FERRO-METAL PROCESSING CAN BE HAZARDOUS TO YOUR HEALTH

Ferro-metals (or Ferro-alloys) are used in making steel, to add different characteristics to the steel. The ferro-metals are often in the form of rocks. The ferro-metals are produced by heating the ore of the needed additive with iron ore. This ferro-metal is then taken to a steel works, where it is used in the furnaces.

There are a number of different ferro-metals, for example:

* Ferro-chrome
* Ferro-manganese
* Ferro-nickel
* Ferro-niobium
* Ferro-selenium
* Ferro-silicon
* Ferro-silicon zircon
* Ferro-vanadium

What are the health problems with Ferro-metals ?

The ferro-metals are used and produced in industries where there are general physical hazards, such as heat, noise, dust, dangerous machines, glare and vibration. These kinds of hazards are often found in all heavy industries.

But the Ferro-metals cause extra problems, because of the additive, for example Chrome in Ferro-chrome, Manganese in Ferro-manganese. The table below shows the hazards of the different types of Ferro-metal.

Ferro-metal	Danger	Effect
Ferro-manganese	Manganese	Headaches, nervous problems, asthma
Ferro-nickel	Nickel	Skin disease, eye problems, asthma
Ferro-silicon	Silicon	Silicosis

+ water phosphine and arsine produces toxic gases, caused when water reacts with ferro-silicon

Ferro-selenium	Selenium	Poisoning
Ferro-vanadium	Vanadium	Cough, bronchitis, pneumonia, green tongue, blue urine
Ferro-chrome	Physical dangers like heat, dust	

How can problems of Ferro-metals be avoided?

The Ferro-metals often get into the body in dust form through the lungs. Many of the problems with the Ferro-metals can be avoide if dust is controlled in the factory. A good dust control system would have the following points:

* good ventilation, especially extraction where powders are used

* enclosing the mixing and baking processes

* powders kept moist wherever possible

* powders to be kept in closed containers wherever possible

* keep dusty work to one side of plant

* regular maintenance on ventilation system

* free work clothes, goggles, boots and respirators (where necessary)

* washing facilities at the work station and at change houses

* regular medical checks for workers, including X-rays and lung function tests. The medical tests should be provided free of charge. Workers should make sure that they see the results of their medical tests. There are other special precautions that should be taken to prevent problems caused by the Ferro-metals themselves. Ferro-silicon should never be wet, even for dust control purposes. Wetting of ferro-silicon causes Arsine & Phosgine, two very toxic chemicals. Ferro-manganese and ferro-zircon can cause fire hazards, so extra care should to be taken to remove sources of flame and sparks from the areas where they are used.

Another problem with ferro-metals is that not much is known about the combined effects of several ferro-metals. Some people think that the more ferro-metals in a workplace, the worse the effects will be. So if you use both Ferro-managnese and Ferro-nickel, you will be much more likely to get asthma than if you just use one of these. This has not yet been scientifically proved.

How can workers protect themselves against the hazards from Ferro-metals ?

Workers will have to look at conditions in their factories. If few of the above dust control measures are used, it is likely that dust levels are high. Better conditions must be negotiated with management. Points to remember include:

* Find out what ferro-metals you work with
* Check that there is no visible dust in the factory
* Ask management for the levels of various types of dust in the plant
* Negotiate that dust levels be reduced in the plant - maximum levels are specified by overseas agencies e.g. NIOSH, HSE etc
* Have independent experts measure the dust levels
* Make good use of the hygiene facilities provided

Issued by the Technical Advice Group

FOUNDRY WORK

In a foundry, castings are made by melting metal and moulding it into different shapes. Foundry work is very dangerous and workers get killed and injured in foundries more than in most other industries.

COMMON HAZARDS :

1. **Sand dust** from the mold and core sand is the most common problem in foundries. Other hazardous dusts like asbestos and talc are often present too. The dangers and preventative measures for dust are explained in the pamphlet on dust.

2. **Metal fumes** are tiny particles of metal suspended in the air. In foundries these fumes are produced mainly around melting, pouring and welding operations. Breathing in these fumes can cause metal fume fever. This is a sickness which feels like a cold, with high temperature, shivering, weakness and vomiting. This often happens to new workers in the foundry. Different metal fumes have other different effects. Some cause immediate lung disese (like water on the lung or asthma) or lung diseases develop over a long time (like scarring of the lung or cancer). Fumes can also cause skin disease and sores.

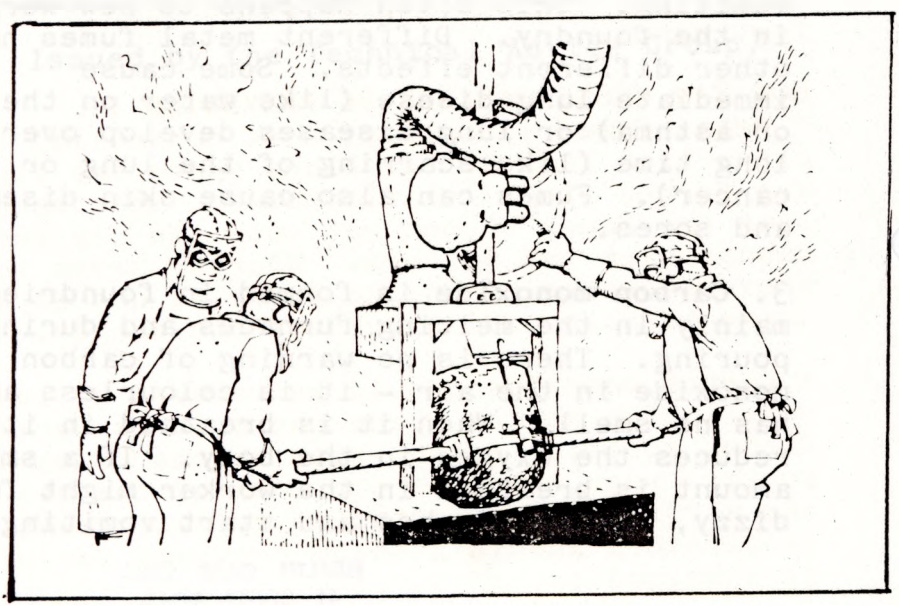
3. **Carbon monoxide** is formed in foundries mainly in the melting furnaces and during pouring. There is no warning of carbon monoxide in the air - it is colourless and has no smell. When it is breathed in it reduces the oxygen in the body. If a small amount is breathed in the worker might feel dizzy, have headaches and start vomiting.

Large amounts of carbon monoxide will cause the worker to faint and sometimes to die. The only way to know how much of this gas there is in the air, it to regularly take air measurements using a special instrument.

4. **Chemicals** are used in making molds. There are many different kinds which are dangerous in different ways. See the pamphlet on chemicals for moire details.

