



# WORKSAFE ACT

A Guide to Manual Tasks



## Disclaimer

This Guide provides general information about the obligations of persons conducting a business or undertaking and/or persons in control of premises and workers under the Work Safety Act 2008. The Guide gives some suggestions for complying with these obligations. However, this Guide is not intended to represent a comprehensive statement of the law as it applies to particular problems or to individuals or as a substitute for legal advice. Full details of legal obligations and responsibilities are set out in the Work Safety Act 2008 referred to in this Guide. If you refer to the legislation you should take care to ensure that you use the most up-to-date version, available from [www.legislation.act.gov.au](http://www.legislation.act.gov.au). You should seek legal advice if you need assistance on the application of the law to your situation.

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## Further Acknowledgements

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# **WORKSAFE**ACT

## A Guide to Manual Tasks

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# GUIDANCE ON MANUAL TASKS

This guidance has been developed to introduce and summarise the major factors associated with manual tasks. The guide includes information to assist you to identify, assess and control manual task hazards and risks. For more detailed information, refer to the Manual Handling Regulation and Code of Practice.

The attached Manual Tasks Resource (pages 25 onwards) is intended for browsing only. Only the relevant examples should be printed.

## What are Manual Tasks?

A manual task may also be known as manual handling, means lifting, lowering, pushing, pulling, carrying, moving, holding or restraining any object, animal or person.

A manual task is more than just lifting or carrying an object. A manual task can include a wide range of activities such as pulling a lever, restraining an animal or holding and operating a power tool.

## Preventing Manual Task Injuries

Australian workers' compensation statistics show that one third of all occupational injuries at work happen during manual tasks. This rate of injury has not been reduced by traditional approaches that concentrated on correct lifting techniques that looked upon the weight of an object as the only source of danger.

The most successful approach is a systematic one that aims to 'design out' the whole range of possible causes of injury during manual tasks.

## Three Steps to Safe Manual Tasks

The Work Safety Regulation 2009 and the ACT Manual Handling Code of Practice 2010 (Code of Practice) provide a systematic approach to removing the hazards involved in manual tasks.

The Manual Handling Regulation requires employers to identify, assess and control all the risks arising from manual tasks. In particular, it requires employers to ensure:

1. that plant, equipment and containers that may be manually handled are safe when manually handled; and
2. that work practices involving manual handling are designed to be safe; and
3. that the working environment is designed to be consistent with safe manual handling activities.

Employers are required to involve the workers and their work safety representatives in this process through consultation.

The Code of Practice gives advice on the best way for employers to achieve the requirements of the Manual Handling Regulation.

**Note.** Schedule 1 of the guide provides one model to assist persons to identify and assess the hazards and risks posed by manual tasks; to identify controls to eliminate or, where elimination is not reasonably practicable, to minimise any residual risk.

## STEP 1: RISK IDENTIFICATION

Where a manual task is likely to be a risk to workers' health and safety an employer must ensure that it is examined and assessed.

Where practicable this identification should be undertaken in consultation with employees and their health and safety representatives.

There are a number of ways to do this:

### Check workplace injury records

Workplace injury records should be checked to identify where, and in what jobs, manual task injuries have occurred.

### Talk to employees and their representatives

The employees actually doing the job will be aware of many of the risks and will often have good suggestions.

### Look at the workplace

Conduct a simple walk through the workplace is a good way to identify risks. The self assessment instrument provided at the end of this booklet may be useful and will help you to identify problem areas that can be eliminated or reduced to make the task safer.

## STEP 2: ASSESS RISK

Once a hazardous manual task or workplace has been identified, they should be assessed in detail to try to find what is causing the problem. To do this it is helpful to look at the following aspects of the job:

### Actions and movements

The worker should not have to make any sudden, jerky or hard to control movements, or do anything which causes them discomfort or pain or to be in an awkward position.

### Workplace and workstation layout

The work area should be arranged so that manual tasks can be either eliminated or done at waist level, without too much bending, reaching or twisting (see Figure 1).

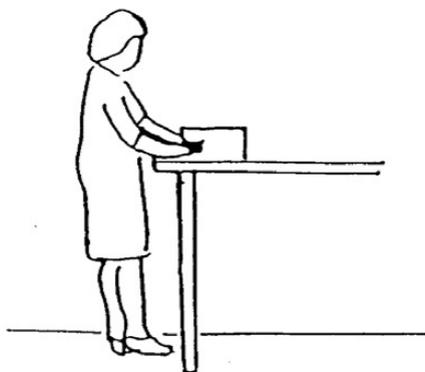


Figure 1: Avoid stooping



Figure 2: Use step to avoid reaching above shoulder height

### Working posture and position

Work activities should be varied so that the worker does not spend a long time holding the same posture or position. The worker should not have to bend down a lot or twist around to do their job.

### Duration and frequency of manual tasks

The risk of injury increases as the manual task is done more often, faster or over a longer period of time.

### Where the load is and how far it has to be moved

There is an increased risk whenever the load is below mid-thigh height or above shoulder level (see Figure 2). There is also an increased risk if a load has to be placed very accurately or carried over a long distance.

## Weight

Usually, the heavier the object the greater the risk of injury during manual tasks. However, weight should not be considered separately from the other factors listed here. For example, a person is more at risk of injury from carrying a bulky object, which can't be carried close to the body, than from carrying a smaller object of the same weight further away from the body. They will also be at a greater risk of injury from moving an object from an awkward position, such as a high shelf, than from moving an object of the same weight located in an easy to reach position (see Figure 2).

## Force

Many manual tasks in industry require the use of force to push, pull, hold or restrain an object and the greater the force, the higher the risk of injury. It is important to realise that sometimes a large amount of force is needed to produce little or no movement, such as when restraining an animal, holding up a video camera or pulling a stiff lever.

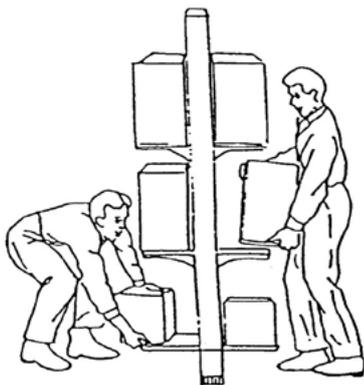


Figure 3: Store heavier and frequently used items at waist level

## Characteristics of loads and equipment

There are more risks involved in handling some loads. For example, a bulky parcel may be too wide and long to be held close to the body. Badly designed equipment for manual tasks may also increase risks. For example, a four-wheel trolley with wheels out of alignment may force the worker to make awkward push and pull movements.

## Work organisation

Staff shortages, unrealistic deadlines and insufficient rest breaks increase the risk of injury.

## Work environment

Poor lighting, extremes of climate, not enough room to move and rough or slippery ground or floor surfaces will increase the risk of injury.

## Skills and experience

Inexperienced, untrained and unskilled workers will be at a greater risk of injury.

## Personal Characteristics

In general, young workers are at greater risk than adult workers because they are still developing physically. For older workers, as age increases, the person's capacity may decrease giving rise to greater risk.

## Clothing

Some types of clothing increase risks. For example, loose sleeves may get caught on objects or a person wearing 'good' clothes without an apron or dust coat may be unwilling to grasp objects properly, close to the body.

### Special needs

Employees returning from an extended period away from work (leave, injury or illness etc) may need time to build up their skills and abilities. It may be necessary to make changes to the job or equipment for someone with an injury or disability.

## STEP 3: CONTROL RISK

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

The best way to make manual tasks safer is to redesign the task, to eliminate, or control the risk factors. There are a number of ways to do this:

### 1. Modify workplace and workstation layout

Use an adjustable platform to reduce bending and reaching (see Figure 3), and provide work surfaces at the correct height (see Figure 4).

### 2. Change the way things are moved

Eliminate unnecessary handling (see Figure 3 and 5). Ensure that all heavy objects are at waist level where they can be handled comfortably.

### 3. Modify the task

If none of these options can be used, then mechanical handling equipment like forklifts, cranes and hoists may be needed (see Figure 6).

Modify the task by using tools such as levers, hooks or crowbars (see Figure 7) or by using team lifting.

### 4. Modify the object

Change the shape of bulky objects so that they are easier to hold, or pack products in smaller cartons.

### 5. Use different actions, movement and forces

Reducing body movements and forces, such as bending, lifting, twisting, reaching and holding, reduce risk.

## 6. Evaluation

An important step in the reduction of manual handling injuries is to check to ensure that any changes made to the workplace are working successfully. The changes need to be evaluated to make sure they are being used correctly, are not increasing the risk of injury and help to reduce manual handling injuries. A period of trialing improvements is often needed to find a good modification.

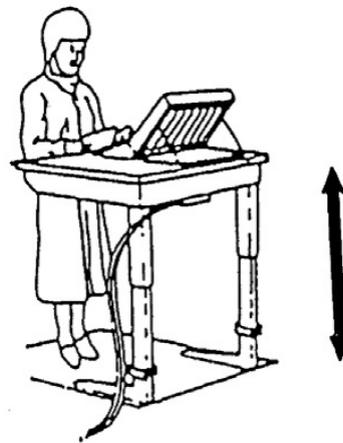


Figure 4: Adjustable work heights

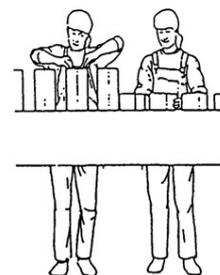


Figure 5: Tilt objects to reduce work height

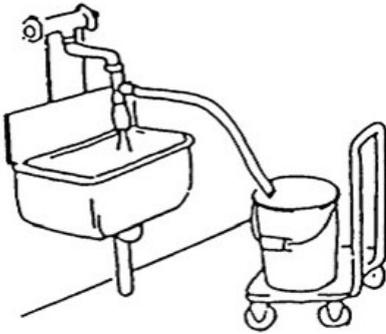


Figure 6: Hose avoids lifting

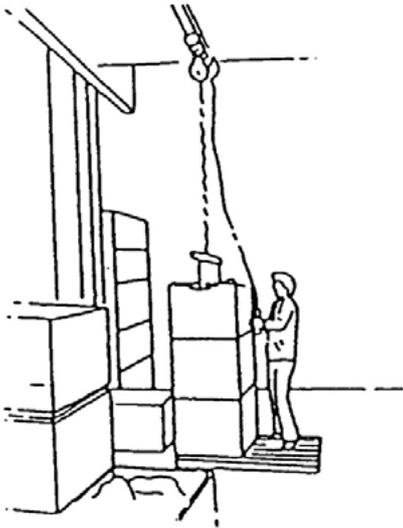


Figure 7: Electric Hoist



Figure 8: Levers reduce force required

## Training

Employers must provide adequate training to employees to identify manual task hazards and in safe manual handling practices.

Supervisors and managers, work safety representatives and staff responsible for work organisation and job and task design should also receive training.

The training should encourage understanding of ways to identify and avoid the risks in manual tasks. Adequate training should also be provided in the use of mechanical aids, team lifting and personal protective equipment such as gloves and aprons.

### The Law

The Work Safety Act 2008 provides the requirements and scope for work safety legislation in the ACT.

The Manual Handling Code of Practice provides specific guidance on this hazard.

# SUMMARY

A Recommended Approach for Reducing Manual Task Injuries

## 1. Development of an overall strategy.

## 2. Provide training to employees

To identify manual task hazards and safe manual handling practices.

## 3. Step 1 Identify Hazards

Where are manual task injuries happening in the workplace?

- look at injury records
- talk to employees and their health and safety representatives
- watch the work in progress

## 4. Step 2 Assess Risks

What could cause these manual task injuries? Look at –

- actions and movements used
- layout of the workplace
- position of the body while working
- how often, and for how long, manual task is done
- where the load is positioned and how far it has to be moved
- weights and forces involved
- characteristics of the loads and equipment
- organisation of the work
- work environment
- skills, experience and age of the workers
- type of clothing worn

- special needs of workers
- Guidance on Manual Tasks

## 5. Step 3 Control Risks

What changes can be made to prevent these manual handling injuries?

- eliminate the task
- redesign the job
- provide mechanical handling equipment
- provide training in manual handling skills

## 6. Evaluation

Are the changes made working successfully? Check that the changes –

- are implemented
- are used correctly
- are not causing further problems
- help reduce injuries

## Step 1. Risk identification worksheet

Management representative:

Date:

Work Safety representative:

If a manual task is likely to be a risk to health and safety, a person in control of a workplace must ensure that it is examined<sup>1</sup>. However, not all manual tasks are hazardous. Hazard identification is a way of sifting through tasks to find which ones have the potential to cause injury.

Hazardous manual tasks must be identified for all existing and proposed tasks or whenever changes occur in the workplace, or new information or reports on hazardous manual task is brought to your attention.

If you ticked one or more boxes for a particular task, you must do a risk assessment of that task.

