



HEALTH AND SAFETY
AUTHORITY

Guide on Manual Handling Risk Assessment in the **Manufacturing Sector**



Our vision:

A country where worker safety, health and welfare and the safe management of chemicals are central to successful enterprise

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Contents

INTRODUCTION	2
THE BUSINESS CASE FOR MANAGING MANUAL HANDLING IN THE MANUFACTURING SECTOR	3
WHY IS THERE A NEED TO MANAGE THE HAZARD OF MANUAL HANDLING IN THE WORKPLACE? ..	5
THE MANUAL HANDLING RISK ASSESSMENT PROCESS	8
MANUAL HANDLING RISK ASSESSMENT CASE STUDIES	10
APPENDIX 1: MANUAL HANDLING RISK ASSESSMENT WORKSHEET	15
APPENDIX 2: EXAMPLES OF RISK FACTORS FOR MANUAL HANDLING OF LOADS	17
APPENDIX 3: EXAMPLE OF A SAFE SYSTEM OF WORK PLAN (SSWP)	18

INTRODUCTION

This guide gives direction and practical information to those that work in the manufacturing sector on action that can be taken to manage the potential hazard of manual handling in the workplace. This is necessary in order to work towards preventing musculoskeletal injuries at work and reducing exposure to high financial costs including compensation claims.

The objectives of providing such information are:

- To raise awareness of the business case for managing the hazard of manual handling
- To explain why the hazard of manual handling needs to be managed in the workplace
- To help employers understand and recognise what the potential risk factors are in relation to manual handling in their workplace
- To give direction on manual handling risk assessment and how it can be used to highlight potential hazards and create opportunities for developing better ways of working including use of handling aids, improved housekeeping or better organisation of work processes resulting in reduced handling of stock and reduced risk of musculoskeletal injury
- To explain how to complete a manual handling risk assessment process through illustrated case studies
- To give direction on developing a safe system of work plan

The manufacturing sector covers a wide range of different business types including metalwork, woodworking, food processing, electronics, plastics and medical device production. The tasks conducted in the manufacturing sector require people to engage in different types of activity which sometimes may require manual handling. Not all manual handling is hazardous; however, in some cases the activity will require a person to engage in a work practice which may involve a significant amount of handling, including lifting heavy loads or lifting loads above shoulder height. It is important to be aware that manual handling can be a potential workplace hazard which can result in a person suffering a musculoskeletal injury such as a back injury and therefore needs to be managed effectively.

THE BUSINESS CASE FOR MANAGING MANUAL HANDLING IN THE MANUFACTURING SECTOR

Injuries due to manual handling account for 33% of all accidents reported to the Health and Safety Authority each year, and nearly 20% of these manual handling accidents take place in the manufacturing sector. A review of figures in the Health and Safety Authority 2011 Annual Statistics show that 49% of the manual handling injuries in the manufacturing sector occurred when the person was lifting or carrying a load.

Figures from the Personal Injuries Assessment Board (PIAB) show that in 2008 €31.36 million was awarded in respect of 972 employer liability awards. Just over one in five (20.41%) of these awards were to people working in the manufacturing sector. Further analysis of the data shows that sprains (41.97%) are the most common injury resulting in a claim. The average employer liability award for 2008 was €32,266.

Musculoskeletal injuries at work are a massive drain on the resources of an employer, including costs such as sick pay, lost productivity, retraining, legal fees and injury benefit. They represent a significant opportunity for cost reduction, since they are manageable and preventable.

A study of civil court judgements on cases concerning injury due to manual handling identified the following key systems failures when making rulings on compensation claims: (Health and Safety Review, 2000)

- No risk assessment of work activities
- Lack of safe system of work plans
- Mechanical aids were not provided and maintained
- Adequate training was not provided
- No evidence of work supervision

The case study below demonstrates how tangible improvements are possible if action is taken to address systems failures such as those outlined above. The interventions were introduced at a medium-sized Irish manufacturing company.