5. **Noise** is a great hazard in foundries. The noisiest places are the shakeout and cleaning rooms and where molding and coremaking take place. The pamphlet on noise describes these hazards and preventative measures in detail.

6. **Heat** is a major foundry hazard. Foundry workers are often exposed to high temperatures at the shakeout, furnace and pouring areas. The pamphlet on heat deals with this.



7. **Radiation** is light that we cannot see. It is given off from the hot metal during melting, pouring and welding operations. It can severely damage unprotected skin and eyes. The damage to the skin ranges from burns to bad blisters. It causes inflammation of the eyes and can cause vision to become clouded or make the eyes feel sandy and scratchy.

8. **Back Problems** are often experienced by workers who lift and carry heavy materials. Back injuries are the most common reported injuries in foundries. Back strain results from incorrect lifting and carrying methods or carrying too heavy a load.

9. **Explosions and Burns** : molten metal can easily explode when it comes into contact with water or cold surfaces. The molten metal then shoots out onto workers and causes severe burns. This is very common during pouring operations which causes many foot burns.

HOW CAN THESE HAZARDS BE PREVENTED ?

* **Metal fumes** are always best controlled by extraction fans at the place where the fumes are formed (local ventilation). This means that the fumes do not get into the air and cannot harm the workers. Wearing masks to prevent breathing in the fumes is not as good as ventilation which removes the danger.

* **Carbon monoxide** should be removed by local ventilation at the place where it is formed. Carbon monoxide metres with alarms to warn workers when there is too much of the gas in the air should be installed by management. Respirators should also be provided for use in emergencies.

* **Radiation** hazards should be prevented by using face shields (particularly for welding) as well as gloves and protective clothing. Curtains or screens around operations causing radiation protect other workers in the area who have no protective clothing.

* **Back problems** can be prevented by using correct lifting procedures and by not lifting or carrying more than you can comfortably handle. When lifting a weight :
1. keep your back straight
2. bend your knees when picking it up
3. lift the load with a straight back
4. straighten up slowly.

Management should provide trolleys to transport heavy loads.

* **Explosions and burns** : management must provide protective aprons, gloves, boots with coverings (spats) and these should be worn where there is a danger of hot metal flying about. Goggles or visors must be supplied to protect the eyes.

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WHAT IS ASBESTOS ?

Asbestos is a mineral rock that comes from the earth, like gold or coal. A lot of it is mined in South Africa, in the Northern cape and the North Eastern Transvaal.

There are three main types of asbestos : white (chrysotile), blue (crocidolite) and brown (amosite).

Most asbestos is used to make asbestos cement. The cement is then used for pipes, roofs, sheets, gutters, and for insulation.

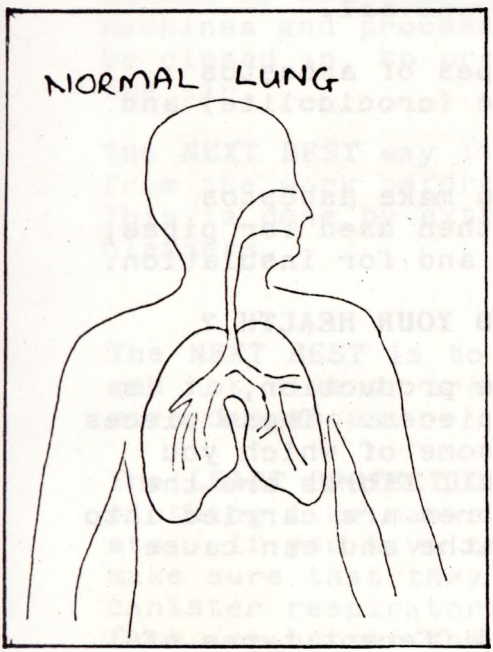
WHAT DOES ASBESTOS DO TO YOUR HEALTH ?

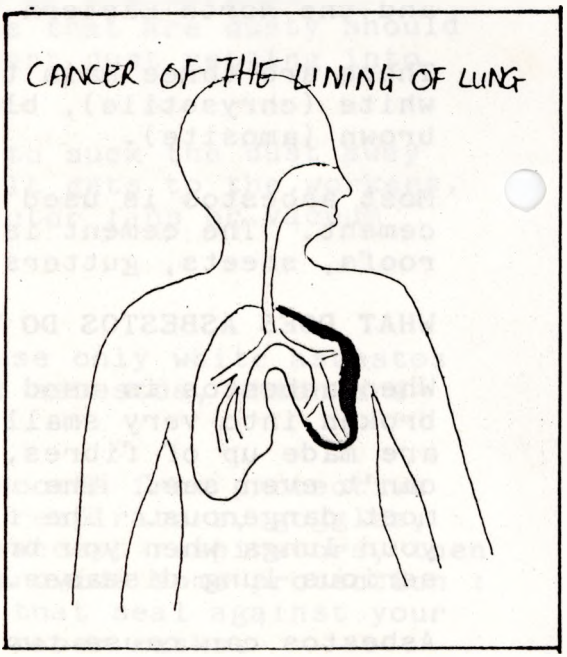
When asbestos is used in production, it is broken into very small pieces. These pieces are made up of fibres, some of which you can't even see. The small fibres are the most dangerous. The fibres are carried into your lungs when you breathe and can cause serious lung diseases.

Asbestos can cause two different types of diseases :

* **asbestosis** : The asbestos fibres are breathed into the lung and get caught in the lung tissue. They cause scars to form around them. The scars reduce the ability of the lungs to expand and contract when breathing. After many years, a person with asbestosis finds it very difficult to breathe. If the scars are very bad, the person can die. Early signs of asbestosis are shortness of breath and a dry cough. But sometimes there are no early signs and it is only when the lungs are badly damaged that the disease becomes obvious.

* **cancer** : Asbestos fibres can also cause cancer of the lungs. There are two differet types of asbestos cancer :
- cancer of the lining of the lung, called mesothelioma
- cancer in the lung itself





ASBESTOS CANCER ALWAYS KILLS ITS VICTIMS

You can get cancer after working with asbestos for only a short time. Some people say that even one day's exposure to asbestos can cause cancer.

All asbestos diseases take between 20 and 40 years to show up. By the time you feel sick, it is too late : your lungs are too badly damaged to so anything about it.

So it is important for asbestos workers to know about the dangers of asbestos and to make sure that they are protected long before they start getting sick.

HOW BAD IS THE PROBLEM ?

There are two ways of finding out how bad the problem of asbestos is in your factory :

1. by measuring how much asbestos dust there is in the factory air

2. by checking the workers' lungs for signs of disease

To measure the air, a worker carries an instrument in his top pocket for a whole shift. This instrument measures how much dust the worker breathes in during the day. Another instrument measures the dust in one place for a short time.

