week 23 2003
Assess new system of work	Safety Officer	Week 24 2003
Train people in use of hoist	Jim Carr	Week 25 2003
Communicate changes to all Relevant staff	Personnel	Week 26 2003

REVIEW OF EFFECTIVENESS OF CHANGES:

A review of the activity was carried out in Week 28, 2003.

The new system of work is in place and the hoist is working effectively.

Appendix 5

REFERENCES

Eastman Kodak, 1986 Ergonomic Design for people at work: (Vol 2), John Wiley & Sons.

Health and Safety Executive, 2004
Getting to grips with Manual Handling, A short guide
HSE

Health and Safety Executive, 2003
Press Release: New HSE research on principles of good manual handling.
HSE Press Release

Health and Safety Executive, 1998
A Pain in your workplace: Ergonomic problems and solutions, HS (G) 121,
HSE Books

Health and Safety Executive, 2002
Manual Handling Assessment Charts:
HSE Books

Health and Safety Executive, 2000
Moving food and drink, Manual handling solutions for the food and drink industries: HSG196,
HSE Books

Health and Safety Executive, 2000 Backs for the future, Safe Manual handling in construction:
HSE (G) 149 HSE Books

Health and Safety Executive, 1998
Manual Handling: Guidance of Regulations: L23,
HSE Books

Health and Safety Executive, 1998
Manual Handling in the Health Services:
HSE Books

Helander M, 1995 A Guide to Ergonomics in Manufacturing: Taylor & Francis

Hignett Sue. 2003 Intervention strategies to reduce musculoskeletal injuries associated with handling patients: A systematic review. Occupational Environmental Medicine

International Labour Office, 1998 Work Organisation and Ergonomics: (ILO)

Kroemer K.H.E., and Grandjean E, 2000 Fitting the Task to the Human
Taylor & Francis.

Mital A and Nicholson and Ayoub M.M. 1997 A Guide to Manual materials handling (2nd
Edition): Taylor & Francis

National Institute for Occupational Safety and Health (NIOSH), 1997. Musculoskeletal
Disorders and Workplace Factors: A Critical Review of Epidemiologic Evidence for Work
related musculoskeletal disorders of the neck, upper extremity and low back: U.S. Department
of Health and Human Services.

National Authority for Occupational Safety and Health 2000. Guide to the Safety Health and
Welfare at Work Act, 1989 and the Safety, Health and Welfare at work (General Application)
Regulations, 1993: Government Publications

National Institute for Occupational Safety and Health (NIOSH) 1997 Elements of Ergonomics
Programs: U.S. Department of Health and Human Services.

National Institute for Occupational Safety and Health (NIOSH), 1994, Applications Manual
for the Revised NIOSH Lifting Equation, U.S. Department of Health and Human Services.

Pheasant, Stephen 1999 Bodyspace, Taylor & Francis

Power, Frank. 2003 Manual Handling in the Irish Workplace, Issues and Findings from a
Detailed Inspection Programme. Health & Safety Authority.

Safety Health and Welfare at Work Act, 1989
Government Publications

Safety Health and Welfare at Work (General) Application Regulations 1993
Government Publication

Sanders M.S., McCormick J., 1992 Human Factors in Engineering and Design, McGraw Hill
International.

Guidance on the Management of Manual Handling in the Workplace

*Achieving a
Healthy
and Safe
Working Life
-Together*

HEALTH AND SAFETY
AUTHORITY HEADQUARTERS
10 Hogan Place, Dublin 2

Tel. 1890 289 389

Fax. (01) 614 7020
website: www.hsa.ie



HEALTH AND SAFETY
AUTHORITY

ISBN 1-84496-023-4