<p>Problem identification</p>	<p>The production process required a significant level of manual handling. A number of risk factors resulted including:</p> <ul style="list-style-type: none"> - Repetitive bending during a packing operation - Large, awkward and heavy parts carried over long distances <p>As a result there were a high level of reportable injuries due to unsafe manual handling practice, and insurance costs running at €60,000 per year.</p>
<p>Management interventions</p>	<p>Management agreed to implement a risk reduction strategy which included:</p> <ul style="list-style-type: none"> - Managers being trained to conduct risk assessments - The completion of a manual handling risk assessment of operations - Changes being made to work practices to reduce the manual handling risk factors. These improvements included the introduction of variable height pallet trucks and hydraulic trollies, the transporting of large parts on wheels, training of staff and new housekeeping procedures
<p>Results</p>	<ul style="list-style-type: none"> - No reportable injuries - Insurance costs reduced to €18,000 per year

WHY IS THERE IS A NEED TO MANAGE THE HAZARD OF MANUAL HANDLING IN THE WORKPLACE?

A work activity that requires repetitive bending and the lifting of heavy loads could result in compression of the disc, facet joint or ligament damage. Twisting and bending together is perhaps the greatest stress on the spine, especially the disc.



It is for reasons such as these that there is a regulation with provisions governing the management of the hazard of manual handling in the workplace in order to avoid or reduce the risk of injury, particularly back injury. The Safety, Health and Welfare at Work (General Application) Regulations 2007 (SI No. 299 of 2007), Chapter 4 of Part 2, outline the requirements that employers must adhere to in relation to manual handling.

In the first instance manual handling is defined in Regulation 68 of the Safety, Health and Welfare at Work (General Application) Regulations 2007:

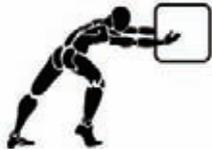
Manual Handling involves any transporting or supporting of a load by one or more employees, and includes lifting, putting down, pushing, pulling, carrying or moving a load, which by reason of its characteristics or unfavourable ergonomic conditions, involves risk, particularly of back injury, to employees.

The regulation applies only to those manual handling operations which involve risk of injury to employees. The definition of manual handling clarifies that not all manual handling involves a risk of injury, only handling with particular load characteristics (e.g. loads that are too heavy or too large) or unfavourable ergonomic conditions (e.g. twisting movement of the trunk). The regulation refers to a schedule of risk factors (see the Appendices for examples of these risk factors) which take account of these load characteristics or unfavourable ergonomic conditions. This schedule is an important reference point when carrying out task-specific manual handling risk assessments.

It is important to have an understanding of the range of work activities that take place in the workplace. As a first step, a walk-through of the workplace should be carried out and staff consulted to identify work activities of which manual handling forms a significant part. Most manufacturing sites have three key stages in their production process:

- Goods inwards
- Production/assembly
- Goods outwards/packing

It is useful, through consultation with staff, to get an understanding of the potential risk factors as they relate to specific tasks. Manual handling tasks that will need to be risk assessed will include one or all of the following risk factors:

Risk factor (unfavourable ergonomic condition)	Picture
The lifting of the load requires repeated manipulation of the load at a distance from the trunk	
The lifting of the load requires repeated bending of the trunk	
The load is very large and difficult to grasp	
The handling repeatedly takes place at floor level or above shoulder height	
The physical effort can only be achieved by a twisting of the trunk	
The load is carried over a long distance and there is poor housekeeping with unsafe access	

Note: This is not an exhaustive list of risk factors for manual handling of loads

The basic principle of the regulation is that where manual handling activities in the workplace may involve a risk of injury (particularly to the back) due to exposure to unfavourable ergonomic conditions, the employer must take measures to avoid or reduce the risk of injury. In other words, the employer needs to manage the hazard of manual handling through implementation of a manual handling risk assessment process and implementation of preventative measures based on the outcomes of the risk assessments. This may include the implementation of safe system of work plans for site-specific tasks, providing information on the use of mechanical aids, the reorganisation of a work activity to allow loads to be handled at a safe height or the provision of instruction to workers on how to use handling aids or handle loads safely.

The manual handling risk assessment process is explained in the next section of this guide.



THE MANUAL HANDLING RISK ASSESSMENT PROCESS

There are different tools for assessing manual handling tasks, including the NIOSH lifting equation and the Mac Tool. Below is a brief summary of a five-step risk assessment process which can be used to assess individual manual handling tasks. Examples of completed manual handling risk assessments are detailed in the next section of this guide.