Workers are not safe just because the dust is being measured. Workers are only safe if there is no dust at all. But it is better to have less dust than more dust.

There are different ways of checking the workers for asbestos diseases :

* an X-ray will show the disease in the lungs before the worker starts feeling sick. All asbestos workers should be X-rayed at least once a year.

* a lung function test shows if a worker's lungs are working properly. The worker has to blow into the machine, which measures how well the lungs are working.

Workers should know the results of these medical tests, so that they can make sure that they are treated properly and moved to dust-free areas in the plant.

HOW CAN WORKERS BE PROTECTED AGAINST ASBESTOS ?

The **SAFEST** way is to stop using asbestos. There are other materials that can be used.

The **NEXT BEST** is to make sure that dust cannot be breathed in by the workers. Machines and processes that are dusty should be closed in, to prevent dust getting into the air.

The **NEXT BEST** way is to suck the dust away from the work before it gets to the workers. This is done by extractor fans or vacuum cleaners.

The **NEXT BEST** is to use only white asbestos and not blue or brown asbestos, which are more dangerous.

The **LEAST PROTECTION** comes from protective clothing like masks, respirators, goggles, etc. If you have to accept respirators, then make sure that they provide some protection : canister respirators that seal against your face are better than paper masks.

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VENTILATION - WHAT YOU SHOULD KNOW

Ventilation can be used to make the air in the workplace safe to breathe.

WHAT IS VENTILATION ?

Ventilation means moving the air to change the air conditions in a workplace. This means either removing the bad air, or adding more air to a room. To do this, fans are used. The fan makes the air move through metal pipes (often very big pipes) called ducts. All ventilation systems will have both these pipes and fans.

There are two types of ventilation system i.e. the exhaust and the forced or general system. The main difference between these two is the direction in which they move the air. The forced system blows into a space, while the exhaust system sucks the air out of the space. The two systems have different uses, which are explained below.

WHY IS VENTILATION USED ?

* **Exhaust Ventilation** is used to remove dangerous fumes, dust, sparks or chemicals that are carried in the air. The inlet to the system must be as close to the source of the problem as possible.

This air is sucked away from the worker so that he cannot breathe the bad air into his lungs. This reduces the chance of the worker getting a lung disaese.

Examples of where exhaust ventilation should be used include:

* Welding Operations
* Weighing of Powders
* Grinding metals
* Above furnaces
* In paint shops
* Handling chemicals

* **Forced Ventilation** is used to add more air to a workplace, either to reduce the air temperature or to make more fresh air available for breathing. To cool the air, more air that is cooler is brought into the workplace. If the air outside is cooler, then this is usually used. If a machine (like a fridge) is used to cool the air, then this is called "air conditioning". If fresh air is needed for breathing, this is taken from somewhere outside from the factory where the air is fresher. Examples of where general ventilation should be used are:

* Near Furnaces
* Inside containers
* Near tyre moulds
* In cotton mills

WHAT ARE THE PROBLEMS WITH VENTILATION ?

The problem is that ventilation is expensive, and management is often reluctant to pay for it. So ventilation equipment is often not installed.

Management may tell workers that ventilation isn't necessary. Instead they give the workers milk to drink. Unfortunately many workers believe that this will protect them from dust, but these workers still get lung disease and TB. Sometimes management provides respirators, but these are very uncomfortable and the workers cannot wear them for a whole day. If the workplace is hot, then the workers are forced to adapt to the heat.

So many workers are affected by not having good ventilation in their workplaces. They can get lung diseases, skin rashes and dermatitis, cancer, heart failure, heat stroke or kidney failure if the ventilation in their factory is not good.

HOW CAN WORKERS GET GOOD VENTILATION AT THEIR WORKPLACES ?

* Check in your factories for places that are very dusty, smelly or hot.

* Check to see if there is a ventilation system installed.

* See if this is reducing the fume, dust or heat problem.

* Check to see if it is given regular maintenance.

* Speak to your union representative about the problem.

* Approach management to fix the system, or install one.

* Approach independent experts to make sure the ventilation system is a good one.

* Approach experts to help make recommendations to management.

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Too Hot?

HOT WORK

Many workers in South Africa work under hot conditions. If you work in any of the following places you might be exposed to a lot of heat:

* Mines
* Steelworks
* Plastics Factories
* Rubber Factories
* Bakeries
* Foundries
* Power Stations
* Agriculture
* Chemical Plants
* Food Industry
* Engineering Works
* Car Manufacturing

HOW DOES HEAT AFFECT PEOPLE ?

The human body tries to keep a constant temperature. If it gets too hot, then it starts to sweat. When the sweat evaporates, this removes heat from the body. If it gets cold, then the body begins to shiver. This makes more energy to keep it warm. These ways of keeping the body's temperature constant usually work quite well.

For industrial workers, heat in factories or mines can be a serious problem. Most industrial workers are not constantly exposed to hot conditions, so that their bodies never adapt to the heat properly. Sometimes the body's cooling system can go wrong. This can happen if the air is already humid and has a lot of water in it. Then the sweat cannot evaporate into the air easily, so the body cannot cool down properly. If people cannot replace the water they loose by sweating, they could get sick.

When workers are exposed to a lot of heat the first thing that happens is they get tired easily, and find it hard to think properly. Their hands and feet get sweaty, which makes it easier for things to slip, possibly causing accidents. These problems can be avoided if workers are allowed rest breaks.

If they have to stay on in the hot area, then things can get worse. They can get heat rashes, heat exhaustion, heat stroke or even fall unconscious. This can cause permanent damage to the body, so the worker should see a doctor as soon as possible, if any of these things happen to them.

HOW CAN HOT WORKPLACES BE MADE SAFER?

* The management should have temperatures in the factory measured regularly.

* The management should tell the workers or their union what the temperatures are.

* The management should try to reduce the heat in hot parts of the factory This can be done by:
    * improving the ventilation
    * using air conditioning
    * changing the work process or procedure

* Management should provide as much cold drinking water as workers need. This should be freely available to any worker at any time.

* Workers should be allowed to take rest breaks according to the following chart. (The numbers are the temperatures in degrees Centigrade 'C).

Rest Time	Light work	Medium work	Heavy work
Continous work	30'	27'	25'
25% Rest	31'	28'	26'
50% Rest	32'	29.5'	28'
75% Rest	33'	31'	30'

For example: If a worker is working with a shovel (heavy work) and the temperature is 29'(between 28 & 30'), then the worker should be allowed to rest for half of each shift. The resting place should be cool, and water should be provided.

WHAT CAN WORKERS DO ABOUT HOT CONDITIONS ?

* Talk to other workers working in the hot areas, and keep a record of their names and how the heat affects them.

* Inform the union of the problems, and allow the union to negotiate with the management using the information collected in the factory.