Task (use extra sheets if the space provided is insufficient)	Repetitive or sustained application of force	Repetitive or sustained awkward posture	Repetitive or sustained movement	Application of high force	Exposure to sustained vibration	Handling load that are unstable, unbalanced or difficult to move
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Step 2. Risk assessment worksheet – Long version

Step 2 provides two options for completing a manual task risk assessment. The ‘Long version’ provides you with a more detailed tool to assist your analysis. However, as you become more familiar with the process you may find the ‘Short version’ meets your needs.

Long version

Task:

Date:

Management rep:

Work safety rep:

Once you’ve identified the tasks in Step 1 that involve hazardous manual handling, the next step is to work out if they are likely to cause an injury. This process is called a risk assessment. See Step 2, page 2, for further information on risk assessment.

### 2(a) Does the task involve repetitive or sustained postures, movements or force?

Tick yes if the task requires any of the following actions to be done more than twice a minute or for more than 30 seconds at a time

	Yes	Comments
Bending forwards or sideways more than 20 degrees	<input type="checkbox"/>	
Twisting sideways more than 20 degrees	<input type="checkbox"/>	
Backward bending of the back more than 5 degrees	<input type="checkbox"/>	
Bending the head forwards or sideways more than 20 degrees	<input type="checkbox"/>	
Twisting the neck more than 20 degrees	<input type="checkbox"/>	
Bending the head backwards more than 5 degrees	<input type="checkbox"/>	
Working with one or both hands above shoulder height	<input type="checkbox"/>	
Reaching forwards or sideways more than 30 cm from the body	<input type="checkbox"/>	
Reaching behind the body	<input type="checkbox"/>	
Squatting, kneeling, crawling, lying, semi-lying or jumping	<input type="checkbox"/>	
Standing with most of the body’s weight on one leg	<input type="checkbox"/>	
Twisting, turning, grabbing, picking or wringing actions with the fingers, hands or arms	<input type="checkbox"/>	
Working with the fingers close together or wide apart	<input type="checkbox"/>	

	Yes	Comments
Very fast movements	<input type="checkbox"/>	
Excessive bending of the wrist	<input type="checkbox"/>	
Lifting or lowering	<input type="checkbox"/>	
Carrying with one hand or one side of the body	<input type="checkbox"/>	
Exerting force with one hand or one side of the body	<input type="checkbox"/>	
Pushing, pulling or dragging	<input type="checkbox"/>	
Gripping with the fingers pinched together or held wide apart	<input type="checkbox"/>	
Exerting force while in an awkward posture	<input type="checkbox"/>	
Holding, supporting or restraining any object, person, animal or tool	<input type="checkbox"/>	

### 2(b) Does the task involve long duration?

Tick yes if the task is done for more than 2 hours over a whole shift or continually for more than 30 minutes at a time)

Yes

Comments

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## 2(c) Does the task involve high force?

A manual task that involves high force is one that either most people, or the employees likely to do the task, would find difficult because of the effort involved.

Tick yes if the task involves any of the following high force actions.

	Yes	Comments
Lifting, lowering or carrying heavy loads	<input type="checkbox"/>	
Applying uneven, fast or jerky forces during lifting, carrying, pushing or pulling	<input type="checkbox"/>	
Applying sudden or unexpected forces (e.g. when handling a person or animal)	<input type="checkbox"/>	
Pushing or pulling objects that are hard to move or to stop (e.g. a trolley)	<input type="checkbox"/>	
Using a finger-grip, a pinch-grip or an open handed grip to handle a heavy or large load	<input type="checkbox"/>	
Exerting force at the limit of the grip span	<input type="checkbox"/>	
Needing to use two hands to operate a tool designed for one hand	<input type="checkbox"/>	
Throwing or catching	<input type="checkbox"/>	
Hitting or kicking	<input type="checkbox"/>	
Holding, supporting or restraining a person, animal or heavy object	<input type="checkbox"/>	
Jumping while holding a load	<input type="checkbox"/>	
Exerting force with the non-preferred hand	<input type="checkbox"/>	
Two or more people need to be assigned to handle a heavy or bulky load	<input type="checkbox"/>	
Exerting high force while in an awkward posture	<input type="checkbox"/>	

## 2(d) Have your employees reported any of the following about the task?

	Yes	Comments
Pain or significant discomfort during or after the task	<input type="checkbox"/>	
The task can only be done for short periods	<input type="checkbox"/>	
Stronger employees are assigned to do the task	<input type="checkbox"/>	
Employees think the task should be done by more than one person, or seek help to do the task	<input type="checkbox"/>	
Employees say the task is physically very strenuous or difficult to do	<input type="checkbox"/>	

### 2.1 Is there a risk?

	Yes	Comments
Does the task involve repetitive or sustained postures, movements or forces, and long duration? (Did you tick yes in 2(a) and 2(b)?) If yes, the task is a risk. Risk control is required.	<input type="checkbox"/>	
Does the task involve high force? (Did you tick yes in 2(c) or 2(d)?) If yes, the task is a risk. Risk control is required.	<input type="checkbox"/>	

## 2.2 Are environmental factors increasing the risk?

If a manual task involves one or more of the following environmental factors, the risks posed by that manual task can be increased.

Tick yes if any of the following environmental factors are present in the task

	Yes	Comments
Vibration (hand-arm or whole-body)	<input type="checkbox"/>	
High temperatures	<input type="checkbox"/>	
Radiant heat	<input type="checkbox"/>	
High humidity	<input type="checkbox"/>	
Low temperatures	<input type="checkbox"/>	
Wearing protective clothing while working in hot conditions	<input type="checkbox"/>	
Wearing thick clothing while working in cold conditions (e.g. gloves)	<input type="checkbox"/>	
Handling very cold or frozen objects	<input type="checkbox"/>	
Employees are working in hot conditions and are not used to it	<input type="checkbox"/>	

Sketch the task or attach a photograph, if helpful



## Step 2. Risk assessment worksheet – Short version

As you become familiar with completing a manual task risk assessment you may find the following ‘Short version’ meets your needs. See Step 2, page 3, for further information on assessing risks.

Short version

Task:

Date:

Management rep:

Work Safety rep:

2(a) Does the manual task involve repetitive or sustained postures, movements or force?

	Yes	Comments
For example, bending or twisting the body, neck, arms or wrists, reaching, lifting, pushing, pulling, carrying, very fast movements, or exerting force while in an awkward posture	<input type="checkbox"/>	

2(b) Does the task involve long duration?

	Yes	Comments
Is the task done for more than 2 hours over a whole shift or continually for more than 30 minutes at a time?	<input type="checkbox"/>	

2(c) Does the task involve high force?

	Yes	Comments
For example, lifting, lowering or carrying heavy loads, sudden or unexpected forces, pushing or pulling objects that are hard to move, exerting force at the limit of the grip span, or the task is difficult to do	<input type="checkbox"/>	

2.1 Is there a risk?

	Yes	Comments
The task is a risk if you answered yes in any of the sections above (2(a) - 2(d)) and risk control is required.	<input type="checkbox"/>	

2.2 Are environmental factors increasing the risk?

	Yes	Comments
For example, vibration, heat, cold or humidity, or thick protective clothing.	<input type="checkbox"/>	

Other comments:

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Sketch the task or attach a photograph. If helpful



### Step 3. Risk control worksheet

Task:

Date:

Management rep:

Work Safety rep:

Risk control means the implementing of effective measures to eliminate or reduce the risk of injury from manual tasks (See Step 3, page 6, for further information).

What are the sources of risk? (Identified in Step 2)

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Can you eliminate the task?  
Eliminating the manual task is the most effective way of protecting the health and safety of your employees

NO

YES

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Is it practicable to eliminate or reduce the risk by:

- Altering the workplace
- Altering the environmental conditions
- Altering the systems of work
- Changing the objects used in the task, or
- Using mechanical aids?

NO

YES

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How can you reduce the risk with information, instruction and training?

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When will these controls be implemented?

Short term:

Medium term:

Long term:

Who is responsible for making sure that it happens?

How do you know the risk controls will work?

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## FOR FURTHER INFORMATION

Work Safety Regulations 2009

ACT Code of Practice for Manual Handling  
2010

Other publications and information on manual handling are available from your union and employer organisations.

For further guidance on manual task hazard identification and control please contact:

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Australian Safety and Compensation Council

Phone (02) 6121 6000

[www.ascc.gov.au](http://www.ascc.gov.au)



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## CASE STUDY 1

### Innovative Designs Reduce Manual Tasks At Australia Post

Australia Post is one of the largest road transport operators in Australia, handling tens of thousands of mailbags, letter trays and other items every day. In the past these mail bags and letter trays were handled manually at post offices and mail centres. This often required repetitive bending, twisting and reaching while lifting loads of up to 16 kg into and out of trucks and vans.

#### New Equipment

This manual task has now been significantly reduced with the introduction of the Folding Unit Load Device (FULD), a stackable steel mesh container that is lifted and moved by forklift, even at centres where there is no loading dock. A further innovation is a pneumatically operated device developed by Australia Post (NSW) for securing the FULDs in trucks. The device is basically a steel channel, suspended from the roof of the truck that descends to clamp down the FULDs in the truck.

With this invention Australia Post is eliminating the use of shoring bars ('pogo sticks'). These are spring-loaded telescoping poles that are widely used in the road transport industry to restrain loads, but their use requires forceful manual handling action in awkward postures.

#### Injuries Down, Efficiency Up

These and other innovations in the transport and associated operations areas have helped to reduce the incidence of manual task related incidents in Australia Post NSW by up to 17 per cent in one financial year. The changes have also resulted in a more efficient transport operation with faster turnaround times.

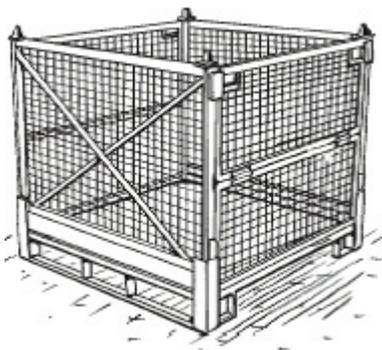


Figure 1: FULD with side down



Figure 2: FULD with side up

## CASE STUDY 2

### Reduce the Load Avoid Back Injury and Save Money

Lifting and carrying heavy loads are common causes of back injury. The good news is that some products and materials can be purchased in smaller sizes. Using smaller-sized products can reduce back injuries at work and save you money in the long term.

#### Forty Kilogram Cement Bags Cause Injury

The size and weight of bags of cement have come under scrutiny at work for work safety reasons. Many workers find the standard 40 kg cement bags cumbersome and difficult to manage and they can be a cause of injury. Forty kilograms is clearly an unsafe load for many workers. The risk of back injury increases significantly with objects above the range of 16-20 kg' and 'as weight increases from 16 kg up to 55 kg, the percentage of healthy adults who can safely lift, lower or carry the weight decreases.'

Although 20 kg bags have been available for a few years, some employers are reluctant to change their purchasing habits, so they continue to order 40 kg bags.

#### Assessment

The safety coordinator at Integral Energy assessed the causes of back injuries by reviewing accident records as well as consulting and observing workers on the job. He found that the major cause of back injuries was the handling of 40 kg cement bags by crewmembers erecting power poles for Integral Energy.

#### Solution

The safety coordinator knew that smaller and lighter cement bags were available on the market but they were more expensive than the standard 40 kg bags. His calculations showed that the extra cost of buying the smaller bags was between \$20,000 and \$25,000 per year. However, this cost was equivalent to the cost of just one workers compensation claim for a back injury.

This evidence enabled him to persuade management to purchase smaller cement bags. The benefit of spending more money to buy smaller bags of cement will decrease future economic and human costs for Integral Energy.

#### Workers Support Change to the Lighter and Smaller Bags

The workers fully supported the change to the lighter bags, although there were early experiences when workers were seen carrying two bags of cement instead of one. It took a small number of workers some time to appreciate that it was acceptable to carry only one bag at a time.



Figure 3: Using 20 kg cement bags can reduce back injuries

## CASE STUDY 3

### Purpose-Built Chairs Assisted Movement of Aged Residents in Health Care Institution

#### Problem

Aged persons or patients recovering from a period of incapacity (e.g. hip fractures) have difficulty getting in and out of many standard-design chairs. In such situations, health care employees may be called upon to help. Many low-profile chairs, while appearing comfortable for the patient, have the potential to injure employees helping patients in and out of these chairs. Many 'off the shelf' reclining armchairs, besides having a low profile, are also heavy, making it difficult for employees to move them. This may also contribute to manual task injuries.

#### Solution

Employees and management of a medium-sized health care institution, which incorporates an aged care hostel, recognised these problems and sought the assistance of the work safety committee to find a solution. The committee's investigation resulted in the hospital obtaining purpose-built chairs to solve these problems. The chair is lightweight, partly due to its hollow metal tube frame. The legs of the chair are height adjustable when the chair is empty. This makes getting into and out of the chair much easier for patients or employees assisting patients. The chair is not designed to transport patients, however, two castors are fitted to the rear legs to assist staff when moving an empty chair. The chair also incorporates a table top/ tray, which is stored under the seat when not in use.