Step 1	Task description	In consultation with staff, collect information on how the task is carried out. Identify the key stages of the task and summarise all information collected.
Step 2	Collect technical information	The type of information to collect will include information on the weight of the load, physical measurements of the load, postures observed during the handling activity, the amount of space available, housekeeping, the duration of the task, the number of handling activities and the employee's knowledge of a task.
Step 3	Identify the risk factors	Examples of risk factors include: <ul style="list-style-type: none"> • Load is too heavy • Employee is prevented from handling a load at a safe height • Handling is made with the body in an unstable posture Each risk factor identified must be supported by evidence. A list of risk factors or unfavourable ergonomic conditions and load characteristics is detailed in the Appendices.
Step 4	Identify the improvements to be put in place	This requires consultation with staff and an objective review of the information collected. The improvements put in place should avoid or reduce the risk of injury, and may be a combination of the following: <ul style="list-style-type: none"> • Use of mechanical aids for all or part of the activity • Reorganisation of work area or materials • Where handling will still take place, instruction in safe lift techniques • Development of a safe system of work plan • Communication of improvements to staff
Step 5	Review the effectiveness of the improvements	This could involve simple checks or supervision to ensure that lifting techniques are being conducted in line with the instruction given, or that appropriate handling aids are being used. Risk assessment should be seen as a continuous process and a review of risk assessments is important to ensure they are kept up to date and revised if necessary.

SAFE SYSTEM OF WORK PLAN (SSWP)

The outcomes of each manual handling risk assessment are the improvements that have been identified in the fourth step of the risk assessment process. A simple way to communicate the improvements or control measures is to develop a safe system of work plan.

A safe system of work plan is a set of instructions according to which something must be done, which takes account in advance of the foreseeable manual handling risk factors. The purpose of a safe system of work plan is to give instruction on the new way of carrying out a particular work activity which avoids or reduces manual handling and therefore reduces the risk of injury. The safe system of work plan should take account of the handling required from origin of lift to end point of lift and can include a combination of the following:

- Use of handling equipment (how is it used) to eliminate or reduce handling
- Reorganisation of work area (what changes are made)
- Instruction and training in safe handling techniques (how is it done)

Ideally safe system of work plans should be incorporated into a manual handling training programme.

While it is important to conduct individual manual handling risk assessments, it is of more importance to communicate the improvements that are to be implemented. A short safe system of work plan for each manual handling task assessed is a suitable way to manage risk effectively. The duty to provide safe systems of work remains the employer's responsibility. An example of a safe system of work plan is included in the Appendices.

The case study below illustrates the implications of not conducting a risk assessment of a manual handling task and not implementing a safe system of work.

CASE STUDY

A High Court Judge rejected allegations of an exaggerated claim by a worker who injured his back while lifting pallets and awarded the employee €370,000 in damages. The Judge stated that:

- The employee suffered two injuries
 - He was required to lift pallets onto a conveyor at an unsafe height
 - The company failed to take appropriate measures to avoid the necessity for manual handling
 - There were three simple and inexpensive alternatives that the company could have adopted
- (Health and Safety Review 2003)

This is one example of the financial implications for an employer and the human cost to the employee of failing to effectively manage the hazard of manual handling in a workplace.

The case studies in the next section of this guide illustrate some examples of work practices that exist in the manufacturing sector. They are not intended to represent all types of work practice, but to illustrate the process of manual handling risk assessment.

MANUAL HANDLING RISK ASSESSMENT CASE STUDIES

This section of the guide aims to demonstrate the application of the five-step manual handling risk assessment process with the use of case studies specific to the manufacturing sector. This is not an exhaustive list of work activities that may need to be assessed. The case studies illustrate the importance of following a logical step-by-step process in order to:

- Fully understand how a work activity is completed
- Be aware of the technical aspects of the activity including weight, posture, environment, etc
- Be able to clearly identify the potential risk factors of the activity
- Be able to make an informed decision based on the facts collected as to the best approach to take to avoid or reduce the manual handling risk factors within the work activity

The solutions in these case studies are not exhaustive and it may be feasible to develop an alternative solution for the specific needs of the business which still does not impact negatively on the health of the staff involved in the handling activity. The handling aids illustrated in the case studies are examples of the types of handling equipment available on the market. Many handling aids are cost effective as they provide a solution to a potential manual handling hazard and can improve efficiency and reduce exposure to compensation claims. It is good practice to consult with relevant staff when sourcing equipment, to provide appropriate training in the safe use of equipment and to ensure appropriate maintenance.