* Approach independent experts to help make recommendations about what the workers could demand from management.

* Ask experts to measure the temperatures and check the management figures.

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MACHINERY HAZARDS

Many workers are killed or injured at work every day. In South African factories in 1983, **every single working day**, about 8 workers were killed, 110 workers were badly injured and about 1200 had some injury. Many of these accidents were caused by the machines used in factories.

Why do machines cause accidents ?

Most machines have places where the operators body can get caught in the machine. When some part of the body is caught by the machine, the machine can pull the worker into the machine. Machines are very strong, and often the parts of the body that get caught are badly hurt. These places in the machine are called **nip points.** Nip points are found in the following places:

* Between the blades of a shear

* Between two closely spaced rollers that turn

* Where a belt or chain goes onto a pulley or sprocket, or near conveyor belts

* Where parts of the machine open or shut

* Where the machine has moving arms or links

* Between surfaces that slide against one another

Another problem is that machines are often difficult, tiring or boring to operate. Near the end of the shift, when the workers are tired, it is more likely that the worker will get hurt.

Often management say that this is the workers' own fault. They say the worker was careless. But workers know that accidents happen because workers get so tired. This is often because the machines are made to produce goods as fast as possible. The designer does not often think about how tiring or boring it is for the worker to operate the machine.

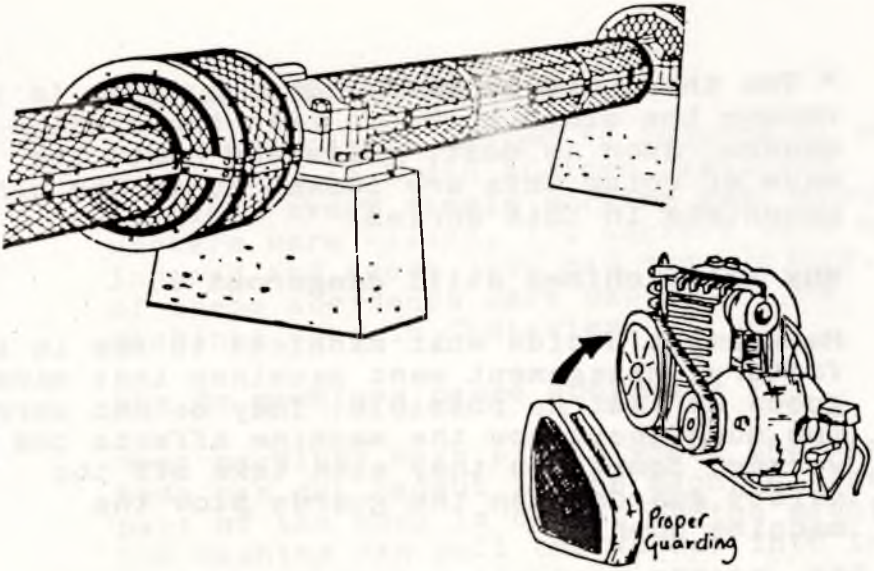
Some machines also create other problems for workers. Machines can be noisy, or make a lo of dust. Some machines shake when they work, or they get very hot. All of these things make the job more difficult for workers. These problems make it easier for accidents to happen.

How can machines be made safer ?

The best way to stop machines from causing accidents is to get machines that are designed to be safe. All the problems that could cause accidents should be removed by the people who make the machines. There are three main ways of removing the problems.

* The first way is **machine guarding.** This means making it machines impossible for the machine to catch the workers' body. There are many different types of machine guarding. Some are better than others.

The best type of machine guarding is called **fixed guarding.** Fixed guards are covers that prevent the workers' body from getting caught in the machine, for example, the cover around a Vee belt. These types of guard are the best because they are always on the machine, and they never need to be changed.



The next best machine guard is the **interlocked guard.** This is when the guard, which can move, has a switch on it. The machine cannot be switched on until the guard is place. The problem with these guards is that they need to be adjusted , so that they always work properly. In many factories, this maintenance is not well done.

* The second way that accidents from machines can be avoided is to make sure that the machines are easy to operate. The machine should :
(1) be the right size for the worker
(2) not need a lot of strength to use
(3) have controls that are easy to understand
(4) have gauges and dials that are easy to understand

In other words, the machine must made with the worker in mind, not simply production. The science of fitting machines to people is called **ergonomics.**

* The third way to make machines safer is to remove the other problems that the machine causes, such as dust, noise and heat. The ways of doing this are looked at in the other pamphlets in this series.

Why are machines still dangerous ?

Management decide what machines to use in the factory. Management want machines that make goods as fast as possible. They do not worry too much about how the machine affects the worker. Sometimes they even take off the safety guards when the guards slow the machine down.

What should workers negotiate to make machines safer ?

* Workers should look at the machines in the factory. They should look for safety guards. They should try to think of ways to guard the machine properly. If the machine has bad guards, or no guards at all, they should negotiate suitable guards for it.
* If workers see safety guards being taken off a machine, they should be able to stop this.
* If the workers hear that new machines are being bought, they should be consulted before the machines are put in.

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THE HAZARDS OF WELDING

Many workers are employed as welders or welders' assistants in S.A. They are probaby aware that their work can affect their health. Many of them have probably had "arc-eye" or other problems because of welding. But many welder have more problems than just "arc-eye".

WHAT ARE THE PROBLEMS WITH WELDING ?

There are many hazards caused by welding. These include:

* very bright light (glare and ultra-violet radiation)
* fumes, dust and gases in the air
* sparks and flying bits of hot metal
* electrical hazards (in arc welding)
* explosive welding gas mixtures (oxy-acetylene welding & flame cutting)

The list below shows what the hazards are for different types of welding.

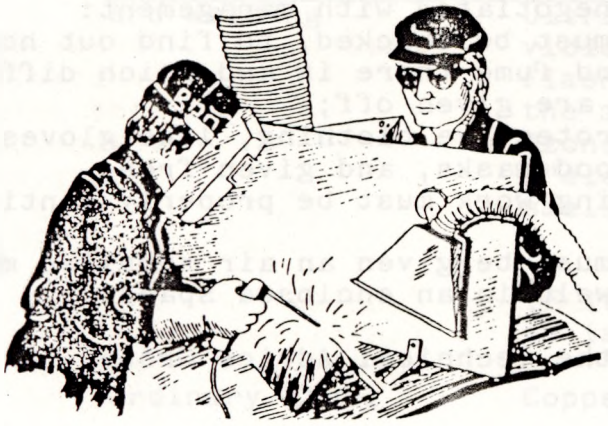
Type of Welding	Hazard	Health Effects
Arc Welding	Ultra-violet arc	Sunburn, skir cancer
	Flash from the arc	Arc-eye
	Ozone ("electric smell)	Irritates eyes, nose, throat, lungs Cause head & chest pains.
	If it can be smelled, it is already dangerous	
Ordinary steel	Copper	Metal fume fever (like 'flu), damage eyes, nose & throat

Type of Welding	Hazard	Health Effects
	Zinc	Metal fume fever, nausea, headaches
	Iron	Lung abnormality : "siderosis"
	Coated rods have fluorides	Lung irritation, chills, fever, eventually kidney damage
Galvanized steel	Zinc	As above
Stainless steel	Chromium	Nose & lung damage, bronchitis, asthma lung cancer
	Nickel	Lung damage, cancer
Painted steel	Lead	Tiredness, irritability, sore joints & stomach. Kidney, blood & nerve damage Sterility.
Brazing & soldering	Cadmium (in silver solder)	Loss of appetite, weakness, vomiting

HOW CAN THE WELDING HAZARDS BE REMOVED ?