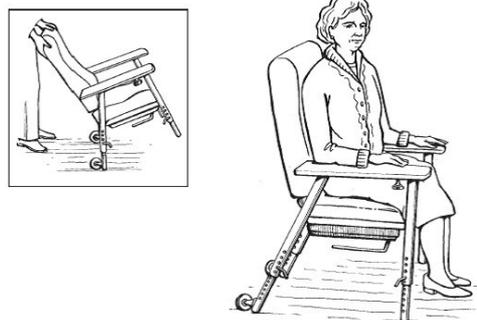


Figure 4: Patient in purpose built chair

#### Benefits

The introduction of the new style of chair has reduced the risks when staff are placing patients in, and getting patients out of, chairs. This lightweight chair, is strong, easy for employees to manoeuvre, and comfortable for patients.

## CASE STUDY 4

### Dispensing Cleaning Chemicals Safely

Cleaners often risk injury when they have to lift heavy drums of cleaning chemicals. This happens when they need to lift the drums from the floor and onto a table in order to dispense the chemical from the tap or, even worse, have to lift and hold the drum to pour the contents into another container. Cleaning staff at Sutherland Hospital identified this as a problem.

#### Solution

To solve the problem, staff at Sutherland Hospital went straight to the chemical company that produced the cleaning chemicals. When the company heard about the problem they provided a dispenser that could pump the contents from the drum while the drum remained on the floor. As well, the contents were dispensed in measured amounts.

This not only reduced the manual task significantly, but also reduced the chemical wastage. Recognising that the hospital was a long-term customer, the company provided the special dispenser free of charge.

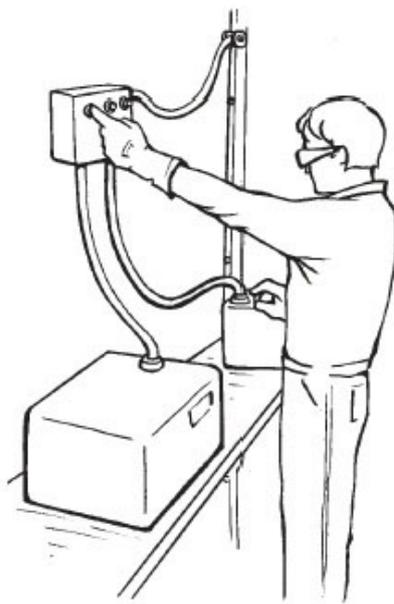


Figure 5: Chemical dispensing system

Companies often have solutions to problems people have using their products, so it may pay to confer with them. Their experience and expertise may lead to a quick solution.

## CASE STUDY 5

### Better Ways of Handling Chickens at a Supermarket Deli

Handling tubs of fresh chicken was identified as a significant manual-handling problem in the deli section of Coles Supermarkets. This problem was identified through observation and consultation with staff. In the larger stores, staff would handle more than two tonnes of chickens a week.

#### Assessment

Assessment showed that tubs of chickens, weighing 15 – 20 kg each, were delivered onto standard double-decker trolleys in the loading dock, wheeled to the cool room and then manually unloaded and placed on the floor in stacks up to and above shoulder height.

This involved twisting, bending and reaching actions that were hazardous in combination with the weights involved. From the cool room, the tubs were manually carried or dragged to the bench where chickens were prepared for cooking. Leakage of liquid from the tubs added a slip hazard to the manual-handling problem.

#### Solution

A number of solutions were considered, including smaller tubs or more staff, but these solutions would have added to costs and not solved the leakage problem. Finally it was decided to reduce the double handling by providing enough purpose-built trolleys. The idea was to be able to leave the tubs on the trolleys in the cool room and only wheel them to the preparation area when required.

A new trolley was developed for Coles by RPM Building Services and staff tried out a prototype. This trolley, which is now in use, has a drip tray in the base to overcome the leakage problem. Tubs of chickens are stacked directly onto the trolleys in the loading dock. This means that deli staff now only have to lift each full tub once (onto the preparation table) instead of three to four times as in the old system. The loaded tubs are never lifted from the floor.

The OHS coordinator at Coles, Ross McCaskill, calculates that the cost of the new trolleys will be recovered in just over a year by improved efficiency and reduced injury costs. The new system will now be implemented in all Coles stores.

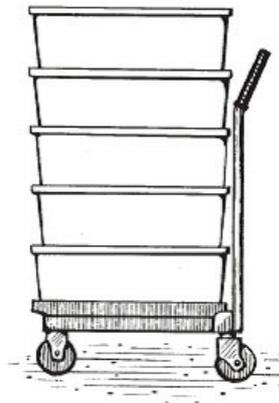


Figure 6: Chicken Trolley

## CASE STUDY 6

### Storing Things the Easy Way

A leading energy supplier significantly reduced the amount of manual tasks and, as a result, reduced the risk of back injuries by a simple rearrangement of their storage systems.

#### Manual Task Risks

The members of the organisation's OHS committee were concerned that a large number of linesmen had been affected by back injuries. They were also worried about the heavy loads being lifted onto trucks by the linesmen. The most awkward items lifted were the timber crosses that sit at the top of power poles (cross-arms). The committee, in consultation with linesmen and management, reviewed the existing handling processes with a view to improving them.

#### Assessment

The assessment revealed that the cross-arms were:

- Manually handled three times before reaching the truck (from the main store to the material store then to the truck loading area)
- Often stored on the floor (requiring bending or stooping to reach them)
- About 20 – 40 kg (making them a heavy load for most healthy adults).



Figure 7: Using pallets to keep material at waist height

#### Solution

It was decided to store cross-arms in the truck loading area instead of the main store. Storing them on pallets at waist and truck height, rather than storing them on the floor increased the storage height. At this height the cross-arms could be slid from the pallets to the truck without any bending or lifting. These changes reduced the need to double-handle or carry out a low lift or a heavy lift of the cross-arms.

After a three-month trial, the linesmen, OHS committee representatives and management recommended construction of permanent storage in the truck loading area. The successful rearrangement of the storage for heavy and awkward cross-arms has been duplicated in the storage of concrete stay blocks and bags of cement. These are now stored on elevated platforms, close to the loading area, with the resultant benefits of reductions in bending, stooping and double handling.

## CASE STUDY 7

### Moving and Loading a Potential Source of Back Injuries

Ferrero Australasia Manufacturing Pty Ltd, Lithgow, has been able to reduce back injuries caused by moving products and stores from pallets to shelves, from pallets to production lines or just unstacking stock.

#### Manual Task Risks

Moving products and stores from pallets to shelves, from pallets to production lines or just unstacking stock, are common sources of back injuries. These tasks typically require the worker to bend or crouch to reach stores on floor level as well as reaching across to the back of the pallet. In these positions neither the back nor the arms are working efficiently or safely, and in crouching to low levels the knees are stressed. The management of Ferrero, believing that there was a potential problem with the existing system of work, carried out an assessment of the factory's manual task procedures.

#### Assessment

Assessment of the manual task risks involved observing the tasks and consulting the workers. The workers had to reach down to lift boxes off the base of the pallet. They also tended to bend and twist to reach boxes from the rear of the pallets. The workers considered this task a nuisance and reported that it was faster and simpler to bend and reach the rear of the pallets instead of walking around them.

#### Solution

A few ideas were tested before an acceptable solution was found:

1. One partial solution was using a commercially available spring-loaded scissor lift that supported the pallet. When each layer of product was removed from the pallet the springs would bring the pallet up higher. This lift allowed the product to remain at a more comfortable height. This device solved some of the problems, but some refinements were needed.
2. The final solution was using an electrically operated scissor platform. The features that made this the best option were that:
  - It was easier to adjust the platform height
  - It was easier to move the platform between sites as it was on wheels
  - A turntable on the platform allowed easy access to products on different sides of the pallets.

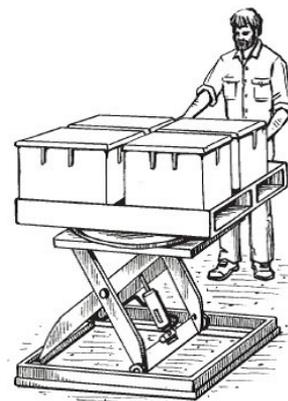


Figure 8: . Electrically operated scissor platform

#### Results

This platform has now been in use for seven years. The company believes that they have had a 'terrific return on this investment' in terms of both safety and money. The equipment has reduced some of the major contributing factors to back injury. The workers do not have to bend to reach low loads or twist to reach loads in awkward positions

## CASE STUDY 8

### Mechanical Aid to Assist Movement of Floor Polishing Machines

#### Problem

A government department wished to reduce the risk of back injury to school cleaners caused by the manoeuvring of heavy industrial floor polishers or buffing machines up and down flights of stairs.

#### Solution

The concept of the stair trolley was adapted to suit an industrial floor-polishing machine by fitting a set of three wheels to each side of the machine. The device incorporates a specially designed fold-back axle to enable the wheels to be moved out of the way when the machine is in use. The 'Easy Wheels' can be used with a wide range of polishers.

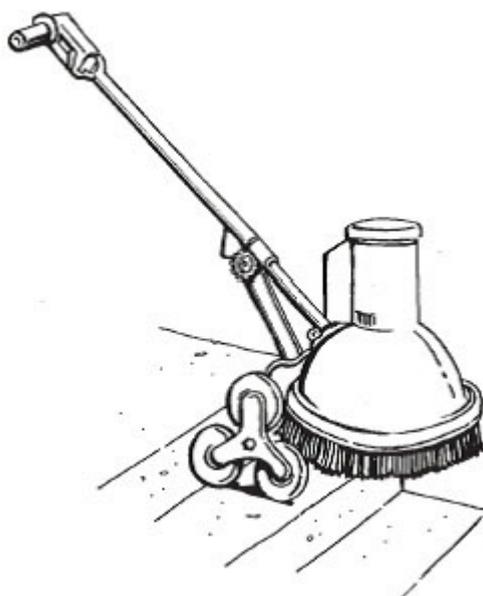


Figure 9: Specially designed floor trolley

#### Benefit

The machine is easier to manoeuvre up and down stairs than a conventional floor polisher, and reduces the possibility of operator injury.

## CASE STUDY 9

### High Stacking from the Yellow Trolley

Loading shelves at a major supermarket often meant lifting stock to shelves just below ceiling height. Stock had to be loaded onto trolleys that were wheeled into place and then stock placed on the shelves.

An ongoing review of stock control and manual tasks at the supermarket chain showed that the two-level red trolleys that had been used in the stores for many years caused problems with the handling of stock. The Health and Safety Manager – Design and Warehouse, and the National Design and Development Manager decided to look at the problem and come up with a better solution.

#### Identifying The Problem

While undertaking the process of hazard identification, risk assessment and control, the team enlisted the help of operational managers, an ergonomist, the Civil Engineering Department at the University of Sydney, representatives of NSW retailers, the Australian Institute of Supermarkets, the Shop Distributive and Allied Employees Association and WorkCover's Rural Team. The team also used procedures developed through their Step Towards Excellence Program, along with interviews with staff who used the trolleys and observations made in the stores.

#### Solution

The process led to a new inventory control system that is expected to reduce the double handling of stock, lower the height of stock in the top level fixtures and improve access to stock on the highest fixtures through the invention of the Yellow Trolley. The Yellow Trolley will improve stock handling and lead to increased safety through its special design features. Improved features include:

- Angled ladder with rails, to improve access to the upper deck
- Textured rungs and upper platform surfaces, to reduce the risk of slippage
- Lowering the height of the top deck, to improve trolley stability
- Gate on the upper platform, to prevent staff from falling off
- Tension-compression gate mechanism located under the top deck, to reduce pinch points and protrusions and control the gate's swing velocity
- Brake mechanism designed to be effective on uneven surfaces, with improved access and operation
- Castors aligned with guard rail and periphery of top deck, to improve stability
- Increased trolley width, to improve stability
- Bumper bar surrounds trolley base, to reduce lower limb injuries
- Mesh sides, to prevent climbing on trolley and allow unobstructed vision when moving trolley
- Upper deck rails are 900mm high, to comply with AS 1657-85
- Stock step located at end of trolley, to provide resting place for stock that is being passed up or down. This removes need to reach over upper deck rails, or to bend and reach under rails.



Figure 10: The new trolley design

## Training

A training program, standard operating procedures and a training evaluation program have been developed by the Health and Safety Manager, in consultation with retail team members. The package will be evaluated as part of the trolley trials, with the assistance of the retail-training group.

## Evaluation

The Yellow Trolley is being trialled in a number of NSW stores, in conjunction with the training package. Evaluation will include a comprehensive risk assessment, incorporating observation of the trolleys in use, interviews, questionnaires and accident/injury data.

## CASE STUDY 10

### Built-in Fuel Tanks Replace 200 Litre Fuel Drums

Loading and unloading heavy fuel drums were sources of manual task problems for the Evans Shire Council (Bathurst) until they changed to a custom-made built-in fuel tank in their vehicles.