FURTHER INFORMATION:

Management of Manual Handling in the Workplace at www.hsa.ie

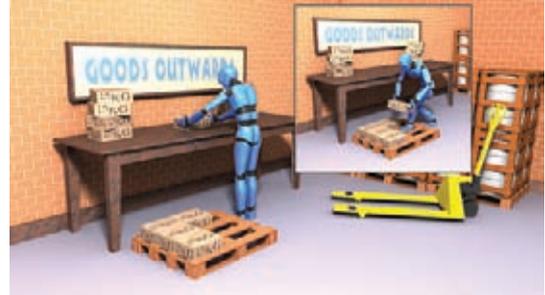
Manual Handling Risk Assessment Case Studies at www.hsa.ie

Guidance on the Manual Handling of Loads Regulation at www.hsa.ie

CASE STUDY 1: PACKING STATION AT GOODS OUTWARDS

STAGE 1: TASK DESCRIPTION

The employee is working at a packing station which is at the end of the production process. The employee is required to transfer boxes weighing 15 kg from the workbench to the pallet on the floor.



STAGE 2: COLLECT ALL TECHNICAL DETAILS

- The boxes weigh 15 kg
- The employee has to lift a number of boxes into position on a pallet
- The employee has to work below knee height when positioning some boxes on the pallet
- The pallet is very close to the employee, which results in the employee engaging in an upper body twist when transferring the boxes to the pallet

STAGE 3: IDENTIFY THE RISK FACTORS

- The physical effort can involve a twisting movement of the trunk
- The load is positioned in a manner requiring it to be held with a bending of the trunk
- The work environment prevents the handling of loads at a safe height
- The activity requires over-frequent or over-prolonged physical effort involving the spine

STAGE 4: IDENTIFY THE IMPROVEMENTS TO BE PUT IN PLACE

- A high lift or variable height pallet truck is used and can be adjusted to optimum height as the pallet is being packed
- The staff are trained in the correct use of the pallet truck, including the benefits of setting the equipment to optimum height
- A job rotation system is introduced so that staff are not involved in this activity for long periods of time
- A conveyor table which is adjustable in height is sourced to allow the boxes to be rolled along the conveyor



STAGE 5: REVIEW EFFECTIVENESS OF THE SOLUTION

CASE STUDY 2: MAINTENANCE (NON-ROUTINE)

STAGE 1: TASK DESCRIPTION

The employee is completing preventive maintenance on a production machine. The technician is required to remove pumps from different machines and bring them to the workshop for maintenance work. Under current procedures, the technician brings a low level trolley to the machine. He then disassembles the part and lifts it from the machine onto the trolley. He then transfers the part on the trolley to the workshop. The part is then lifted off the trolley to a workbench for the maintenance work to be completed.



STAGE 2: COLLECT ALL TECHNICAL DETAILS

- The part can weigh in the range of 16–20 kg
- The parts that are removed for maintenance are located at different levels on the machines
- The technician has to work below knee height when positioning the parts onto the trolley and when transferring the parts to the workbench in the workshop

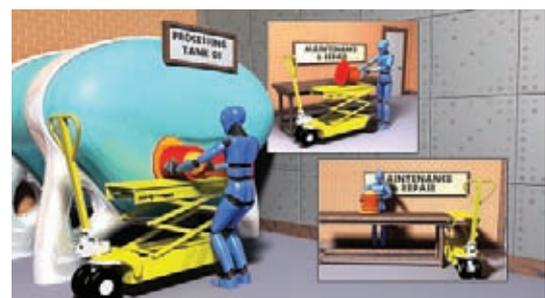
STAGE 3: IDENTIFY THE RISK FACTORS

- The load is positioned in a manner requiring it to be held with a bending of the trunk
- The work environment prevents the handling of loads at a safe height
- There are excessive lifting distances when lifting from the machine to the trolley

STAGE 4: IDENTIFY THE IMPROVEMENTS TO BE PUT IN PLACE

- A mobile scissors lift table is used and it can be set to the optimum height when transferring the part from the machine to the lift table. The pump is secured appropriately on the mobile scissors lift
- The staff are trained in the correct use of the lift table and the benefits of setting to optimum height are included in training
- The technician can adjust the mobile scissors lift to be flush with the workbench and can then slide the pump onto the workbench

TAGE 5: REVIEW EFFECTIVENESS OF THE SOLUTION



CASE STUDY 3: MANUAL HANDLING DURING THE PRODUCTION PROCESS

STAGE 1: TASK DESCRIPTION

The employee is required to complete drilling work on a part. The part has to be drilled in different areas and this requires the employee to move and adjust the part a number of times in order to complete the drilling operations. He lifts the part, places it flat on the floor and completes some drilling. He then has to lift the metal part and rotate it to another position to complete more drilling operations.