Glare: Every welder must have a welding mask. The glass in the mask should be tinted, like sun glasses, to take out the harmful light in the welding flash. Most welders already know this, but they do not realise that there are different types of glass for different types of welding. This is because some kinds of welding cause more ultra-violet light than others.The glare also affects the skin. The welder should wear clothes and gloves that cover all parts of the body.

Glare from nearby welders can also cause problems. This can be avoided if welding screens are placed between welders. The welding screens work best when they are made of dark plastic, not the yellow type that is often used. The dark shields stop the visible flash, not just the U-V light. The shield is shown in the picture.



Welding shields

Extraction pipe

Welding smoke: Any welding smoke that is breathed in will harm the workers' lungs. The best way to prevent this is to remove the smoke as soon as it is formed. This is done by using an extraction pipe right where the welding is going on. This is very important when welding inside a closed space. The extraction pipe can be held in place near the work by using a magnet. This is shown above.

Sparks & flying hot metal: The welder should be given leather gloves that cover the elbows, apron and shoe covers. These should be given free of charge.

Electrical hazard: All the wires on the welding machine must be completely insulated.

Welding gas explosions: Pipes must not leak, cylinders must have automatic valves.

WHAT CAN WORKERS DO TO MAKE WELDING SAFER ?

Through the union, the following things should be negotiated with management:
* The air must be checked, to find out how much gas and fume there is and which different gases are given off;
* Proper protective clothing, like gloves, aprons & good masks, and given free;
* All welding work must be properly ventilated;
* Welders must be given an air supplied mask when they weld in an enclosed space.

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ORGANISING WORK FOR HIGHER PRODUCTIVITY

WORK STUDY	JOB EVALUATION
* study the production process	* evaluate the human resources
* reorganise all aspects of production	* grade these resources
* set up the most productive system	* slot employees into grades and allocate wages

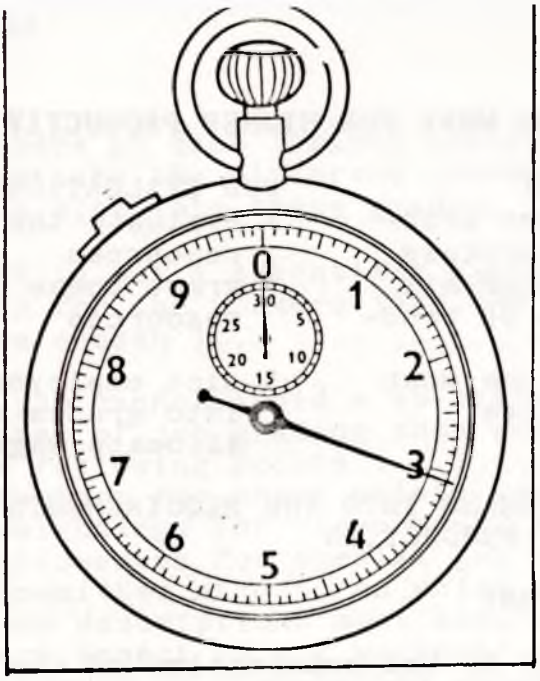
FITTING HUMANS INTO THE REQUIREMENTS OF PRODUCTION

* WORK STUDY

Work study is the examination of the way resources are used in the production process and the reorganisation of production to make it more efficient. It involves :

1. Method Study which looks at the way of working in a particular job. It charts the elements of the job and tries to eliminate idle time. It makes work more intensive.

2. Work Measurement which means working out the time taken by a qualified worker to do a job at a defined rate of working. It goes through the following process :
* the job is broken into elements
* the elements are timed
* the work is rated (the amount of effort put into the job is assessed)
* a standard time is calculated
* the standard time is now the time for the job.



What Can Unions Do ?

* Negotiate no retrenchments or loss of wages
* Negotiate for all relevant information
* Check the aims and feasibility of the work study
* Make sure safety is not compromised
* Check the elements of the job are accurate
* Check all timing and rating
* Check that normal working conditions appl,
* Check that allowances are made for resting, eating, tiredness and working conditions
* Negotiate all work changes

* JOB EVALUTION

Job evaluation ranks jobs in a hierarchy in order to allocate wages. It has 4 basic steps :

1. examine each jobs according to selected factors, like decision-making or education
2. compare jobs on the basis of these factors
3. grade the jobs in a rank order
4. link this order to rates of pay

Four primary job evaluation systems are used in South Africa :

* Paterson : is based on the factor of decision-making
* Peromnes : points are given for 8 factors
* Castellion : points are allocated for 6 factors
* Hay/MSL : has 3 factors and allowances for monotony and physical effort

These systems are based on the following steps

1. choose the factors
2. measure the jobs against the factors and allocate points
3. assess the importance of each factor - the important ones get more points
4. calculate the total points for each job
5. slot the jobs into grades according to the number of points they get.

What Can Unions Do ?

Try not to be drawn into complex systems of wage determination that management can easily manipulate.

Instead, try to ensure that a simple system of grading is used to determine wages. The usual system is a 3-tier system of

* skilled
* semi-skilled
* unskilled

Workers at each factory should be able to negotiate the different grades and which jobs slot into these grades.

This is not a scientific system, but it is fair for the workers involved because they have chosen it.