#### Identifying And Assessing The Risk

The original system required operators to manually load 200 litre drums of fuel on vehicles (usually utes) and drive them to remote sites. Then they rolled the drums off the vehicles, lifted them upright, manoeuvred them close to the plant and hand pumped fuel from the drums into the plant.

Fuel operators often reported back pain after manoeuvring the 200 litre drums despite 'careful handling'. It was particularly awkward during cold mornings when frost covered the drums and made them too slippery to grip. The operators accepted this heavy, awkward and difficult task as just part of their job.

Discussions between fuel operators and the Engineering Department of the Council resulted in a decision to find an easier way to refuel plant without exposing the operators to such a high risk of injury. The main risks were:

- The weight of the load and the force required to move it
- The awkward postures adopted by the operators when manoeuvring the drums
- The difficult work environment in the field.

#### Trialling Controls

A number of methods of loading the drums onto utes were trialled including the use of a mechanical grab, attached by a chain and a "D" shackle to the bucket of the yard frontend loader. The grab had a scissor action, which clamped onto the top rim of the drum allowing it to be lifted onto the utes. This system was satisfactory in the yard but it still meant that the drums had to be manually handled in the field.

#### Solution

The council arranged for built-in fuel tanks to be custom made for vehicles transporting fuel to plant in distant locations. The new arrangement eliminated the need to manually handle 200 litre fuel drums. It made the task safer, faster and easier to complete. The council also replaced hand pumps with electric pumps.

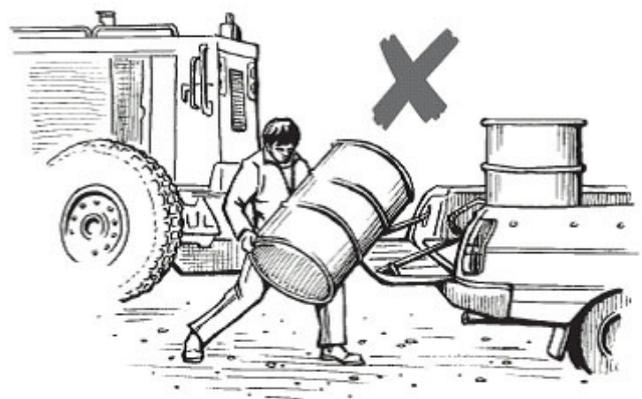


Figure 11: Maneuvering a 200 litre drum causes back problems

## CASE STUDY 11

### Handling Garbage The Easy Way

Wheelie bins (two-wheeled, 240 litre rubbish bins) have made life easier for many of us at home – saving us from carrying heavy loads. But at some worksites, emptying these wheelie bins into rubbish skips without any assistance is not an easy task. School cleaners have identified this task as a potential cause of back injury.

#### Back Injury Statistics in the NSW Cleaning Industry

Cleaners in NSW have reported a large number of back injuries – with 204 male workers and 305 female workers reporting back injuries in the 2000/01 financial year.

#### Consultative Process

The OHS officer of the ALHMWU consulted the cleaners, their employers, and WorkCover NSW during the risk assessment process. The employers represent some of the largest contract cleaning companies in Sydney that employ school cleaners (Berkeley Challenge, Menzies Property Services and Tempo Services), and they have supported this health and safety initiative.

#### Risk Assessment

In assessing the task of manually emptying the wheelie bins, the following risk factors have been noted:

- Weight of the total load (which varies considerably, but is often more than 25 - 30 kg)
- Twisted and bent posture
- Reach required to bend below the knee with one hand to grip the base of the bin and reach up to grip the top of the bin with the other hand
- Uneven load on the spine due to the asymmetrical posture
- Lifting the load above shoulder height.

#### Solutions

There are now a number of new devices on the market that reduce the need for cleaners to lift the bins. The solutions range from simple mechanical devices using gas struts, to electrically operated hydraulic lifters complete with fully enclosed safety cages.

## Check Each Site's Specific Requirements

Before rushing off to buy a bin lifter, the OHS coordinators and cleaning company managers recommend the importance of assessing each worksite. It is necessary to check exactly what each site's specific requirements are as there is not one solution that fits every site.

Some of the issues that need to be addressed when selecting a bin lifter include:

- Terrain around the dumpsters (is it a rough dirt track or a smooth concrete path?)
- Size of the dumpster – e.g. 1.5 cubic metre dumpsters are lower than three cubic metre dumpsters
- Frequency that the wheelie bins need to be emptied
- The type of rubbish to be carried
- Security issues
- Users of the devices.

Consultation between management and the user is critical to ensure the right purchasing decision is made. The equipment suppliers may also offer a free trial to check if the lifter is appropriate for the task in mind, and they can generally advise if any custom-made modifications are required.

With a consultative approach and continuing evaluation by management as well as the cleaners, a successful solution can usually be found.

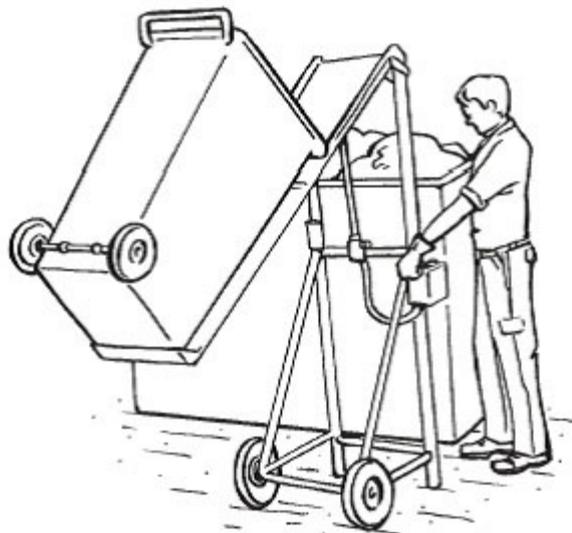


Figure 12: A bin-lifter in use

## CASE STUDY 12

### Plate Glass Handling Frame

#### Problem

The National Gallery of Victoria has many glass display cases. When it is time to alter or remove the display, the front pane of glass has to be removed. The procedure involved attaching several suction cups to the frame and then sliding it out of its track and lifting it to a safe storage position. When the display case was ready to be sealed up, the reverse procedure took place. All glass panes were picked up and lifted by hand into position.

The size and weight of the glass made it awkward to lift. The task required several people. A serious accident could occur if one of the lifting team tripped, lost their grip on the suction cup, or the suction cup came unstuck from the glass.

#### Solution

The gallery established an investigation team to research the issue. The team included the health and safety representative, two gallery assistants, the Chief Conservator and the Curator. A hazard identification and risk assessment of the tasks involved were undertaken. The Gallery's health and safety officers consulted various experts in manual handling and glass products. After extensive consultation and development a special glass-handling frame was developed.

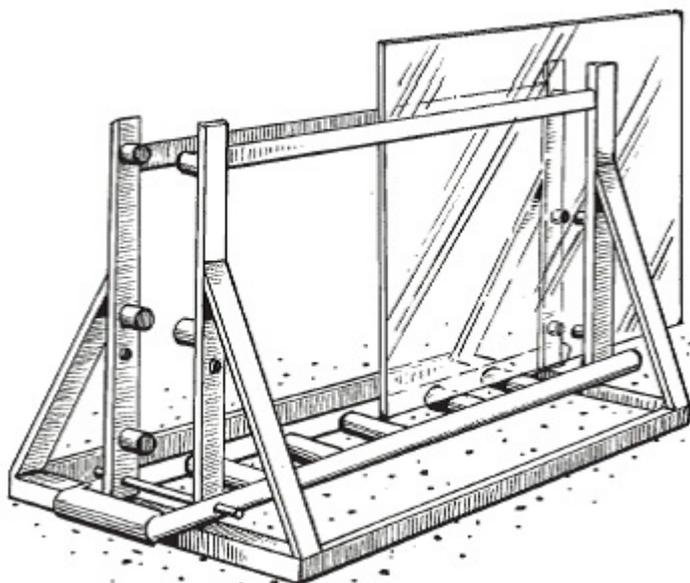


Figure 13: Glass handling frame makes removal and replacement of panels easier and safer.

The frame has several internal castors so that staff can slide the glass panel into the glass frame and out with minimal effort; the glass always remains secure. The frame sits on a hydraulic lifting table so that its height can be adjusted to that of the cabinets.

## Benefit

The glass-handling frame and hydraulic lifting table have eliminated the need for staff to manually lift and carry heavy glass panels with suction caps. Because the glass is held securely by the frame, the risk of injury, should the glass shatter or break, is significantly reduced. There have been no reported sprain or strain injuries since the introduction of the frame and an added benefit is that staff can change the displays much more quickly.

## CASE STUDY 13

### Using Heavy Tools Can Strain the Arms and Back

Manual task injuries are generally associated with lifting, carrying, pushing and pulling. Using force to hold or restrain objects is another aspect of manual tasks but it is often overlooked. Workers using heavy tools or machinery are at risk because of the strain they place on their backs and arms. One example of this sort of manual task problem is using chainsaws.

#### Tree Trimming with Chainsaws

Tree trimming crews at Integral Energy are responsible for keeping branches and foliage away from overhead power lines. The crews use petrol chainsaws to trim the branches while standing on elevated work platforms (commonly known as cherry pickers).

#### Identifying the Problem

An analysis of the crews' accident and injury records revealed that a large number of musculoskeletal sprains and strains to the shoulders and back were being experienced by tree trimmers. It was also clear from observing the task and consulting with the crews that it would be necessary to make the task physically less demanding.

#### Risks

Manual task risk factors on analysis of the task are as follows:

- The chainsaw/tool is held away from the body
- The tool is heavy
- The worker has to adopt a twisted, constrained or bent posture
- The work environment and layout cannot be controlled
- The task is performed for a long time.

The main problems include the weight of the tool and the posture adopted by operators when trimming the trees. The operators tend to lean out of the elevated work platforms with the chainsaw held away from their bodies to reach the branches to be trimmed. Operators working in certain postures can affect the chainsaw's kickback safety brake. If the operator works with arms angled down, the kickback would work, but in some awkward and twisted postures it was ineffective.

## Solution

A new type of chainsaw was trialed to reduce the manual task problems affecting the tree trimming crews. These chainsaws are powered by the hydraulic power take off on the trucks instead of petrol. The advantages of these hydraulic chainsaws are as follows:

- Lighter weight
- Longer handle (making it possible to take some load off the operator by resting the chainsaw handle on the edge of the bucket)
- Quieter than petrol chainsaws
- Easier start mechanism
- Fewer moving parts so less maintenance time.

Manual Tasks Resource



Figure 14: New long-handled lightweight saw

The crews and safety personnel recommended the purchase of hydraulic chainsaws for the tree trimming crews after using this chainsaw for five years.

## CASE STUDY 14

### Laying Paving Blocks By Machine

Bricklaying and block laying are recognised as trades with a high risk of back and shoulder injury due to repetitive lifting, frequent twisting and bending. Laying of paving blocks has the added risk of being done at ground level, requiring work to be done in a sustained bent posture. Experienced paving block layers typically lay about 1,500 blocks (35 to 40 square meters) per day. A worker in a bent posture handles about six tonnes per day (with each block weighing 4.2 kg). Workers are also required to lift and carry pavers from the delivery pallets to the place where the pavers are being laid.

#### Easy To Identify

As with many tasks in the building industry, the risks of manual paving work are easy to identify but it is hard to develop other ways of getting the job done. However, a fully mechanised system for laying of pavers has now been developed by Segmental Paving Services Pty Ltd of Sydney. This system has eliminated nearly all the manual aspects of the job. The system uses a laying machine that picks up a 1.25 square meter 'slab' of 50 blocks from a stack, and then puts them down in the correct position on the ground.

The stacks of blocks, with each layer already arranged in a herringbone pattern, are automatically assembled on pallets by another machine off site and then delivered ready for the laying machine. Using a pavement cutting saw to trim the edges of the herringbone pattern after laying, rather than trimming each block separately before laying further reduces manual tasks.



Figure 15: Paver laying machine

## Mechanised System

Paul Junghans, developer of the system and managing director of Segmental Paving Services, says the mechanised system is most applicable for laying large, heavy duty paved areas such as airports and transport depots, where thousands of square meters of paving are required. The machine can lay paving at a rate of more than 2,000 square meters per week – equivalent to ten people laying by hand.

Eliminating manual tasks through automation and mechanisation is the most effective way of reducing the risk of injuries. This block-laying system provides an example of how clever thinking and mechanisation can be applied to traditionally labour intensive work in the construction industry. The mechanised system reduces risks as well as improving productivity and the quality of the finished work.

## CASE STUDY 15

### New Linen Trolleys Reduce Hospital Manual Task Risks

A large number of back injuries in non-nursing hospital workers can be attributed to pushing, pulling and loading or unloading trolleys. Muscular stress or slips and falls mainly cause these injuries.