STAGE 2: COLLECT ALL TECHNICAL DETAILS

- The part can weigh up to 30 kg
- The part is large and bulky
- The part has to be manipulated a number of times in order to complete the drilling operations
- The employee engages in a number of awkward postures when rotating the part

STAGE 3: IDENTIFY THE RISK FACTORS

- The load is positioned in a manner requiring it to be held with a bending of the trunk
- The load is positioned requiring it to be manipulated at a distance from the trunk
- The physical effort is made with the body in an unstable posture
- The load is unwieldy and difficult to grasp
- There is excessive lifting distance
- The work environment prevents the handling of loads at a safe height
- There is over-frequent physical effort involving the spine

STAGE 4: IDENTIFY THE IMPROVEMENTS TO BE PUT IN PLACE

- A jig is developed which allows the part to be fixed into position and rotated when carrying out different drilling operations on the part
- The staff are trained in the correct use of the jig and the benefits of being able to adjust the jig to allow easier access to the part for drilling
- A trolley is used to transfer parts between workstations
- Housekeeping policy is introduced to ensure that trolleys are stored in appropriate areas
- The employee can request assistance when transferring the part onto/off the jig



STAGE 5: REVIEW EFFECTIVENESS OF THE SOLUTION

CASE STUDY 4: MANUAL HANDLING IN GOODS INWARDS

STAGE 1: TASK DESCRIPTION

The employee is lifting 20 kg boxes into position on the racking. There are barrels stored on the floor.



STAGE 2: COLLECT ALL TECHNICAL DETAILS

- The barrels weigh 70 kg
- The boxes being loaded onto racking weigh 20 kg
- The loads stored in racking are positioned above shoulder height

STAGE 3: IDENTIFY THE RISK FACTORS

- The box being placed in racking is positioned in a manner requiring it to be manipulated at a distance from the trunk
- The physical effort when handling the load in racking is made with the body in an unstable posture
- The barrels are too heavy, too large and difficult to grasp

STAGE 4: IDENTIFY THE IMPROVEMENTS TO BE PUT IN PLACE

- The racking is restructured to allow 20 kg loads to be stored at waist height and to allow full pallets to be loaded directly at ground level in racking
- Through better planning, deliveries are scheduled with a view to reducing congestion
- Areas are marked out to allow for better access and improved housekeeping
- Barrels are delivered on pallets
- Simple trolleys or sack trucks or dollies are used to transfer stock



STAGE 5: REVIEW EFFECTIVENESS OF THE SOLUTION

APPENDIX 1: MANUAL HANDLING RISK ASSESSMENT WORKSHEET

Step 1: Task description: how is the task carried out?



Step 2: Collect all technical details.



Step 3: Identify the risk factors



Step 4: Identify the improvements to be put in place.



Step 5: Review the effectiveness of the solution.



APPENDIX 2: EXAMPLES OF RISK FACTORS FOR MANUAL HANDLING OF LOADS

As part of the five-step manual handling risk assessment process, it will be necessary to identify the risk factors which are relevant to a particular task. This checklist is a useful aide-memoire to identify risk factors as part of the risk assessment process. The information collected can then be used to identify what improvements can be put in place to avoid or reduce manual handling in a task.

RISK FACTORS	YES	NO	COMMENT
Is the load too heavy?			
Is the load too large?			
Is the load unwieldy or difficult to grasp?			
Is the load manipulated at a distance from the trunk?			
Is the load positioned in a manner requiring bending or twisting of the trunk?			
Is the physical effort too strenuous?			
Is the physical effort only achieved by a twisting movement of the trunk?			
Is the physical effort required likely to result in a sudden movement of the load?			
Is the physical effort made with the body in an unstable posture?			
Is there enough room, particularly vertically, to carry out the activity?			
Is the floor uneven?			
Does place of work prevent handling of the load at a safe height or with good posture?			
Are there variations in the level of the floor?			
Is the floor or footrest unstable?			
Does the activity involve over- frequent or over-prolonged physical effort?			
Are there excessive lifting, lowering or carrying distances?			

Note: The guide titled Management of Manual Handling in the Workplace at www.hsa.ie gives more detail on the risk factors above.