If you cannot avoid a so-called "scientific" system of job grading then try to negotiate the following points :

* factors for which points are given
* weightings for "important" factors
* allowances for special job characterisitics
* committee structures which do the grading
* job descriptions must accurately describe every aspect of all workers' jobs
* appeals by dissatsfied workers
* wages according to normal wage bargaining

Issued by the Technical Advice Group

DUST

Dust is made up of small particles of various substances carried in the air. Dust is found mainly in :

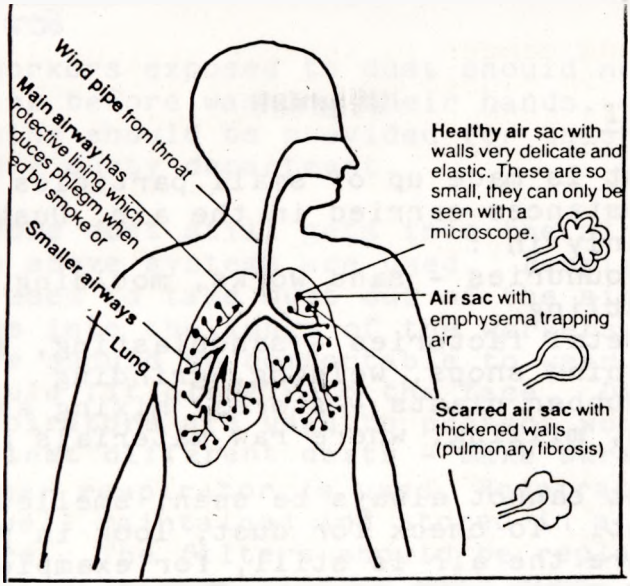
* Foundries - sand works, moulding, shakeout, fettling
* Metal factories - sandblasting, sawing, machine shops, welding, grinding
* Rubber plants - stores, mixing and weighing, milling, where raw materials are handled.

Dust cannot always be seen, smelled or even felt. To check for dust, look in places where the air is still, for example, on window sills. The amount of dust in the air can also be measured with different instruments. Some of these are carried by workers for a whole shift, to measure how much dust the worker is breathing in. Some instruments give quick readings. It is important to know how much dust there is, so that a good way can be found to remove from the factory air.

How does dust affect the body ?

Dust can cause serious health problems, because it goes into our lungs with the air we breathe. But first we must understand how our lungs work.

When we breathe in, our chests expands, and air goes into the body through the nose and mouth. The air is carried through tubes and into the main part of the lung, which looks like a sponge. The spongy part of the lung also expands. Here the clean air mixes with the blood. At the same time, used up air is released from the blood into the spongy tissue and breathed out. When we breathe out, the spongy tissue gets smaller, to get rid of the dirty air.



Industrial dust is the cause of 4 lung diseases. Disease in the lung means that either the tubes, the spongy tissue or both are affected.

1) When workers feel a tightness of the chest and they wheeze (Whistling sound in the chest) they may have a disease called **asthma.** This is when the dust irritates the tubes and makes them get smaller.

2) The fine dust can settle in the lungs. This causes the spongy tissue to become stiffer. These diseases are generally called **Pneumoconioses.** Silica dust causes silicosis and asbestos dust causes asbestosis. This makes it difficult for the lungs to exchange air as easily as before. Shortness of breath when walking fast up a slope is often a sign of this.

3) **Chest infections** such as Tuberculosis (T.B.) are caused by germs getting into the chest. These diseases happen more easily if the lungs are always irritated or damaged by dust. Many workers who work in dusty jobs can also suffer from T.B. and other chest infections.

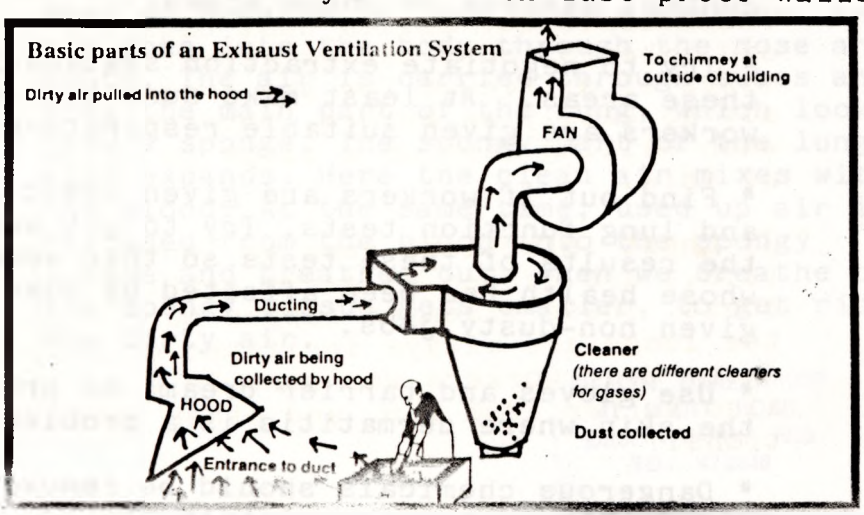
4) **Lung cancer** is another serious disease which is caused by working with some dusts, such as asbestos. Lung cancer is an uncontrollable growth in the tubes or spongy tissue which takes over the normal tissue. This growth is difficult to stop. Cancer can be caused by working with asbestos, cadmium, and many other chemicals. Smoking also causes lung cancer.

Dusts can also cause **dermatitis**, which is irritation of the skin. This damages the skin, sometimes permanently. Some dusts can cause an allergic reaction in some workers. This results in rashes, which are caused by the body trying to defend itself against the dust.

How can dust be controlled?

* The best way to control dust is to remove it where it is formed. This is done by sucking out the dusty air by using extraction pipes. The extracted air should be filtered to prevent people outside the factory from being affected. All machines which produce dust should be fitted with extraction hoods.

* These extractors may not take away all the dust, so it is also important to keep all dusty work on one side of the factory and enclose the dusty work with dust-proof walls



* Workers exposed to dust should not eat or drink before washing their hands. Wash basins should be provided for this purpose in every dusty department.

* Some dust still gets into the air even if the above systems are used. Respirators can be used to take dust out of the air before it goes into the lungs of the workers. Respirators should be comfortable to wear, and should fit closely to the face. Different respirators are used to protect workers against different dusts - make sure the proper respirator is used. Respirators should be well maintained and stored in a clean place. The filters should be replaced whenever it becomes clogged with dust. New filters should be easily available.

* Sometimes workers carry home dangerous chemicals in the dust on their overalls. It is important that the employer provides a laundry service to clean these overalls.

What can workers do about dust?

* Find out the names of the powders and chemicals used in the factory.

* Find out which areas in the factory produce the most dust and whether there are any dust-control systems in these areas.

* Try to negotiate extraction systems for these areas. At least make sure that exposed workers are given suitable respirators.

* Find out if workers are given chest X-rays and lung function tests. Try to get access to the results of these tests so that workers whose health has been affected by dust can be given non-dusty jobs.

* Use gloves and barrier creams to protect the skin where dermatitis is a problem.

* Dangerous chemicals should be removed from use in the factory completely.