A detailed study of linen trolley design was undertaken in 1994 by Jules Potiki at Sydney's Royal Prince Alfred Hospital with a view to identifying problems and overcoming them with improved trolley design. Mr Potiki surveyed existing trolleys and found that pushing and pulling forces for laden trolleys were frequently high, especially when:

- Starting a trolley when the swivelling wheels were not pointing the right way
- Using trolleys on carpeted floors (about 50 per cent more force is required than on vinyl)
- Moving trolleys up ramps (a slope of only 2.6° increased the force required by 400 per cent)
- Moving trolleys over a bump or gap in the floor surface, such as moving the trolley into a lift.

### Consultation

Trolleys with improved designs were developed at the hospital through a consultative process involving staff of the linen services, engineering services, and a trolley manufacturer, in order to arrive at a new trolley specification. A prototype was made and tried by staff, leading to some modifications that were included in the final design.

### Solution

The new fleet of trolleys has the following features:

- No more than 4 kg force is needed to push the trolley in a straight line on a hard, smooth floor surface
- Handle height is between 940 – 1,000 mm, i.e. about elbow height
- Wheel diameter is 200 mm. (the large diameter wheels have less rolling resistance and are less affected by bumps and gaps in the floor surface)
- Loads in the linen trolleys are restrained by lightweight removable straps (replacing heavy metal gates) that allow loading/unloading with minimum bending and reaching.

Together with improvements to floor surfaces and work practices, the new trolleys have reduced the risk of injury. Mr Potiki estimates that if the new designs halve the cost of trolley related accidents (and early indications are that they could do better than this), then there will be a saving of about \$15,000 per year to the hospital.



Figure 16: New linen trolley – fully open side when straps are removed allows access to load with minimum reaching and bending

## CASE STUDY 16

### Implementing a Manual Task Program Roads and Traffic Authority NSW

The Sydney Region of the Roads and Traffic Authority (RTA) employs more than 2,000 people and its worksites are located throughout Sydney. This case study outlines the process of designing and implementing a manual-handling program by the organisation's occupational health and safety unit.

#### Beginning

Sydney Region's occupational health and safety staff assisted in designing and carrying out the program, which was facilitated by a special projects officer. The RTA began by gaining the commitment and involvement of management. This task involved informing branch and senior management about the aims, objectives and reasons for the program. Once management was convinced of the merits of the program, the first phase of the program was launched.

#### Targeting a Priority Area

The process had to be phased into the organisation because of the large number of workers and many different worksites. Priority was given to the area with the most manual task incidents. Reviewing workers determined the area the highest incidence of manual task injuries (the Operations Group) from compensation records and accident data.

The Operations Group consisted of Road Construction Services, Road Maintenance Services, Fleet Services, Traffic Services, and Bridge Services.

#### Gaining Worker Commitment and Involvement

The OHS unit then sought the commitment and involvement of the workers. The unit realised that they had to have the support and input from workers to successfully resolve manual task problems. Workers are generally best placed to identify the known or potential risks and they can provide practical risk control suggestions.

A team of five or six representatives from various sections was nominated for a manual task team from each of the services. The team included both management and staff.

#### Training Team Members

The team members attended a one-day training course developed by the RTA in conjunction with the Sydney Hospital Occupational Health and Safety Service. The training program included detailed information on manual task law, the risk management process and the practical aspects of performing hazard identification, risk assessment and control within the RTA Sydney Region. A case study involving practical risk assessment ensured that teams could understand and apply the process.

In addition, a manual task awareness training session (two hours) was conducted for other workers. This course looked at the main points outlined at the team training, provided an overview and showed their likely involvement in the manual-handling program.

## Identifying And Assessing Hazards

After workers compensation and accident records were reviewed, the team members were asked to identify other manual task hazards, and to consult with their colleagues and supervisors to analyse tasks. Once the hazards were identified, team members assessed them using a checklist supplied by the occupational health and safety unit. Because of the large number of identified hazards, team members graded them into high, medium and low hazards and addressed the high-risk activities first.

## Controlling the Hazards

The teams developed manual task hazards control strategies to be trialed. This process required the teams to meet regularly, either monthly or bi-monthly, to discuss and clarify issues and solve problems. A register of the tasks identified as hazards and the action plans were kept to ensure that issues were not forgotten and that all risk control measures were regularly reviewed.

## Evaluation

The first phase lasted for about 12 months and a number of successful risk control measures were carried out. The RTA has not carried out a formal review of the manual task teams' activities. However, informal reports suggest that they have had a positive influence on reducing manual task problems.

## Future Plans

The RTA hopes to repeat a similar process with the Driver Vehicle Services Branch, the Sydney Harbour Bridge Toll Branch and Consultative Services Branch.

## CASE STUDY 17

### Innovative Trailer Design Saves Backs

The Sydney Region of the Roads and Traffic Authority (RTA) organised and carried out a manual task hazard identification, risk assessment and control program within its Operation Group (see case study 16). One successful solution arising from this process was a new system of transporting gear to road sites, which reduced manual task injuries.

#### Hazard Identification

The manual task injuries from loading and unloading trucks by the Road Patch Crews were identified during a thorough hazard identification process. A member of the Yennora Road Maintenance manual task team identified this problem during discussions with the members of RTA depots. Manual task injuries during unloading and loading of trucks were also identified as a problem from the accident and workers compensation data, anecdotal evidence and thorough observation of the task.

The Road Patch Crews travel out to the sites in a five-tonne truck. Carried in the rear of the truck are all the signs, barriers, barrier stands, concrete blocks, 25 litre drums and a jackhammer. The crew would normally load and unload all of this equipment over the side of the truck. A worker was required to stand inside the truck to help load and unload. Lifting the jackhammers in and out of the trucks caused the greatest numbers of injuries.

#### Risk Assessment

A number of risk factors were identified during the assessment of the task. These included:

- Lifting heavy loads (more than 25 kg)
- Lifting loads from ground level to over head height
- Reaching up to pass loads over the side of the truck
- Accessing items from the floor of the truck made difficult because of poor layout
- Bending and twisting
- Handling large, and awkward loads – such as jackhammers and signs
- Loading and unloading tools and equipment frequently.

## Solving the Problem

The manual task team decided to adapt an existing RTA trailer so that it could be custom fitted with shelving and slots to hold the various pieces of equipment at more convenient heights, and at the same time provide much easier access. The fitters at RTA were brought in to assist with the design and construction of the new custom-fitted trailer.

The new trailer now incorporates the following features to make the manual task safer and easier:

- A bracket on the side, at about hip height, to hold the jackhammer
- Vertical racks at waist height to hold new rubber blocks/feet for the signs
- A shelving system where signs are easily slid in and out
- A designated area to hold the 25 litre drums.

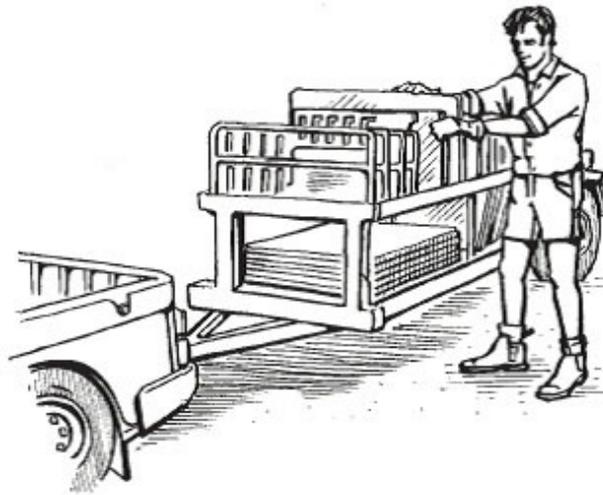


Figure 17: The new trailer with most loads accessible between knee and chest height

Another solution involved replacing the concrete blocks that secure temporary road signs with rubber blocks, and changing the signs to a smaller lighter design. Additionally, improved ramps allowed workers easier access to the trailers.

Management accepted these solutions, as they could see immediate savings in terms of efficiency as well as potential savings in workers compensation because of a reduced injury rate. With management's support, the new trailer became a reality. This trailer has now been in operation for some time and is gradually being adapted as new and better ideas come up. The crews are aware of their important role in helping develop better and safer ways of doing things.

The manual task representative who coordinated this project believes it was successful because of the tremendous commitment and involvement of the crews and the rest of the manual task team.

Management was so pleased by the result that it made available a \$15,000 grant to build a new trailer from the ground up, incorporating all of the improvements.

## CASE STUDY 18

### Step Backwards For Safety

The association between back injuries and jobs involving heavy lifting and carrying is well known. However, what is not as well known is that drivers are also at risk of back injuries, especially when climbing in and out of their cabs. Some drivers have to climb in and out of their vehicles many times each day, and drivers of heavy vehicles have special problems because of difficult access to their cabs.

#### Hazard Identification

Integral Energy has almost half of its entire workforce working out of vehicles. About 15 years ago it was found that drivers had a large number of work injuries. A review of the company's accident statistics showed that drivers suffered a variety of injuries, including twisted ankles and back injuries. Further analysis revealed that:

- Back injuries were the main injury
- The most common cause of these injuries was getting out of vehicle cabins and off the back of flat top trucks.

#### Risk Assessment

A project team with representatives from the company's transport and linesmen areas was formed to investigate the causes of injuries when drivers get out of vehicle cabins and off the back of flat top trucks. The assessment involved observing drivers climbing in and out of their vehicles. The risk factors identified by the assessment were that:

- The drivers generally jumped forwards out of the vehicles, rather than climb down
- The drivers jarred their backs jumping from a height onto mainly uneven ground
- The drivers seemed to have adopted this method of getting out of their vehicles because of inadequate foot and handholds. They had not been trained to use any particular method to leave their vehicles.

#### Practical Controls

Since this problem needed immediate action, the project team agreed to a series of control measures. They knew these controls needed to be practical and simple if the operators were to stop this potentially dangerous practice.

#### First, construct sufficient number of steps and handholds

The first stage was to ensure that each vehicle had a sufficient number of steps and handholds. This meant the construction of steps onto the backs of some trucks, adding wheel rim steps, and providing additional handrails for cabin access.

## Second, promote the controls

The second stage was to publicise the best method to climb down. This was achieved using wall posters around the common areas as well as colourful stickers demonstrating the incorrect way with a red cross and correct method with a green tick. These posters and stickers were pasted in the cabin of each vehicle. In addition, slide and video presentations and discussions with the vehicle operators were organised. These presentations and discussions defined the problem and the reasons for the change.

## Success: Back Injury Reduced

The safety coordinator at Integral Energy claims that this initiative decreased the number of back injuries caused by alighting from vehicles by 99 per cent. This program entitled 'Step Backwards for Safety' has been implemented by a number of other companies.

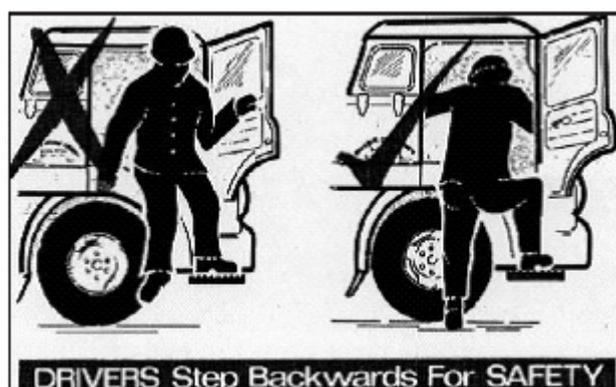


Figure 18: Dashboard sticker developed by Integral Energy

## CASE STUDY 19

### Chemical Storage and Diluting System for Cleaners

Centennial House is a large nursing home with over 200 residents. The home employs many cleaning staff to maintain floors, bathrooms and window surfaces and numerous cleaning detergents are used in this process. The chemical detergents, once stored in 25 litre drums, were heavy and awkward to lift and store. In addition, staff were required to move from floor to floor throughout the nursing home. No injuries were reported.

However, management was aware of the potential for sprains and strains from lifting the heavy drums. There was also a high risk of injuries from chemical splashing, which could occur while cleaners decanted the chemicals into smaller containers.

#### Solution

The cleaning staff discussed the hazard with the environmental supervisor and assistant administrator. Management and staff undertook a hazard assessment of the tasks involved and investigated better ways of storing and handling bulk chemicals. After consultation with cleaning staff the nursing home purchased an Oasis chemical dispensing system.

All bulk concentrated chemicals are now stored in one location on the lowest rung of the specially designed shelving system. They are connected to separate mixing containers located directly above by heavy duty PVC pipe. A water hose and trigger filler are connected to the local water supply. Fast flowing water creates a vacuum that draws the chemicals up to the mixing chamber. A one-way inlet valve allows a predetermined amount of the concentrated chemical to mix with the water in the chamber, thereby taking the 'guess work' out of diluting cleaning solution.