APPENDIX 3: EXAMPLE OF A SAFE SYSTEM OF WORK PLAN (SSWP)

SSWP number 1

Title:

Safe system of work plan for the handling of pumps during non-routine maintenance

Scope:

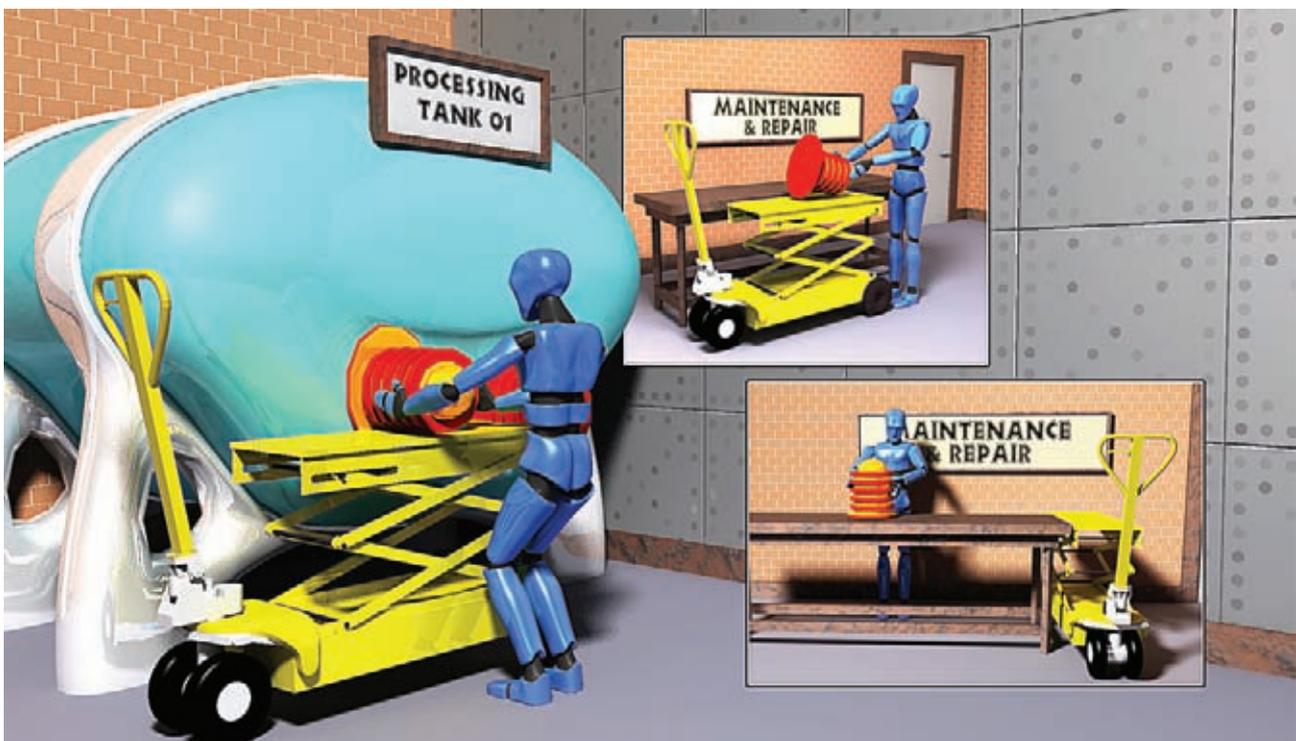
This safe system of work plan summarises the instructions to be followed in order to move pumps safely during non-routine maintenance.

Key Requirements:

Staff have received appropriate manual handling training and instruction.

There is a mobile scissors lift table in working order and available for use by staff.

Staff are instructed in the safe use of the mobile scissors lift.



Instructions:

- The employee sources the mobile scissors lift and proceeds to the machine in order to remove a pump for maintenance.
- The employee moves the mobile scissors lift into position, adjusts the table to the appropriate height and secures the brake system.
- The employee removes the pump from the machine and ensures that it is secured safely on the mobile scissors lift. The brake system on the mobile scissors lift is then released.
- The employee proceeds to move the mobile scissors lift to the workshop.
- The employee ensures that the table on the mobile scissors lift is adjusted to be flush with the workbench, secures the brake system, and the pump is then transferred onto the workbench.
- The employee can then complete the maintenance work required on the pump.

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