CHEMICALS CAN BE DANGEROUS TO YOUR HEALTH

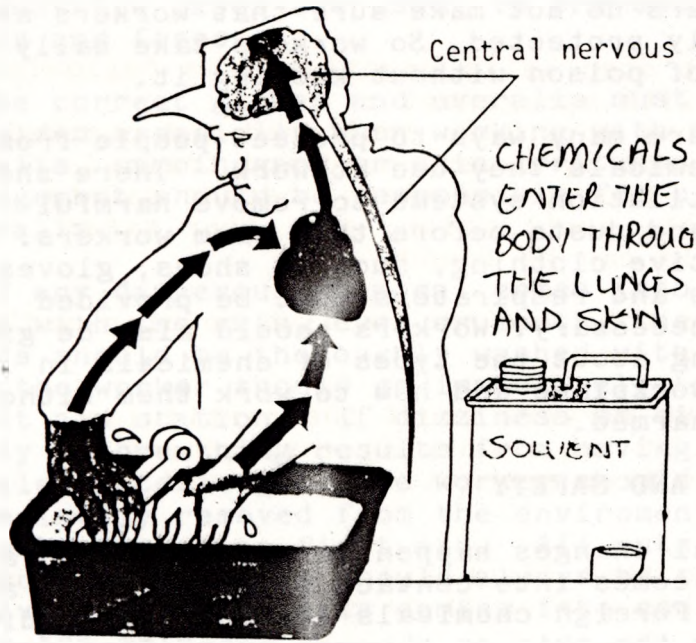
It should be the right of every person who works with chemicals to know what the chemicals they work with are, how dangerous they can be to the body and most important, how to handle them safely. Many chemicals are dangerous, but the danger is often invisible and the effects sometimes only appear years later. Even if the effects are known, many employers do not make sure that workers are properly protected. So workers take daily doses of poison without knowing it.

There are many ways to protect people from the chemicals they use at work. There should be ventilation systems to remove harmful gases and dusts before they harm workers. Protective clothing, such as shoes, gloves, goggles and respirators must be provided where necessary. Workers should also be given training about the types of chemicals in their workplace and how to work them without being harmed.

HEALTH AND SAFETY

Chemical changes happen in the body when a person comes into contact with chemicals at work. Foreign chemicals get into our bodies through the skin or through cuts. They can also enter through the lungs by breathing them in with air. They could also be swallowed, for example where food, which has been contaminated by chemicals, is eaten. These foreign chemicals travel around the body in the blood, and affect the other chemicals in the body.

The effects of different chemicals vary. You may feel nothing and not be harmed in any way. You could experience a short term reaction: for example, ammonia gas irritates the eyes. Or you could have a long-term effect where permanent damage is done to some part of the body, for example lung cancer caused by asbestos only shows up 20 years later. Or there may be instant death, such as when cyanide is swallowed. Some chemicals need little time to produce dangerous results, such as carbon monoxide. Others need exposure over a long period before damage is caused.



WHAT CAN UNIONS DO ?

Little is known about the effects of most chemicals on people. So the best way to protect health is to reduce contact with chemicals. A chemical worker can do this in two ways :

1. the union can negotiate with management to remove the health hazards;
2. if each worker is given training on the hazards of the chemicals in their workplace, they can protect themselves from unnecessary dangers.

Workers should try to collect information about the chemicals used, so they can find out how many are dangerous.

If management will not give a list of chemicals used, you can look on the labels on the chemical containers. Once you have the proper name and chemical formula, you can look up on a list of chemicals to find out it's dangers and how to handle it safely. If the only name on the label is the trade name, you can try writing to the manufacturer to find out what chemicals are in the product, their dangers and the recommended precautions.

The next step is to negotiate the following points with management :

* have the workplace monitored and checked for hazards by experienced and trained people. From these tests, better safety equipment, ventilation, and other safer chemicals can be found.

* ensure that workers receive regular medical checkups

* educate workers about the particular hazards of their working environment, so they can take precautions to avoid the hazards

* ensure that first aid and a qualified person to administer it is available

* the system of work should be designed so that safety is built in and it is impossible for workers to make fatal mistakes

* ensure that the correct equipment to protect workers is given, free of charge

* see that all chemicals are properly labelled, showing content, potential hazards and first aid procedures.

Individual workers should also be taught safe ways of working, such as :

* safety glasses should be worn where any solvent vapour or fume could irritate the eyes

* there should be no drinking or eating in the workplace. Where there are dangerous dusts or chemicals, workers should be allowed to wash and change clothes before eating, and before going home.

* there should be no smoking on the job, particularly where flammable solvents or combustible gases are used, to prevent explosions and fires.

* The correct gloves and overalls must be provided especially when working with acids, alkalis, carcinogens or skin irritants. Management should be responsible for cleaning overalls.

* if any dangerous chemical comes into contact with the skin, eyes or mouth, these areas should be thoroughly washed with water and the worker should go immediately to the first aid station. If dizziness or difficulty in breathing results from having inhaled a toxic gas, the worker should be immediately removed from the enviroment and given appropriate first aid. All cuts should be covered and care should always be taken to avoid any chemicals coming into contact with the skin.

* all volatile substances, dusts, fumes and poisonous gases should be handled with caution. Ventilation should be adequate to remove these hazards. But where these are not adequate or where they are not working properly, workers should wear respirators.

Issued by the Technical Advice Group

WHAT IS NOISE ?

Noise is loud sound. Noise can damage your hearing and seriously affect your life. The intensity (amount) of noise is measured in decibels (dBA). The following table gives you an idea of the intensity of noise:

Level(dBA)	Example of Noise
0	Start of hearing
10	Quiet whisper
20	Very quiet room
40	Quiet office
50	Normal conversation
80	Street traffic
NOISE DAMAGE	STARTS
90	Lathes; Process plant
100	Foundry; Pneumatic drill
110	Woodworking shop
120	Boiler shop
130	Jet engine; Rivetting

Noise is transmitted through the ear. A sudden very loud noise can burst your ear drum. This permanently damages the ear. If you are exposed to a noise which is louder than 80dBA for long periods, you will gradually lose some of your hearing ability. Some people lose more than others. This can become a permanent hearing loss.

NOISE MONITORING

Noise is measured by using a sound level meter. From these measurements you can find all the areas where the noise is greater than 85dBA. It is a legal requirement that all areas where the noise levels are higher than 85dBA must be marked and the workers protected from the noise.

Noise can also be measured by using a small instrument worn by an individual worker for an entire working day. It records the amount of noise he is exposed to during the day.

HEARING SCREENING TESTS

This is done with an audiometer. Workers' hearing is tested individually in a quiet room to see whether it has been affected in any way. The test should be done after the worker has been away form work for at least one shift.These tests are useful in two ways

* Workers with bad hearing loss can be sent to hospital for more hearing tests which are necessary if the worker wants to claim compensation.

* They show in which areas workers are suffering from hearing loss. These workers should either demand that they are moved to quieter jobs or that the workplace be made quieter.