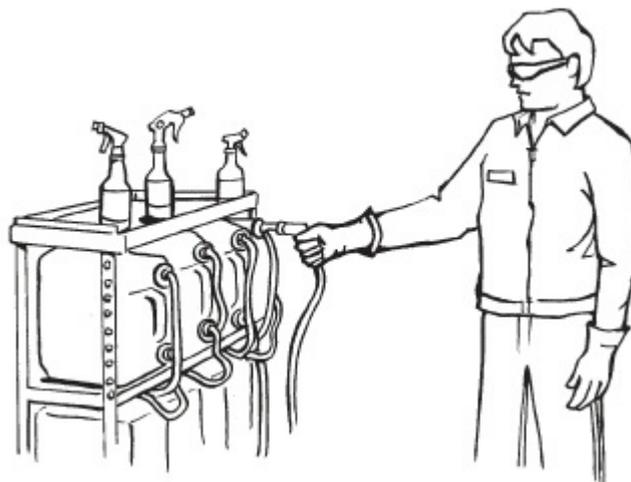


Figure 19: A tower rack system holds chemicals for mixing and feeds them directly into cleaning buckets

The diluted solution can then be easily transferred to small bottles for use in other areas or into cleaning containers. The mixing chamber has an overflow pipe that is angled away from employees. Any overflow from the filling process is trapped in a spill tray.

## Benefits

Chemicals are now stored in smaller amounts. They are easier to carry and this process has reduced the risk of manual task injuries. Because the system is totally enclosed, employees no longer come into direct contact with the concentrated chemicals. The risk of splash incidents has also decreased. The chemicals are colour coded to match the labels on the bottles and a colour-coded chart is provided for those who have low skills in written English to identify where the chemicals are used. This has reduced the risk of staff using or mixing inappropriate chemicals.

## CASE STUDY 20

### Patient Handling A Weighty Problem

Hospital staff are concerned when an obese patient is admitted to their wards, anticipating problems with lifting and moving. Staff at Sutherland Hospital were doubly worried when not one, but two, obese (200 kg) patients were admitted on the same day, both scheduled for surgery within 24 hours and needing full patient care.

#### Identifying Hazards and Assessing the Risk

Fortunately, Sutherland Hospital had appointed a manual task coordinator and instituted a manual task program only a few months prior to the admission of the two patients. This meant staff didn't have to handle the situation 'as best they could', but could get help in assessing and controlling the problem.

The manual task coordinator met with the nursing unit manager and program manager to assess the situation and suggest solutions to control the problem. The first suggestion made was to ensure enough wards persons were available to help with the lifting problem. The coordinator pointed out that this solution only transferred the problem to the wards persons and that sufficient wards persons might not be available when the patients needed to be lifted or moved.

#### Solutions

Further discussion led to the suggestion of using an electric bed for one of the patients. This would reduce the risk on the ward by reducing sustained bending. The coordinator cautioned that this solution would only solve the problem in the ward. Ward persons and surgical staff had to be considered when the patient had to be moved for surgery.

After further discussion, surgical staff and wards persons agreed to use the electric bed for all components of the patient's care, significantly reducing the number of transfers and sustained postures.

With only one electric bed available the group had to find another solution for handling the second patient. They decided a sling kept under the patient at all times (to avoid continual manual handling of the patient to position the sling), and a hoist permanently positioned nearby, would assist staff. However, since the hospital did not have a large enough sling, one was purchased.

#### Long-Term Solutions

The arrival of the obese patients forced the hospital staff to consider procedures to cope when this situation arose again. A new system will be implemented to require visiting medical officers to provide notification to the wards when patients are to be admitted who may increase the risk of manual task injuries to staff. To ensure that proper equipment is on hand, the hospital appointed a small committee to select and trial a variety of hoists, taking into consideration both patient and staff requirements.

## CASE STUDY 21

### Product Packaging Identified as a Manual Task Risk

In even the best-designed workplaces and with good knowledge of manual task issues, workers can be in danger of injury by the goods or products they handle or use. Two retailers, who identified problems with some products, recently had 'wins' when suppliers agreed to change their products to better meet the needs of the retailers.

#### Hazard Identification Process Helps Identify Manual Task Problems

A systematic process to identify jobs or tasks that are likely to cause manual task injuries in large organisations include:

Recording and monitoring injuries and near misses

Seeking employee's feedback about health and safety issues

Observing people doing their jobs.

Once the tasks are identified, they can be assessed and controlled to eliminate or reduce the risks. Listed below are two cases where systematic hazard identification, risk assessment and control were effective in eliminating manual task injuries.

#### Example 1 – Coles and Smallgoods

##### Employees help identify source of back and arm discomfort

Coles is one company that used the hazard identification process to good effect. Their delicatessen staff was experiencing back and arm discomfort. Delicatessen work requires doing a number of different tasks, so it was important to determine exactly which aspects of their work were contributing to the problems. From discussions with staff, the problem was narrowed down to preparing and slicing various small goods products.

##### Assessing task confirms the cause of back and arm discomfort

A risk assessment confirmed that the weight, shape and repetitive lifting and handling of the small goods caused the back and arm discomfort.

##### The assessment showed that:

- Small goods were supplied in boxes up to 27 kilograms
- The boxes were an awkward shape to comfortably manage
- The small goods were frequently lifted and handled so that staff could slice portions for customers.

## Repackaged small goods reduce complaints of back and arm discomfort

After discussing alternative ways to lift and carry the product, management and staff agreed that the best way to control the problem was to try to alter the size and shape of the small goods' packaging. The aim was to achieve smaller and lighter loads that could be easily lifted and handled by staff.

Coles involved the manufacturer of the small goods in finding a solution. After only a few meetings, the manufacturer agreed to alter the size, shape and weight of the small goods food. The introduction of the new product has reduced the number of reported incidents in the delicatessens. Coles staff report that manual tasks are a lot easier since the change in product packaging.

## Example 2 — Chickadee Chickens and Heavy Gravy

### Employees help identify difficulties with bulk packaged gravy

Chickadee Chickens, with outlets selling takeaway foods in major shopping centres, successfully collaborated with a manufacturer of gravy to change the bulk packaging of gravy.

Chickadee Chickens' staff identified a number of the foodstuffs supplied in bulk that caused manual task problems. The bulk packaged gravy was often difficult to move to the storage shelf, and difficult to use. Bulk foods that can sit in a container on a shelf and have small portions taken by means of a tap or a scoop can be easy to handle but some products are more difficult to access.

Assessing task confirms the risks of lifting and carrying large bags of gravy A risk assessment of the most difficult tasks showed that lifting and carrying large plastic bags of gravy had the most risks. The load was:

- Too heavy for many workers at 25 kilograms
- Awkward, as the bag had no handholds and the contents were unstable
- Difficult to pour out into containers.

### Repackaged gravy easier to manage

Chickadee Chickens consulted the suppliers and manufacturers of the gravy for a solution to the problem. The manufacturers, after several meetings, agreed to repack the gravy.

The gravy is now supplied in small, easier to manage bags and workers at Chickadee Chickens as well as workers in other industries – manufacturing, transport, wholesale and retail – have benefited.

## CASE STUDY 22

### Reorganisation of Stock Assembly Area Eliminates Unsafe Work Practices

Replenishing the stock used to assemble orders at Australian Pharmaceutical Industries Limited (API) is a never-ending process, with obvious risks of back injury.

Forklifts raised pallets of stock to the high-level bays behind the flow racking, and then storemen moved these pallet bays to the flow racks. Semi-bulk stock was also stored on high shelves above the pallet bay. To prevent staff from falling from the rear of the high pallet bay area, a safety bar was fitted across the front of each bay with a safety harness attached. This meant that storemen needed to keep bending under the bar to access stock on the pallets before transferring the stock to the flow racking. The risks in this process include:

- Frequent bending under the bar
- Stretching to reach stock at the back of the pallet
- Lifting while in a stooped posture
- Twisting to work around the restrictions posed by the safety rope.

Back injury statistics, observation of these activities and discussions with the storemen doing the work identified this activity as a serious manual task risk.



Figure 20: The old system



Figure 21: The new system:

Now workers assembling the stock can reach the stock easily

## Consultation With Employees Has Proved To Be Of Great Benefit To API

Good risk management emphasises that consultation with the workers involved is the best way to both identify the risks and provide effective solutions. At API, Chas Sinstead, one of the replenishing storemen, after being trained in manual task risk assessment and control, recommended the following changes to the work system:

- Modification to the storage racking to lower the high shelf down to the level of the safety bar, so that the shelf could take pallets of incoming stock
- Use of existing ladder trolleys and grab poles to draw cartons from the rear of the pallets. The trolley's surface is the same height as the pallet, allowing cartons to be easily transferred from pallet to trolley
- Placing semi-bulk stock, which is accessed infrequently, and not on a pallet, on the floor below the new pallet shelf.

With this new system, the storemen can move the frequently handled stock from the pallets at a comfortable height, while standing on the floor or on the ladder trolley, without use of the safety harness. Storing the infrequently used semi-bulk stock at the front of the lower semi-bulk location also reduced manual task risks.

### The Changes are both Cost Effective and Efficient

Carol Bates, OHS Officer at API, says that the changes greatly decreased the manual tasks risk by reducing the need to bend, twist, reach and lift stock.

The new method also reduced the need for forklift drivers to break pallets down before lifting the contents into storage, further reducing the risk to the drivers. Semi-bulk stock is now more accessible, so workers assembling stock can reach the stock without asking storemen to remove it from the high shelf where it was stored previously.

The modifications to the storage racking cost very little, so the new system is both cost effective and efficient. After trialling the changes in one area, API is now adopting the changes in all similar areas. Chas Sinstead, the employee who recommended the changes, has been nominated for an excellence award in the company's Employee Recognition Award Scheme. Consultation with employees, an essential part of risk management of manual tasks, has proved to be of great benefit to API.

## CASE STUDY 23

### Right Equipment for Wet-Mopping Reduces Manual Task Injuries

Injury statistics show that wet mopping by cleaners is a hazardous activity. One company, Tempo Cleaning Services, is working towards reducing the incidence of back injuries by reviewing the equipment being used and trialing new systems.

#### Three Main Risk Factors Associated With Wet-mopping Identified

A review of accident reports and consultation with cleaners suggests that there are three main risk factors when wet-mopping floors. These are:

1. Lifting and carrying the bucket of water. The variables that may affect the likelihood of a back injury include methods of filling the bucket, type of bucket and the distance carried.
2. Slippery floors. Slippery floors pose a serious risk of slips both before and after mopping. It is not yet clear whether the slips are a result of water spillage, poor choice of footwear, speed, or a combination of factors. Since slips, trips and falls are the second main reason for back injuries across all industries, this needs investigating.
3. Posture and the movements used to mop different areas. Repetitive twisting and bending of the back are known contributing factors to back injuries, and both movements are common when wet mopping, particularly if space is restricted.

#### Tempo Assesses Risks Of Wet-Mopping At Work

Tempo's ongoing risk assessments have confirmed the three main risk factors listed above. The second risk factor (slippery floors) is especially a matter of concern in larger sites where there are many people milling around (e.g. shopping centres). There is always the possibility of someone slipping if safety precautions are neglected.

#### New Equipment Replaces The Old Steel Bucket

Tempo has investigated a number of alternative mop and bucket systems to replace the traditional steel buckets, to use in large sites where there are many people present. The criteria for selection of the bucket system were:

- The weight
- The wringer mechanism used to wring out the mop
- The weight of the mop head and mop handle and the ease with which the two could be separated
- The colour coding for infection control purposes
- The way the mop and bucket system was going to be transported around the site.



Figure 22: Improved mop and bucket system

Tempo looked at a number of different systems, including a variety of foot-operated buckets, quick-release mop heads and lightweight handle systems. The new equipment was trialed at a large retail centre for two months.

A mop and bucket system was selected with the assistance of employees, supervisors and equipment suppliers. The system consists of a transportable bucket with a hand wringer mechanism that supports a wet floor sign and a basket for a dry mop head. The system is guided around the site using a lightweight aluminium handle. This handle is attached to a wet-mop head that can be changed with a dry-mop head for spot cleaning.

All reports show that the system is working well. Staff find it practical, easy to manoeuvre, easier on the back and arms when wringing out the mop and with less risks of slips to both workers and the public.

## CASE STUDY 24

### Redesigned Clothing for Residents Means Less Bending and Twisting for Staff

Dressing and undressing elderly residents causes serious risks for staff. Staff at Baptist Community Services – Waldock Nursing Home (Dementia Specific) successfully trialled clothing that allows easy and quick dressing and undressing of residents.

#### Residents Need Frequent Dressing And Undressing

Nurses dress and undress residents frequently throughout a shift, particularly when assisting with toileting. Residents who are incontinent require a complete change of outfit many times throughout a shift. The staff at Waldock Nursing Home identified this task as a manual task issue.

The assessment of this task showed that:

- Staff maintained awkward postures, such as bending to one side and twisting, for prolonged periods whilst supporting the resident and pulling on a pair of pants
- Weight of the limb being supported was excessive
- Dressing and undressing occurred frequently throughout the shift.

#### New Clothing Designed To Reduce Manual Task Injuries

Some important features of the redesigned clothing include:

- Openings of tops and dresses across the shoulders eliminates the need to lift arms up high
- Back opening for trousers and dresses. This reduces the need to lean over or around residents
- Velcro/press-stud openings for fast opening and closing
- Using capes instead of jumpers and cardigans. This eliminates the need to lift arms.

## Residents And Staff Approve New Clothing

Staff approved the use of these clothing after a successful trial period. Residents, particularly those receiving palliative care, found the new clothing comfortable. The benefits include:

- Less manual handling during dressing and undressing residents
- Less time taken to complete task
- Ability to quickly toilet resident
- Residents more comfortable, suffer less strain
- Less agitation from normally aggressive patients during dressing and undressing
- Greater dignity for residents when being dressed as task is completed quickly
- Fewer skin tears to residents' fragile skin.

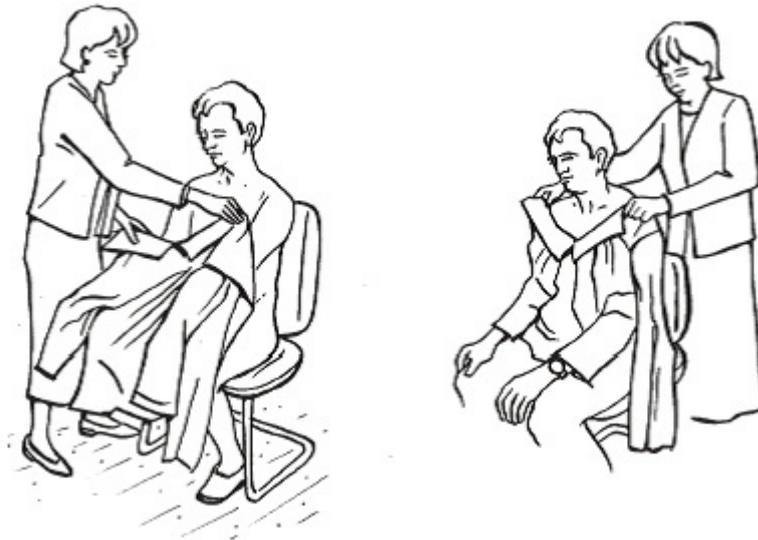


Figure 23: New adjustable clothing – safer for staff and comfortable for residents.

## CASE STUDY 25

### Employee Invents Back-Saving Breadroom Trolley

The ACT manual handling regulation requires employers to consult their employees to identify, assess and control manual handling risks. Employees are closest to the tasks and are able to provide ideas and insights that are valuable in solving problems at work.

Furthermore, effective consultation usually increases employee job satisfaction, is generally cost effective and improves communication and morale within the organisation. An example of effective employee consultation is the invention, design and manufacture of a purpose-built trolley by Joseph Szanto, a bread room hand.

### Lifting And Handling Crates Leads To Back And Knee Strain

Joseph Szanto is responsible for lifting and handling crates of bread ready for loading into the distributor's trucks. A common practice in the industry is to lift and stack crates of bread on two-wheeled trolleys, wheel them to the track then lift and stack the crates on the trucks. After working in the bread room for about 10 years, Joseph was developing back and knee pain. His co-workers were also having difficulty handling the crates.

Old Trolley Had Several Disadvantages

The old trolley had several disadvantages. These were:

- Levering and lowering the trolley, as it was only two-wheeled
- Reaching down to floor level to pick up the lowest crates
- Double handling crates, from the trolleys to the dollies
- Carrying awkward and heavy loads, carrying five crates on the trolley.



Figure 24: Old trolley



Figure 25: Only able to carry 5 crates

## A Safer Alternative Developed

Joseph Szanto was determined to improve the task, and make it easier and safer for everyone. He built a prototype after much thought and redesign. His training and work experience as a fitter helped Joseph build a sophisticated four-wheeled alternative to the traditional two-wheeled trolley.

## New Trolley Is A Success

The prototype successfully underwent trials in the bread room to ensure it addressed the manual task risks. The main features of the new trolley are:

- Four wheels for improved stability
- A special release handle that lowers the crates onto the dollies
- Capacity to carry 10 crates.

Since the first trial of the prototype, more than three years ago, there have been fewer injuries in the bread room. Workers can handle more crates at once, but with less back and knee strain. More than 70 trolleys have been manufactured for use in the bread room, and other bread manufacturers have bought replicas of the now famous (called 'Joe-a-matic') trolley.

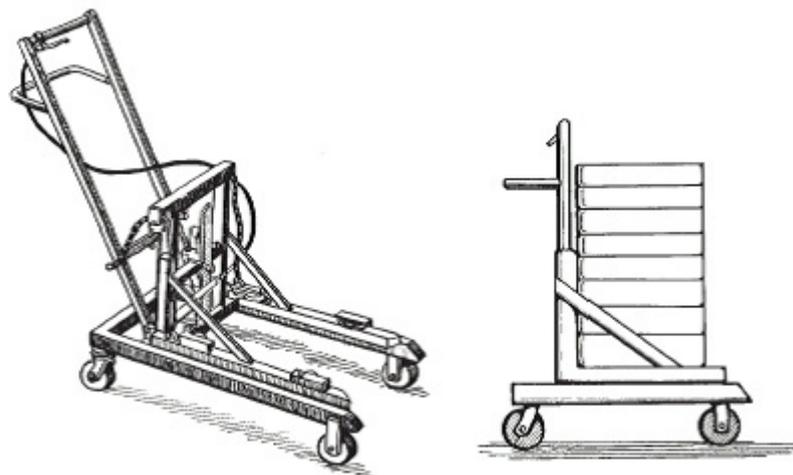


Figure 26: The Joe-a-matic trolley – a safer alternative

## CASE STUDY 26

### Lighter Blocks for Building Reduces Backache

New lighter blocks are now available in the building construction industry. These blocks greatly reduce one of the back injury risk factors in block laying.

#### Blocklayers Suffer From a High Level of Back Injuries

Laying concrete blocks has a high incidence of back injuries, particularly when laying lower course work (below mid-thigh height) and higher course work (above shoulder height). Block layers tend to work in awkward, twisted positions to lay blocks around pipes and other services. They continually bend and twist throughout the day while handling blocks, which are significant loads. The blocks are handled from the delivery pallets to the nearest position to the workplace, and then handled again during the laying of the blocks. A 400 x 250 x 200 millimetre block weighs up to 14.2 kilograms.

A risk assessment showed that repetitive bending and twisting while handling heavy blocks is a high risk for back injuries. The risk increases when laying blocks for the lower courses and while picking up the blocks. A local block laying company in consultation with its employees carried out this risk assessment.

#### Studies Show That Lighter Blocks Are Safer

A recently available alternative walling system, using autoclaved aerated concrete (AAC), seems to reduce a major risk factor associated with block laying. The AAC blocks are approximately a quarter the weight of conventional concrete blocks. Studies show that decreasing the size and the weight of the blocks leads to reductions in the load on the back and the energy required to lay the blocks.

Another benefit of AAC blocks is the use of adhesive glue, which is lighter than the mortar used to lay concrete blocks. Using the adhesive glue reduces the handling of the cement bags and mixing the cement mortar.

Block layers report that the lighter blocks are much easier to use and cause less backache, compared with the conventional blocks.

## CASE STUDY 27

### Special Bins Reduce Manual Handling Tasks Save Storage Space and Time

Transferring goods from the order assembly area in the warehouse to the delivery trucks, and then to their retail outlets was a major manual-handling problem for Repco's central store. Many of the destination retail outlets could not accommodate pallet-loads, and deliveries were often after hours.

This meant that a large number of different sized and shaped loads had to be first packed into the delivery trucks by the storemen and drivers, and then unpacked and carried from the trucks into the retail stores without assistance. This amount of multiple handling of stock was inefficient for the company as well as a major manual task risk for the workers.

#### 'Mobile Pallets' Is The Solution

Repco's Distribution Manager, Graham Hutt, solved the problem by introducing what might be called 'mobile pallets'. Large (1,000 litre) plastic four-wheeled Otto bins were introduced in which all the stock for one store would be loaded. He first negotiated with the manufacturers to modify the bins, so that one side folded down to permit easy access for loading goods into the bin without excessive bending and reaching. Large diameter wheels permitted easy handling of the bins, even when full.

As the Repco delivery trucks were all fitted with tailgate loaders, one person (driver or storeman) could easily wheel the loaded bin onto the truck, then off again at the destination without requiring assistance from pallet handling equipment or other workers.

Awkwardly shaped stock, such as car mufflers, often didn't fit easily on pallets or in boxes. They can now be placed on top of the other stock in the large bins and wheeled along with the rest of the load.



Figure 27: One side of the bin folds down for easy access to the contents

At the destination, the bins are wheeled through the doors, locked if required (the lids permit securing with a lock), and left for the staff to unload the next morning. The empty bin from the previous delivery is collected and returned to Repco's central store for re-use.

A bonus for the company and the workers is that the re-useable bins minimise the need for, and wastage of, materials such as cardboard boxes and plastic stretch wrapping, and the extra manual work involved in using these.

A thorough, regular maintenance schedule for the bins is an important part of Repco's risk prevention program, to ensure that no additional manual task risk is introduced by faulty equipment. This includes feedback from the bin users and regular inspections of the casing and wheels so that no excessive force is required to handle the bins.

## CASE STUDY 28

### Truck Modification Solves Jackhammer Problem

For the bitumen-patching crew at Randwick Municipal Council, retrieving and storing a jackhammer on their truck had the potential to cause back injury. Fortunately, no one had been injured so far, but the potential for injury was obvious. The bitumen-patching crew's determination to solve the problem – combined with appropriate manual task training – resulted in safer retrieval and storage of the jackhammer.

#### Awkward Position Adopted To Lift Jackhammer

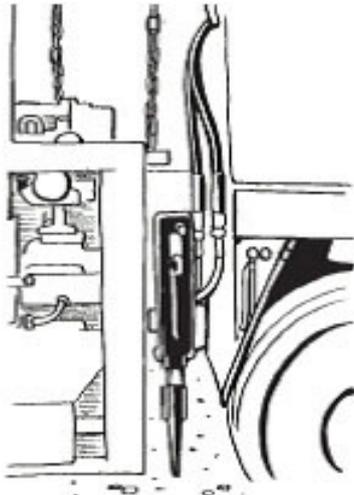


Figure 33: Jackhammer in hard to reach position



Figure 34: New position allows jackhammer to be lifted without straining

The bitumen-patching crew use trucks to carry all their tools, materials and equipment for bitumen patching. The jackhammer was hung on a bracket on the chassis in a narrow gap between the back wheel and a frame that carries a vibrating roller. This narrow gap made it difficult to get close to the jackhammer, which weighs 36 kg. The only way the crew could lift the jackhammer onto a bracket, was with a jerky action with the back bent sideways.

#### Sliding In A Steel Tube Instead Of Hanging On Hooks

At a manual-task training workshop, the bitumen-patching crew was shown how to identify and assess some of the potential causes of back injury at their work.

The first manual-handling problem identified by the crew was the location of the jackhammer on their truck. This problem had concerned them for a long time. Together with their supervisor and the truck maintenance workshop, the crew came up with a simple and economical solution.

Instead of hanging the jackhammer on a hook, they now slide it sideways into a large steel tube, which is angled up a little from a horizontal position. The position of the tube allows the jackhammer to be held against the body at about waist height while it slides in or out.

The modification (called the 'rocket launcher' by the crew) has been an instant success and has been copied on a second bitumen truck.

## CASE STUDY 29

### Lifting Gully Grates Sydney City Council Finds a Better Way

Lifting gully grates and drain covers is a manual task problem for councils everywhere. Gully grates have to be lifted regularly to clean out the drainage pits at the roadside with an adductor truck. The Council of the City of Sydney staff conducted a risk assessment, consulted workers and trialled some ideas before finding a solution where there was no need for manual effort.

#### Manually Lifting Gully Grates Causes Injuries

The Council of the City of Sydney workers manually lifted gully grates, weighing 52 kilograms, using levers and hooks. The practice was responsible for a number of back injuries, hernias and crushed fingers. Some of these injuries were serious and resulted in a lot of time off work.

#### Risk Assessment, Consultation and Trialling Leads to a Satisfactory Solution

The Council conducted a manual task risk assessment and consulted workers about possible solutions. Mechanical lifting was attempted initially with a cable attached to the boom arm that lifts the pipe on the adductor truck. This was not successful because of the limited lifting power of the boom, and the awkwardness of working around the adductor pipe. In addition, there were problems with the cable slipping on the bars of the grate, requiring manual effort to keep the grate steady while lifting and lowering.

After this trial, and with further consultation, it was decided to add a crane with an electric winch at the back of the adductor trucks and design a lifting bar that clamps onto the grate. The lifting bar, developed by Council's Equipment Management Unit, locks quickly and securely onto the grate and ensures that the grate stays level. Now there is no manual effort needed and no need for the workers to have their hands near the grate when it comes out.

Lifting bars were made for the Council by John L. Robertson Pty Ltd and have a certified safe working load.