ANALYSIS OF THE RESULTS

The results of the measurements can provide unions with information about :

* whether the noise levels in a factory are too high

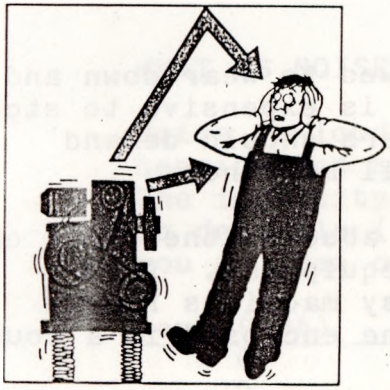
* where these high noise levels are in a factory

* ways to reduce the noise levels

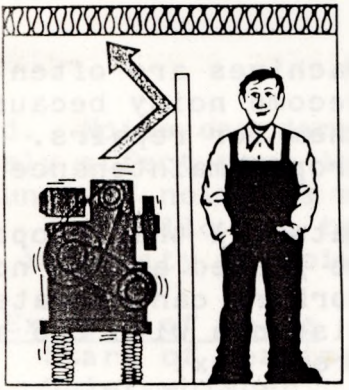
* the workers who should have regular hearing tests to prevent any further hearing loss.

NOISE CONTROL

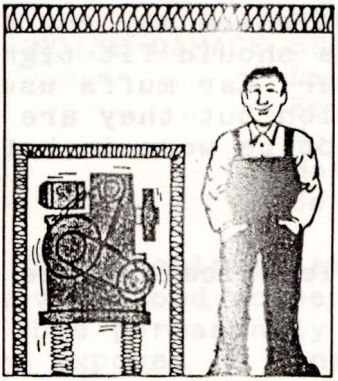
The best way to control noise is at the source. Machines should be designed so that they do not produce a lot of noise. Any new machinery that is introduced should be quiet.



NOISY MACHINE



NOISE SCREEN



ENCLOSE THE MACHINE

However, most factories have old machines which are very noisy. Noise is caused by one piece of metal hitting against another. Some machines can be changed by putting material between pieces of metal or by replacing the metal with plastic. Also if a machine is set on the floor it should be placed on springs or pieces of rubber to reduce the noise. Silencers can be fitted on machinery like ventilation systems and vehicles.

Machines are often allowed to wear down and become noisy because it is expensive to stop them for repairs. Workers should demand proper maintenance of all machinery.

Material that stops and absorbs the noise can be placed around noisy equipment. Also workers can operate noisy machines from a distance with the machine enclosed in a sound-proof box.

If all other measures fail, ear muffs and ea plugs can be worn. However, even good ear plugs and muffs will only reduce the noise level by 20 dBA which may not prevent hearing loss. Earplugs should fit tightly inside the individual's ear. Ear muffs usually provide better protection but they are very uncomfortable and cannot be worn in hot and dusty conditions.

Issued by the Technical Advice Group

Organise for a Safe Factory

Sipho Rakabela lost his hand in an accident at work. He tells his story:

"I operate the metal cutting machine. We are paid an hourly rate and a production bonus. There is a guard on the machine but it makes the work slow. The Induna showed me how to take it off. We stuck some paper into one of the buttons. Then you could operate with one hand and load with the other hand. The same day my hand was caught in the machine. Management blamed me for the accident. When I returned to work I was already sacked. My employer will not do anything for me. He just tells me to wait for my money from WCA. I am endorsed out and I cannot get a job again. I am angry. The job wrecked my life.

YOU CAN ALSO HAVE AN ACCIDENT.

- There are 300,000 accidents at work every year.
- Every year2000 workers are killed in accidents at work.
- Every two hours of the working day, a worker somewhere loses an eye in an accident.
- Every seven and a half minutes, a worker loses a finger in an accident.

WHY DO ACCIDENTS HAPPEN? WORKERS KNOW THAT ACCIDENTS HAPPEN BECAUSE THE JOB IS DANGEROUS.

Management says workers are careless. Workers know the job is dangerous. The worker must be careful but one day he makes a small mistake and gets injured. When he comes back to work after the accident, there is no job for him.

Reasons For Accidents

- Machines are dangerous.
- Production makes the work too fast.
- The work is not organised in a safe way.
- The factory is too dark to see properly. It is too noisy to hear if someone shouts a warning.It is dangerous. A worker can fall over rubbish on the floor and get hurt.

THE WORKERS ARE NOT ALLOWED TO DECIDE HOW THEY WORK

Management controls the work. The bosses decide how work is organised and what machines are bought. They want big profits, so they try to make people work faster. They do not like to spend time and money protecting the health of workers.

WORKERS CAN ORGANISE AGAINST ACCIDENTS

1. Workers can look at their jobs and see what is dangerous. They can discuss it with the union and find ways to make the job safer. They can make demands:

   - A guard on a machine.
   - Better training in safety.
   - The right to change the work if it is dangerous.
   - The factory must be clean.
   - Safety boots, uniforms, face shields.

2. Shop stewards can investigate and record every accident.

   They can demand changes so that the accident does not happen again. Afterwards, they must make sure the changes are made.

3. The Union can negotiate with management about safety. The union should have the right to inspect the factory and take up safety issues with management. They can demand information about safety and machines.

4. The shop stewards can see what the law says about safety. The safety laws are the Regulations of the Factories Act, or the Machinery and Occupational Safety Act. They deal with things like machine guards, conveyor belts and scaffolding. The shop stewards can force management to follow the laws.

WHAT TO DO AFTER AN ACCIDENT

1. Report the Accident to a supervisor on the same day. The employer must send the injured worker to a doctor on the same day unless it is a very small injury. The employer must also report the accident to Workmens Compensation in Pretoria, and send them all the forms.. The union should check whether this is being done.

   Make sure the worker is not blamed for the accident. If the employer was negligent you can claim extra compensation.

2. Union members and shop stewards should try to find out everything about the accident. They need to know what happened. The must look at the machines and the way the work is done. Are the workers trained on the machine? What went wrong? Can the work and the machine be changed to make the work safe? The workers should discuss these things in their meetings. They can take it up with management.

3. Workers can visit the injured worker in hospital and his family at home. Management should pay full wages while the worker is sick. The worker must not lose his job, even if he is crippled.

4. If there is a serious accident or a worker is killed the Labour Department Inspector will hold an Inquiry at the factory within a few weeks. The union must find out about the Inquiry and try to attend. Shop stewards will need help from a union person trained in Health and Safety. People outside the union can advise on laws, safety measures and how the Inquiry works.

The union can organise around health and safety at work. In 1984 the Government will bring in the Machinery and Occupational Safety Act. The Act says management must set up Safety Committees. The employers will appoint workers to these committees. These committees will be like Liaison Committees for safety.

WORKERS NEED TO DECIDE WHAT THEY ARE GOING TO DO ABOUT MANAGEMENT SAFETY COMMITTEES.

ssued by Technical Advice Group and Health Information Centre.