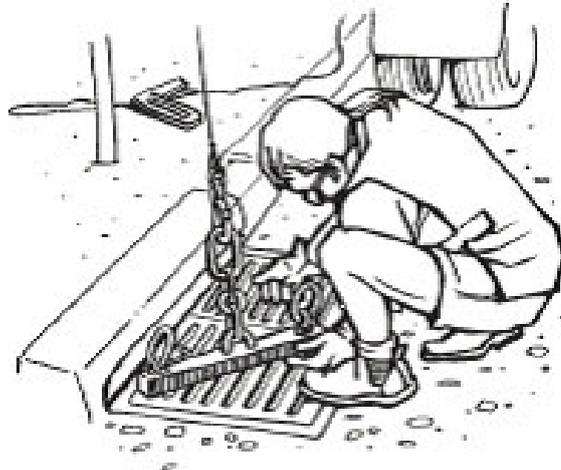


Figure 28: Lifting bar quickly clamps on to grate

The employees, who now use the system, are very happy with the outcome. The results show how a little lateral thinking can find simple and effective solutions to problems that may have plagued an organisation for a long time.

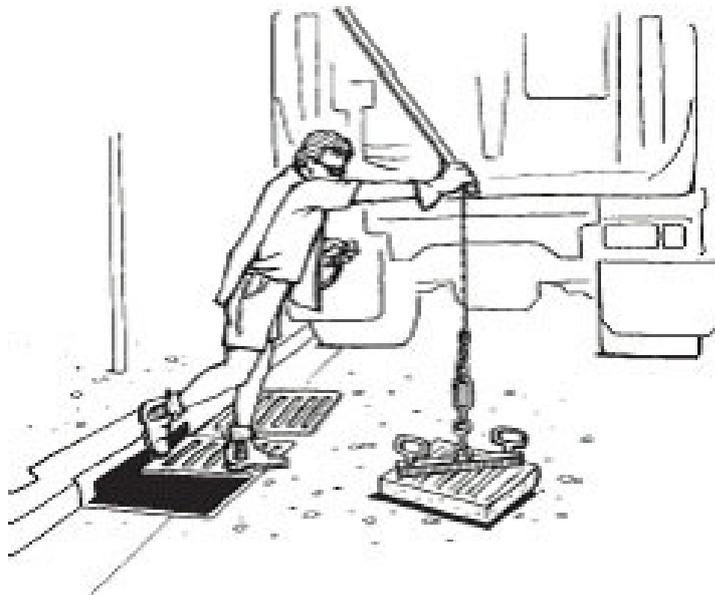


Figure 29: the grate is easily manipulated using the new system

## CASE STUDY 30

### Moveable, Hinged Ladder Provides Safer Access to Truck Trays

Poor access to cargo areas of trucks is a major cause of muscular stresses and strains as well as slips and falls. Often there are no steps on the truck because it is assumed that all loading will be done at a loading dock or by forklift, however, this is not always the case.

Grab handles are not always located where they are needed. They are sometimes slippery and require considerable agility from the driver to swing up onto the truck tray.

In addition, loads are often stacked flush with the edge of the truck tray, leaving insufficient room for the driver to stand on the tray. The driver must climb down, preferring to jump because it's quicker. Jumping from the truck is particularly hazardous for the back as well as the ankles and knees.

#### Bandy Safety Steps: An Access Answer

Ken Dennis of Victoria has designed a moveable, hinged ladder, which can be stored on a rack under the tray or trailer.



Figure 30:

The ladder is known as Bandy Safety Steps. It can be retrieved from storage within seconds, and simply positioned for loading at any of the different locations around the truck.

Because the ladder is relatively small and lightweight (around six kilograms), very little effort is involved in storing and retrieving, setting up for use, or moving from place to place around the truck or trailer.

Steps such as these reduce the risks associated with climbing on and off trucks, often with loads, and doing other tasks around vehicles.

## CASE STUDY 31

### Eliminating Drilling into Concrete Ceilings Reduces Strain

Innovative methods that eliminate the need to drill into concrete ceilings have recently been introduced. One method requires pre-placement of the metal anchors before the cement has been poured. Another method uses extendable tools and improved adhesives to place anchors after the concrete is set. Plumbers, fire sprinkler installers and electrical and communications cable installers find the new methods have many benefits, including less shoulder, neck and arm strain.

#### Tradespeople Face Multiple Hazards When Drilling Into Concrete Ceilings

Plumbers, electricians, fire service installers and data communications installers are just a few of the tradespeople that drill into concrete ceilings to attach fixtures such as hooks for suspended ceilings or brackets to secure water pipes, electricity cables, data and communications cables. These tasks involve drilling numerous holes while coping with the hazards of working with ladders, electricity, dust and noise.

#### The Main Manual Task Risks Are Shoulder, Neck And Back Strain

A risk assessment of the tasks found that prolonged arching backwards of the neck and back, as well as prolonged elevation of the arms when drilling and holding the drill, caused shoulder, neck and back strain. Other risk factors that may result in injury include:

- Power leads from drills underfoot. This is a potential trip hazard.
- Working on ladders. A large number of falls in the building construction industry are associated with working on ladders.

These risks were identified and assessed by a Sydney plumbing company.

#### Two New Methods Reduce Manual Task Risks

Two new methods that replace the need to drill holes into the ceiling were trialled recently. The first method sprays special primer on the ceiling using an extendable primer tool; the fixtures are then placed on the ceiling using an installation tool.

The second method places metal anchors or fall out hooks on the formwork plywood before the concrete is poured. Once the formwork is stripped the anchors and hooks are ready to use immediately.

The manual task risks are reduced by eliminating the need to:

- Arch the back and neck for long periods
- Hold the drill with the arm in an elevated position for long periods
- Work on ladders
- Trail power leads on the ground.

Other benefits include:

- Less time to complete job
- Less noise around the workplace
- Reduced level of dust.

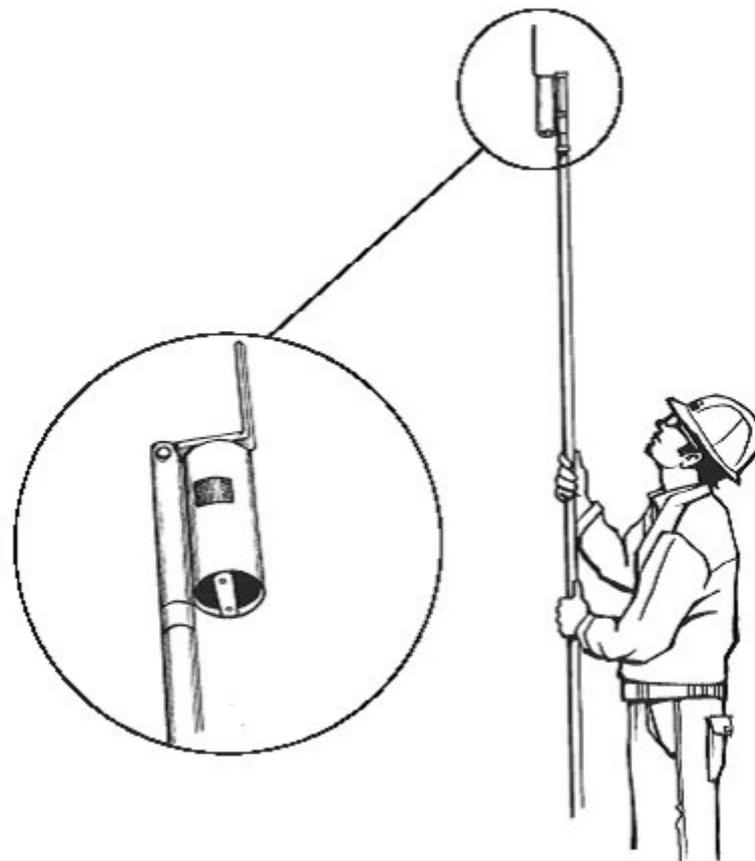


Figure 31: Brackets set before the concrete is poured.

## CASE STUDY 32

### Cashier Workstation Redesign: Risk Management Approach

Poor workstation design can contribute to musculoskeletal problems in workers.

Workstations can impose debilitating stress and strain on workers' posture; just as very heavy physical work can lead to back and arm injuries. It is the cumulative effect of these postures that is the problem. For example, workstations that are not at the correct height for workers:

- Can cause forward bending while stooping and straining the back, if too low
- Can cause workers to lift their shoulders and arms and in the process strain the arms, if too high.

If workstations are too small or too large, other problems can arise.

### Cashier Workstations Can Cause Back And Overuse Injuries

Cashier workstations in the retail industry are just one example of a workstation where the lack of height adjustment can cause problems. Workers compensation statistics, observing cashiers in action and discussing the task with workers suggest that working at a cashier workstation can contribute to musculoskeletal injury in some people.

The main injuries are:

- Back injuries – because of bending, reaching for products and lifting bags
- Occupational overuse of injuries in the arms and shoulders – because of repetitive handling of products, often with shoulders elevated if the workstation is too high, or with arms reaching if the workstation is too large.

### Common Risk Factors Identified By Different Retailers

Detailed assessments by different organisations show the following risk factors:

- Actions and movements – there may be twisting and bending to the side to pick up products
- Workstation layout – some designs encourage reaching to the side to access bags
- Working posture – if the station is low for the cashier, the cashier will need to lean forward
- Location of loads and distances moved – varying demands, ranging from the cashier lifting items to or from a trolley to having a conveyor system bring in the product.

Any cashier workstation identified as contributing to any type of manual task injury must be individually assessed. Individual assessment is necessary to compensate for the store's unique design and the different skills and requirements of individual cashiers.

Other risk factors to consider during risk assessment are:

- Weight and forces – some single products are heavy, and bags can be overfilled making them too heavy
- Characteristics of loads – there may be slippery loads (frozen foods), bulky loads (bags of dried dog food), and awkward loads (pot plants)
- Work organisation – depending on staffing arrangements, there can be long queues of customers placing stress on the cashier
- Work environment – limited or cluttered floor space can restrict ease of movement
- Duration – some cashiers work for hours without an opportunity to change position or have a break
- Skills and experience – some work methods may be unsafe unless the cashier has good training and supervision. Additionally, some of the physical demands of the task may be beyond the capacity of the worker
- Age – some younger workers may not have the maturity or the strength to manage aspects of the task
- Clothing – tight clothing that restricts crouching and stepping. High heeled or slippery footwear can create problems when manually handling items
- Special needs – when assessing any workstation, it is important to take into account any special issues regarding the worker at the station. Do they have injuries? Are they in good physical condition to do manual work?

## Major Supermarket Reviews, Designs and Trials New Workstation



Figure 32:

The designs for cashier workstations, have gradually improved over the years. Design considerations have taken account of the layout and the positioning of the hardware such as registers, scanners, scales, bag units and trolleys. Because retailers sell a variety of products and their customer and staff requirements also vary, there will not be one perfect workstation for every business. However, a number of features should be considered when redesigning cashier workstations.

This company has taken active steps to review, redesign and trial their cashier workstations in an attempt to improve the work conditions for cashiers and customers. The company investigated cashier systems in Australia and overseas, conducted ergonomic assessments of the existing models, and consulted managers and workers. As a result of this process a range of risk control options are being investigated. Design options are being trialled in stores to find how well they fit the requirements of the task, and the cashiers.

Some of the features being trialled include:

- Wrap-around style workstation to reduce the need for the operator to reach beyond a comfortable range
- Conveyor guide to bring products closer to the scanning area
- Multidirectional scanner to reduce the need to manipulate products to locate the barcode
- Weighing scale incorporated into scanner to eliminate the need for repeated turning and reaching to the register unit
- Bag-packing unit next to the scanner, so as to place products in the bag immediately after scanning
- Increasing the size of the bag-packing unit to allow packed bags to accumulate while the conveyor is being loaded by the customer. This eliminates the need for cashiers to lift excess bags from the floor or over the top of the bag-packing unit
- Sloping surface on the bag-packing unit allows the bags to slide towards the customer, reducing the need to lift and pass the bag to the customer
- A push button height adjustment of the cashier workstation.

## Risk Management Approach To Solving Manual Task Injuries

Before the trials, staff were trained to use the new workstation (instruction was provided for staff to find the best work surface height for themselves). Ideally, the cashier workstation (the scanner and conveyor) should be positioned about 5–15 centimetres below the worker's bent elbow. This may vary depending on the size of objects being handled.

This position stops shorter workers from hitching their shoulders up to reach the products and taller workers are not forced to bend down to work.

Consulting cashiers, customers and the store managers during the trial period is an important part of the review process. The design adjustment provides the important benefit of making workstations fit the worker, rather than trying to make the worker fit the workstation.

Additionally, cashiers do not need to lift and pass bags to customers. This case study is a good example of the risk management approach to reducing manual task injuries at work. Through this system of hazard identification, risk assessment and the development and trialling of controls, the supermarket has demonstrated understanding of the risk management approach and is aiming for continual improvement in its operations.

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